



Rules for the Classification of Ships

Consolidated edition effective from 1 February 2019 including RV-MSDTC-2019-01

Part A Classification and Surveys

RINA
Via Corsica, 12 - 16128 Genova - Italy
Tel. +39 01053851 - Fax: +39 0105351000
E-MAIL info@rina.org - WEB www.rina.org

GENERAL CONDITIONS

Definitions:

"Rules" in these General Conditions means the documents below issued by the Society:

- Rules for the Classification of Ships or other special units;
- Complementary Rules containing the requirements for product, plant, system and other certification or containing the requirements for the assignment of additional class notations;
- Rules for the application of statutory rules, containing the rules to perform the duties delegated by Administrations;
- Guides to carry out particular activities connected with Services;
- Any other technical document, as for example rule variations or interpretations.

"Services" means the activities described in Article 1 below, rendered by the Society upon request made by or on behalf of the Interested Party.

"Society" or "RINA" means RINA Services S.p.A. and/or all the companies in the RINA Group which provide the Services.

"Surveyor" means technical staff acting on behalf of the Society in performing the Services.

"Interested Party" means the party, other than the Society, having an interest in or responsibility for the Ship, product, plant or system subject to classification or certification (such as the owner of the Ship and his representatives, the ship builder, the engine builder or the supplier of parts to be tested) who requests the Services or on whose behalf the Services are requested.

"Owner" means the registered Owner, the ship Owner, the manager or any other party with the responsibility, legally or contractually, to keep the ship seaworthy or in service, having particular regard to the provisions relating to the maintenance of class laid down in Part A, Chapter 2 of the Rules for the Classification of Ships or in the corresponding rules indicated in the specific Rules.

"Administration" means the Government of the State whose flag the Ship is entitled to fly or under whose authority the Ship is authorised to operate in the specific case.

"Ship" means ships, boats, craft and other special units, as for example offshore structures, floating units and underwater craft.

"Client" means the Interested Party and any other party who requires the Services.

Article 1

1.1. - The purpose of the Society is, among others, the classification and certification of ships and the certification of their parts and components.

The Society:

- sets forth and develops Rules;
- publishes the Register of Ships;
- issues certificates, statements and reports based on its survey activities.

1.2. - The Society also takes part in the implementation of national and international rules and standards as delegated by various Governments.

1.3. - The Society carries out technical assistance activities on request and provides special services outside the scope of classification, which are regulated by these general conditions, unless expressly excluded in the particular contract.

Article 2

2.1. - The Rules developed by the Society reflect the level of its technical knowledge at the time they are published. Therefore, the Society, though committed, also through its research and development services, to continuous updating, does not guarantee they meet state-of-the-art science and technology at the time of publication or that they meet the Society's or others' subsequent technical developments.

2.2. - The Interested Party is required to know the Rules on the basis of which the Services are provided. With particular reference to Classification Services, special attention is to be given to the Rules concerning class suspension, withdrawal and reinstatement. In case of doubt or inaccuracy, the Interested Party is to promptly contact the Society for clarification.

The Rules for Classification of Ships are published on the Society's website: www.rina.org.

2.3. - The Society exercises due care and skill:

- in the selection of its Surveyors
- in the performance of its Services, taking into account the level of its technical knowledge at the time the Services are performed.

2.4. - Surveys conducted by the Society include, but are not limited to, visual inspection and non-destructive testing. Unless otherwise required, surveys are conducted through sampling techniques and do not consist of comprehensive verification or monitoring of the Ship or of the items subject to certification. The surveys and checks made by the Society on board ship do not necessarily require the constant and continuous presence of the Sur-

veyor. The Society may also commission laboratory testing, underwater inspection and other checks carried out by and under the responsibility of qualified service suppliers. Survey practices and procedures are selected by the Society based on its experience and knowledge and according to generally accepted technical standards in the sector.

Article 3

3.1. - The class assigned to a Ship, like the reports, statements, certificates or any other document or information issued by the Society, reflects the opinion of the Society concerning compliance, at the time the Service is provided, of the Ship or product subject to certification, with the applicable Rules (given the intended use and within the relevant time frame).

The Society is under no obligation to make statements or provide information about elements or facts which are not part of the specific scope of the Service requested by the Interested Party or on its behalf.

3.2. - No report, statement, notation on a plan, review, Certificate of Classification, document or information issued or given as part of the Services provided by the Society shall have any legal effect or implication other than a representation that, on the basis of the checks made by the Society, the Ship, structure, materials, equipment, machinery or any other item covered by such document or information meet the Rules. Any such document is issued solely for the use of the Society, its committees and clients or other duly authorised bodies and for no other purpose. Therefore, the Society cannot be held liable for any act made or document issued by other parties on the basis of the statements or information given by the Society. The validity, application, meaning and interpretation of a Certificate of Classification, or any other document or information issued by the Society in connection with its Services, is governed by the Rules of the Society, which is the sole subject entitled to make such interpretation. Any disagreement on technical matters between the Interested Party and the Surveyor in the carrying out of his functions shall be raised in writing as soon as possible with the Society, which will settle any divergence of opinion or dispute.

3.3. - The classification of a Ship, or the issuance of a certificate or other document connected with classification or certification and in general with the performance of Services by the Society shall have the validity conferred upon it by the Rules of the Society at the time of the assignment of class or issuance of the certificate; in no case shall it amount to a statement or warranty of seaworthiness, structural integrity, quality or fitness for a particular purpose or service of any Ship, structure, material, equipment or machinery inspected or tested by the Society.

3.4. - Any document issued by the Society in relation to its activities reflects the condition of the Ship or the subject of certification or other activity at the time of the check.

3.5. - The Rules, surveys and activities performed by the Society, reports, certificates and other documents issued by the Society are in no way intended to replace the duties and responsibilities of other parties such as Governments, designers, ship builders, manufacturers, repairers, suppliers, contractors or sub-contractors, Owners, operators, charterers, underwriters, sellers or intended buyers of a Ship or other product or system surveyed.

These documents and activities do not relieve such parties from any fulfilment, warranty, responsibility, duty or obligation (also of a contractual nature) expressed or implied or in any case incumbent on them, nor do they confer on such parties any right, claim or cause of action against the Society. With particular regard to the duties of the ship Owner, the Services undertaken by the Society do not relieve the Owner of his duty to ensure proper maintenance of the Ship and ensure seaworthiness at all times. Likewise, the Rules, surveys performed, reports, certificates and other documents issued by the Society are intended neither to guarantee the buyers of the Ship, its components or any other surveyed or certified item, nor to relieve the seller of the duties arising out of the law or the contract, regarding the quality, commercial value or characteristics of the item which is the subject of transaction.

In no case, therefore, shall the Society assume the obligations incumbent upon the above-mentioned parties, even when it is consulted in connection with matters not covered by its Rules or other documents.

In consideration of the above, the Interested Party undertakes to relieve and hold harmless the Society from any third party claim, as well as from any liability in relation to the latter concerning the Services rendered.

Insofar as they are not expressly provided for in these General Conditions, the duties and responsibilities of the Owner and Interested Parties with respect to the services rendered by the Society are described in the Rules applicable to the specific Service rendered.

Article 4

4.1. – Any request for the Society's Services shall be submitted in writing and signed by or on behalf of the Interested Party. Such a request will be considered irrevocable as soon as received by the Society and shall entail acceptance by the applicant of all relevant requirements of the Rules, including these General Conditions. Upon acceptance of the written request by the Society, a contract between the Society and the Interested Party is entered into, which is regulated by the present General Conditions.

4.2. – In consideration of the Services rendered by the Society, the Interested Party and the person requesting the service shall be jointly liable for the payment of the relevant fees, even if the service is not concluded for any cause not pertaining to the Society. In the latter case, the Society shall not be held liable for non-fulfilment or partial fulfilment of the Services requested. In the event of late payment, interest at the legal current rate increased by 2% may be demanded.

4.3. – The contract for the classification of a Ship or for other Services may be terminated and any certificates revoked at the request of one of the parties, subject to at least 30 days' notice to be given in writing. Failure to pay, even in part, the fees due for Services carried out by the Society will entitle the Society to immediately terminate the contract and suspend the Services.

The Society may withhold, suspend or withdraw any certificate, report or service in the event of non-payment of fees due to any member of the RINA Group by the Client in relation to the entire business relationship between any member of the RINA Group and the Client or by any other companies belonging to the same group as the Client. This also applies when the obligation to pay rests with a builder or with the Ship's previous Owner.

For every termination of the contract, the fees for the activities performed until the time of the termination shall be owed to the Society as well as the expenses incurred in view of activities already programmed; this is without prejudice to the right to compensation due to the Society as a consequence of the termination.

With particular reference to Ship classification and certification, unless decided otherwise by the Society, termination of the contract implies that the assignment of class to a Ship is withheld or, if already assigned, that it is suspended or withdrawn; any statutory certificates issued by the Society will be withdrawn in those cases where provided for by agreements between the Society and the flag State.

Article 5

5.1. – In providing the Services, as well as other correlated information or advice, the Society, its Surveyors, servants or agents operate with due diligence for the proper execution of the activity. However, considering the nature of the activities performed (see art. 2.4), it is not possible to guarantee absolute accuracy, correctness and completeness of any information or advice supplied. Express and implied warranties are specifically disclaimed.

Therefore, except as provided for in paragraph 5.2 below, and also in the case of activities carried out by delegation of Governments, neither the Society nor any of its Surveyors will be liable for any loss, damage or expense of whatever nature sustained by any person, in tort or in contract, derived from carrying out the Services.

5.2. – Notwithstanding the provisions in paragraph 5.1 above, should any user of the Society's Services prove that he has suffered a loss or damage due to any negligent act or omission of the Society, its Surveyors, servants or agents, then the Society will pay compensation to such person for his proved loss, up to, but not exceeding, five times the amount of the fees charged for the specific services, information or opinions from which the loss or damage derives or, if no fee has been charged, a maximum of one hundred thousand Euro. Where the fees charged are related to a number of Services, the amount of the fees will be apportioned for the purpose of the calculation of the maximum compensation, by reference to the estimated time involved in the performance of the Service from which the damage or loss derives. Any liability for indirect or consequential loss, damage or expense is specifically excluded. In any case, irrespective of the amount of the fees charged, the maximum damages payable by the Society will not be more than 1 million Euro. Payment of compensation under this paragraph will not entail any admission of responsibility and/or liability by the Society and will be made without prejudice to the disclaimer clause contained in paragraph 5.1 above.

5.3. – Any claim for loss or damage of whatever nature by virtue of the provisions set forth herein shall be made to the Society in writing, within the shorter of the following periods: THREE MONTHS from the date on which the Services were performed or THREE MONTHS from the date on which the damage was discovered. Failure to comply with the above deadline will constitute an absolute bar to the pursuit of such a claim against the Society.

Article 6

6.1. – Any dispute arising from or in connection with the Rules or with the Services of the Society, including any issues concerning responsibility, liability or limitations of liability of the Society, will be determined in accordance with Italian Law and settled through arbitration assigned to a board of three arbitrators who will proceed in compliance with the Rules of the Chamber of National and International Arbitration of Milan. Arbitration will take place in Genoa, Italy.

6.2. – However, for disputes concerning non-payment of the fees and/or expenses due to the Society for services, the Society shall have the right to submit any claim to the jurisdiction of the Courts of the place where the registered or operating office of the Interested Party or of the applicant who requested the Service is located.

In the case of actions taken against the Society by a third party before a public Court, the Society shall also have the right to summon the Interested Party or the subject who requested the Service before that Court, in order to be relieved and held harmless according to art. 3.5 above.

Article 7

7.1. – All plans, specifications, documents and information provided by, issued by, or made known to the Society, in connection with the performance of its Services, will be treated as confidential and will not be made available to any other party other than the Owner without authorisation of the Interested Party, except as provided for or required by any applicable international, European or domestic legislation, Charter or other IACS resolutions, or order from a competent authority. Information about the status and validity of class and statutory certificates, including transfers, changes, suspensions, withdrawals of class, recommendations/conditions of class, operating conditions or restrictions issued against classed ships and other related information, as may be required, may be published on the website or released by other means, without the prior consent of the Interested Party.

Information about the status and validity of other certificates and statements may also be published on the website or released by other means, without the prior consent of the Interested Party.

7.2. – Notwithstanding the general duty of confidentiality owed by the Society to its clients in clause 7.1 above, the Society's clients hereby accept that the Society will participate in the IACS Early Warning System which requires each Classification Society to provide other involved Classification Societies with relevant technical information on serious hull structural and engineering systems failures, as defined in the IACS Early Warning System (but not including any drawings relating to the ship which may be the specific property of another party), to enable such useful information to be shared and used to facilitate the proper working of the IACS Early Warning System. The Society will provide its clients with written details of such information sent to the involved Classification Societies.

7.3. – In the event of transfer of class, addition of a second class or withdrawal from a double/dual class, the Interested Party undertakes to provide or to permit the Society to provide the other Classification Society with all building plans and drawings, certificates, documents and information relevant to the classed unit, including its history file, as the other Classification Society may require for the purpose of classification in compliance with the applicable legislation and relative IACS Procedure. It is the Owner's duty to ensure that, whenever required, the consent of the builder is obtained with regard to the provision of plans and drawings to the new Society, either by way of appropriate stipulation in the building contract or by other agreement.

In the event that the ownership of the ship, product or system subject to certification is transferred to a new subject, the latter shall have the right to access all pertinent drawings, specifications, documents or information issued by the Society or which has come to the knowledge of the Society while carrying out its Services, even if related to a period prior to transfer of ownership.

Article 8

8.1. – RINA shall not be obliged to perform any obligation towards the Client (including, without limitation, obligation to (a) perform, deliver, accept, sell, purchase, pay or receive money to, from or through a person or entity, or (b) engage in any other act) if this would be in violation of, inconsistent with or expose RINA to punitive measures under any United Nations resolutions and/or under any laws, regulations, decrees, ordinances, orders, demands, requests, rules or requirements of EU, United Kingdom, and/or United States of America and which relate to foreign trade controls, export controls, embargoes or international boycotts (applying, without limitation, to the financing, payment, insurance, transportation, delivery or storage of product and/or services) hereinafter referred to as "trade sanctions".

Recurring the above circumstances, Rina shall be entitled at its sole and absolute discretion:

I) to immediately suspend payment or performance of the affected obligation until such time as RINA may lawfully fulfill the obligation; and/or

II) to a full disengagement from the affected obligation, in the event that the inability to fulfill the obligation persists until the term provided for the obligation hereunder, provided that where the relevant obligation relates to payments for activities and/or services which have already been delivered, the affected payment obligation shall remain suspended until such time as the payment may be lawfully made; and/or

III) to terminate the contract following which RINA will be relieved of its further contractual obligations, without prejudice to the rights and obligations already accrued in favor of RINA by the date of termination, which shall survive the termination in accordance with this provision.

Article 9

9.1. – Should any part of these General Conditions be declared invalid, this will not affect the validity of the remaining provisions.

9.2. - In the event of doubts concerning the interpretation of these General Conditions, the Italian text will prevail.

Article 10

10.1. – When the Society provides its Services to a consumer - i.e. a natural person who does not act within the scope of his business or professional activity - the following provisions do not apply: art. 3.2. (as far as the Society is solely entitled to the interpretation of the Rules); art. 4.2., (as far as the payment of the fees is also due for services not concluded due to causes not attributable to the Interested Party); art. 5.1. (as far as the exclusion of liability is concerned); art. 5.2.; art. 5.3.; and art. 6.1. (as far as the jurisdiction of a Board of Arbitrators based in Genoa is concerned).

EXPLANATORY NOTE TO PART A

1. Reference edition

The reference edition for Part A is the RINA Rules 2000 edition, which is effective from 1 June 2000 with the exception of Chapters 3 to 5, which are effective from 1 October 2000.

2. Amendments after the reference edition

2.1 RINA Rules 2000 has been completely rewritten and reorganised.

2.2 Except in particular cases, the Rules are updated and published annually.

3. Effective date of the requirements

3.1 All requirements in which new or amended provisions with respect to those contained in the reference edition have been introduced are followed by a date shown in brackets.

The date shown in brackets is the effective date of entry into force of the requirements as amended by the last updating. The effective date of all those requirements not followed by any date shown in brackets is that of the reference edition.

3.2 Item 6 below provides a summary of the technical changes from the preceding edition. In general, this list does not include those items to which only editorial changes have been made not affecting the effective date of the requirements contained therein.

4. Rule Variations and Corrigenda

Until the next edition of the Rules is published, Rule Variations and/or corrigenda, as necessary, will be published on the RINA web site (www.rina.org). Except in particular cases, paper copies of Rule Variations or corrigenda are not issued.

5. Rule subdivision and cross-references

5.1 Rule subdivision

The Rules are subdivided into six parts, from A to F.

Part A: Classification and Surveys

Part B: Hull and Stability

Part C: Machinery, Systems and Fire Protection

Part D: Materials and Welding

Part E: Service Notations

Part F: Additional Class Notations

Each Part consists of:

- Chapters
- Sections and possible Appendices
- Articles
- Sub-articles
- Requirements

Figures (abbr. Fig) and Tables (abbr. Tab) are numbered in ascending order within each Section or Appendix.

5.2 Cross-references

Examples: Pt A, Ch 1, Sec 1, [3.2.1] or Pt A, Ch 1, App 1, [3.2.1]

- Pt A means Part A

The part is indicated when it is different from the part in which the cross-reference appears. Otherwise, it is not indicated.

- Ch 1 means Chapter 1

The Chapter is indicated when it is different from the chapter in which the cross-reference appears. Otherwise, it is not indicated.

- Sec 1 means Section 1 (or App 1 means Appendix 1)

The Section (or Appendix) is indicated when it is different from the Section (or Appendix) in which the cross-reference appears. Otherwise, it is not indicated.

- [3.2.1] refers to requirement 1, within sub-article 2 of article 3.

Cross-references to an entire Part or Chapter are not abbreviated as indicated in the following examples:

- Part A for a cross-reference to Part A
- Part A, Chapter 1 for a cross-reference to Chapter 1 of Part A.

6. Amendments introduced in the edition effective from 1 February 2019

This edition of Part A contains amendments whose effective date is **1 February 2019**.

This edition also includes:

1 - RV-MSDTC-2019-01: Amendments to Part A of the "Rules for the Classification of Ships": in line with IACS Recommendation No. 133, it has been deemed necessary to amend Part A, Chapter 2, Sec 2 and Chapter 3, Sec 6 of the Rules for the Classification of Ships in order to introduce the possibility for an extended dry docking (EDD) scheme, effective from 1/2/2019

The date of entry into force of each new or amended item is shown in brackets after the number of the item concerned.

Part A
Classification and Surveys

Chapters **1 2 3 4 5 6**

Chapter 1	PRINCIPLES OF CLASSIFICATION AND CLASS NOTATIONS
Chapter 2	ASSIGNMENT, MAINTENANCE, SUSPENSION AND WITHDRAWAL OF CLASS
Chapter 3	SCOPE OF SURVEYS (all ships)
Chapter 4	SCOPE OF SURVEYS IN RESPECT OF THE DIFFERENT SERVICES OF SHIPS
Chapter 5	SCOPE OF SURVEYS RELATED TO ADDITIONAL CLASS NOTATIONS
Chapter 6	RETROACTIVE REQUIREMENTS FOR EXISTING SHIPS

CHAPTER 1

PRINCIPLES OF CLASSIFICATION AND CLASS NOTATIONS

Section 1 General Principles of Classification

1	Principles of classification	33
	1.1 Purpose of the Rules	
	1.2 General definitions	
	1.3 Meaning of classification, scope and limits	
	1.4 Request for services	
	1.5 Register of ships	
2	Rules	35
	2.1 Equivalence	
	2.2 Effective date	
	2.3 Novel features	
	2.4 Interpretation	
	2.5 Disagreement and appeal	
3	Duties of the Interested Parties	35
	3.1 International and national regulations	
	3.2 Surveyor's intervention	
	3.3 Operation and maintenance of ships	
	3.4 Flag and Port State Control inspections	
	3.5 Use of measuring equipment and of service suppliers	
	3.6 Spare parts	
	3.7 Use of asbestos	

Section 2 Classification Notations

1	General	38
	1.1 Purpose of the classification notations	
	1.2 Types of notations assigned	
2	Main class symbol	38
	2.1 Main class symbol	
3	Construction marks	38
	3.1 General	
	3.2 List of construction marks	
4	Service notations	39
	4.1 General	
	4.2 Cargo ships	
	4.3 Bulk, ore and combination carriers	
	4.4 Additional service features and corresponding design loading conditions for bulk carriers	
	4.5 Ships carrying liquid cargo in bulk	
	4.6 Ships carrying passengers	
	4.7 Ships for dredging activities	
	4.8 Working ships	
	4.9 Non-propelled and assisted propulsion units, sailing ships	

4.10	Fishing vessels	
4.11	Units intended for the transshipment of dry cargo in bulk	
4.12	Miscellaneous units	
5	Navigation and operating area notations	52
5.1	Navigation notations	
5.2	List of navigation notations	
5.3	Operating area notations	
6	Additional class notations	53
6.1	General	
6.2	System of Trace and Analysis of Records (STAR)	
6.3	Availability of machinery (AVM)	
6.4	Automated machinery systems (AUT)	
6.5	Integrated ship systems (SYS)	
6.6	Monitoring equipment (MON)	
6.7	Comfort on board ships (COMF)	
6.8	Pollution prevention	
6.9	Refrigerating installations	
6.10	Navigation in ice (ICE CLASS)	
6.11	Navigation in ice (POLAR CLASS)	
6.12	WINTERIZATION (temp)	
6.13	Planned maintenance scheme and condition based maintenance (PMS/CBM)	
6.14	Other additional class notations	
7	Other notations	63
7.1		

CHAPTER 2

ASSIGNMENT, MAINTENANCE, SUSPENSION AND WITHDRAWAL OF CLASS

Section 1 Assignment of Class

1	General	69
1.1	Main cases of assignment of class	
2	New building procedure	69
2.1	Ships surveyed by the Society during construction	
2.2	Other cases	
2.3	Documentation	
3	Ships classed after construction	71
3.1	General	
3.2	Transfer to the Society's class of a ship in service classed by another QSCS Classification Society (IACS PR 1A)	
3.3	Transfer to the Society's class of a ship surveyed during construction by another QSCS Classification Society at ship's delivery (IACS PR 1A)	
3.4	Addition of the Society's class to a ship in service classed by another QSCS Classification Society (IACS PR 1B)	
3.5	Addition of the Society's class to a ship surveyed during construction by another QSCS Classification Society at the ship's delivery (IACS PR 1B)	
3.6	Ships in service not classed with a QSCS Society or not classed at all (PR1D)	
4	Date of initial classification	77
4.1	Definitions	
5	Reassignment of class	78
5.1	Ships in service classed by a QSCS Classification Society	
5.2	Ships in service not classed by a QSCS Classification Society	
5.3	Ships in service not classed by a QSCS Classification Society, but previously classified by a QSCS Classification Society	
5.4	Ships no longer in service since class withdrawal by the Society	
5.5	Ships no longer in service since class withdrawal by a QSCS Classification Society or by a non-QSCS Classification Society	
6	Double or dual class procedures	78
6.1	Definitions	
6.2	Procedures	

Section 2 Maintenance of Class

1	General principles of surveys	79
1.1	Survey types	
1.2	Change of periodicity, postponement or advance of surveys	
1.3	Extension of scope of survey	
1.4	General procedure of survey	
1.5	Appointment of another Surveyor	
2	Definitions and procedures related to surveys	80
2.1	General	

2.2	Terminology related to hull survey	
2.3	Procedural requirements for thickness measurements	
2.4	Agreement of firms for in-water survey	
2.5	Conditions for surveys	
2.6	Surveys by use of a Remote Inspection Technique (RIT)	
2.7	Access to structures	
2.8	Equipment for surveys	
2.9	Rescue and emergency response equipment	
2.10	Surveys at sea and anchorage	
2.11	Repairs and maintenance during voyage	
2.12	Prompt and thorough repairs	
2.13	Survey attendance requirements	
2.14	Procedure for imposing and clearing recommendations	
3	Certificate of Classification: issue, validity, endorsement and renewal	90
3.1	Issue of Certificate of Classification	
3.2	Validity of Certificate of Classification, maintenance of class	
3.3	Endorsements of Class	
3.4	Status of surveys and recommendations	
4	Class renewal survey	91
4.1	General principles	
4.2	Normal system	
4.3	Continuous survey system	
4.4	Planned maintenance scheme (PMS/CBM) for machinery	
5	Annual surveys	92
5.1		
6	Intermediate surveys	92
6.1		
7	Bottom survey	92
7.1	General	
7.2	Extended dry docking (EDD) scheme	
8	Shaft survey	94
8.1	General	
8.2	Surveys of Propeller Shafts and Tube Shafts	
8.3	Tailshaft Monitoring System (MON-SHAFT)	
8.4	Other propulsion systems	
9	Boiler survey	99
9.1		
10	Links between anniversary dates and annual surveys, intermediate surveys and class renewal surveys	99
10.1		
11	Occasional surveys	100
11.1	General	
11.2	Damage and repair surveys	
11.3	Port State Control survey	
11.4	Conversions, alterations and repairs	
11.5	Quality System audits	
12	Change of ownership	100
12.1		

13	Lay-up and re-commissioning	101
	13.1 General principles	
14	Possible safety management system failures	101
	14.1	

Section 3 Suspension and Withdrawal of Class

1	General	102
	1.1 Discontinuance of class	
	1.2 Suspension of class	
	1.3 Withdrawal of class	
	1.4 Reassignment of class following class withdrawal	
	1.5 Suspension/withdrawal of additional class notations	

Appendix 1 CMS and PMS: Surveys Carried Out by the Chief Engineer

1	Documentation	105
	1.1	
2	Limits of the interventions	105
	2.1	
3	Procedure for carrying out surveys	105
	3.1 General	
	3.2 Main diesel engines	
	3.3 Auxiliary diesel engines	
	3.4 Reciprocating compressors	
	3.5 Coolers, condensers, heaters	
	3.6 Electrical switchboard	
	3.7 a.c. and d.c. generators	
	3.8 Other items (pumps, electric motors, etc.)	
4	Records of surveys carried out	106
	4.1	
5	Confirmatory survey	107
	5.1	

Appendix 2 Thickness Measurements: Extent, Determination of Locations and Acceptance Criteria

1	General	108
	1.1 Aim of the Appendix	
	1.2 Scope of the Appendix	
2	Rule requirements for the extent of measurements	108
	2.1 General	
	2.2 Class renewal survey: all ships except those submitted to ESP	
	2.3 Class renewal survey: ships submitted to ESP or equivalent	
3	Number and locations of measurements	110
	3.1 General	

3.2	Locations of points	
4	Acceptance criteria for thickness measurements	110
4.1	General	
4.2	Criteria	
4.3	Local and global strength criteria	
4.4	Buckling strength criterion	
4.5	Pitting	

Appendix 3 Thickness Measurements: Number, Locations and Acceptance Criteria for Ships Built Under the Common Structural Rules

1	General	134
1.1	Field of application	
1.2	Aim of the Appendix	
1.3	Scope of the Appendix	
2	Rule requirements for the extent of measurements	134
2.1	General	
2.2	Class renewal survey: ships submitted to ESP built under CSR	
3	Single skin bulk carriers	135
3.1	Number and locations of measurements	
3.2	Acceptance criteria	
4	Double skin bulk carriers	142
4.1	Number and Locations of measurements	
4.2	Acceptance criteria	
5	Double hull oil tankers	148
5.1	Number and locations of measurements	
5.2	Acceptance criteria	

Appendix 4 Criteria for Longitudinal Strength of the Hull Girder

1	General	154
	1.1	
2	Calculation of transverse sectional areas of deck and bottom flanges of hull girder	154
	2.1	
3	Requirements for transverse section modulus of hull girder	154
	3.1	
4	Calculation criteria of section moduli of midship section of hull girder	154
	4.1	
5	Diminution limit of minimum longitudinal strength of ships in service	155
	5.1	
6	Oil tankers - Sampling method of thickness measurements for longitudinal strength evaluation and repair methods	156
	6.1	Extent of longitudinal strength evaluation
	6.2	Sampling method of thickness measurement
	6.3	Additional measurements where the longitudinal strength is deficient
	6.4	Effective repair methods

CHAPTER 3

SCOPE OF SURVEYS (ALL SHIPS)

Section 1 Survey for New Construction

1	Hull	161
1.1	General	
1.2	Definitions	
1.3	Application	
1.4	Personnel	
1.5	Survey of the hull structure	
1.6	Review of the shipyard	
1.7	Newbuilding survey planning	
1.8	Examination and test plan for newbuilding activities	
1.9	Proof of the consistency of surveys	
1.10	Ship Construction File	
1.11	Shipyard review record	
2	Requirements for Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10	185
2.1	Examination and test plan for newbuilding activities	
2.2	Design Transparency	
2.3	Ship Construction File (SCF)	
3	Machinery and systems	195
3.1	General	
3.2	Definitions	
3.3	Application	
3.4	Personnel	
3.5	Survey of Machinery installations	
3.6	Newbuilding survey planning	
3.7	Examination and test plan for newbuilding activities	
3.8	Proof of the consistency of surveys	
3.9	Inspection and tests of machinery components	

Section 2 Survey for Assignment of Class of a Ship in Service

1	Surveys required by IACS Procedural Requirement PR1A	198
1.1	Transfer to the Society's class of a ship in service classed by another QSCS Classification Society	
1.2	Transfer to the Society's class of a ship surveyed during construction by another QSCS Classification Society at ship's delivery	
2	Surveys required by IACS Procedural Requirement PR1B	199
2.1	Addition of the Society's class to a ship in service classed by another QSCS Classification Society	
2.2	Addition of the Society's class to a ship surveyed during construction by another QSCS Classification Society at ship's delivery	
3	Surveys required by IACS Procedural Requirement PR1D	199
3.1	Ships in service not classed with a QSCS Classification Society or not classed at all	

4	Reassignment of class	200
4.1	Surveys	
5	Ships of less than 100 gross tonnage	200
5.1	Surveys and documentation	

Section 3 Annual Survey

1	General	201
1.1		
2	Hull	201
2.1	Scope	
2.2	Hull and hull equipment	
2.3	Cargo hatch covers and coamings, weather decks and ship side plating above the waterline	
2.4	Suspect areas	
2.5	Ballast tanks	
2.6	Additional requirements for single hold cargo ships (see Note 1 to [1.1.1] of Ch 4, Sec 8)	
3	Machinery and systems	203
3.1	General machinery installations	
3.2	Boilers	
3.3	Electrical machinery and equipment	
3.4	Fire protection, detection and extinction	

Section 4 Intermediate Survey

1	General	205
1.1		
2	Hull	205
2.1		

Section 5 Class Renewal Survey

1	General	207
1.1		
2	Hull and hull equipment	207
2.1	Bottom survey	
2.2	Decks, hatch covers and equipment	
2.3	Holds and other dry compartments	
2.4	Tanks	
2.5	Thickness measurements	
2.6	Additional requirements for single hold cargo ships (see Note 2 to [1.1.1] of Ch 4, Sec 8)	
3	Machinery and systems	211
3.1	General	
3.2	Main and auxiliary engines and turbines	
3.3	Reduction gears, main thrust and intermediate shaft(s)	
3.4	Pumps and other machinery items	

- 3.5 Systems in machinery spaces
- 3.6 Electrical equipment and installations
- 3.7 Controls

Section 6 Bottom Survey

1	General	215
	1.1	
2	Bottom survey in dry condition	215
	2.1 General requirements	
	2.2 Bottom survey held within the scope of class renewal survey	
3	Bottom in-water survey	215
	3.1 General	
4	Bottom in-water survey of ships enrolled into the extended dry docking (EDD) scheme	216
	4.1 In-water survey	

Section 7 Shaft Survey

1	Survey of shafts	217
	1.1 General	
	1.2 METHOD 1	
	1.3 METHOD 2	
	1.4 METHOD 3	
	1.5 METHOD 4	
	1.6 Extension surveys	
2	Periodical survey of other propulsion systems	219
	2.1 Rotating and azimuth thrusters	
	2.2 Vertical axis propellers	
	2.3 Pump jet systems	

Section 8 Boiler Survey

1	Steam boilers	220
	1.1	
2	Thermal oil heaters	220
	2.1	

Section 9 Gas Fuelled Ships

1	Ships other than liquefied gas carriers	222
	1.1 Application	
	1.2 Annual Survey	
	1.3 Intermediate Survey	
	1.4 Renewal Survey	

2	Liquefied gas Carriers	224
	2.1 Annual survey	
	2.2 Intermediate survey	
	2.3 Renewal survey	

Appendix 1 Class Requirements and Surveys of Laid-up Ships

1	General	225
	1.1	
2	Safety conditions	225
	2.1	
3	Preservation measures for lay-up and maintenance	225
	3.1 General	
	3.2 Exposed parts of the hull	
	3.3 Internal spaces	
	3.4 Deck fittings	
	3.5 Machinery	
	3.6 Electrical installations	
	3.7 Steering gear	
	3.8 Boilers	
	3.9 Automation equipment	
4	Lay-up site and mooring arrangements	228
	4.1 General	
	4.2 Recommendations for the lay-up site	
	4.3 Recommendations for the mooring arrangements	
	4.4 Review of the mooring arrangements	
5	Surveys	229
	5.1 Laying-up survey	
	5.2 Annual lay-up condition survey	
	5.3 Re-commissioning survey	

CHAPTER 4

SCOPE OF SURVEYS IN RESPECT OF THE DIFFERENT SERVICES OF SHIPS

Section 1 General

1	General	233
	1.1	
2	Service notations subject to additional surveys	233
	2.1	

Section 2 Bulk Carriers, Combination Carriers and Self-Unloading Bulk Carriers of Single Side Skin Construction

1	General	235
	1.1 Application	
	1.2 Documentation on board	
	1.3 Reporting and evaluation of surveys	
	1.4 Access to structures	
2	Annual survey	237
	2.1 General	
	2.2 Hull and equipment	
	2.3 Weather decks, hatch covers and coamings	
	2.4 Cargo holds	
	2.5 Ballast tanks	
	2.6 Additional requirements after determining compliance with SOLAS regulation XII/12 (water level detectors) and XII/13 (availability of pumping systems)	
	2.7 Means of access	
	2.8 Self unloading bulk carrier - cargo handling system(s)	
3	Intermediate survey - Hull items	240
	3.1 General	
	3.2 Ships between 5 and 10 years of age	
	3.3 Ships between 10 and 15 years of age	
	3.4 Ships over 15 years of age	
4	Class renewal survey	243
	4.1 Survey program and preparation for survey	
	4.2 Scope of survey	
	4.3 Hatch covers and coamings	
	4.4 Overall and close-up surveys	
	4.5 Thickness measurements	
	4.6 Tank testing	
	4.7 Additional requirements after determining compliance with SOLAS regulation XII/12 (water level detectors) and XII/13 (availability of pumping systems)	
	4.8 Self unloading bulk carrier - cargo handling system(s)	
	4.9 Survey Program	
	4.10 Survey Planning Questionnaire	

Section 3 Oil Tankers and Combination Carriers

1	General	261
	1.1 Application	
	1.2 Documentation on board	
	1.3 Reporting and evaluation of surveys	
2	Annual survey - Hull items	262
	2.1	
	2.2 Hull and weather decks	
	2.3 Cargo pump rooms and pipe tunnels	
	2.4 Ballast tanks	
	2.5 Emergency towing arrangement	
	2.6 Means of access	
	2.7 Safe access to bow	
3	Annual survey - Cargo machinery items	263
	3.1 Cargo area and cargo pump rooms	
	3.2 Instrumentation and safety devices	
	3.3 Inert gas system	
	3.4 Steering capability	
4	Intermediate survey - Hull items	264
	4.1 Weather decks	
	4.2 General	
	4.3 Ships between 5 and 10 years of age	
	4.4 Ships between 10 and 15 years of age	
	4.5 Ships over 15 years of age	
5	Intermediate survey - Cargo machinery items	265
	5.1 Cargo area and cargo pump rooms	
	5.2 Inert gas system	
6	Class renewal survey - Hull items	265
	6.1 Survey program and preparation for hull survey	
	6.2 Scope of survey	
	6.3 Overall and close-up surveys	
	6.4 Thickness measurements	
	6.5 Tank testing	
	6.6 Cargo area and cargo pump rooms	
	6.7 Emergency towing arrangement	
	6.8 Survey Program	
	6.9 Survey Planning Questionnaire	
7	Class renewal survey - Cargo machinery items	276
	7.1 Cargo area and cargo pump rooms	
	7.2 Inert gas system	

Section 4 Double Hull Oil Tankers

1	General	279
	1.1 Application	
	1.2 Documentation on board	
	1.3 Reporting and evaluation of surveys	
2	Annual survey - Hull items	280
	2.1	

2.2	Hull and weather decks	
2.3	Cargo pump rooms and pipe tunnels	
2.4	Ballast tanks	
2.5	Emergency towing arrangement	
2.6	Means of access	
2.7	Safe access to bow	
3	Intermediate survey - Hull items	281
3.1	Weather decks	
3.2	General	
3.3	Ships between 5 and 10 years of age	
3.4	Ships between 10 and 15 years of age	
3.5	Ships exceeding 15 years of age	
4	Class renewal survey - Hull items	283
4.1	Survey program and preparation for hull survey	
4.2	Scope of survey	
4.3	Overall and close-up surveys	
4.4	Thickness measurements	
4.5	Tank testing	
4.6	Cargo area and cargo pump rooms	
4.7	Emergency towing arrangement	
4.8	Survey Program	
4.9	Survey Planning Questionnaire	

Section 5 Chemical Tankers

1	General	298
1.1	Application	
1.2	Documentation on board	
1.3	Reporting and evaluation of surveys	
2	Annual survey - Hull items	299
2.1		
2.2	Hull and weather decks	
2.3	Cargo pump rooms and pipe tunnels	
2.4	Ballast tanks	
2.5	Emergency towing arrangement	
2.6	Safe access to bow	
3	Annual survey - Cargo machinery items	300
3.1	Cargo area and cargo pump rooms	
3.2	Instrumentation and safety devices	
3.3	Inert gas system and inert/padding/drying gas	
3.4	Steering capability	
4	Intermediate survey - Hull items	301
4.1	Weather decks	
4.2	General	
4.3	Ships between 5 and 10 years of age	
4.4	Ships between 10 and 15 years of age	
4.5	Ships over 15 years of age	
5	Intermediate survey - Cargo machinery items	301
5.1	Cargo area and cargo pump rooms	
5.2	Inert gas system	

6	Class renewal survey - Hull items	302
6.1	Survey program and preparation for hull survey	
6.2	Scope of survey	
6.3	Overall and close-up surveys	
6.4	Thickness measurements	
6.5	Tank testing	
6.6	Cargo area and cargo pump rooms	
6.7	Emergency towing arrangement	
6.8	Survey Program	
6.9	Survey Planning Questionnaire	
7	Class renewal survey - Cargo machinery items	318
7.1	Cargo area and cargo pump rooms	
7.2	Inert gas system	

Section 6 Liquefied Gas Carriers

1	General	319
1.1	Application	
2	Annual survey - Hull items	319
2.1	Scope	
3	Annual survey - Cargo installations items	320
3.1	General	
3.2	Weather decks and cargo handling rooms	
3.3	Other arrangements or devices	
3.4	Cargo area, cargo compressor rooms, cargo pump rooms	
3.5	Instrumentation and safety devices	
3.6	Inert gas/air drying systems	
3.7	Steering capability	
4	Intermediate survey - Hull items	321
4.1	Schedule	
4.2	Scope	
5	Intermediate survey - Cargo installation items	322
5.1	General	
5.2	Weather decks and cargo handling rooms	
5.3	Cargo area, cargo pump rooms, cargo compressor rooms	
5.4	Instrumentation and safety devices	
5.5	Inert gas system	
6	Class renewal survey - Hull items	323
6.1	Schedule	
6.2	Scope of survey	
6.3	Extent of overall and close-up surveys	
6.4	Extent of thickness measurements	
6.5	Extent of tank testing	
6.6	Emergency towing arrangement	
7	Class renewal survey - Cargo installation items	326
7.1	General	
7.2	Cargo containment	
7.3	Piping systems	
7.4	Cargo area, cargo pump rooms, cargo compressor rooms	
7.5	Inert gas system	

Section 7 Ro-ro Cargo Ships, Car Carrier Passenger Ships, Ro-ro Passenger Ships

1	General	330
	1.1	
	1.2 Application	
	1.3 Definitions	
2	Ro-ro cargo ships, Car Carrier - Annual survey	330
	2.1 Shell and inner doors	
	2.2 Internal platforms and ramps	
	2.3 Fire protection, detection and extinction	
3	Ro-ro cargo ships, Car Carrier - Class renewal survey	332
	3.1 Shell and inner doors	
	3.2 Internal platforms and ramps	
	3.3 Fire protection, detection and extinction	
4	Passenger ships - Annual survey	333
	4.1 Watertight bulkheads	
	4.2 Openings in shell plating	
	4.3 Lightweight survey	
5	Passenger ships - Class renewal survey	333
	5.1	
6	Ro-ro passenger ships - Annual and class renewal surveys	333
	6.1	

Section 8 General Dry Cargo Ships

1	General	334
	1.1 Application	
	1.2 Reporting and evaluation of surveys	
2	Annual survey	334
	2.1 Scope	
	2.2 Additional requirements for single hold cargo ships	
3	Intermediate survey	336
	3.1 Schedule	
	3.2 Scope	
4	Class renewal survey	337
	4.1 Schedule	
	4.2 Scope of survey	
	4.3 Hatch covers and coamings	
	4.4 Extent of overall and close-up surveys	
	4.5 Extent of thickness measurements	
	4.6 Tank testing	
	4.7 Additional requirements for single hold cargo ships	

Section 9 Double Skin Bulk Carriers and Self-Unloading Bulk Carriers of Double Skin Construction

1	General	343
	1.1 Application	
	1.2 Documentation on board	
	1.3 Reporting and evaluation of surveys	
2	Annual survey	344
	2.1 General	
	2.2 Hull Structure and Equipment	
	2.3 Weather decks, hatch covers and coamings	
	2.4 Cargo holds	
	2.5 Ballast tanks	
	2.6 Additional requirements after determining compliance with SOLAS regulations XII/12 (water level detectors) and XII/13 (availability of pumping systems)	
	2.7 Means of access	
3	Intermediate survey	346
	3.1 General	
	3.2 Ships between 5 and 10 years of age	
	3.3 Ships between 10 and 15 years of age	
	3.4 Ships over 15 years of age	
4	Class renewal survey	347
	4.1 Survey program and preparation for survey	
	4.2 Scope of survey	
	4.3 Hatch covers and coamings	
	4.4 Overall and close-up surveys	
	4.5 Thickness measurements	
	4.6 Tank testing	
	4.7 Additional requirements after determining compliance with SOLAS XII/12 (water level detectors) and XII/13 (availability of pumping systems)	
	4.8 Survey Program	
	4.9 Survey Planning Questionnaire	

Section 10 Other Service Notations

1	General	365
	1.1	
2	Container ship or ship equipped for the carriage of containers	365
	2.1 Annual survey	
	2.2 Class renewal survey	
3	Livestock carrier	365
	3.1 Annual survey	
	3.2 Class renewal survey	
4	FLS tanker	366
	4.1 Annual survey - Hull items	
	4.2 Annual survey - Cargo machinery items	
	4.3 Intermediate survey - Hull items	
	4.4 Intermediate survey - Cargo machinery items	
	4.5 Class renewal survey - Hull items	
	4.6 Class renewal survey - Cargo machinery items	

5	Dredging units	367
	5.1 Annual survey	
	5.2 Class renewal survey	
6	Tug, salvage tug, escort tug	368
	6.1 Annual survey	
	6.2 Class renewal survey	
7	Supply vessel	368
	7.1 Supply vessel - Oil product or Supply vessel - Chemical product	
	7.2 Supply vessel - Anchor handling or Supply vessel - Anchor handling stab	
8	Fire-fighting ship	370
	8.1 Annual survey	
	8.2 Class renewal survey	
9	Oil recovery ship	371
	9.1 Annual survey	
	9.2 Class renewal survey	
10	Cable laying ship	371
	10.1 Annual survey	
	10.2 Class renewal survey	
11	Fishing vessel	371
	11.1 Annual survey	
	11.2 Class renewal survey	
12	Pipe laying ship	372
	12.1 Annual survey	
	12.2 Class renewal survey	
13	Research ship	372
	13.1 Annual and Class renewal survey	
14	Cement carrier	372
	14.1 Annual survey	
	14.2 Class renewal survey	
15	Asphalt tanker	372
	15.1 Annual survey - Hull items	
	15.2 Annual survey - Cargo machinery items	
	15.3 Intermediate survey - Hull items	
	15.4 Class renewal survey - Hull items	
	15.5 Class renewal survey - Cargo machinery items	
16	Compressed natural gas carrier	373
	16.1 Annual and Class renewal survey	
17	Barge	373
	17.1 General	
	17.2 Barge-accommodation - Annual survey	
	17.3 Barge-accommodation - Renewal survey	
	17.4 Barge-oil - Application	
	17.5 Barge-oil - Annual survey	
	17.6 Barge-oil - Intermediate survey	
	17.7 Barge-oil - Renewal survey	

18	Oil Carrier-Assisted Propulsion, Palm Oil Carrier-Assisted Propulsion	377
	18.1 Annual survey - Hull items	
	18.2 Annual survey - Cargo machinery items	
	18.3 Intermediate survey - Hull items	
	18.4 Intermediate survey - Cargo machinery items	
	18.5 Class renewal survey - Hull items	
	18.6 Class renewal survey - Cargo machinery items	
19	Transshipping Unit, Transshipping Floating Terminal	379
	19.1 Annual survey - Hull items	
	19.2 Annual survey - Cargo handling system(s)	
	19.3 Renewal survey - Hull items	
	19.4 Renewal survey - Cargo handling system(s)	
20	Sugar carrier	380
	20.1 Annual survey	
	20.2 Class renewal survey	
21	Fly ash carrier	380
	21.1 Annual survey	
	21.2 Class renewal survey	
22	Ships with additional service feature BC	381
	22.1 Annual and renewal survey	
23	Ships with additional service feature BC-XII	381
	23.1 Annual and renewal survey	
24	Well stimulation	381
	24.1 General	
	24.2 Annual survey	
	24.3 Renewal survey	
25	Car carrier with additional service feature H-CNG	381
	25.1 Annual and renewal survey	

Appendix 1 Survey Reporting Principles for Ships Subject to Enhanced Survey Program

1	Survey reporting principles	383
	1.1 General	
	1.2 Issue of a survey report	
	1.3 Purpose of reporting	
	1.4 Surveys split between different stations	
	1.5 Identification of spaces and areas	
	1.6 Items surveyed	
	1.7 Thickness measurement report	
	1.8 Longitudinal strength	
	1.9 List of required repairs	
	1.10 List of repairs carried out	
	1.11 List of repairs not completed	

CHAPTER 5

SCOPE OF SURVEYS RELATED TO ADDITIONAL CLASS NOTATIONS

Section 1 General

1	General	387
	1.1	
2	Additional class notations subject to additional surveys	387
	2.1	

Section 2 STAR (System of Trace and Analysis of Records)

1	General	390
	1.1 Application	
2	STAR-HULL	390
	2.1 Survey scope and periodicity	
3	STAR-MACH	390
	3.1 Survey scope and periodicity	

Section 3 Availability of Machinery

1	General	391
	1.1	
2	Annual survey	391
	2.1	
3	Class renewal survey	391
	3.1	

Section 4 Automated Machinery Systems

1	General	392
	1.1	
2	Annual survey	392
	2.1	
3	Class renewal survey	392
	3.1	

Section 5 Integrated Ship Systems

1	General	393
	1.1	
2	Annual survey	393
	2.1 All notations	
	2.2 Notations SYS-NEQ and SYS-NEQ-1	
	2.3 Notation SYS-COM	
	2.4 Notation SYS-IBS	
3	Class renewal survey	394
	3.1 All notations	

Section 6 Monitoring Equipment

1	General	395
	1.1 Application	
2	MON-HULL	395
	2.1 Annual and class renewal survey	
3	MON-SHAFT	395
	3.1 Tailshaft survey	

Section 7 Pollution Prevention

1	General	396
	1.1 Application	
2	CLEAN-SEA	396
	2.1 Annual and class renewal survey	
3	CLEAN-AIR	397
	3.1 Annual and class renewal survey	
4	GREEN PLUS	397
	4.1 Annual and class renewal survey	
5	GREEN PLUS T	397
	5.1 Annual survey	
	5.2 Class renewal survey	
6	GREEN STAR 3	398
	6.1 Annual and class renewal survey	
7	LOW SO_x (N)	398
	7.1 Annual and class renewal survey	
8	GC CARGO HANDLING	398
	8.1 Annual survey	
	8.2 Class renewal survey	

Section 8 Refrigerating Installations

1	General	400
	1.1	
2	Annual survey	400
	2.1 General	
	2.2 Refrigerating plant	
	2.3 Refrigerated spaces	
	2.4 Instrumentation and safety devices	
	2.5 Notation -AIRCONT	
3	Class renewal survey	401
	3.1 General	
	3.2 Refrigerating plant	
	3.3 Refrigerated spaces	
	3.4 Instrumentation and safety devices	
	3.5 Notation -AIRCONT	

Section 9 Arrangements for Navigation in Ice - Ice Class and Polar Class

1	General	403
	1.1	
2	Class renewal survey	403
	2.1 Thickness measurements	
	2.2 Sea chests	

Section 10 Winterization (temp)

1	General	404
	1.1	
2	Annual survey	404
	2.1 Anti-icing arrangements	
	2.2 De-icing arrangements	
	2.3 Anti-freezing arrangements	
	2.4 Distribution switchboards for de-icing	
	2.5 Heating equipment	
	2.6 Tests	
	2.7 Special equipment	

Section 11 Helideck

1	General	405
	1.1 Application	
2	Annual survey	405
	2.1	
3	Class renewal survey	406
	3.1	

Section 12 Other Notations

1	General	407
	1.1	
2	STRENGTHBOTTOM	407
	2.1 Dry-docking survey	
3	GRABLOADING and GRAB [X]	407
	3.1 Class renewal survey	
4	SPM	407
	4.1 Annual survey	
	4.2 Class renewal survey	
5	Lashing and Route dependent lashing	407
	5.1 General	
	5.2 Class renewal survey	
6	DYNAPOS	408
	6.1 Annual survey	
	6.2 Class renewal survey	
7	VCS	408
	7.1 Annual survey	
	7.2 Class renewal survey	
8	COVENT	409
	8.1 Annual survey	
	8.2 Class renewal survey	
9	CARGOCONTROL	409
	9.1 Annual survey	
	9.2 Class renewal survey	
10	COAT-WBT	409
	10.1 General	
	10.2 Intermediate and class renewal surveys	
	10.3 Coating damage and repairs	
11	DIVINGSUPPORT	409
	11.1 Annual survey	
	11.2 Class renewal survey	
12	HVSC	410
	12.1 Annual and class renewal survey	
13	FIRE	410
	13.1 General	
14	SELF-UNLOADING	410
	14.1 Annual survey	
	14.2 Class renewal survey	
15	TAS	411
	15.1 Annual survey	
16	EFFICIENT SHIP (S, DWT)	411
	16.1 Annual and class renewal survey	

17	MOORING	411
	17.1 Annual survey	
	17.2 Renewal survey	
18	CARGO HANDLING	412
	18.1 General	
	18.2 Annual survey	
	18.3 Renewal survey	
19	◀ SAHARA and SAHARA	413
	19.1 Annual survey	
	19.2 Renewal survey	
20	COMF-NOISE	413
	20.1 Renewal survey	
21	RISK MITIGATION (...)	413
	21.1 Annual and renewal survey	
22	AIR MON	413
	22.1 Annual and renewal survey	
23	DANGEROUS GOODS	414
	23.1 Annual and renewal survey	
24	INF 1, INF 2, INF 3	414
	24.1 Annual and renewal survey	
25	INERTGAS A, INERTGAS B, INERTGAS C	414
	25.1 Annual survey	
	25.2 Renewal survey	
26	GAS FUELLED additional class notations (GAS FUELLED, GAS FUELLED (Main), GAS FUELLED (Aux))	415
	26.1 Annual survey	
	26.2 Intermediate Survey	
	26.3 Renewal survey	
27	MAN OVERBOARD DETECTION SYSTEM	415
	27.1 Annual survey	
	27.2 Renewal survey	
28	CYBER RESILIENCE	415
	28.1 Annual survey and renewal survey	
29	DIGITAL SHIP	415
	29.1 Annual survey and renewal survey	

CHAPTER 6

RETROACTIVE REQUIREMENTS FOR EXISTING SHIPS

Section 1 General

1	General	419
1.1		
1.2	List of retroactive rule requirements	

Section 2 Bulk Carriers, Ore Carriers and Combination Carriers

1	Requirements for the foremost cargo hold	421
1.1	Application	
1.2	Schedule for compliance	
1.3	Scantlings of the transverse bulkhead between the two foremost cargo holds	
1.4	Allowable hold loading of the foremost cargo hold with the same hold flooded	
1.5	Damage stability	
1.6	Alternative requirements	
1.7	Loading conditions, loading manuals and loading instruments	
2	Requirements for all cargo holds	423
2.1	Application	
2.2	Longitudinal strength of hull girder	
2.3	Scantlings of transverse bulkheads in all cargo holds	
2.4	Allowable hold loading in all cargo holds	
3	Detection of water ingress into cargo holds	424
3.1	Requirements for installation of detectors	
3.2	Requirements for testing and survey	
4	Strength and securing of small hatches on the exposed fore deck	424
4.1	General	
4.2	Application	
4.3	Implementation	
5	Strength requirements for fore deck fittings and equipment	424
5.1	General	
5.2	Application	
5.3	Implementation	
6	Cargo hatch cover securing arrangements for bulk carriers not built in accordance with Part B, Ch 9, Sec 7	425
6.1	General	
6.2	Application	
6.3	Implementation	
6.4	Securing Devices	
6.5	Stoppers	
6.6	Materials and Welding	

7	Renewal criteria for side shell frames and brackets in cargo holds of single side skin bulk carriers and single side skin OBO carriers not built in accordance with Part E, Ch 4, Sec 3, [3.2] and Part E, Ch 4, Sec 3, [6.2]	426
---	---	-----

- 7.1 General
- 7.2 Application
- 7.3 Implementation
- 7.4 Ice strengthened ships
- 7.5 Renewal or other measures
- 7.6 Strength check criteria

Section 3 Ships Carrying Liquid Cargo in Bulk

1	General	435
1.1	Application	
1.2	Safe access to ship bows	
1.3	Secondary means of flow in the cargo tanks venting systems	

Section 4 Passenger Ships, Ro-ro Passenger Ships and Ro-ro Cargo Ships

1	General	436
1.1	Application	
2	Increased stability and watertight integrity	436
2.1		
3	Side Shell Doors, Stern Doors, Bow Doors and Inner Doors	437
3.1	Side Shell Doors and Stern Doors	
3.2	Bow Doors and Inner Doors	

Section 5 General Dry Cargo Ships

1	Strength and securing of small hatches on the exposed fore deck	439
1.1	General	
1.2	Application	
1.3	Implementation	
2	Strength requirements for fore deck fittings and equipment	439
2.1	General	
2.2	Application	
2.3	Implementation	

Section 6 Ships with Ice Class Notation

1	General	441
1.1	Definitions	
1.2	Application	
2	Requirements to retain ICE CLASS notations	441
2.1	General	

3	Other methods of determining K_C or R_{CH}	441
3.1	General	
4	Draught limitation in ice	442
4.1	Warning triangle	

Appendix 1 Technical Retroactive Requirements for Bulk Carriers

1	General	443
1.1		
2	Evaluation of scantlings of the transverse watertight vertically corrugated bulkheads between the two foremost cargo holds	443
2.1	Application and definitions	
2.2	Load model	
2.3	Bending moment and shear force in the bulkhead corrugations	
2.4	Strength criteria	
2.5	Local details	
2.6	Steel renewal	
3	Guidance on renewal/reinforcement of the transverse watertight vertically corrugated bulkhead between the two foremost cargo holds	451
3.1		
4	Evaluation of allowable hold loading of the foremost cargo hold with the same cargo hold flooded	453
4.1	Application and definitions	
4.2	Load model	
4.3	Shear capacity of the double bottom of the foremost cargo hold	
4.4	Allowable hold loading	

Appendix 2 Guidelines for the Thickness Measurements of Side Shell Frames and Brackets in Single Side Skin Bulk Carriers Subject to Compliance with the Requirements of Section 2, [7]

1	General	456
1.1		
2	Zones of side shell frames and brackets	456
2.1		
3	Pitting and grooving	456
3.1	General	
3.2	Assessment based upon area	
4	Gauging methodology	457
4.1	General	
4.2	Gauging for Zones A, B and D - Web plating	
4.3	Gauging for Zone C - Web plating	
4.4	Gauging for sections a) and b) (flanges and side shell plating)	
5	Report on thickness measurements of cargo hold frames	458
5.1		

Part A
Classification and Surveys

Chapter 1

**PRINCIPLES OF CLASSIFICATION AND CLASS
NOTATIONS**

SECTION 1 GENERAL PRINCIPLES OF CLASSIFICATION

SECTION 2 CLASSIFICATION NOTATIONS

SECTION 1

GENERAL PRINCIPLES OF CLASSIFICATION

1 Principles of classification

1.1 Purpose of the Rules

1.1.1 The Rules published by the Society give the requirements for the assignment and the maintenance of class for seagoing ships.

Class assigned to a ship reflects the discretionary opinion of the Society that the ship, for declared conditions of use and within the relevant time frame, complies with the Rules applicable at the time the service is rendered.

Note 1: The general conditions of classification are laid down in the "General Conditions" placed at the beginning of this Part.

1.1.2 (1/1/2008)

The application criteria of the different parts of the present Rules are the following with the exceptions indicated in [1.1.3] and [1.1.4]:

- Part A - Classification and Surveys applies to all ships.
- Part B - Hull and Stability, Part C - Machinery, Systems and Fire Protection, Part D - Materials and Welding and Part E - Service Notations apply to seagoing ships whose hull is of welded steel construction. Where necessary, the extent of application is more precisely defined in each chapter of these parts of the Rules.
- Part F - Additional Class Notations applies, at the request of the Interested Party, to all ships.

The classification of ships other than those dealt with in the above-mentioned Parts B, C, D and E is covered by specific Rules published by the Society.

Note 1: As from 1 January 2007, the statutory requirements of the SOLAS Convention and/or national safety regulations, as applicable, regarding fire protection, detection and extinction (hereinafter referred to as "fire protection statutory requirements") are no longer mandatory for the purpose of classification, except where the Society carries out surveys relevant to fire protection statutory requirements on behalf of the flag Administration. In such cases, fire protection statutory requirements are considered a matter of class and therefore compliance with these requirements is also verified by the Society for classification purposes at class surveys.

In general, only IACS Unified Requirements in force related to fire protection, detection and extinction have been retained as Rule requirements within the scope of classification. Thus, the survey requirements for class surveys (annual, intermediate, class renewal surveys and others) no longer include those related to fire protection statutory requirements.

The above is applicable to all ships (new buildings and ships in service) and therefore the scope of surveys as stipulated in the present Part A has also been reduced accordingly for all ships.

1.1.3 (1/1/2016)

For the hull structures of ships contracted for construction on or after 1 April 2006, the Common Structural Rules are to be applied in the following cases:

- single side skin and double side skin bulk carriers with unrestricted navigation, having length L of 90 m or

greater, contracted for construction on or after 1 April 2006 but before 1 July 2015, (as defined in Chapter 1, Sec 1, [1.1.2] of the "Common Structural Rules for Bulk Carriers"),

- double hull oil tankers of 150 m length or greater contracted for construction on or after 1 April 2006 but before 1 July 2015 (as defined in Section 1 of the "Common Structural Rules for Double Hull Oil Tankers"),
- single side skin and double side skin bulk carriers having length L of 90 m or greater, contracted for construction on or after 1 July 2015, (as defined in Part 1 Chapter 1, Sec 1, [1.2] of the "Common Structural Rules for Bulk Carriers and Oil Tankers"),
- double hull oil tankers of 150 m length or greater, contracted for construction on or after 1 July 2015, (as defined in Part 1 Chapter 1, Sec 1, [1.3] of the "Common Structural Rules for Bulk Carriers and Oil Tankers").

1.1.4 (1/1/2008)

Special consideration may be given in application of Rule requirements relevant to periodical surveys of:

- the hull,
- machinery, including boilers,
- the outside of the ship's bottom and related items, and
- tailshafts,

for commercial ships owned or chartered by Governments, which are used in support of military operations or service. The above special consideration cannot be given in application of hull survey requirements regarding ESP ships.

1.2 General definitions

1.2.1 (1/1/2019)

The following general definitions are used in these Rules:

- Society means RINA Services S.p.A. and/or all the companies in the RINA Group which provide the Services
- Rules means these Rules for the Classification of Ships and documents issued by the Society serving the same purpose
- Common Structural Rules means the "Common Structural Rules for Bulk Carriers", the "Common Structural Rules for Double Hull Oil Tankers" and the "Common Structural Rules for Bulk Carriers and Oil Tankers" adopted by IACS
- Surveyor means technical staff acting on behalf of the Society to perform tasks in relation to classification and survey duties
- Survey means an intervention by the Surveyor for assignment or maintenance of class as defined in

Chapter 2, or interventions by the Surveyor within the limits of the tasks delegated by the Administrations

- Administration means the Government of the State whose flag the ship is entitled to fly or the State under whose authority the ship is operating in the specific case
- Interested Party means a party, other than the Society, having responsibility for the classification of the ship, such as the Owner of the ship and his representatives, or the Shipbuilder, or the Engine Builder, or the Supplier of parts to be tested
- QSCS Classification Society means a Classification Society which is subject to verification of compliance with the IACS Quality System Certification Scheme (QSCS)
- Owner means the Registered Owner or the Disponent Owner or the Manager or any other party having the responsibility to keep the ship seaworthy, having particular regard to the provisions relating to the maintenance of class laid down in Chapter 2
- Approval means the examination and acceptance by the Society of documents, procedures or other items related to classification, verifying solely their compliance with the relevant Rules requirements, or other references where requested
- Type approval means an approval process for verifying compliance with the Rules of a product, a group of products or a system, and considered by the Society as representative of continuous production
- Essential service is intended to mean a service necessary for a ship to proceed at sea, be steered or manoeuvred, or undertake activities connected with its operation, and for the safety of life, as far as class is concerned.

1.3 Meaning of classification, scope and limits

1.3.1 The classification consists of:

- the development of Rules, guides and other documents relevant to the ship, structure, material, equipment, machinery and any other item covered by such documents
- the examination of plans and calculations and the surveys, checks and tests intended to ensure that the ship meets the Rules (refer to Ch 2, Sec 1)
- the assignment of class (see Ch 2, Sec 1) and issue of a Certificate of Classification, where the above Rules are met
- the periodical, occasional and class renewal surveys performed to verify that the ship in service meets the conditions for maintenance of class (see Ch 2, Sec 2).

1.3.2 The Rules, surveys performed, reports, certificates and other documents issued by the Society, are in no way intended to replace or alleviate the duties and responsibilities of other parties such as Administrations, Designers, Shipbuilders, Manufacturers, Repairers, Suppliers, Contractors or Sub-contractors, actual or prospective Owners or Operators, Charterers, Brokers, Cargo-owners and Underwriters. The Society cannot therefore assume the obligations arising from these functions, even when the Society is con-

sulted to answer inquiries concerning matters not covered by its Rules, or other documents.

The activities of such parties which fall outside the scope of the classification as set out in the Rules, such as design, engineering, manufacturing, operating alternatives, choice of type and power of machinery and equipment, number and qualification of crew or operating personnel, lines of the ship, trim, hull vibrations, spare parts including their number, location and fastening arrangements, life-saving appliances, and maintenance equipment, remain therefore the responsibility of those parties, even if these matters may be given consideration for classification according to the type of ship or additional class notation assigned.

The classification-related services and documents performed and issued by the Society do not relieve the parties concerned of their responsibilities or other contractual obligations expressed or implied or of any liability whatsoever, nor do they create any right or claim in relation to the Society with regard to such responsibilities, obligations and liabilities. In particular, the Society does not declare the acceptance or commissioning of a ship or any part of it, this being the exclusive responsibility of the Owner.

1.3.3 Unless otherwise specified, the Rules do not deal with structures, pressure vessels, machinery and equipment which are not permanently installed and used solely for operational activities such as dredging or heavy load lifting, workshops or welding equipment, except for their effect on the classification-related matters, as declared by the Interested Party, such as fire protection and ship's general strength.

During periods of construction, modification or repair, the unit is solely under the responsibility of the builder or the repair yard. As an example, the builder or repair yard is to ensure that the construction, modification or repair activities are compatible with the design strength of the ship and that no permanent deformations are sustained.

Note 1: Refer to [3.3] as regards the Owner's responsibility for maintenance and operation of the ship in relation to the maintenance of class.

1.4 Request for services

1.4.1 Requests for interventions by the Society, such as surveys during construction, surveys of ships in service, tests, etc., are in principle to be submitted in writing and signed by the Interested Party. Such request implies that the applicant will abide by all the relevant requirements of the Rules, including its "General Conditions".

The Society reserves the right to refuse or withdraw the class of any ship for which any applicable requirement of the Rules is not complied with.

1.5 Register of ships

1.5.1 A Register of Ships is published periodically by the Society. This publication, which is updated by the Society, contains the names of ships which have received the Certificate of Classification, as well as particulars of the class assigned and information concerning each ship.

2 Rules

2.1 Equivalence

2.1.1 The Society may consider the acceptance of alternatives to these Rules, provided that they are deemed to be equivalent to the Rules to the satisfaction of the Society.

2.2 Effective date

2.2.1

The effective date of entry into force of any amendments to the Rules is indicated on the inside front page of each Part of the Rules.

2.2.2 (1/7/2007)

In principle, the applicable Rules for assignment of class to a new ship are those in force at the date when the contract for construction between the Owner and the shipbuilder is signed (see Note 1).

Note 1:

- a) The date of "contract for construction" of a ship is the date on which the contract to build the ship is signed between the prospective Owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the ships included are to be declared to the Society by the party applying for the assignment of class to a new building.
- b) The date of "contract for construction" of a series of ships, including specified optional ships for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective Owner and the shipbuilder. For the purpose of this issue, ships built under a single contract for construction are considered a "series of ships" if they are built to the same approved plans for classification purposes. However, ships within a series may have design alterations from the original design provided:
 - 1) such alterations do not affect matters related to classification, or
 - 2) if the alterations are subject to classification requirements, either these alterations comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective Owner and the shipbuilder or, in the absence of the alteration contract, they comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval.

The optional ships will be considered part of the same series of sister ships, if the option is exercised not later than one year after the contract to build the series was signed.

- c) If a contract for construction is later amended to include additional ships or additional options, the date of "contract for construction" for such ships is the date on which the amendment to the contract is signed between the prospective Owner and the shipbuilder. The amendment to the contract is to be considered as a "new contract" to which a) and b) above apply.
- d) If a contract for construction is amended to change the ship type, the date of "contract for construction" of this modified ship, or ships, is the date on which the revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder.

2.2.3 Special consideration may be given to applying new or modified rule requirements which entered into force sub-

sequent to the date of the contract, at the discretion of the Society and in the following cases:

- when a justified written request is received from the party applying for classification
- when the keel is not yet laid and more than one year has elapsed since the contract was signed
- where it is intended to use existing previously approved plans for a new contract.

2.2.4 The above procedures for application of the Rules are, in principle, also applicable to existing ships in the case of major conversions and, in the case of alterations, to the altered parts of the ship.

2.2.5 The rule requirements related to assignment, maintenance and withdrawal of the class of ships already in operation, are applicable from the date of their entry into force.

2.3 Novel features

2.3.1 The Society may consider the classification of ships based on or applying novel design principles or features, to which the Rules are not directly applicable, on the basis of experiments, calculations or other supporting information provided to the Society. The specific limitations may then be indicated on the Certificate of Classification.

2.4 Interpretation

2.4.1 The Society alone is qualified to decide upon the meaning, interpretation and application of the Rules and other classification-related documents. No reference to the Rules or other classification-related documents has any value unless it involves, accompanies or follows the intervention of the Society.

2.5 Disagreement and appeal

2.5.1 Any technical disagreement with the Surveyor in connection with the performance of his duties should be raised by the Interested Party as soon as possible.

The Interested Party may appeal in writing to the Society, which will subsequently consider the matter and announce its decision according to its established procedure.

3 Duties of the Interested Parties

3.1 International and national regulations

3.1.1 (1/7/2001)

The classification of a ship does not absolve the Interested Party from compliance with any requirements issued by Administrations and any other applicable international and national regulations for the safety of life at sea and protection of the marine environment.

3.1.2 Where requirements of International Conventions, such as SOLAS, ILLC, MARPOL, ILO or of IMO Assembly Resolutions, are quoted as excerpts, they are printed in italic type replacing the word "Administration" with "Society".

When these requirements are quoted from such International Conventions, they are printed in italic type.

In the event of disputes, the text of the International Conventions will prevail.

3.1.3 When authorised by the Administration concerned, the Society will act on its behalf within the limits of such authorisation. In this respect, the Society will take into account the relevant national requirements, survey the ship, report and issue or contribute to the issue of the corresponding certificates.

The above surveys do not fall within the scope of the classification of ships, even though their scope may overlap in part and may be carried out concurrently with surveys for assignment or maintenance of class.

3.1.4 (1/10/2007)

The IACS Unified Interpretations applicable to a ship and its machinery and equipment in accordance with the implementation dates and provisions stated in the Unified Interpretations themselves will be applied, as appropriate, by the Society when acting as a recognised organisation, authorised by a flag State Administration to act on its behalf, unless the flag Administration provides its own interpretation.

3.1.5 In the case of a discrepancy between the provisions of the applicable international and national regulations and those of the Rules, normally, the former take precedence. However, the Society reserves the right to call for the necessary adaptation to preserve the intention of the Rules or to apply the provisions of [1.4.1].

3.2 Surveyor's intervention

3.2.1 Surveyors are to be given free access at all times to ships which are classed or being classed, shipyards and works, to carry out their interventions within the scope of assignment or maintenance of class, or within the scope of interventions carried out on behalf of Administrations, when so delegated.

Free access is also to be given to auditors accompanying the Surveyors of the Society within the scope of the vertical audits as required in pursuance of the Society's internal Quality System or as required by external organizations.

3.2.2 (1/7/2013)

Interested Parties are to take the necessary measures for the Surveyors' inspections and testing to be carried out safely. Interested Parties - irrespective of the nature of the service provided by the Surveyors of the Society or others acting on its behalf - assume with respect to such Surveyors all the responsibility of an employer for his workforce such as to meet the provisions of applicable legislation. As a rule, the Surveyor is to be constantly accompanied during surveys by personnel of the Interested Party. Refer also to Ch 2, Sec 2, [2.5] to Ch 2, Sec 2, [2.10].

For safe entry into confined spaces, the requirements of IACS Procedural Requirement No. 37 "Procedural Requirement for Confined Space Safe Entry" apply.

3.2.3 The Certificate of Classification and/or other documents issued by the Society remain the property of the Society. All certificates and documents necessary to the Surveyor's interventions are to be made available by the Interested Party to the Surveyor on request.

3.2.4 During the phases of ship design and construction, due consideration should be given to rule requirements in respect of all necessary arrangements for access to spaces and structures with a view to carrying out class surveys. Arrangements of a special nature are to be brought to the attention of the Society.

3.3 Operation and maintenance of ships

3.3.1 Operation of the ship (1/7/2001)

The classification of a ship is based on the understanding that the ship is loaded and operated in a proper manner by competent and qualified crew or operating personnel according to the loading, environmental, operating and other criteria on which classification is based.

In particular, it will be assumed that the draught of the ship in operating conditions will not exceed that corresponding to the freeboard assigned or the maximum approved for the classification, that the ship will be properly loaded taking into account both its stability and the stresses imposed on its structures and that cargoes will be properly stowed and suitably secured. That the speed and course of the ship are adapted to the prevailing sea and weather conditions according to the normal prudent seamanship and that the ship is operated in accordance with the applicable international and national regulations for the prevention and containment of marine pollution.

3.3.2 Maintenance of the ship

Any document issued by the Society in relation to its interventions reflects the condition of the ship as found at the time and within the scope of the survey. It is the Interested Party's responsibility to ensure proper maintenance of the ship until the next survey required by the Rules. It is the duty of the Interested Party to inform the Surveyor when he boards the ship of any events or circumstances affecting the class.

3.3.3 Hull inspection and maintenance schemes (1/7/2008)

Hull inspection and maintenance schemes may be adopted by the Owner as a means for maintaining compliance with classification and statutory requirements between surveys. However, these schemes will not be accepted as an alternative to, or a substitute for, the performance of required classification and/or statutory surveys of the hull by the Surveyors of the Society, or of another duly authorised Society (see Note 1). No information received from the Owner indicates that, where adopted, these schemes have proven to be free from any deficiencies.

Note 1: The Surveyors may be assisted, where appropriate, by service suppliers as defined in the "Rules for the certification of service suppliers.

3.4 Flag and Port State Control inspections

3.4.1 Owner's duties (1/7/2012)

When a ship is detained further to an inspection by a Port State Authority or the flag Administration, Owners are to:

- immediately report the outcome of this inspection to the Society, and
- ask the Society to perform an occasional survey in order to verify that the deficiencies, when related to the class of the ship or to the statutory certificates issued by the Society on behalf of the flag Administration, are rectified and/or the necessary repair work is carried out within the due time.

Should the Owners fail to notify the Society of detention of a ship, the Society reserves the right to suspend or withdraw its classification.

3.4.2 Co-operation with and assistance to inspecting Authorities (1/7/2008)

The Society will co-operate during Port State Control inspections by:

- liaising with Port State Control Authorities to ensure that Surveyors are called in as appropriate when deficiencies related to class and statutory matters are found;
- liaising with Port State Control Officers to ensure uniformity of interpretation of class and statutory requirements;
- providing Port State Control Officers, upon request, with background information, extracts from reports pertinent to the inspection, and details of outstanding conditions of class and statutory items;
- liaising with the flag State in accordance with any prior agreement, and the Owner's representative and/or Company, in order to ensure that both parties are fully aware of actions being taken that affect safety-related matters of either a class or statutory nature.

Any request received from a Port State to attend on board a ship is dealt with promptly and efficiently by the Society in order to assist in the rectification of reported hardware deficiencies or other discrepancies.

Before attending on the ship, the Society will inform the Company, either directly or through the Owner's representative, of the purpose of the visit.

3.5 Use of measuring equipment and of service suppliers

3.5.1 General

Firms providing services on behalf of the Interested Party, such as measurements, tests and servicing of safety systems

and equipment, the results of which may form the basis for the Surveyor's decisions, are subject to the acceptance of the Society, as deemed necessary.

The equipment used during tests and inspections in workshops, shipyards and on board ships, the results of which may form the basis for the Surveyor's decisions, is to be customary for the checks to be performed. Firms are to individually identify and calibrate to a recognised national or international standard each piece of such equipment.

3.5.2 Simple measuring equipment

The Surveyor may accept simple measuring equipment (e.g. rulers, tape measures, weld gauges, micrometers) without individual identification or confirmation of calibration, provided it is of standard commercial design, properly maintained and periodically compared with other similar equipment or test pieces.

3.5.3 Shipboard measuring equipment

The Surveyor may accept measuring equipment fitted on board a ship (e.g. pressure, temperature or rpm gauges and meters) and used in examination of shipboard machinery and/or equipment based either on calibration records or comparison of readings with multiple instruments.

3.5.4 Other equipment

The Surveyor may request evidence that other equipment (e.g. tensile test machines, ultrasonic thickness measurement equipment, etc) is calibrated to a recognised national or international standard.

3.6 Spare parts

3.6.1 It is the Owner's responsibility to decide whether and which spare parts are to be carried on board.

3.6.2 As spare parts are outside the scope of classification, the Surveyor will not check that they are kept on board, maintained in a satisfactory condition, or suitably protected and lashed.

However, in the case of repairs or replacement, the spare parts used are to meet the requirements of the Rules as far as practicable; refer to Ch 2, Sec 2, [11.4.2].

3.7 Use of asbestos

3.7.1 (1/1/2011)

New installation of materials which contain asbestos is prohibited.

SECTION 2

CLASSIFICATION NOTATIONS

1 General

1.1 Purpose of the classification notations

1.1.1 The classification notations give the scope according to which the class of the ship has been based and refer to the specific rule requirements which are to be complied with for their assignment. In particular, the classification notations are assigned according to the type, service and navigation of the ship and other criteria which have been provided by the Interested Party, when applying for classification.

The Society may change the classification notations at any time, when the information available shows that the requested or already assigned notations are not suitable for the intended service, navigation and any other criteria taken into account for classification.

Note 1: Reference should be made to Sec 1, [1.3] on the limits of classification and its meaning.

1.1.2 The classification notations assigned to a ship are indicated on the Certificate of Classification, as well as in the Register of Ships published by the Society.

1.1.3 (1/7/2008)

Ships and units, other than those covered in Parts B, C, D, E and F, are to comply with specific Rules published by the Society, which also stipulate the relevant classification notations.

1.1.4 The classification notations applicable to existing ships conform to the Rules of the Society in force at the date of assignment of class, as indicated in Ch 2, Sec 1. However, the classification notations of existing ships may be updated according to the current Rules, as far as applicable.

1.2 Types of notations assigned

1.2.1 The types of classification notations assigned to a ship are the following:

- a) main class symbol
- b) construction marks
- c) service notations with additional service features, as applicable
- d) navigation notations
- e) operating area notations (optional)
- f) additional class notations (optional)

The different classification notations and their conditions of assignment are listed in [2] to [6] below, according to their types.

1.2.2 As an example, the classification notations assigned to a ship may be as follows (the kind of notation shown in

brackets does not form part of the classification notation indicated in the Register of Ships and on the Certificate of Classification):

C ⌘ **HULL** ⌘ **MACH**

(main class symbol, construction marks)

oil tanker-chemical tanker-ESP-Flash point > 60°C

(service notation and additional service features)

Unrestricted navigation

(navigation notation)

⌘ **SYS - NEQ**

(additional class notation).

2 Main class symbol

2.1 Main class symbol

2.1.1 The main class symbol expresses the degree of compliance of the ship with the rule requirements as regards its construction and maintenance. There is one main class symbol, which is compulsory for every classed ship.

2.1.2 (1/1/2009)

The main class symbol **C** is assigned to ships built in accordance with the requirements of the Rules or other rules recognised as equivalent, and maintained in a condition considered satisfactory by the Society. The period of class (or interval between class renewal surveys) assigned to a ship is maximum 5 years; see Ch 2, Sec 2, [4].

Except for special cases, class is assigned to a ship only when the hull, propulsion and auxiliary machinery installations, and equipment providing essential services have all been reviewed in relation to the requirements of the Rules.

Note 1: The symbol **C** with the 5 year class period is to be understood as being the highest class granted by the Society.

Note 2: The symbol **C** may be followed by the additional construction feature **light ship** in case of ships or other units having restricted navigation notations and generally having length not greater than 50 m as well as speed greater than 15 knots, whose hull scantlings and outfitting comply with the applicable requirements of Chapters 3 and 6 of the "Rules for the Classification of High Speed Craft", issued separately by the Society.

3 Construction marks

3.1 General

3.1.1 The construction mark identifies the procedure under which the ship and its main equipment or arrangements have been surveyed for initial assignment of the class. The procedures under which the ship is assigned one of the construction marks are detailed in Ch 2, Sec 1.

3.1.2 One of the construction marks defined below is assigned separately to the hull of the ship and its appendages, to the machinery installation, and to some installations for which an additional classification notation (see [6] below) is assigned.

The construction mark is placed before the symbol **HULL** for the hull, before the symbol **MACH** for the machinery installations, and before the additional class notation granted, when such a notation is eligible for a construction mark.

When the same construction mark is assigned to both hull and machinery, the construction mark is assigned globally to the ship without indication **HULL** and **MACH** after the main class symbol.

If the ship has no machinery installations covered by classification, the symbol **MACH** is not granted and the construction mark will be placed before the symbol **HULL**.

3.1.3 The construction marks refer to the original condition of the ship. However, the Society may change the construction mark where the ship is subjected to repairs, conversion or alterations.

3.2 List of construction marks

3.2.1 The mark ☒ is assigned to the relevant part of the ship, when it has been surveyed by the Society during its construction in compliance with the new building procedure detailed in Ch 2, Sec 1, [2.1].

3.2.2 (1/7/2011)

The mark ☒ is assigned to the relevant part of the ship, when the latter is classed after construction in compliance with the procedure detailed in Ch 2, Sec 1, [3.2] and it was built under the survey of a QSCS Classification Society and was assigned by this Society a class deemed equivalent to that described in the Rules.

This mark is assigned to ships:

- admitted to class in the course of construction surveyed by another QSCS Classification Society;
- for which the procedure detailed in Ch 2, Sec 1, [3.2] does not apply, as it was disclassified from a QSCS Classification Society for a period longer than six months, but which was built according to the Rules and under the survey of a QSCS Classification Society. In this case, the admission to class survey is to confirm that the ship has not undergone conversions or modifications or alterations, which were not approved by a QSCS Classification Society.

3.2.3 The mark ● is assigned to the relevant part of the ship, where the procedure for the assignment of classification is other than those detailed in [3.2.1] and [3.2.2], but however deemed acceptable.

4 Service notations

4.1 General

4.1.1 The service notations define the type and/or service of the ship which have been considered for its classifica-

tion, according to the request for classification signed by the Interested Party. At least one service notation is to be assigned to every classed ship.

Note 1: The service notations applicable to existing ships conform to the Rules of the Society in force at the date of assignment of class. However, the service notations of existing ships may be updated according to the current Rules, as far as applicable, at the request of the Interested Party.

4.1.2 (1/4/2006)

The assignment of any service notation to a new ship is subject to compliance with general Rule requirements laid down in Part B, Part C and Part D of the Rules and, for some service notations, the additional requirements laid down in Part E and in the Common Structural Rules for bulk carriers and double hull oil tankers.

4.1.3 A ship may be assigned several different service notations. In such case, the specific rule requirements applicable to each service notation are to be complied with. However, if there is any conflict in the application of the requirements applicable to different service notations, the Society reserves the right to apply the most appropriate requirements or to refuse the assignment of one of the requested service notations.

4.1.4 (1/7/2013)

A service notation may be completed by one or more additional service features, giving further precision regarding the type of service of the ship, for which specific rule requirements are applied.

For each service notation, the different service features which may be assigned are indicated in this item [4]. However, at the request of the Interested Parties, an additional service feature may be assigned together with service notations different from those for which the additional service feature is specifically foreseen in this item [4], upon acceptance of the Society, taking into account the service of the ship for which the assignment of the additional service feature is required.

4.1.5 (1/7/2009)

The different service notations which may be assigned to a ship are listed in [4.2] to [4.12], according to the category to which they belong. These service notations are also listed in alphabetical order in Tab 1.

As a rule, all notations in [4.2], [4.3], [4.5] and [4.6] are only to be assigned to self-propelled units.

4.1.6 (1/7/2009)

The list of the service notations which may be assigned in accordance with separate Rules is indicated in Tab 2.

In addition, for ships engaged in inland navigation the relevant list of service notations is given in the specific "Rules for the classification of inland waterways ships and for compliance with Directive 2006/87/EC".

4.1.7 (1/7/2009)

The assignment of a service notation does not absolve the Interested Party from compliance with any international and national regulations established by the Administrations. Neither does it waive the requirements in Sec 1, [3.3.1].

4.2 Cargo ships

4.2.1 The service notations related to self-propelled ships intended for the carriage of cargo are listed in [4.2.2] to [4.2.17] below.

Table 1 : List of service notations assigned in accordance with the requirements of these Rules (1/1/2018)

Service notation	Reference for definition	Reference chapter in Part E
asphalt tanker	[4.5.8]	Part E, Chapter 7
asphalt tanker ESP	[4.5.9]	Part E, Chapter 7
barge	[4.9.1]	Part E, Chapter 19
bulk carrier ch xii	[4.2.16]	(1)
bulk carrier ch xii - double side-skin	[4.2.17]	(1)
bulk carrier ESP	[4.3.2]	Part E, Chapter 4
bulk carrier ESP CSR	[4.3.3]	Part E, Chapter 4
cable laying ship	[4.8.7]	Part E, Chapter 7
chemical recovery ship	[4.8.6]	Part E, Chapter 28
car carrier	[4.2.5]	(1)
chemical tanker	[4.5.4]	Part E, Chapter 8
chemical tanker ESP	[4.5.4]	Part E, Chapter 8
cement carrier	[4.2.10]	Part E, Chapter 23
combination carrier/OBO ESP	[4.3.6]	Part E, Chapter 6
combination carrier/OOC ESP	[4.3.7]	Part E, Chapter 6
compressed natural gas carrier	[4.2.11]	Part E, Chapter 24
container ship	[4.2.6]	Part E, Chapter 2
deck cargo ship	[4.2.12]	(1)
dredger	[4.7.2]	Part E, Chapter 13
escort tug	[4.8.2]	Part E, Chapter 14
fire-fighting ship	[4.8.4]	Part E, Chapter 16
fishing vessel	[4.10.1]	Part E, Chapter 20
fly ash carrier	[4.2.9]	(1)
FLS tanker	[4.5.6]	Part E, Chapter 7
general cargo ship	[4.2.2]	(1)
general cargo ship - double-side-skin	[4.2.13]	(1)
hopper dredger	[4.7.2]	Part E, Chapter 13
hopper unit	[4.7.2]	Part E, Chapter 13
liquefied gas carrier	[4.5.5]	Part E, Chapter 9
livestock carrier	[4.2.7]	Part E, Chapter 3
oil carrier - assisted propulsion	[4.5.11]	Part E, Chapter 25
oil recovery ship	[4.8.5]	Part E, Chapter 17
oil tanker	[4.5.2]	Part E, Chapter 7
oil tanker ESP	[4.5.2]	Part E, Chapter 7
oil tanker ESP CSR	[4.5.3]	Part E, Chapter 7
ore carrier ESP	[4.3.5]	Part E, Chapter 5

(1) No additional requirements are specified in Part E for this service notation.
(2) No additional requirements are specified in Part E for this service notation; however the requirements of Part F, Chapter 8 for the assignment of the additional class notation **REF-CARGO** are to be applied.
(3) These ships are considered on a case by case basis by the Society according to their type of service.

Service notation	Reference for definition	Reference chapter in Part E
palm oil carrier - assisted propulsion	[4.5.12]	Part E, Chapter 26
passenger ship	[4.6.2]	Part E, Chapter 11
pipe laying ship	[4.8.9]	Part E, Chapter 22
pontoon	[4.9.2]	Part E, Chapter 19
refrigerated cargo ship	[4.2.5]	(2)
research ship	[4.8.8]	Part E, Chapter 21
ro-ro cargo ship	[4.2.3]	Part E, Chapter 1
ro-ro passenger ship	[4.6.3]	Part E, Chapter 12
salvage tug	[4.8.2]	Part E, Chapter 14
Self-Unloading Bulk Carriers ESP	[4.3.8]	(1)
special service	[4.12.1]	(3)
split hopper dredger	[4.7.2]	Part E, Chapter 13
split hopper unit	[4.7.2]	Part E, Chapter 13
sugar carrier	[4.2.8]	(1)
supply vessel	[4.8.3]	Part E, Chapter 15
tanker	[4.5.7]	Part E, Chapter 10
transshipping unit transshipping floating terminal	[4.11.1]	Part E, Chapter 27
tug	[4.8.2]	Part E, Chapter 14
well stimulation	[4.8.10]	Part E, Chapter 29
wood chip carrier	[4.2.14]	(1)
<p>(1) No additional requirements are specified in Part E for this service notation.</p> <p>(2) No additional requirements are specified in Part E for this service notation; however the requirements of Part F, Chapter 8 for the assignment of the additional class notation REF-CARGO are to be applied.</p> <p>(3) These ships are considered on a case by case basis by the Society according to their type of service.</p>		

Table 2 : List of service notations assigned in accordance with the requirements of separate Rules (1/1/2019)

Service notation	Separate Rules for reference
HSC (1) (2) (3)	Rules for the Classification of High Speed Craft
MODU	Rules for the classification of floating offshore units at fixed locations and mobile offshore drilling units
Fixed platform	Rules for the Classification of Steel Fixed Offshore Platforms
FPSO: assigned to units intended for the production, storage and off-loading of liquid hydrocarbons FSO : assigned to units intended for the storage and off-loading of liquid hydrocarbons FSRU: assigned to units intended for off-loading, storage and/or regasification of liquefied natural gas (LNG) and/or liquefied petroleum gas (LPG) FLNG: assigned to units intended for liquefaction, storage and off-loading of natural gas (LNG)	Rules for the classification of floating offshore units at fixed locations and mobile offshore drilling units
offshore support vessel (4)	Rules for the Classification of Offshore Support Vessels
lifting unit	Rules for loading and unloading arrangements and for other lifting appliances on board ships
floating dock	Rules for the classification of floating docks
submersible	Rules for the classification of underwater units
submersible pontoon	Rules for the classification of underwater units
submersible pontoon launching	Rules for the classification of underwater units
submarine	Rules for the classification of underwater units
<p>(1) The notation is completed by one of the following additional service features, specifying the category of the craft in accordance with the IMO "International Code of Safety for High Speed Craft" :</p> <ul style="list-style-type: none"> • A for a passenger craft which can be defined according to the Code as category A • B for a passenger craft which can be defined according to the Code as category B • C for a cargo craft which can be defined according to the Code as category C. <p>(2) The notation may also be completed by one of the following additional service features specifying the type of construction:</p> <ul style="list-style-type: none"> • MON if the craft is a monohull • CAT if the craft is a catamaran • HYF if the craft is a hydrofoil • ACV if the craft is an air-cushion vehicle • SES if the craft is a surface effect ship • SWATH if the craft is a twin hull small waterplane vehicle. <p>(3) The notation may be followed by the service notations specified in [4], as applicable; for example by the notation ro-ro passenger ship for a passenger craft specially equipped to load trains or wheeled vehicles.</p> <p>(4) The notation is to be completed by at least one of the following additional service features unless the vessel complies with requirements identified by the Designer that have been considered by the Society as equivalent to those relevant to the additional service feature supply:</p> <ul style="list-style-type: none"> • supply • tug • salvage tug • fire-fighting • oil recovery • diving support • cable laying • pipe laying • well stimulation. <p>(5) The notation may be completed by the following additional service features:</p> <ul style="list-style-type: none"> • 12 m SI for boats of 12-metre international rating class • 6 m SI for boats of 6-metre international rating class. 	

Service notation	Separate Rules for reference
bathyscaphe	Rules for the classification of underwater units
mesoscaphe	Rules for the classification of underwater units
bathysphere	Rules for the classification of underwater units
mesosphere	Rules for the classification of underwater units
MSS	Rules for the classification of underwater units
hyperbaric diving bell	Rules for the classification of underwater units
Isobaric diving bell	Rules for the classification of underwater units
ROV	Rules for the classification of underwater units
diving-suit	Rules for the classification of underwater units
habitat	Rules for the classification of underwater units
SEALAB	Rules for the classification of underwater units
submersible igloo	Rules for the classification of underwater units
stowage reservoir	Rules for the classification of underwater units
decompression chamber	Rules for the classification of underwater units
diving system	Rules for the classification of underwater units
Y	Rules for the Classification of Pleasure Yachts
Y_{ch}	Rules for the Classification of Yachts designed for commercial use
racing sailing boat (5)	Rules for the construction and classification of racing sailing boats
<p>(1) The notation is completed by one of the following additional service features, specifying the category of the craft in accordance with the IMO "International Code of Safety for High Speed Craft" :</p> <ul style="list-style-type: none"> • A for a passenger craft which can be defined according to the Code as category A • B for a passenger craft which can be defined according to the Code as category B • C for a cargo craft which can be defined according to the Code as category C. <p>(2) The notation may also be completed by one of the following additional service features specifying the type of construction:</p> <ul style="list-style-type: none"> • MON if the craft is a monohull • CAT if the craft is a catamaran • HYF if the craft is a hydrofoil • ACV if the craft is an air-cushion vehicle • SES if the craft is a surface effect ship • SWATH if the craft is a twin hull small waterplane vehicle. <p>(3) The notation may be followed by the service notations specified in [4], as applicable; for example by the notation ro-ro passenger ship for a passenger craft specially equipped to load trains or wheeled vehicles.</p> <p>(4) The notation is to be completed by at least one of the following additional service features unless the vessel complies with requirements identified by the Designer that have been considered by the Society as equivalent to those relevant to the additional service feature supply:</p> <ul style="list-style-type: none"> • supply • tug • salvage tug • fire-fighting • oil recovery • diving support • cable laying • pipe laying • well stimulation. <p>(5) The notation may be completed by the following additional service features:</p> <ul style="list-style-type: none"> • 12 m SI for boats of 12-metre international rating class • 6 m SI for boats of 6-metre international rating class. 	

4.2.2 (1/7/2015)

general cargo ship, for ships intended to carry general cargo.

The service notation may be completed by the additional service features as per [4.2.15], as applicable.

Note 1: With respect to the survey requirements of Ch 4, Sec 8, "General Dry Cargo Ships" are those self-propelled general cargo ships of 500 gt and above carrying solid cargoes other than:

- bulk carriers and combination carriers of single side skin construction or double skin bulk carriers
- dedicated container carriers
- ro-ro cargo ships
- refrigerated cargo ships
- dedicated wood chip carriers
- dedicated cement carriers
- livestock carriers
- deck cargo ships (a "deck cargo ship" is a ship that is designed to carry cargo exclusively above deck without any access for cargo below deck),
- general cargo ships of double side-skin construction, with double side-skin extending for the entire length of the cargo area, and for the entire height of the cargo hold to the upper deck,
- sugar carriers,
- fly ash carriers.

4.2.3 (1/7/2015)

ro-ro cargo ship, for ships specially intended to carry vehicles, trains or loads on wheeled beds. The additional requirements of Part E, Chapter 1 are applicable to these ships. The service notation may be completed by the additional service features as per [4.2.15], as applicable.

4.2.4 (1/7/2016)

car carrier, for ro-ro cargo ships specially intended with multi deck ro-ro spaces designed for the carriage of empty cars and trucks as cargo.

The service notation may be completed by the additional service features in [4.2.15], as applicable.

4.2.5 (1/7/2015)

refrigerated cargo ship, for ships specially intended to carry refrigerated cargo. No additional requirements are specified in Part E for this service notation; however, the requirements of Part F, Chapter 8 for the assignment of the additional class notation **REF-CARGO** are to be applied. The service notation may be completed by the additional service features as per [4.2.15], as applicable.

4.2.6 (1/7/2015)

container ship, for ships specially intended to carry containers in holds or on decks. The additional requirements of Part E, Chapter 2 are applicable to these ships.

The service notation may be completed by the additional service feature **OPEN TOP**. The additional service feature is assigned to container ships that are specially designed so that one or more of the cargo holds need not be fitted with hatch covers. The requirements for the assignment of this

additional service feature are given in Pt E, Ch 2, Sec 2, [2.1.4], [2.1.5] and Pt E, Ch 2, Sec 3, [1.1.1].

The service notation may be completed by other additional service features as per [4.2.15], as applicable.

4.2.7 (1/7/2015)

livestock carrier, for ships specially intended to carry livestock. The additional requirements of Part E, Chapter 3 are applicable to these ships.

4.2.8 (1/7/2015)

sugar carrier, for ships intended for the carriage of sugar in bulk and provided with loading and unloading arrangements such that these operations are not carried out by grabs heavier than 10 t, power shovels or other means which frequently damage cargo hold structures.

The service notation may be completed by the additional service features as per [4.2.15], as applicable.

4.2.9 (1/7/2015)

fly ash carrier, for ships intended for the carriage of fly ash in bulk and provided with loading and unloading arrangements such that these operations are not carried out by grabs heavier than 10 t, power shovels or other means which frequently damage cargo hold structures.

The service notation may be completed by the additional service features as per [4.2.15], as applicable.

4.2.10 (1/7/2015)

cement carrier, for ships specially intended to carry cement in bulk in holds and equipped with fixed arrangements for that purpose. The additional requirements of Part E, Chapter 23 are applicable to these ships.

The service notation may be completed by the additional service features as per [4.2.15], as applicable.

4.2.11 (1/7/2012)

compressed natural gas carrier, for ships specially intended to carry compressed natural gas (CNG ships) in specifically designed cargo tanks. The additional requirements of Part E, Chapter 24 are applicable to these ships.

4.2.12 (1/7/2015)

deck cargo ship, for ships intended to carry solid general cargo exclusively above deck without any access for cargo below deck.

The service notation may be completed by the additional service features as per [4.2.15], as applicable.

4.2.13 (1/7/2015)

general cargo ship - double side-skin, for ships intended to carry solid general cargo of double side-skin construction, with double side-skin extending for the entire length of the cargo area, and for the entire height of the cargo hold to the upper deck.

The service notation may be completed by the additional service features as per [4.2.15], as applicable.

4.2.14 (1/7/2015)

wood chip carrier, for ships intended for the carriage of wood chip.

The service notation may be completed by the additional service features in [4.2.15], as applicable.

4.2.15 (1/7/2016)

The service notations listed in [4.2.1] to [4.2.13] may be completed by the following additional service features, as applicable:

- **equipped for carriage of containers**, where the ship's fixed arrangements comply with the applicable rule requirements in Part E, Chapter 2
- **heavycargo [AREA1, X1 kN/m2 - AREA2, X2 kN/m2 - ...**

when the cargo areas intended to support heavy cargoes fulfill the appropriate rule requirements. The values Xi indicate the maximum allowable local pressures on the various AREAs where the cargo is intended to be stowed. The requirements for the assignment of this additional service feature are given in Pt B, Ch 5, Sec 6, [4.1.2]

- **nonhomload**, when the ship has been designed in such a way that the cargo spaces may be loaded non-homogeneously, including cases where some holds may be empty, at a draught up to the scantling draught and fulfill the appropriate rule requirements for general strength, and when the corresponding loading conditions are listed in the reviewed loading manual. This notation can be completed with the indication of the different maximum loads allowed in each hold and which holds may be empty, if appropriate.

- **P** when the ship is intended for the exclusive carriage of goods in package or any other form excluding solid goods in bulk,

- **BC** applicable to:

- a) single skin ship having length less than 100 m and no reduced freeboard which is intended to carry dry cargoes in bulk and comply with the following requirements of SOLAS Ch XII regulations:

- XII/11: "Loading Instrument"
- XII/12: "Hold, Ballast and Dry Space Water Ingress Alarms"
- XII/13: "Availability of Pumping Systems".

Ships having length greater than or equal to 100 m or reduced freeboard are to comply with the requirements for the assignment of the additional service feature **BC Ch XII**.

- b) double skin ship having no reduced freeboard which is intended to carry dry cargoes in bulk and comply with the following requirements of SOLAS Ch XII regulations:

- II-1/3-2.2: "Protective Coatings of Dedicated Seawater Ballast Tanks in All Types of Ships and Double-Side Skin Spaces of Bulk Carriers"
- XII/6.2, 6.3 and 6.4: "Structural and Other Requirements for Bulk Carriers"
- XII/11: "Loading Instrument"
- XII/12: "Hold, Ballast and Dry Space Water Ingress Alarms"
- XII/13: "Availability of Pumping Systems".

Ships having reduced freeboard are to comply with the requirements for the assignment of the additional service feature **BC Ch XII**.

- **BC Ch XII**: applicable to ships intended to primarily carry dry cargoes in bulk, which are not constructed with the typical midship section arrangements as per [4.3.2] or [4.3.3] and comply with the requirements in Parts A, B, C and D, as applicable, and with the requirements in SOLAS, Chapter XII.

- **H-CNG**: applicable to car carriers when ro-ro spaces comply with the rule requirements in Part E, Chapter 1.

4.2.16 (20/9/2017)

bulk carrier ch xii, for general cargo ships intended to primarily carry dry cargoes in bulk, which are not constructed with the typical midship section arrangements as per [4.3.2] or [4.3.3] and comply with the requirements in Parts A, B, C and D, as applicable, and with the requirements in SOLAS, Chapter XII.

At Owner request this notation can be assigned as equivalent to that assigned for a general cargo ship, with service feature **BC Ch XII** (refer to [4.2.15]).

4.2.17 (1/1/2018)

bulk carrier ch xii - double side-skin applies to ships in compliance with [4.2.16] and with double side-skin extending for the entire length of the cargo area, and for the entire height of the cargo hold to the upper deck.

4.3 Bulk, ore and combination carriers**4.3.1 (1/7/2016)**

The service notations related to self-propelled ships (see Note 1) intended for the carriage of dry cargo in bulk are listed in [4.3.2] to [4.3.7] below.

The service notations described in this item are always completed by the additional service feature **ESP**, which means that these ships are submitted to the Enhanced Survey Program as laid down in Ch 4, Sec 2.

Example: **ore carrier ESP**

Note 1: Self-propelled ships are ships with mechanical means of propulsion not requiring assistance from another ship during normal operation.

The service notation **bulk carrier** is completed by the additional service feature **CSR** for bulk carriers built in accordance with:

- the "Common Structural Rules for Bulk Carriers" (i.e. single side skin and double side skin bulk carriers with unrestricted navigation, having length L of 90 m or greater, contracted for construction on or after 1 April 2006 but before 1 July 2015), or
- the "Common Structural Rules for Bulk Carriers and Oil Tankers" (i.e. single side skin and double side skin bulk carriers, self-propelled with unrestricted navigation, having length L of 90 m or greater, contracted for construction on or after 1 July 2015).

Example: **bulk carrier ESP CSR**

4.3.2 (1/4/2006)

bulk carrier ESP, for self-propelled ships which are constructed generally with single deck, double bottom, hopper side tanks and topside tanks and with single or double side skin construction in cargo length area and intended primarily to carry dry cargoes in bulk (see Note 1). Typical midship sections are given in Fig 1. However, other midship

section arrangements may be accepted, if deemed equivalent by the Society.

The additional requirements of Part E, Chapter 4 are applicable to these ships.

Note 1: For bulk carriers with hybrid cargo hold arrangements, i.e. with some cargo holds of single side skin and others of double side skin, the requirements of Ch 4, Sec 2 are to apply to cargo holds of single side skin and those of Ch 4, Sec 9 to cargo holds of double side skin.

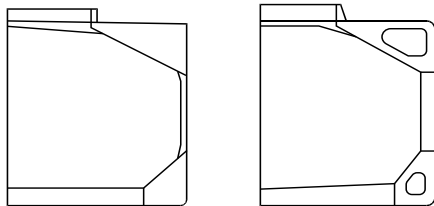
4.3.3 (1/4/2006)

bulk carrier ESP CSR, for self-propelled ships which are constructed generally with single deck, double bottom, hopper side tanks and topside tanks and with single or double side skin construction in the cargo length area and intended primarily to carry dry cargoes in bulk (see Note 1), with unrestricted worldwide navigation, having length L of 90 m or greater, contracted for construction on or after 1 April 2006. Typical midship sections are given in Fig 1.

The additional requirements of Part E, Chapter 4 are applicable to these ships with the limitations indicated therein.

Note 1: For bulk carriers with hybrid cargo hold arrangements, i.e. with some cargo holds of single side skin and others of double side skin, the requirements of Ch 4, Sec 2 are to apply to cargo holds of single side skin and those of Ch 4, Sec 9 to cargo holds of double side skin.

Figure 1 : Typical midship sections of ships with service notation bulk carrier ESP



Left: Single side skin construction

Right: Double side skin construction

4.3.4 (1/4/2006)

The service notations in [4.3.2] and [4.3.3] may be completed by the following additional service features, as applicable:

- **heavycargo [HOLD_i, Xi kN/m², pi kN/m³ - HATCH_i, Yi kN/m²]**, when the ship's structure designed to support heavy cargoes fulfils the appropriate Rule requirements.

The values Xi and Yi indicate, respectively, the maximum allowable local pressures on the inner bottoms of the various HOLD_i and on the hatch covers HATCH_i where the cargo is intended to be stowed and pi is the maximum density of the bulk cargo allowable for carriage in the relevant HOLD_i. The requirements for the assignment of this additional service feature are given in Pt E, Ch 4, Sec 3, [4.8];

- **nonhomload**, when the ship has been designed in such a way that the cargo spaces may be loaded non-homogeneously, including cases where some holds may be empty, at a draught up to the scantling draught and fulfil the appropriate Rule requirements for general strength, and when the corresponding loading conditions are listed in the reviewed loading manual. This notation can

be completed with the indication of the different maximum loads allowed in each hold and which holds may be empty, if appropriate.

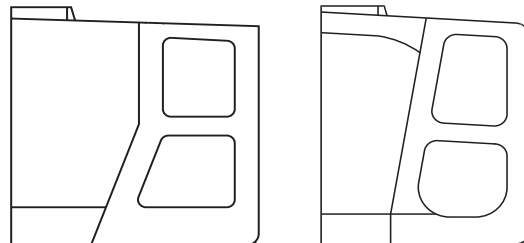
- **double skin**, when the ship is constructed in accordance with the definition given in Ch 2, Sec 2, [2.2.21].

4.3.5 (1/1/2005)

The notation **ore carrier ESP**, or equivalent, is to be assigned to self-propelled ships which are constructed generally with single deck, two longitudinal bulkheads and a double bottom throughout the cargo length area and intended primarily to carry ore cargoes in the centre holds only. Typical midship sections are given in Fig 2. However, other midship section arrangements may be accepted, if deemed equivalent by the Society.

The additional requirements of Part E, Chapter 5 are applicable to these ships.

Figure 2 : Typical midship section of ship with service notation ore carrier ESP (1/1/2005)

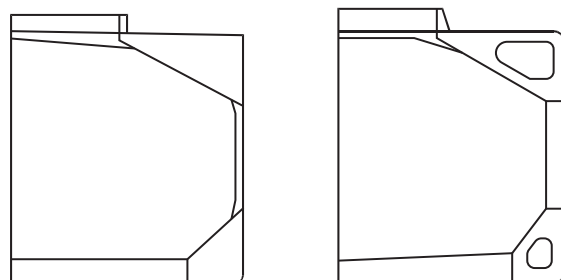


4.3.6 (1/1/2012)

combination carrier/OBO ESP for self-propelled ships intended to carry both oil and dry cargoes in bulk; these cargoes are not carried simultaneously, with the exception of oily mixture retained in slop tanks. This notation is assigned to ships which are constructed generally with single deck, double bottom, hopper side tanks and topside tanks and with single or double side skin construction in the cargo length area, and intended primarily to carry oil or dry cargoes, including ore, in bulk. Typical midship sections are given in Fig 3. The additional requirements of Part E, Chapter 6 are applicable to these ships.

Note 1: Combination carriers/OBO that do not comply with MARPOL I/19 may be subject to international and/or national regulations requiring phase out.

Figure 3 : Typical midship section of ship with service notation combination carrier/OBO ESP (1/1/2005)



Left: Single side skin construction

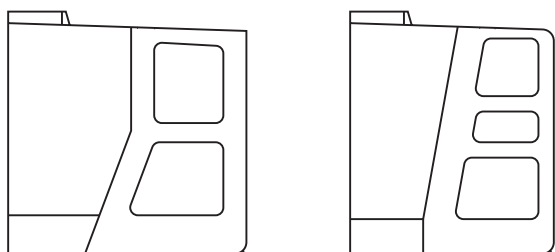
Right: Double side skin construction

4.3.7 (1/1/2012)

combination carrier/OOC ESP, for self-propelled ships intended to carry both oil and dry cargoes in bulk; these cargoes are not carried simultaneously, with the exception of oily mixture retained in slop tanks. This notation is assigned to ships which are constructed generally with single deck, two longitudinal bulkheads and a double bottom throughout the cargo length area, and intended primarily to carry ore cargoes in the centre holds and oil cargoes in the centre holds and wing tanks. Typical midship sections are given in Fig 4. The additional requirements of Part E, Chapter 6 are applicable to these ships.

Note 1: Combination carriers/OOC that do not comply with MARPOL I/19 may be subject to international and/or national regulations requiring phase out.

Figure 4 : Typical midship sections of ships with service notation combination carrier/OOC ESP (1/1/2005)

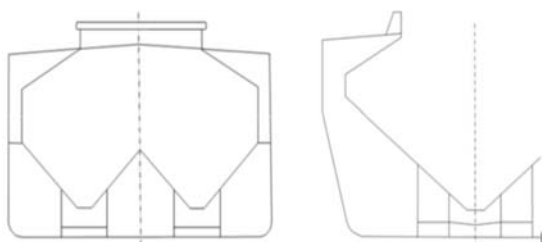


4.3.8 (1/1/2017)

Self-Unloading Bulk Carriers ESP, or equivalent, is assigned self-propelled ships which are constructed generally with single deck, double bottom, hopper side tanks and topside tanks and with single or double side skin construction in cargo length area and intended to carry and self-unload dry cargoes in bulk. Typical midship sections are given in Fig 5. However, other midship section arrangements may be accepted, if deemed equivalent by the Society.

Note 1: Combination carriers/OOC that do not comply with MARPOL I/19 may be subject to international and/or national regulations requiring phase out.

Figure 5 : Typical midship sections of ships with service notation Self-Unloading Bulk Carriers/Self-Unloaders ESP (1/1/2017)



4.4 Additional service features and corresponding design loading conditions for bulk carriers

4.4.1 (1/7/2016)

The requirements of item [4.4] are applicable to bulk carriers as defined in [4.3.2], having length as defined in Pt B, Ch 1, Sec 2, [3.1] of 150 m or greater and contracted for new construction on or after 1 July 2003.

For **bulk carriers ESP CSR**, as defined in [4.3.3], having length as defined in Pt B, Ch 1, Sec 2, [3.1] of 150 m or greater and contracted for new construction on or after 1 April 2006 but before 1 July 2015, the requirements of the "Common Structural Rules for Bulk Carriers", Sec 1, [3] apply instead.

For **bulk carriers ESP CSR**, as defined in [4.3.3], having length as defined in Pt B, Ch 1, Sec 2, [3.1] of 150 m or greater and contracted for new construction on or after 1 July 2015, the requirements of the "Common Structural Rules for Bulk Carriers", Ch 1, Sec 1, [3] apply instead.

4.4.2 (1/7/2003)

The loading conditions listed in Pt E, Ch 4, Sec 3, [4.1], Pt E, Ch 4, Sec 3, [4.2] and Pt E, Ch 4, Sec 3, [4.3] are to be used for the checking of rule criteria regarding longitudinal strength (as required by Pt B, Ch 6, Sec 2, [3] and Pt E, Ch 4, Sec 3, [5]), local strength, capacity and arrangement of ballast tanks and stability. The loading conditions listed in Pt E, Ch 4, Sec 3, [4.8]) are to be used for the checking of rule criteria regarding local strength.

4.4.3 (1/7/2003)

For the purpose of applying the conditions for the assignment of the harmonised notations, maximum draught is to be taken as moulded summer load line draught.

4.4.4 (1/7/2003)

Bulk carriers are to be assigned one of the following additional service features.

- BC-A:** for bulk carriers designed to carry dry bulk cargoes of cargo density $1,0 \text{ t/m}^3$ and greater with specified holds empty at maximum draught in addition to **BC-B** conditions.
- BC-B:** for bulk carriers designed to carry dry bulk cargoes of cargo density of $1,0 \text{ t/m}^3$ and greater with all cargo holds loaded in addition to **BC-C** conditions.
- BC-C:** for bulk carriers designed to carry dry bulk cargoes of cargo density less than $1,0 \text{ t/m}^3$.

The following additional service features are to be provided giving further detailed description of limitations to be observed during operation as a consequence of the design loading condition applied during the design in the following cases:

- maximum cargo density** (in t/m^3) for notations **BC-A** and **BC-B**, if the maximum cargo density is less than 3.0 t/m^3
- no MP** for all notations, when the vessel has not been designed for loading and unloading in multiple ports in

accordance with the conditions specified in Pt E, Ch 4, Sec 3, [4.5.4]

- **allowed combination of specified empty holds** for notation **BC-A**.

Note 1: The requirements of this item [4.4] are not intended to prevent any other loading conditions being included in the loading manual, for which calculations are to be submitted as required; nor are they intended to replace in any way the required loading manual/instrument.

Note 2: A bulk carrier in actual operation may be loaded differently from the design loading conditions specified in the loading manual, provided limitations for longitudinal and local strength as defined in the loading manual and loading instrument on board and applicable stability requirements are not exceeded.

4.5 Ships carrying liquid cargo in bulk

4.5.1 (1/5/2013)

The service notations related to self-propelled ships (see Note 1) intended for the carriage of liquid cargo in bulk are listed in [4.5.2] to [4.5.10] below.

Note 1: Self-propelled ships are ships with mechanical means of propulsion not requiring assistance from another ship during normal operation.

The service notations related to assisted propulsion units (see [4.9.4]) intended for the carriage of liquid cargo in bulk are listed in [4.5.11] and [4.5.12] below.

4.5.2 (1/1/2012)

oil tanker, for self-propelled ships which are intended primarily to carry in bulk crude oil or other oil products having any flash point, liquid at atmospheric pressure and ambient temperature (or thus maintained by heating).

This notation is to be assigned to tankers of both single and double hull construction, as well as tankers with alternative structural arrangements, provided they are deemed equivalent by the Society.

For oil tankers with integral cargo tanks, the service notation **oil tanker** is always completed by the additional service feature **ESP** (i.e. **oil tanker ESP**), which means that these ships are submitted to the Enhanced Survey Program as laid down in Ch 4, Sec 3 or Ch 4, Sec 4, as applicable.

Note 1: Oil tankers that do not comply with MARPOL I/19 may be subject to international and/or national regulations requiring phase out under MARPOL I/20 and/or MARPOL I/21.

The service notation may be completed by the following additional service features, as applicable:

- **flash point > 60°C**, where the ship is intended to carry only such type of products, under certain conditions
- **double hull**, when the ship is constructed in accordance with the definition given in Ch 2, Sec 2, [2.2.18]
- **double hull (heavy grades)**, when the ship is constructed in accordance with the definition given in Ch 2, Sec 2, [2.2.20]
- **double hull (independent tanks)**, when the ship is constructed in accordance with the definition given in Ch 2, Sec 2, [2.2.19]
- **product**, where the ship is intended to carry only products other than crude oil.

The additional requirements of Part E, Chapter 7 are applicable to these ships.

4.5.3 (1/7/2016)

The service notation **oil tanker ESP** is always completed by the additional service feature **CSR** for oil tankers built in accordance with:

- the "Common Structural Rules for Double Hull Oil Tankers" (i.e. double hull oil tankers, having length L of 150 m or greater, contracted for construction on or after 1 April 2006 but before 1 July 2015), or
- the "Common Structural Rules for Bulk Carriers and Oil Tankers" (i.e. double hull oil tankers, self-propelled with unrestricted navigation, having length L of 150 m or greater, contracted for construction on or after 1 July 2015).

Example: **oil tanker ESP CSR**

The additional requirements of Part E, Chapter 7 are applicable to these ships with the limitations indicated therein.

4.5.4 (1/7/2011)

chemical tanker, for self-propelled ships which intended primarily to carry in bulk chemical products presenting safety and/or pollution hazards. This notation is to be assigned to tankers of both single and double hull construction, as well as tankers with alternative structural arrangements, provided they are deemed equivalent by the Society.

For chemical tankers with integral cargo tanks, the service notation **chemical tanker** is always completed by the additional service feature **ESP** (i.e. **chemical tanker ESP**), which means that these ships are submitted to the Enhanced Survey Program as laid down in Ch 4, Sec 5.

The additional requirements of Part E, Chapter 8 are applicable to these ships.

The list of products the ship is allowed to carry is attached to the Certificate of Classification or the Certificate of Fitness, where issued by the Society, including, where necessary, the maximum allowable specific gravity and/or temperature.

The service notation may be completed by the additional service feature **IMO 1**, **IMO 2** or **IMO 3**, when the ship complies with the requirements for the assignment of type 1, type 2 or type 3, respectively, in accordance with Chapter 2 of the IBC Code.

4.5.5 liquefied gas carrier, for ships specially intended to carry liquefied gases or other substances listed in Pt E, Ch 9, Sec 1 of the Rules. The additional requirements of Part E, Chapter 9 are applicable to these ships.

The list of products the ship is allowed to carry is attached to the Certificate of Classification or the Certificate of Fitness, where issued by the Society, including, where necessary, the conditions of transportation (pressure, temperature, filling limits).

4.5.6 (1/4/2006)

FLS tanker, for ships specially intended to carry in bulk flammable liquid products other than those covered by the service notations **oil tanker ESP**, **oil tanker ESP CSR**, **chemical tanker ESP** or **liquefied gas carrier**

The list of products the ship is allowed to carry may be attached to the Certificate of Classification, including,

where necessary, the maximum allowable specific gravity and/or temperature.

The service notation may be completed by the additional service feature **flash point > 60°C**, where the ship is intended to carry only such type of products, under certain conditions.

For ships intended to carry only one type of cargo, the service notation may be completed by the additional service feature indicating the type of product carried, e.g. **FLS tanker-acetone**.

The additional requirements of Part E, Chapter 7 are applicable to these ships.

4.5.7 tanker, for ships intended to carry non-flammable liquid cargoes in bulk other than those covered by the service notations in [4.5.2] to [4.5.6] above, such as wine or water.

The list of cargoes the ship is allowed to carry may be attached to the Certificate of Classification.

For ships intended to carry only one type of cargo, the service notation may be completed by the additional service feature indicating the type of product carried, e.g. **tanker-potable water**.

The additional requirements of Part E, Chapter 10 are applicable to these ships.

4.5.8 (1/7/2018)

asphalt tanker, for self-propelled ships which are constructed with independent, non-integral cargo tanks, intended to only carry such type of products, under certain conditions. The maximum cargo temperature will be indicated on the Certificate of Classification.

The additional requirements of Part E, Chapter 7 are applicable to these ships.

For asphalt tankers assigned with other service notations, **asphalt carrier** may be used at the request of the Interested Party in lieu of asphalt tanker provided that all the requirements applicable to asphalt tankers are applicable to these ships.

4.5.9 (1/7/2011)

For asphalt tankers intended to only carry such type of products under certain conditions, but with integral cargo tanks, the service notation **asphalt tanker** is always completed by the additional service feature **ESP** (i.e. **asphalt tanker ESP**), which means that these ships are submitted to the Enhanced Survey Program as laid down in Ch 4, Sec 3. The maximum cargo temperature will be indicated on the Certificate of Classification.

The additional requirements of Part E, Chapter 7 are applicable to these ships.

4.5.10 Refer also to [4.3.6] and [4.3.7] for **combination carrier** intended to carry alternatively oil products and dry cargo in bulk in cargo holds/tanks.

4.5.11 (1/5/2013)

Oil carrier - assisted propulsion, for assisted propulsion ships (see [4.9.4]) of limited size (DWT<10000 tonnes) which are intended primarily to carry in bulk crude oil or other oil products having any flash point, liquid at atmos-

pheric pressure and ambient temperature (or thus maintained by heating) in restricted areas.

This notation is to be assigned to ships of both single and double hull construction, as well as ships with alternative structural arrangements, provided they are deemed equivalent by the Society.

The service notation may be completed by the following additional service features, as applicable:

- **flashpoint > 60°C**, where the ship is intended to carry only such type of products, under certain conditions
- **double hull**, when the ship is constructed in accordance with the definition given in Ch 2, Sec 2, [2.2.18]
- **double hull (heavy grades)**, when the ship is constructed in accordance with the definition given in Ch 2, Sec 2, [2.2.20] Ch 2, Sec 2, [2.2.19]
- **product**, where the ship is intended to carry only products other than crude oil.

The additional requirements of Part E, Chapter 25 are applicable to these ships with the limitations indicated therein.

4.5.12 (1/5/2013)

Palm oil carrier- assisted propulsion, for assisted propulsion ships (see [4.9.4]) of limited size (DWT<10000 tonnes) which are intended primarily to carry in restricted areas palm oil in bulk. This notation is to be assigned to ships of both single and double hull construction, as well as ships with alternative structural arrangements, provided they are deemed equivalent by the Society.

The additional requirements of Part E, Chapter 26 are applicable to these ships with the limitations indicated therein.

4.6 Ships carrying passengers

4.6.1 The service notations related to ships specially intended for the carriage of passengers are listed in [4.6.2] to [4.6.3] below.

4.6.2 passenger ship, for ships intended to carry more than 12 passengers. The additional requirements of Part E, Chapter 11 are applicable to these ships.

The service notation may be completed by the additional service feature **< 36 passengers**, where the ship is intended to carry only such a limited number of passengers.

4.6.3 ro-ro passenger ship, for ships intended to carry more than 12 passengers and specially equipped to load trains or wheeled vehicles. The additional requirements of Part E, Chapter 12 are applicable to these ships.

The service notation may be completed by the additional service feature **< 36 passengers**, where the ship is intended to carry only such a limited number of passengers.

4.7 Ships for dredging activities

4.7.1 The service notations related to ships specially intended for dredging activities are listed in [4.7.2]. The additional requirements of Part E, Chapter 13 are applicable to these ships.

4.7.2 The following notations are provided:

- a) **dredger**, for ships specially equipped only for dredging activities (excluding carrying dredged material)
- b) **hopper dredger**, for ships specially equipped for dredging activities and carrying spoils or dredged material
- c) **hopper unit**, for ships specially equipped for carrying spoils or dredged material
- d) **split hopper unit**, for ships specially equipped for carrying spoils or dredged material and which open longitudinally, around hinges
- e) **split hopper dredger**, for ships specially equipped for dredging and for carrying spoils or dredged material and which open longitudinally, around hinges.

4.7.3 These ships which are likely to operate at sea within specific limits may, under certain conditions, be granted an operating area notation. For the definition of operating area notation, reference should be made to [5.3].

4.8 Working ships

4.8.1 The service notations related to ships specially intended for different working services are listed in [4.8.2] to [4.8.10] below.

4.8.2 (1/11/2016)

The service notations for ships intended to tow and/or push other ships or units are:

- a) **tug**, for ships specially equipped for towing and/or pushing
- b) **salvage tug**, for ships specially equipped for towing and/or pushing having specific equipment for salvage
- c) **escort tug**, for ships specially equipped for towing and/or pushing having specific equipment for escorting ships or units during navigation.

The additional requirements of Part E, Chapter 14 are applicable to these ships.

These service notations may be completed by the additional service features:

- **barge combined**, when units are designed to be connected with barges and comply with the relevant requirements of Pt E, Ch 14, Sec 3. The barges to which the tug can be connected are specified in an annex to the Certificate of Classification.
- **rescue**, when units are specially equipped for rescue of shipwrecked persons and for their accommodation in accordance with Pt E, Ch 14, Sec 2, [2.10.2].
- **standby**, when the unit is also specially intended to perform rescue and standby services (e.g. **tug-standby**).
- **rescue (X, Y)**, when units are specially equipped for rescue of shipwrecked persons and for their accommodation in specified geographical areas, where Pt E, Ch 14, Sec 2, [2.10.3] applies.

The values X and Y indicate, respectively:

X : maximum number of shipwrecked persons for which the unit is designed;

Y : indication of the geographical areas and/or the maximum distance from the shore where the rescue operations are performed.

The relevant arrangements and equipment are recorded in the ship's status.

4.8.3 (1/7/2013)

The service notation **supply vessel** is assigned to ships specially intended for the carriage and/or storage of special material and equipment and/or which are used to provide facilities and assistance for the performance of specified activities.

When the above ships are intended for offshore, underwater activities and other similar activities the service notation **Offshore Support Vessel** is assigned.

The service notation is to be completed by the additional service feature **oil product**, when the ship is also specially intended to carry oil products having any flash point.

The service notation is to be completed by the additional service feature **chemical product**, when the ship is also specially intended to carry chemical products having any flash point.

The service notation is to be completed by the additional service feature **standby**, when the ship is also specially intended to perform rescue and standby services for offshore installations (e.g. **supply vessel - standby**).

The service notation is completed by the additional service feature **rescue**, when the ship is specially equipped for rescue of shipwrecked persons and for their accommodation.

The service notation is completed by the additional service features:

- **anchor handling**, when the ship visibility from the bridge and equipment are specially designed for anchor handling operation; or
- **anchor handling stab**, when the ship is specially designed and equipped for anchor handling operation and also fulfils specific stability requirements related to this service.

The additional requirements of Part E, Chapter 15 are applicable to these ships.

4.8.4 The service notation **fire-fighting ship** is assigned to ships specially intended and equipped for fighting fire. The additional requirements of Part E, Chapter 16 are applicable to these ships.

The service notation may be completed by the following additional service features, as applicable:

- **1 or 2 or 3**, when the ship complies with the applicable requirements of Pt E, Ch 16, Sec 3 and Pt E, Ch 16, Sec 4
- **E** when the characteristics of the fire-fighting system are not those required for the assignment of the additional service features **1**, **2** or **3**, and when the system is specially considered by the Society
- **water-spraying** when the ship is fitted with a self-protection water-spraying system complying with the applicable requirements of Pt E, Ch 16, Sec 4, [3].

4.8.5 (1/1/2012)

The service notation **oil recovery ship** is assigned to ships specially equipped with fixed installations and/or mobile equipment for the removal of oil from the sea surface and its retention on board, carriage and subsequent unloading. The additional requirements of Part E, Chapter 17 are applicable to these ships.

The service notation may be completed by the additional service feature **flash point > 60°C**, where the ship collects only oil with flash point exceeding 60°C.

4.8.6 (15/2/2016)

The service notation **chemical recovery ship** is assigned to ships designed for operation in hazardous atmosphere in case of accident involving chemical products and specially equipped with fixed installations and/or mobile equipment for the removal of chemical products from the sea surface and its retention on board, carriage and subsequent unloading. The additional requirements of Part E, Chapter 28 are applicable to these ships.

4.8.7 The service notation **cable laying ship** is assigned to ships specially equipped for the carriage and/or laying, hauling and repair of submarine cables. The additional requirements of Part E, Chapter 18 are applicable to these ships.

4.8.8 (1/7/2004)

The service notation **research ship** is assigned to ships specially intended for scientific or technological research. The additional requirements of Part E, Chapter 21 are applicable to these ships.

4.8.9 (1/1/2005)

The service notation **pipe laying ship** is assigned to ships specially equipped for the carriage and/or laying, hauling and repair of submarine pipes. The additional requirements of Part E, Chapter 22 are applicable to these ships.

4.8.10 (1/4/2016)

The service notation **well stimulation** is assigned to ships specially equipped permanently with specific systems for the stimulation of the well to improve their productivity.

The additional requirements of Part E, Chapter 29 are applicable to these ships.

4.9 Non-propelled and assisted propulsion units, sailing ships**4.9.1 Barge (1/7/2014)**

The service notation **barge** is assigned to non-propelled units intended to carry (dry or liquid) cargo inside holds or tanks. The type of cargo may be considered adding an additional service feature, e.g. **barge - oil**, **barge - general cargo**. The additional requirements of Part E, Chapter 19 are applicable to these ships.

This service notation may be completed by the additional service feature **tug combined** when units are designed to be connected with tugs, and comply with the relevant requirements of Pt E, Ch 14, Sec 3. The tugs to which the barge

can be connected are specified in an annex to the Certificate of Classification.

In the case of barges equipped with specific arrangements for accommodating on board, when moored, persons other than crew, the additional service feature **accommodation** is added to the notation **barge** (i.e. **barge-accommodation**). It covers units such as floating hotels used for different purposes like offshore industry support or other commercial uses. The notation **barge accommodation** is completed by the additional class notation **MOORING**.

4.9.2 Pontoon (1/7/2015)

The service notation **pontoon** is assigned to non-propelled units intended to carry cargo and/or equipment on deck only. This service notation may be completed by the service feature **crane** when a cargo lifting appliance, such as crane or derrick, is permanently fitted on board, the cargo lifting appliance is to be certified by the Society according to the "Rules for loading and unloading arrangements and for other lifting appliances on board of ships", or certified by another QSCS Classification Society according to its equivalent rules. The additional requirements of Part E, Chapter 19 are applicable to these ships.

4.9.3 Other units

Any non-propelled units other than those covered by the service notations listed above will be assigned the additional service feature **no propulsion**, to be added to their own service notation, e.g. **dredger - no propulsion**.

4.9.4 Assisted propulsion units (1/7/2017)

Any units having a propulsion system not enabling them to proceed at a speed greater than 7 knots, used for short transit voyages, will be assigned the additional service feature **assisted propulsion** to be added to their own service notation, e.g. **dredger - assisted propulsion**.

In case of units classified with a navigation not more than Coastal area and provided with propulsion system not enabling them to proceed at a speed greater than 7 knots, without any limitation of the length of the voyage, the additional service feature **assisted propulsion unlimited** will be assigned.

4.9.5 Sailing ships (1/7/2009)

The additional service feature **sailing ships** is assigned to ships having no means of propulsion other than sails. These ships are to comply with the requirements of the "Rules for masting and rigging of sailing ships", issued separately by the Society.

4.9.6 Engine assisted sailing ship (1/7/2017)

The additional service feature **engine assisted sailing ship** is assigned to ships which are mainly propelled by sails complying with the following requirement:

$$As > 7,0 (D_{max})^{2/3}$$

where:

As : sails surface, in m²

Dmax : maximum displacement, in tons [t],

and provided with internal combustion engine for auxiliary and emergency propulsion.

4.9.7 Engine powered sailing ship (1/7/2009)

The additional service feature **engine powered sailing ship** is assigned to ships propelled primarily by internal combustion engines of power adequate to maintain a speed of at least 7 knots (at continuous service rating, when the ship is fully loaded, in smooth water) when not under sail, but which are provided with sails as an emergency means of propulsion.

4.10 Fishing vessels

4.10.1 The service notation **fishing vessel** is assigned to ships specially equipped for catching and storing fish or other living resources of the sea. The additional requirements of Part E, Chapter 20 are applicable to these ships.

Note 1: Units solely dedicated to service in a fishing flotilla by means of cold storage and/or transformation of fish are not covered by the service notation **fishing vessel**. They will be considered with the service notation **special service**.

4.11 Units intended for the transshipment of dry cargo in bulk

4.11.1 (1/7/2014)

The following service notations are assigned to non-propelled and assisted propulsion units specially intended for the transshipment of dry cargo in bulk:

- a) **transshipping unit**, for units specially intended to transship the cargo from one delivering unit to one receiving unit; these units may either have or not have cargo storage capability
- b) **transshipping floating terminal**, for units specially intended to transship the cargo between more than one delivering and receiving units simultaneously; these units are normally to have cargo storage capability.

These service notations may be completed by the following service features:

- **buffer [X t, HOLD/DECK]** when the unit has bulk cargo storage capacity and is thus able to allow significant buffer capacity, ensuring continuous operation. The X value indicates the cargo mass, in t, which can be stored in holds or on deck (HOLD/DECK)
- **heavycargo [HOLD_i, Xi kN/m², σ_i kN/m³ - DECK, Yi kN/m²]** when the ship structure designed to support heavy cargoes fulfils the appropriate Rule requirements. The values Xi and Yi indicate, respectively, the maximum allowable local pressures on the inner bottoms of the various HOLD_i and on the deck areas DECK_i, where the cargo is intended to be stowed and σ_i is the maximum density of the bulk cargo allowable for carriage in the relevant HOLD_i. The requirements for the assignment of this additional service feature are given in Pt E, Ch 27, Sec 3, [3.2].

The service notation of units operating permanently anchored or moored in a fixed location is completed by the additional class notation "**MOORING**".

The service notation of units provided with at least one crane, fitted with a grab or a bucket, is completed by the additional class notation "**CARGO HANDLING**".

4.12 Miscellaneous units

4.12.1 The service notation **special service** is assigned to ships which, due to the peculiar characteristics of their activity, are not covered by any of the notations mentioned above. The classification requirements of such units are considered by the Society on a case by case basis.

This service notation may apply, for instance, to ships engaged in research, expeditions and survey, ships for training of marine personnel, whale and fish factory ships not engaged in catching, ships processing other living resources of the sea, and other ships with design features and modes of operation which may be referred to the same group of ships.

An additional service feature may be specified after the notation (e.g. **special service - training, special service - ship lift, special service - fish factory**) to identify the particular service in which the ship is intended to trade. The scope and criteria of classification of such units are indicated in an annex to the Certificate of Classification.

5 Navigation and operating area notations

5.1 Navigation notations

5.1.1 Every classed ship is to be assigned one navigation notation as listed in [5.2].

5.1.2 The assignment of a navigation notation, including the reduction of scantlings or specific arrangements for restricted navigation notations, is subject to compliance with the requirements laid down in Part B, Part C, Part D and Part E of the Rules.

5.1.3 The assignment of a navigation notation does not absolve the Interested Party from compliance with any international and national regulations established by the Administrations for a ship operating in national waters, or a specific area, or a navigation zone. Neither does it waive the requirements in Sec 1, [3.3.1].

5.2 List of navigation notations

5.2.1 The navigation notation **unrestricted navigation** is assigned to a ship intended to operate in any area and any period of the year.

5.2.2 The navigation notation **summer zone** is assigned to ships intended to operate only within the geographical limits as defined in ILLC 1966 for the Summer zones.

5.2.3 The navigation notation **tropical zone** is assigned to ships intended to operate only within the geographical limits as defined in ILLC 1966 for the Tropical zones.

5.2.4 The navigation notation **coastal area** is assigned to ships intended to operate only within 20 nautical miles from the shore and with a maximum sailing time of six hours from a port of refuge or safe sheltered anchorage.

5.2.5 The navigation notation **sheltered area** is assigned to ships intended to operate in sheltered waters, i.e. harbours, estuaries, roadsteads, bays, lagoons and generally calm stretches of water and when the wind force does not exceed 6 Beaufort scale.

5.2.6 (1/7/2009)

The navigation notations defined in these items [5.2.1] to [5.2.5] are those considered as "normal". Where particular cases of navigation are to be assigned which are not included among those so defined, the navigation notation **special** is assigned, followed by specified restrictions (such as the designation of the geographical area, distance from the shore and/or the most unfavourable sea conditions considered).

5.2.7 (1/7/2009)

The Society may assign navigation notations provided by the regulations of the flag Administration, which may be different from those defined in [5.2.1] to [5.2.6].

5.3 Operating area notations

5.3.1 The operating area notation expresses the specified area where some service units are likely to operate at sea within specific restrictions which are different from normal navigation conditions.

The operating area notation is, in principle, solely granted to working units, such as dredgers and crane pontoons.

This operating area notation is indicated after the navigation notation.

Example: **unrestricted navigation - "operating area notation"**

5.3.2 The following operating area notations may be assigned:

- notation **specified operating area**, where the specific operating conditions which have been considered by the Society are described in an annex to the Certificate of Classification (i.e. distance from shore or from port of refuge, weather or sea conditions)
- notation **operation service within 'x' miles from shore**, where the operating service is limited to a certain distance from the shore.

6 Additional class notations

6.1 General

6.1.1 An additional class notation expresses the classification of additional equipment or specific arrangement, which has been requested by the Interested Party.

6.1.2 The assignment of such an additional class notation is subject to the compliance with additional rule requirements, which are detailed in Part F of the Rules.

6.1.3 Some additional class notations, due to the importance of relevant equipment or arrangements, are assigned a construction mark, according to the principles given in [3.1.2]. This is indicated in the definition of the relevant additional class notations.

6.1.4 The different additional class notations which may be assigned to a ship are listed in [6.2] to [6.14], according to the category to which they belong. These additional class notations are also listed in alphabetical order in Tab 3.

6.2 System of Trace and Analysis of Records (STAR)

6.2.1 General (1/7/2008)

STAR is a System of Trace and Analysis of Records integrating rational analysis with data and records from ship-in-service concerning planned inspection and ship maintenance.

The requirements for the assignment of these notations are given in Part F, Chapter 1.

6.2.2 STAR-HULL (1/10/2000)

The additional class notation **STAR-HULL** is assigned to ships on which an Inspection and Maintenance Plan (IMP) for the hull is implemented.

The notation may be completed by the suffix **NB** when a structural tridimensional analysis has been performed for the hull structures, as defined in Pt B, Ch 7, App 1 or Pt B, Ch 7, App 2 or Pt B, Ch 7, App 3, as applicable, at the new building stage. The suffix **NB** is removed when the ship enters the **STAR-HULL** survey programme through the implementation of the Inspection and Maintenance Plan (IMP).

6.2.3 STAR-MACH (1/7/2003)

The additional class notation **STAR-MACH** is assigned to ships on which an Inspection and Maintenance Plan (IMP) for the machinery is implemented. This plan is based on a risk analysis review of the installation.

6.2.4 STAR notation (STAR)

When ships are granted both **STAR-HULL** and **STAR-MACH**, the two separate notations are superseded by the cumulative additional class notation **STAR**.

6.3 Availability of machinery (AVM)

6.3.1 General

The notations dealt with under this heading are relevant to systems and/or arrangements enabling the ship to carry on limited operations when single failure affects propulsion or auxiliary machinery or when an event such as fire or flooding involving machinery spaces affects the availability of the machinery.

In compliance with [6.1.3], these notations are assigned a construction mark, as defined in [3].

The requirements for the assignment of these notations are given in Part F, Chapter 2.

6.3.2 AVM-APS (Alternative propulsion system) (1/7/2008)

The additional class notation **AVM-APS** or **AVM-APS-NS** are assigned to ships which are fitted with systems and/or arrangements enabling them to maintain operating conditions with some limitations in speed, range and comfort, in the case of any single failure of items relative to the propulsion.

When the auxiliary propulsion system is designed for use in conditions other than an emergency, the additional class notation **AVM-APS-NS** is assigned.

6.3.3 AVM-IAPS (Independent alternative propulsion system) (1/7/2008)

The additional class notation **AVM-IAPS** is assigned to ships which are fitted with an independent propulsion system enabling them to maintain operating conditions with some limitations in power, speed, range and comfort, in the case of any single failure of items relative to the propulsion.

6.3.4 AVM-DPS (Duplicated propulsion system) (1/7/2008)

The additional class notation **AVM-DPS** or **AVM-DPS-NS** are assigned to ships which are fitted with a duplicated propulsion system enabling them to maintain operating conditions with some limitations in power (but 50% of the main power is to be maintained), speed, range and comfort, in the case of any single failure of items relative to the propulsion.

When the duplicated propulsion system is designed for use in conditions other than an emergency, the additional class notation **AVM-DPS-NS** is assigned.

6.3.5 AVM-IPS (Independent propulsion system) (1/7/2008)

The additional class notation **AVM-IPS** is assigned to ships which are fitted with an independent propulsion system enabling them to maintain operating conditions with some limitations in power (but 50% of the main power is to be maintained), speed, range and comfort, in the case of any single failure of items relative to the propulsion.

6.4 Automated machinery systems (AUT)

6.4.1 General

The notations dealt with under this heading are relevant to automated machinery systems installed on board ships.

In compliance with [6.1.3], these notations are assigned a construction mark, as defined in [3].

The requirements for the assignment of these notations are given in Part F, Chapter 3.

6.4.2 Unattended machinery space (AUT-UMS)

The additional class notation **AUT-UMS** is assigned to ships which are fitted with automated installations enabling machinery spaces to remain periodically unattended in all sailing conditions including manoeuvring.

6.4.3 Centralised control station (AUT-CCS)

The additional class notation **AUT-CCS** is assigned to ships which are fitted with machinery installations operated and monitored from a centralised control station.

6.4.4 Automated operation in port (AUT-PORT)

The additional class notation **AUT-PORT** is assigned to ships which are fitted with automated installations enabling the ship's operation in port or at anchor without personnel specially assigned for the watch-keeping of the machinery in service.

6.5 Integrated ship systems (SYS)

6.5.1 General

The notations dealt with under this heading are relevant to operation of integrated systems regarding navigation, machinery, communication and specific cargo, as applicable.

In compliance with [6.1.3], these notations are assigned a construction mark, as defined in [3].

The requirements for the assignment of these notations are given in Part F, Chapter 4.

6.5.2 Centralised navigation equipment (SYS-NEQ)

The additional class notation **SYS-NEQ** is assigned to ships which are fitted with a centralised navigation control system so laid out and arranged that it enables normal navigation and manoeuvring operation of the ship by two persons in cooperation.

The additional class notation **SYS-NEQ-1** is assigned when, in addition to the above, the installation is so arranged that the navigation and manoeuvring of the ship can be operated under normal conditions by one person, for periodical one man watch. This notation includes specific requirements for prevention of accidents caused by the operator's unfitness.

6.5.3 Integrated bridge system (SYS-IBS)

The additional class notation **SYS-IBS** is assigned to ships which are fitted with an integrated bridge system which allows simplified and centralised bridge operation of all main functions of navigation manoeuvring and communication, as well as monitoring from bridge of other functions related to specific cargoes and pollution; for passenger ships, heating, ventilation and air conditioning are also included in the monitored functions.

6.5.4 Communication system (SYS-COM) (1/7/2009)

The additional class notation **SYS-COM** is assigned to ships which are fitted with a local area network including the alarm, monitoring and control systems and computers used for management operations and external communication devices for reporting ashore navigation, maintenance and operational information.

6.6 Monitoring equipment (MON)

6.6.1 General

The notations dealt with under this heading are relevant to hull and tailshaft monitoring equipment installed on board ships.

The requirements for the assignment of these notations are given in Part F, Chapter 5.

6.6.2 Hull stress monitoring (MON-HULL)

The additional class notation **MON-HULL** is assigned to ships which are fitted with equipment continuously monitoring ship's dynamic loads through measurements of motions in waves and stresses/deformations in the hull structure.

6.6.3 Tailshaft monitoring system (MON-SHAFT)

The additional class notation **MON-SHAFT** is assigned to ships which are fitted with a temperature monitoring system for the tailshaft sterntube bearings. The assignment of this notation allows the ship to be granted a reduced scope for complete tailshaft surveys, see Ch 2, Sec 2, [8.3.1].

6.7 Comfort on board ships (COMF)

6.7.1 General

The notations dealt with under this heading are relevant to the assessment of comfort on board ships with regard to the level of noise, vibration and/or air temperature/humidity.

The parameters which are taken into consideration for the evaluation of the comfort such as the level of noise, the level of vibration and the air temperature and/or humidity will be indicated in the Certificate of Classification.

These parameters are only verified once for all when the ship is classed.

The requirements for the assignment of these notations are given in Part F, Chapter 6.

6.7.2 Comfort with regard to noise (COMF-NOISE) (1/7/2014)

The additional class notation **COMF-NOISE** is assigned to ships satisfying levels of noise defined in Pt F, Ch 6, Sec 1. The assessment of noise levels is only carried out through design review and sea trials.

The notation is completed by a letter **A**, **B** or **C** which represents the merit level achieved for the assignment of the notation, the merit **A** corresponding to the lowest level of acceptable noise. The notation **COMF-NOISE** is only assigned if at least the merit level **C** is reached.

When the merit levels achieved for the passenger spaces (if any) and the crew spaces are different, the notation is completed by the suffix:

- **PAX**, for passenger spaces, and
- **CREW**, for crew spaces.

For crew spaces, the following comfort noise notations are equivalent to the noise level limits stated in IMO Resolution MSC.337(91) "Adoption of the code on noise levels on board ships", as follows:

- for ships with gross tonnage equal to or greater than 10,000 GT: **COMF-NOISE CREW A**
- for ships with gross tonnage from 1,600 GT up to 10,000 GT: **COMF-NOISE CREW B**.

6.7.3 Comfort with regard to vibration (COMF-VIB) (1/7/2007)

The additional class notation **COMF-VIB** is assigned to ships satisfying levels of vibration defined in Pt F, Ch 6, Sec 2. The assessment of vibration levels is only carried out through design review and sea trials.

The notation is completed by a letter **A**, **B** or **C**, which represents the merit level achieved for the assignment of the notation, merit **A** corresponding to the lowest level of vibration. The notation **COMF-VIB** is only assigned if at least merit level **C** is reached.

When the merit levels achieved for the passenger spaces (if any) and the crew spaces are different, the notation is completed by the suffix:

- **PAX**, for passenger spaces, and
- **CREW**, for crew spaces.

6.7.4 Comfort with regard to air temperature/humidity (COMF-AIR)

The additional class notation **COMF-AIR** is assigned to ships fitted with a combined heating-ventilation-air conditioning system (HVAC) satisfying levels of air temperature and humidity defined in Pt F, Ch 6, Sec 3. The assessment of air temperature/humidity levels is only carried out through design review and sea trials in Winter and Summer conditions.

The notation may be completed by one of the letters **W** or **S** when the HVAC system has been satisfactorily tested only in Winter or in Summer conditions respectively.

6.8 Pollution prevention

6.8.1 General

The notations dealt with under this heading are assigned to ships fitted with equipment and arrangements enabling them to reduce the pollution of the sea and/or air caused by release of solid waste and liquid and/or gaseous effluents.

The requirements for the assignment of these notations are given in Part F, Chapter 7.

6.8.2 Sea pollution prevention (CLEAN-SEA) (1/7/2006)

The additional class notation **CLEAN-SEA** is assigned to ships provided with construction and procedural means to prevent pollution of the sea.

This is achieved by compliance with the applicable requirements of Annex I, Annex II, Annex III, Annex IV and Annex V of MARPOL Convention, relevant to ship's liquid and solid releases, as well as additional requirements related to prevention of sea pollution as follows:

- prevention of accidental pollution by means of location of fuel and lube oil tanks above the double bottom and away from ship sides
- prevention of operational pollution by means of bilge water separation and filtering, holding tanks for treated sewage and grey water
- prevention of transfer of harmful organisms and pathogens in the ballast water
- prevention of pollution by tributyltin by means of TBT free antifouling paints
- prevention of pollution by solid garbage (resulting from the compacting device and incinerators) by means of proper storage of such waste
- ship recycling.

6.8.3 Air pollution prevention (CLEAN-AIR) (1/7/2009)

The additional class notation **CLEAN-AIR** is assigned to ships provided with construction and procedural means to prevent pollution of the air. This is achieved by compliance with the applicable requirements of Annex VI of MARPOL

Convention, as well as additional requirements related to low emissions to the air as follows:

- prevention of air pollution by exhaust gas (particles, CO_x, NO_x, SO_x) by means of low emission engines, use of low sulphur content fuels and incinerators
- use of refrigerants and fixed fire fighting means with zero ozone depleting potential and low global warming potential
- control of release of refrigerants to the atmosphere by means of leak detection and evacuation systems
- recovery of vapours emitted from cargo systems of ships carrying dangerous liquid cargoes in bulk.

Note 1: For ships with the service notation **oil tanker, combination carrier/OBO, combination carrier/OOC, chemical tanker, FLS tanker**, excluding those intended for the carriage of products having flashpoint > 60°C or **liquefied gas carrier**, the assignment of the notation **VCS** (Vapour Control System) is a prerequisite for the assignment of the notation **CLEAN-AIR**. However, the notation **VCS** may also be assigned as a single notation as described in [6.14.7].

6.8.4 Sea and air pollution prevention (GREEN PLUS - GREEN STAR 3 DESIGN - GREEN STAR 3) (1/7/2013)

a) GREEN PLUS

The additional class notation **GREEN PLUS** is assigned to ships designed and provided with systems, components and procedural means to control and prevent the emission of polluting substances into the sea, the air and more in general the environment, in accordance with the requirements in Pt F, Ch 7, Sec 1.

b) GREEN PLUS T

The additional class notation **GREEN PLUS T** is assigned to units:

- intended to operate at a fixed location;
- provided with facilities to load and unload other units (e.g. bulk carriers, dry cargo ships carrying solid materials in bulk)

complying with the provision in a) and provided with solid bulk cargo handling systems designed to minimize their environmental impact according to Pt F, Ch 7, Sec 6.

c) GREEN STAR 3 DESIGN

When ships are assigned the notations **CLEAN-SEA** and **CLEAN-AIR**, the two separate notations are superseded by the cumulative additional class notation **GREEN STAR 3 DESIGN**.

d) GREEN STAR 3

The additional class notation **GREEN STAR 3** is assigned to ships provided with equipment and procedural means to prevent pollution of the sea and of the air. This is achieved by compliance with the applicable requirements of Annexes I to VI of MARPOL Convention, relevant to ship's liquid, solid and gas releases, as well as additional requirements related to prevention of sea and air pollution as follows:

- prevention of accidental pollution by means of on board equipment to combat oil spills;
- prevention of operational pollution by means of procedures, bilge water separation and filtering, hold-

ing tanks for treated sewage and grey water, development of an Environmental Management Plan and availability on board of an Environmental Ship Manager, use of refrigerants and fixed fire-fighting means with zero ozone depleting potential and low global warming potential, and use of procedures to control leakage;

- prevention of transfer of harmful organisms and pathogens in the ballast water;
- prevention of pollution by tributyltin by means of TBT free antifouling paints;
- prevention of pollution by solid garbage by means of proper storage of such waste, and for passenger ships other than ro-ro passenger, by means of a strategy of waste recycling;
- ship recycling.

Note 1: For ships with the service notation **oil tanker, combination carrier/OBO, combination carrier/OOC, chemical tanker, FLS tanker**, excluding those intended for the carriage of products having flashpoint > 60°C or **liquefied gas carrier**, the assignment of the notation **VCS** (Vapour Control System) is a prerequisite for the assignment of the notation **GREEN STAR 3**. However, the notation **VCS** may also be assigned as a single notation as described in [6.14.7].

6.8.5 LowSO_x(N) (1/7/2010)

The sulphur content of any fuel oil used on board ships is not to exceed the percentage by mass as required by MARPOL 73/78 Annex VI. The class notation **LOWSO_x(N)** is assigned to ships that use on board fuel oil having sulphur content (average percentage calculated on a yearly basis) less than 3%. The value N in brackets is the maximum percentage of sulphur content in fuel oils used on board according to ship's procedures.

6.8.6 Green and certified cargo handling systems (GC CARGO HANDLING) (1/7/2013)

The additional class notation **GC CARGO HANDLING** is assigned to ships provided with systems for handling solid bulk cargo which may be a source of sea or air pollution (e.g. those handling coal, iron ore, sulphur, etc), designed to minimize their environmental impact. The requirements for the assignment of this notation are given in Pt F, Ch 7, Sec 6.

6.9 Refrigerating installations

6.9.1 General

The notations dealt with under this heading are relevant to refrigerating installations fitted on board ships, including machinery and storing equipment or arrangements.

In compliance with [6.1.3], these notations are assigned a construction mark, as defined in [3].

The requirements for the assignment of these notations are given in Part F, Chapter 8.

6.9.2 Refrigerating installations for cargo (REF-CARGO)

The additional class notation **REF-CARGO** is assigned to ships fitted with refrigerating plants and holds intended to carry cargoes, with the condition that the number and the

power of the refrigerating units are such that the specified temperatures can be maintained with one unit on standby.

6.9.3 Refrigerating installations for insulated containers (REF-CONT)

The additional class notation **REF-CONT** is assigned to ships fitted with refrigerating plants intended to supply refrigerated air to insulated containers carried in holds of container ships.

6.9.4 Refrigerating installations for domestic supplies (REF-STORE)

The additional class notation **REF-STORE** is assigned to ships fitted with refrigerating plants and spaces exclusively intended for the preservation of ship's domestic supplies.

6.9.5 The above may also be completed by the following notations:

- a) **-PRECOOLING** when the refrigerating plants are designed to cool down a complete cargo of fruit and/or vegetables to the required temperature of transportation
- b) **-QUICKFREEZE** for the refrigerating plants of fishing vessels and fish factory ships where the design and equipment of such plants have been recognised suitable to permit quick-freezing of fish in specified conditions
- c) **-AIRCONT** when the refrigerating plants are equipped with controlled atmosphere installations or any other indication related to the specific features of the installation, when these features have been specially examined by the Society

6.10 Navigation in ice (ICE CLASS)

6.10.1 The notations dealt with under [6.10.2] are relevant to ships strengthened for navigation in ice in accordance with the "Finnish-Swedish Ice Class Rules 2010" as adopted on 23 November 2010 by the Finnish Transport Safety Agency (TRAFI).

The requirements for the assignment of these notations are given in Part F, Chapter 9.

These requirements reproduce the provisions of the Finnish-Swedish Ice Class Rules cited above.

6.10.2 The following additional class notations are assigned:

- a) **ICE CLASS IA SUPER**, for navigation in extreme ice conditions
- b) **ICE CLASS IA**, for navigation in severe ice conditions
- c) **ICE CLASS IB**, for navigation in medium ice conditions
- d) **ICE CLASS IC**, for navigation in light ice conditions.

Note 1: Attention is drawn to paragraph 9 of the 1985 Finnish-Swedish Ice Class Rules, where it is stated that these notations are assigned to the maximum permissible draught according to the Tonnage and Loadline Certificates.

Note 2: Attention is drawn to paragraph 2 of the above Rules, where it is stated that the requirements of Finnish-Swedish Ice Class Rules published on 6th April 1971 are still in force for ships whose keel was laid, or at a similar stage of construction, before November 1st 1986.

6.10.3 (1/1/2001)

The additional class notation **ICE CLASS ID** is assigned to ships whose reinforcements for navigation in ice are different from those required for the assignment of the notations defined in [6.10.2], but which comply with the specific requirements detailed in Part F, Chapter 9.

6.10.4 (1/5/2016)

The above may also be completed by the notation **-HULL** when the reinforcements for navigation in ice are relevant to hull only, according to the relevant requirements in Pt F, Ch 9, Sec 1 and Pt F, Ch 9, Sec 2.

6.10.5 (1/1/2001)

The additional class notation **ICE** is assigned to ships whose reinforcements for navigation in ice are different from those required for the assignment of the notations defined in [6.10.2] and [6.10.3], when this has been specially considered by the Society.

6.11 Navigation in ice (POLAR CLASS)

6.11.1 (1/3/2008)

The following additional class notations are assigned to ships intended for navigation in ice-infested polar waters, except icebreakers:

- **POLAR CLASS PC1**
- **POLAR CLASS PC2**
- **POLAR CLASS PC3**
- **POLAR CLASS PC4**
- **POLAR CLASS PC5**
- **POLAR CLASS PC6**
- **POLAR CLASS PC7**

The requirements for the assignment of these notations are given in Part F, Chapter 10.

6.12 WINTERIZATION (temp)

6.12.1 (1/7/2014)

The additional class notation **WINTERIZATION (temp)** is assigned to ships intended to be operated in a cold climate over long periods.

The value **temp**, in brackets, is the design temperature in °C and is to be taken as the lowest mean daily average air temperature in the area where the ship is intended to operate (see Pt F, Ch 11, Sec 1, [2]).

In order for the **WINTERIZATION (temp)** notation to be granted, the ship is to be assigned the additional class notation **GREEN PLUS** or **GREEN STAR 3 DESIGN** or equivalent and one of the following class notations:

- **POLAR CLASS**
- **ICE CLASS IA SUPER**
- **ICE CLASS IA**
- **ICE CLASS IB**
- **ICE CLASS IC**

The requirements for the assignment of this notation are given in Part F, Chapter 11.

6.13 Planned maintenance scheme and condition based maintenance (PMS/CBM)

6.13.1 General (1/7/2009)

The notations dealt with under this item [6.13] are assigned to ships where a Planned Maintenance Scheme (hereinafter denominated PMS) has been implemented according to the requirements given in Part F, Chapter 12.

6.13.2 PMS (1/7/2009)

Where a Planned Maintenance Scheme is approved by the Society the additional class notation **PMS** is assigned. An implementation survey is to be carried out to confirm the validity of the additional class notation.

The requirements for the assignment of this notation are given in Pt F, Ch 12, Sec 1.

6.13.3 PMS-CM(PROP) (1/7/2009)

Where a Planned Maintenance Scheme approved by the Society is implemented and Condition Based Maintenance complying with the requirements of Pt F, Ch 12, Sec 2 relevant to the propulsion system is applied, the additional class notation **PMS-CM(PROP)** is assigned.

6.13.4 PMS-CM(HVAC) (1/7/2009)

Where a Planned Maintenance Scheme approved by the Society is implemented, and Condition Based Maintenance complying with the requirements of Pt F, Ch 12, Sec 3 relevant to the heating, ventilation and air conditioning (HVAC) system is applied, the additional class notation **PMS-CM(HVAC)** is assigned.

6.13.5 PMS-CM(CARGO) (1/7/2009)

Where a Planned Maintenance Scheme approved by the Society is implemented, and Condition Based Maintenance complying with the requirements of Pt F, Ch 12, Sec 4 relevant to the cargo system is applied, the additional class notation **PMS-CM(CARGO)** is assigned.

6.13.6 PMS-CM(ELE) (1/7/2009)

Where a Planned Maintenance Scheme approved by the Society is implemented, and Condition Based Maintenance complying with the requirements of Pt F, Ch 12, Sec 5 relevant to electrical switchboards is applied, the additional class notation **PMS-CM(ELE)** is assigned.

6.13.7 PMS-CM(FDS) (1/7/2009)

Where a Planned Maintenance Scheme approved by the Society is implemented, and Condition Based Maintenance complying with the requirements of Pt F, Ch 12, Sec 6 relevant to the fire detection system is applied, the additional class notation **PMS-CM(FDS)** is assigned.

6.14 Other additional class notations

6.14.1 Strengthened bottom

The additional class notation **STRENGTHBOTTOM** may be assigned to ships built with specially strengthened bottom structures so as to be able to be loaded and/or unloaded when properly stranded.

The requirements for the assignment of this notation are given in Pt F, Ch 13, Sec 1.

6.14.2 Loading by grabs (1/4/2006)

a) The additional class notation **GRABLOADING** may be assigned to ships with hold tank tops specially reinforced for loading/unloading cargoes by means of grabs or buckets.

The requirements for the assignment of this notation are given in Pt F, Ch 13, Sec 2.

However, this does not preclude ships not assigned with this notation from being loaded/unloaded with grabs.

b) The additional class notation **GRAB [X]** may be assigned to ships with hold tank tops designed for loading/unloading cargoes by means of grabs having a maximum mass of [X] tonnes.

The requirements for the assignment of this notation are given in Pt F, Ch 13, Sec 2 (see also Note 2).

Note 1: These additional class notations may only be assigned to ships with the service notation **general cargo ship** (intended to carry dry bulk cargoes), **bulk carrier**, **ore carrier**, **combination carrier/OBO** or **combination carrier/OOC**.

Note 2: The specific requirements for the assignment of the notation **GRAB [X]** to bulk carriers with the service feature **CSR** are given in the Common Structural Rules (Ch 1, Sec 1, [3]).

6.14.3 In-water survey

The additional class notation **INWATERSURVEY** may be assigned to ships provided with suitable arrangements to facilitate the in-water surveys as provided in Ch 2, Sec 2, [7.1.4].

The requirements for the assignment of this notation are given in Pt F, Ch 13, Sec 3.

6.14.4 Single point mooring

The additional class notation **SPM** (Single Point Mooring) may be assigned to ships fitted with a specific mooring installation.

The requirements for the assignment of this notation are given in Pt F, Ch 13, Sec 4.

These requirements reproduce the provisions of "Recommendations for Equipment Employed in the Mooring of Ships at Single Point Mooring" (3rd edition 1993), issued by OCIMF (Oil Companies International Marine Forum).

6.14.5 Container lashing equipment (1/7/2017)

The additional class notation **LASHING** is assigned to ships initially fitted with mobile container lashing equipment that is documented, tested and checked.

The notation **ROUTE DEPENDENT LASHING (start date - end date)** is assigned to ships initially fitted with mobile container lashing equipment that is documented, tested and checked for specific routes and for the period of year defined by the specification start date - end date.

These notation are assigned only to ships having the service notation **container ship** or the additional service feature **equipped for carriage of containers**.

The requirements for the assignment of the notations are given in Pt F, Ch 13, Sec 5.

This equipment, however, will not be verified any longer at the periodical class surveys to which the ship is submitted.

6.14.6 Dynamic positioning (1/7/2017)

The additional class notation **DYNAPOS** may be assigned to ships equipped with a dynamic positioning system.

In compliance with [6.1.3], this notation is assigned a construction mark, as defined in [3].

The additional class notation **DYNAPOS** is assigned, in accordance with [6.1.3], to ships fitted with dynamic positioning installations complying with the requirements of this Section, as follows:

- **DYNAPOS-SAM**
- **DYNAPOS-DP1**
- **DYNAPOS-DP2**
- **DYNAPOS-DP3**

DYNAPOS-SAM (semi-automatic control): the control system of installation is to be achieved by automatic conversion of the instructions issued by the operator in thruster commands: the operator's manual intervention is necessary for position keeping.

DYNAPOS-DP1 (automatic control): position keeping is automatically achieved and loss of position and/or heading may occur in the event of a single failure.

DYNAPOS-DP2 (automatic control): position keeping is automatically achieved, but loss of position and/or heading is not to occur in the event of a single failure in any active component or system.

DYNAPOS-DP3 (automatic control): position keeping is automatically achieved, but loss of position and/or heading is not to occur in the event of a single failure of any active component or system, any static component or loss of any one watertight compartment and any one fire sub-division, due to fire or flooding.

The scope of the notation, including the additional keys for the description of capability of the installation and the requirements for assignment, are given in Pt F, Ch 13, Sec 6.

The notations may be completed by the feature **SKC (L, I1, I2, I3, I4)**, which provides information about the position keeping ability of the ship at the most unfavourable heading for specified limiting environmental conditions; it is defined in Pt F, Ch 13, Sec 10.

6.14.7 Vapour control system (1/10/2000)

The additional class notation **VCS** (Vapour Control System) may be assigned to ships equipped with cargo vapour control systems both in way of midship cargo crossovers and in way of stern cargo manifolds. The notation **-MIDSHIP** is added to the notation where the ship is equipped with cargo vapour control systems only in way of cargo midship crossovers. The notation **-TRANSFER** is added to the notation where, in addition, the ship is fitted with specific arrangements for transferring cargo vapours to another ship.

This notation is assigned only to ships having the service notation **oil tanker, combination carrier/OBO, combination carrier/OOC, liquefied gas carrier, chemical tanker or FLS tanker**.

The requirements for the assignment of this notation are given in Pt F, Ch 13, Sec 7.

6.14.8 Cofferdam ventilation (1/7/2001)

The additional class notation **COVENT** (Cofferdam Ventilation) may be assigned to ships having all cofferdams (including ballast tanks) in the cargo area provided with fixed ventilation systems or having movable components included in the ship equipment complying with the requirements of Pt F, Ch 13, Sec 8.

This notation is assigned only to ships having the service notation **bulk carrier, ore carrier, oil tanker, combination carrier/OBO, combination carrier/OOC, liquefied gas carrier, chemical tanker or FLS tanker**.

The requirements for the assignment of this notation are given in Pt F, Ch 13, Sec 8.

6.14.9 Centralised cargo control

The additional class notation **CARGOCONTROL** may be assigned to ships (carrying liquid cargo in bulk) equipped with a centralised system for handling cargo and ballast liquids.

In principle, this notation is assigned only to ships having the service notation **oil tanker, combination carrier/OBO, combination carrier/OOC, chemical tanker or FLS tanker**.

The requirements for the assignment of this notation are given in Pt F, Ch 13, Sec 9.

6.14.10 Ship manoeuvrability (1/7/2009)

The additional class notation **MANOVR** may be assigned to ships complying with manoeuvring capability standards, defined in IMO Resolution MSC.137(76) - "Standards for Ship Manoeuvrability".

The requirements for the assignment of this notation are given in Pt F, Ch 13, Sec 10.

These requirements reproduce the provisions of IMO Resolution MSC.137(76) and are applicable to ships of all rudder and propulsion types, of 100 m in length and over, and to chemical tankers and gas carriers regardless of the length, which were constructed on or after 1 July 1994.

6.14.11 Damage stability (1/10/2005)

The additional class notation **DMS** may be assigned to ships complying with the damage stability requirements given in Pt F, Ch 13, Sec 11.

6.14.12 Protective coatings in water ballast tanks (1/7/2006)

The additional class notation **COAT-WBT** may be assigned to ships surveyed during construction by the Society, whose water ballast tanks have been provided with protective coatings complying with the requirements for the assignment of this notation given in Pt F, Ch 13, Sec 12.

The notation may be assigned to ships having any service notation.

6.14.13 Fatigue Life (1/2/2008)

The additional class notation **FATIGUELIFE (Y)** is assigned to ships designed for a fatigue life greater than Y years. In general, Y is to be greater than 20 years; for ships with one of the service notations **bulk carrier ESP CSR or oil tanker ESP CSR**, Y is to be greater than 25 years.

The fatigue life is to be calculated in accordance with the applicable criteria defined in the Rules.

For **Y** greater than 30 years, the strength calculation and construction criteria are to be defined by the Society on a case-by-case basis.

6.14.14 Permanent means of access (1/2/2008)

The additional class notation **PMA** is assigned to cargo ships that are provided with permanent means of access complying with SOLAS Regulation II-1/3-6, as amended by Resolution MSC 151(78), with the associated "Technical provisions for means of access for inspections" in IMO Resolution MSC 158(78) and the relevant interpretations in IACS UI SC191.

Note 1: For bulk carriers (as defined in SOLAS Regulation IX/1-6) of 20000 GT or more and oil tankers of 500 GT or more, compliance with the above is requested by SOLAS Regulation II-1/3-6.

6.14.15 Ballast water management (1/2/2008)

The additional class notation **BWM-E** is assigned to ships complying with the "International Convention for the Control and Management of Ship's Ballast Water and Sediments" as adopted by IMO on 13 February 2004, by means of a Ballast Water Exchange system.

The notation is to be completed by one of the following features, as applicable:

- **sequential** when the Ballast Water Exchange system is of sequential type
- **flow-through** when the Ballast Water Exchange system is of flow-through type
- **dilution** when the Ballast Water Exchange system is of dilution type.

Note 1: according to the above Convention, Ballast Water Exchange will be phased out as an acceptable method, depending on the ballast water capacity and date of delivery of the vessel. After phasing out, the only acceptable method will be Ballast Water Treatment. Therefore the class notation BWM-E will be withdrawn when the Ballast Water Exchange is phased out.

The additional class notation **BWM-T** is assigned to ships complying with the "International Convention for the Control and Management of Ship's Ballast Water and Sediments" as adopted by IMO on 13 February 2004, by means of a Ballast Water Treatment system.

6.14.16 Crew Accommodation and Recreational Facilities according to the Marine Labour Convention, 2006 (MLCDESIGN) (1/7/2008)

The additional class notation **MLCDESIGN** is assigned to ships having crew accommodation and recreational facilities complying with the Marine Labour Convention, 2006 - Title 3 and with the requirements of Pt F, Ch 13, Sec 13.

6.14.17 Ships equipped to support diving operations (1/7/2009)

The additional class notation **DIVINGSUPPORT** is assigned to ships equipped to support diving operations, which are provided with a diving system.

Diving systems installed on ships classified by the Society assigned the **DIVINGSUPPORT** notation are to be certified by the Society according to the "Rules for the classification

of underwater units". Certificates issued by another QSCS Classification Society may be accepted.

The requirements for the assignment of this notation are given in Pt F, Ch 13, Sec 14.

6.14.18 High Voltage Shore Connection (HVSC) (1/7/2009)

The additional class notation **HVSC** is assigned to ships fitted with high voltage shore connection systems complying with the requirements given in Pt F, Ch 13, Sec 15.

6.14.19 Low Sulphur Fuels (LSF) (15/1/2010)

The additional class notation **LSF** is assigned to ships for which evidence has been provided to the Society, in accordance with Pt F, Ch 7, Sec 5, that Low Sulphur Fuels (LSF) may be used by some or all on board fuel oil consumers to be recorded in the ship's status, together with the relevant percentage, in weight, of the fuel sulphur content (e.g. 1%, 0.5%, 0.1%).

Upon request, a statement may be issued to ships complying with the requirements of this Section.

It is to be noted that responsibility for ensuring that the ship is suitable for safe operation using the fuels required by the applicable national or international legislation remains with the operator.

6.14.20 Helicopter facilities (1/7/2010)

The additional class notation **HELIDECK** may be assigned to ships fitted with helicopter facilities. In particular, the notation **HELIDECK-H** is assigned to ships fitted with helicopter facilities including hangar and refuelling or maintenance facilities, while the notation **HELIDECK** is assigned when the helicopter facilities do not include hangar and refuelling or maintenance facilities.

The requirements for the assignment of these notations are given in Pt F, Ch 13, Sec 16.

6.14.21 Inert gas systems (1/7/2016)

The additional class notation **INERTGAS-A** may be assigned to ships having the service notation:

- a) built before 1 January 2016 having the service notation:
 - **oil tanker, combination carrier/OBO, combination carrier/OOC, FLS tanker**, having deadweight equal to or greater than 20,000 tonnes, or
 - **chemical tanker and liquefied gas carrier**, having deadweight equal to or greater than 20,000 tonnes but not complying with Pt C, Ch 4, Sec 1, [8.2.4] b)
- b) built on or after 1 January 2016:
 - **oil tanker, combination carrier/OBO, combination carrier/OOC, FLS tanker**, having deadweight equal to or greater than 8,000 tonnes, or
 - **chemical tanker and liquefied gas carrier**, having deadweight equal to or greater than 8,000 tonnes but not complying with Pt C, Ch 4, Sec 1, [8.2.4]

for which the installation of the inert gas system is compulsory.

The installed inert gas system is to comply with Pt C, Ch 4, Sec 1, [9] except Pt C, Ch 4, Sec 1, [9.6].

The additional class notation **INERTGAS-B** may be assigned to ships:

- a) built before 1 January 2016 having the service notation:
- **oil tanker, combination carrier/OBO, combination carrier/OOC, FLS tanker**, whose deadweight is less than 20,000 tonnes, or
 - **chemical tanker and liquefied gas carrier**, having deadweight equal to or greater than 20,000 tonnes but complying with Pt C, Ch 4, Sec 1, [8.2.4] b) or having deadweight less than 20,000 tonnes
- b) built on or after 1 January 2016:
- **oil tanker, combination carrier/OBO, combination carrier/OOC, FLS tanker**, whose deadweight is less than 8,000 tonnes, or
 - **chemical tanker and liquefied gas carrier**, having deadweight equal to or greater than 8,000 tonnes but complying with Pt C, Ch 4, Sec 1, [8.2.4] b) or having deadweight less than 8,000 tonnes

for which the installation of the inert gas system is not compulsory but fitted with an inert gas system complying with the requirements in Pt C, Ch 4, Sec 1, [9.6].

The additional class notation **INERTGAS-C** may be assigned to ships having the service notation:

- a) built before 1 January 2016 having the service notation:
- **oil tanker, combination carrier/OBO, combination carrier/OOC, FLS tanker**, whose deadweight is less than 20,000 tonnes, or
 - **chemical tanker and liquefied gas carrier**, having deadweight equal to or greater than 20,000 tonnes but complying with Pt C, Ch 4, Sec 1, [8.2.4] b) or having deadweight less than 20,000 tonnes
- b) built on or after 1 January 2016:
- **oil tanker, combination carrier/OBO, combination carrier/OOC, FLS tanker**, whose deadweight is less than 8,000 tonnes, or
 - **chemical tanker and liquefied gas carrier**, having deadweight equal to or greater than 8,000 tonnes but complying with Pt C, Ch 4, Sec 1, [8.2.4] b) or having deadweight less than 8,000 tonnes

for which the installation of the inert gas system is not compulsory but fitted with an inert gas system complying with the requirements in Pt C, Ch 4, Sec 1, [9] except Pt C, Ch 4, Sec 1, [9.6].

6.14.22 Safe return to port, orderly evacuation and abandonment (SRTP) (1/7/2010)

The additional class notation **SRTP** is assigned to passenger ships complying with SOLAS Regulations II-1/8-1, II-2/21 and 22 and with the "Interim Explanatory Notes for the assessment of passenger ship systems' capabilities after a fire or a flooding casualty" as per IMO MSC.1/Circ. 1369. Solutions providing an equivalent level of safety as those contained in the above-mentioned IMO MSC.1/Circ. 1369 may be accepted by the Society, on a case-by-case basis.

6.14.23 Fire Protection (FIRE) (1/7/2011)

The following additional class notations are assigned to ships having enhanced features relevant to fire protection:

- **FIRE**
- **FIRE-AS**
- **FIRE-MS**

- **FIRE-CS.**

The requirements for the assignment of these notations are given in Part F, Ch 13, Sec 17.

6.14.24 Gas Fuelled (1/7/2018)

a) GAS FUELLED

The additional class notation **GAS FUELLED** is assigned to ships operating with liquefied or compressed natural gas as fuel for their internal combustion engines or boilers, complying with the design and constructional requirements of:

- Pt E, Ch 9, Sec 16, for liquefied gas carriers,
- Pt C, Ch 1, App 7, for other ship types.

b) GAS FUELLED (Main)

The additional class notation **GAS FUELLED (Main)** is assigned to ships operating with liquefied or compressed natural gas as fuel for their internal combustion main engines, complying with the design and constructional requirements of:

- Pt E, Ch 9, Sec 16, for liquefied gas carriers,
- Pt C, Ch 1, App 7, for other ship types.

c) GAS FUELLED (Aux)

The additional class notation **GAS FUELLED (Aux)** is assigned to ships operating with liquefied or compressed natural gas as fuel for their internal combustion auxiliary engines, complying with the design and constructional requirements of:

- Pt E, Ch 9, Sec 16, for liquefied gas carriers,
- Pt C, Ch 1, App 7, for other ship types.

6.14.25 Carriage of specific solid cargoes in bulk (1/8/2011)

The additional class notation **IMSBC-A** is assigned to ships specially constructed or fitted for the carriage of cargoes belonging to Group A as defined in the IMSBC Code (see Note 1) at a moisture content in excess of their Transportable Moisture Limit (TML).

The additional class notation **IMSBC-nitrate** is assigned to ships intended for the carriage of nitrate cargoes, belonging to Group B of the IMSBC Code, for which a fixed gas fire-extinguishing system is ineffective and for which a water fire-extinguishing system is provided (see Note 2).

The additional class notation **IMSBC-non cohesive** is assigned to ships intended for the carriage of non-cohesive cargoes with an angle of repose less than or equal to 30°.

The cargoes for which each of the above notations is granted are to be listed in the Certificate of Classification.

The requirements for the assignment of these additional class notations are given in Pt F, Ch 13, Sec 18.

Note 1: International Maritime Solid Bulk Cargoes Code, IMO Resolution MSC.286(85).

Note 2: Reference is made to IMO MSC/Circ. 1146 as it may be amended.

6.14.26 Compliance with the Code of Safety for Special Purpose Ships (1/7/2017)

The additional class notation **SPS** is assigned to ships constructed in compliance with the requirements of the Code of Safety for Special Purpose Ships, 2008, adopted by IMO

through Resolution MSC.266(84), as amended or with the requirements of the Code of Safety for Special Purpose Ships, IMO Resolution A.534(13), as amended.

6.14.27 Self-unloading (1/1/2013)

The additional class notation **SELF-UNLOADING** is assigned to ships having one of the following service notations:

- **bulk carrier ESP**
- **bulk carrier ESP CSR**
- **general cargo ship**

provided with permanent on-board loading and unloading equipment which complies with the following conditions:

- a) the equipment that is fitted above the deck is certified in accordance with the "Rules for loading and unloading arrangements and for other lifting appliances on board ships",
- b) the equipment that is fitted inside the holds (horizontal and vertical conveyors) is certified and tested in compliance with a recognised standard.

6.14.28 Technical Advisor Service (TAS) (1/7/2013)

The additional class notation **TAS** is assigned to ships whose approved geometry and structural data are stored in a database in order to allow the Society to provide, through dedicated computer programs, the necessary assistance in the event of damage.

6.14.29 Efficient ship (S, DWT) (1/2/2014)

The additional class notation **EFFICIENT SHIP (S, DWT)** is assigned to ships achieving a level of efficiency as required by Pt F, Ch 13, Sec 19.

The notation is completed by two numbers, between brackets, which represent the reference speed S and deadweight DWT at which the ship has been evaluated.

6.14.30 Mooring (1/7/2014)

The additional class notation **MOORING** is assigned to units provided with arrangements for permanent mooring (anchoring) at a certain location. The mooring arrangement is to comply with Pt F, Ch 13, Sec 21.

6.14.31 Cargo Handling (1/7/2014)

The additional class notation **CARGO HANDLING** is assigned to a unit that is provided with lifting arrangements to load and unload cargoes:

- from the unit itself to shore facilities and vice versa
- from the unit itself to another unit and vice versa (transshipment)
- from a delivery unit to a receiving unit.

The lifting arrangements are to comply with the "Rules for loading and unloading arrangements and for other lifting appliances on board ships or other similar units".

6.14.32 Navigation surrounding the arabian peninsula (SAHARA) (1/7/2014)

The additional class notations **SAHARA** and **SAHARA** are assigned to ships complying with the requirements of Pt F,

Ch 13, Sec 20, intended to operate in the areas surrounding the Arabian Peninsula:

- Arabian Gulf
- Oman Gulf
- Red Sea
- Arabian Sea along the South-East Coast of the Arabian Peninsula.

The additional class notation **SAHARA** is assigned to ships with unrestricted navigation notation.

The additional class notation **SAHARA** is assigned to ships for which navigation in the Arabian Sea along the South-East Coast of the Arabian Peninsula is limited to sea states with significant wave height not greater than 2 meters and intended to operate only within 50 nautical miles from the shore. For these ships, according to [5.2.6], the navigation notation **special (Arabian Peninsula)** is assigned and the specific restrictions (wave height, operating distance from the shore or any specific operating area) are to be indicated.

6.14.33 Risk of failure reduction (RISK MITIGATION) (1/1/2015)

The additional class notation **RISK MITIGATION (...)** is assigned to ships for which additional measures are adopted in order to reduce the risk of failures in specific technical matters such as fire protection, propulsion systems, etc. which are indicated between brackets in the notation itself.

Details of the adopted measures are indicated in an annex to the Certificate of Classification of the ship.

6.14.34 Indoor Air Quality Monitoring (AIR MON) (1/7/2015)

The additional class notation **AIR MON** is assigned to ships for which an air quality management system is implemented and verified by the Society according to the requirements of Pt F, Ch 13, Sec 22.

6.14.35 DANGEROUS GOODS (1/7/2015)

The additional class notation **DANGEROUS GOODS** is assigned to ships that comply with the provisions for the carriage of dangerous goods given in SOLAS Regulation II-2/19.

6.14.36 INF 1, INF 2, INF 3 (1/7/2015)

The additional class notations **INF 1**, **INF 2**, **INF 3** are assigned to ships that comply with the requirements of the International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-level Radioactive Wastes on Board Ships (INF Code).

The notation **INF 1** is assigned to ships that are certified to carry packaged irradiated nuclear fuel, plutonium and high-level radioactive wastes with an aggregate activity less than 4000 TBq.

The notation **INF 2** is assigned to ships that are certified to carry packaged irradiated nuclear fuel or high-level radioactive wastes with an aggregate activity less than 2 x 10⁶ TBq and ships which are certified to carry plutonium with an aggregate activity less than 2 x 10⁵ TBq.

The notation **INF 3** is assigned to ships that are certified to carry packaged irradiated nuclear fuel or high-level radio-

active wastes and ships which are certified to carry plutonium with no restriction of the maximum aggregate activity of the materials.

6.14.37 Dedicated Oil Recovery System (DORS) (15/7/2015)

The additional class notation **DORS** is assigned to ships with cargo tanks and fuel oil tanks provided with two or more connectors in order to allow the recovery of the content of the tanks.

The requirements for the assignment of this additional class notation are given in Pt F, Ch 13, Sec 23.

6.14.38 GAS READY (X1, X2, X3...) (1/10/2015)

The additional class notation **GAS READY (X1, X2, X3...)** is assigned to ships whose design is in compliance with the applicable Rules for Gas Fuelled Ships, and the relevant systems and arrangement are partially installed on board, thus easing a future ship conversion into a Gas Fuelled Ship.

The requirements for the assignment of this additional class notation are given in Pt F, Ch 13, Sec 24.

6.14.39 Temporary Refuge (RISKS) (1/7/2016)

The additional class notation **TEMPORARY REFUGE (RISKS)** is assigned to ships whose design includes specific characteristics and facilities in order to safely accommodate persons, granting temporary protection from the consequences (**RISKS**) of a possible major accident, as defined by the Designer.

The design of the temporary refuge ship is to be developed in accordance with the criteria of a recognised standard and is to include:

- the identification and quantification of the risks by the Designer and the duration of exposure to these risks,
- the assessment of its protection characteristics and capabilities effectiveness with respect to their progressive impairment,
- the adoption of an appropriate programme of tests, inspections, maintenance, repair and replacement, which contribute to the impairment detection, prevention and mitigation.

6.14.40 DOLPHIN QUIET SHIP or DOLPHIN TRANSIT SHIP (1/3/2017)

The additional class notations **DOLPHIN QUIET SHIP** or **DOLPHIN TRANSIT SHIP** are assigned to ships whose design is such as to ensure a low environmental impact originated from underwater noise radiation.

The requirements for the assignment of this additional class notation are given in Pt F, Ch 13, Sec 25.

6.14.41 GREAT LAKES ST LAWRENCE SEAWAY (1/7/2017)

The additional class notation **GREAT LAKES ST LAWRENCE SEAWAY** is assigned to ships whose design and equipment is in compliance with the applicable requirements issued by "The St. Lawrence Seaway Management Corporation and the Saint Lawrence Seaway Development Corpora-

tion". The relevant arrangements and equipment are recorded in the ship's status.

6.14.42 EGCS-SOX/NOX (1/7/2017)

The additional class notation **EGCS-SOX** and/or **EGCS-NOX** are assigned to ships equipped respectively with exhaust gas cleaning systems suitable to reduce the SO_x emissions (i.e. typically scrubbers) and the NO_x emissions (i.e typically Selective Catalytic Reduction systems) .

The requirements for the assignment of this additional class notation are given in Pt F, Ch 13, Sec 26.

6.14.43 BATTERY POWERED SHIPS (1/1/2019)

The additional class notation **BATTERY POWERED SHIPS**, is assigned to ships where batteries, other than Lead and Nickel-Cadmium batteries, having a capacity of 50 kWh or above are installed to supply essential or not-essential services and emergency services, in compliance with the requirements of Pt C, Ch 2, App 2.

6.14.44 Man Overboard Detection System (MOB) (1/11/2018)

The additional class notation **MOB** is assigned to ships equipped with a Man Overboard Detection System capable of detecting persons that pass through the MOB detection zone while going overboard.

The requirements for the assignment of this additional class notation are given in Pt F, Ch 13, Sec 27.

6.14.45 Hybrid Propulsion Ship (HYB-...) (1/1/2019)

The additional class notation **HYBRID PROPULSION SHIP (HYB-...)** is assigned to ships equipped with an hybrid propulsion system.

The requirements for the assignment of this additional class notation are given in Pt F, Ch 13, Sec 28.

6.14.46 Cyber Resilience (1/1/2019)

The additional class notations **CYR (Cyber resilience)**, **CYR-OT (Cyber resilience of Operational Technology)** and **CYR-IT (Cyber resilience of Information Technology)** assigned to ships complying with the cyber resilience requirements given in Pt F, Ch 13, Sec 29.

6.14.47 Digital Ship (1/1/2019)

The additional class notation **DIGITAL SHIP** is assigned to ships fitted with an automatic data collection system enabling the collection of navigation and machinery data and their transmission on shore.

The requirements for the assignment of this additional class notation are given in Pt F, Ch 13, Sec 30.

7 Other notations

7.1

7.1.1 The Society may also define other notations by means of provisional requirements and guidelines, which may then be published in the form of tentative rules.

Table 3 : List of additional class notations (1/1/2019)

Additional class notation	Reference for definition	Reference in Part F	Remarks
AIR-MON	[6.14.34]	Pt F, Ch 13, Sec 22	
AUT-CCS	[6.4.3]	Pt F, Ch 3, Sec 2	(1)
AUT-PORT	[6.4.4]	Pt F, Ch 3, Sec 3	(1)
AUT-UMS	[6.4.2]	Pt F, Ch 3, Sec 1	(1)
AVM-APS or AVM-APS-NS	[6.3.2]	Pt F, Ch 2, Sec 1	(1)
AVM-IAPS	[6.3.3]	Pt F, Ch 2, Sec 2	(1)
AVM-DPS or AVM-DPS-NS	[6.3.4]	Pt F, Ch 2, Sec 3	(1)
AVM-IPS	[6.3.5]	Pt F, Ch 2, Sec 4	(1)
BATTERY POWERED SHIPS	[6.14.43]	Pt C, Ch 2, App 2	
BWM-E	[6.14.15]	NA	(5)
BWM-T	[6.14.15]	NA	
CARGOCONTROL	[6.14.9]	Pt F, Ch 13, Sec 9	
CARGO HANDLING	[6.14.31]	NA	
CLEAN-AIR	[6.8.3]	Pt F, Ch 7, Sec 3	(4)
CLEAN-SEA	[6.8.2]	Pt F, Ch 7, Sec 4	(4)
COAT-WBT	[6.14.12]	Pt F, Ch 13, Sec 12	
COMF-AIR	[6.7.4]	Pt F, Ch 6, Sec 3	
COMF-NOISE	[6.7.2]	Pt F, Ch 6, Sec 1	
COMF-VIB	[6.7.3]	Pt F, Ch 6, Sec 2	
COVENT	[6.14.8]	Pt F, Ch 13, Sec 8	
CYBER RESILIENCE (CYR, CYR-OT and CYR-IT)	[6.14.46]	Pt F, Ch 13, Sec 29	
DANGEROUS GOODS	[6.14.35]	NA	
DIGITAL SHIP	[6.14.47]	Pt F, Ch 13, Sec 30	
DIVINGSUPPORT	[6.14.17]	Pt F, Ch 13, Sec 14	
DOLPHIN QUIET SHIP or DOLPHIN TRANSIT SHIP	[6.14.40]	Pt F, Ch 13, Sec 25	
DORS	[6.14.37]	Pt F, Ch 13, Sec 23	
DMS	[6.14.11]	Pt F, Ch 13, Sec 11	
DYNAPOS	[6.14.6]	Pt F, Ch 13, Sec 6	(1)
EGCS-SOX and/or EGCS-NOX	[6.14.42]	Pt F, Ch 13, Sec 26	
EFFICIENT SHIP (S, DWT)	[6.14.29]	Pt F, Ch 13, Sec 19	
FATIGUELIFE (Y)	[6.14.13]	NA	
FIRE	[6.14.23]	Pt F, Ch 13, Sec 17	
FIRE-AS	[6.14.23]	Pt F, Ch 13, Sec 17	
FIRE-MS	[6.14.23]	Pt F, Ch 13, Sec 17	
FIRE-CS	[6.14.23]	Pt F, Ch 13, Sec 17	
GAS FUELLED	[6.14.24] a)	NA	
GAS FUELLED (Main)	[6.14.24] b)	NA	
GAS FUELLED (Aux)	[6.14.24] c)	NA	
GAS READY (X1, X2, X3...)	[6.14.38]	Pt F, Ch 13, Sec 24	
GRABLOADING and GRAB (X)	[6.14.2]	Pt F, Ch 13, Sec 2	
GREAT LAKES ST LAWRENCE SEAWAY	[6.14.41]	NA	

(1) A construction mark is added to this notation.
(2) This notation may be completed by the specific notations **-PRECOOLING**, **-QUICKFREEZE** and/or **-AIRCONT** (see [6.9.5]).
(3) This notation may be completed by the specific notations **-MIDSHIP** and **-TRANSFER** (see [6.14.7]).
(4) When ships are assigned the notations **CLEAN-SEA** and **CLEAN-AIR**, the two separate notations are superseded by the cumulative additional class notation **GREEN STAR 3 DESIGN** (see [6.8.4]).
(5) This notation may be completed by the specific features: **sequential**, **flow-through**, **dilution**.
(6) This notation may be completed by the specific notation **-HULL** (see [6.10.4]).

Additional class notation	Reference for definition	Reference in Part F	Remarks
GREEN PLUS	[6.8.4] a)	Pt F, Ch 7, Sec 1	
GREEN PLUS T	[6.8.4] b)	Pt F, Ch 7, Sec 1 and Pt F, Ch 7, Sec 6	
GREEN STAR 3 DESIGN	[6.8.4] c)	Pt F, Ch 7, Sec 2	This cumulative notation supersedes the notations CLEAN-SEA and CLEAN-AIR , when both are assigned
GREEN STAR 3	[6.8.4] d)	Pt F, Ch 7, Sec 2	
GC CARGO HANDLING	[6.8.6]	Pt F, Ch 7, Sec 6	
HELIDECK	[6.14.20]	Pt F, Ch 13, Sec 16	
HELIDECK-H	[6.14.20]	Pt F, Ch 13, Sec 16	
HYBRID PROPULSION SHIP (HYB-...)	[6.14.45]	Pt F, Ch 13, Sec 28	(1)
HVSC	[6.14.18]	Pt F, Ch 13, Sec 15	
ICE	[6.10.5]	-	
ICE CLASS IA	[6.10.2]	Part F, Chapter 9	(6)
ICE CLASS IA SUPER	[6.10.2]	Part F, Chapter 9	(6)
ICE CLASS IB	[6.10.2]	Part F, Chapter 9	(6)
ICE CLASS IC	[6.10.2]	Part F, Chapter 9	(6)
ICE CLASS ID	[6.10.3]	Part F, Chapter 9	(6)
IMSBC-A	[6.14.25]	Pt F, Ch 13, Sec 18	
IMSBC-nitrate	[6.14.25]	Pt F, Ch 13, Sec 18	
IMSBC-non cohesive	[6.14.25]	Pt F, Ch 13, Sec 18	
INERTGAS-A	[6.14.21]	NA	
INERTGAS-B		NA	
INERTGAS-C		NA	
INWATERSURVEY	[6.14.3]	Pt F, Ch 13, Sec 3	
INF 1, INF 2, INF 3	[6.14.36]	NA	(1)
LASHING	[6.14.5]	Pt F, Ch 13, Sec 5	
LOWSOx(N)	[6.8.5]	Pt F, Ch 7, Sec 3	
LSF	[6.14.19]	Pt F, Ch 7, Sec 5	
MMAN OVERBOARD DETECTION SYSTEM (MOB)	[6.14.44]	Pt F, Ch 13, Sec 27	
MANOVR	[6.14.10]	Pt F, Ch 13, Sec 10	
MLCDESIGN	[6.14.16]	Pt F, Ch 13, Sec 13	
MON-HULL	[6.6.2]	Pt F, Ch 5, Sec 1	
MON-SHAFT	[6.6.3]	Pt F, Ch 5, Sec 2	
MOORING	[6.14.30]	Pt F, Ch 13, Sec 21	
PMA	[6.14.14]	NA	
PMS	[6.13.2]	Pt F, Ch 12, Sec 1	
PMS-CM(PROP)	[6.13.3]	Pt F, Ch 12, Sec 2	
PMS-CM(HVAC)	[6.13.4]	Pt F, Ch 12, Sec 3	
PMS-CM(CARGO)	[6.13.5]	Pt F, Ch 12, Sec 4	
PMS-CM(ELE)	[6.13.6]	Pt F, Ch 12, Sec 5	
PMS-CM(FDS)	[6.13.7]	Pt F, Ch 12, Sec 6	
POLAR CLASS	[6.11.1]	Part F, Chapter 10	
REF-CARGO	[6.9.2]	Pt F, Ch 8, Sec 2	(1) (2)
REF-CONT	[6.9.3]	Pt F, Ch 8, Sec 3	(1) (2)
REF-STORE	[6.9.4]	Pt F, Ch 8, Sec 4	(1) (2)

(1) A construction mark is added to this notation.
(2) This notation may be completed by the specific notations **-PRECOOLING**, **-QUICKFREEZE** and/or **-AIRCONT** (see [6.9.5]).
(3) This notation may be completed by the specific notations **-MIDSHIP** and **-TRANSFER** (see [6.14.7]).
(4) When ships are assigned the notations **CLEAN-SEA** and **CLEAN-AIR**, the two separate notations are superseded by the cumulative additional class notation **GREEN STAR 3 DESIGN** (see [6.8.4]).
(5) This notation may be completed by the specific features: **sequential**, **flow-through**, **dilution**.
(6) This notation may be completed by the specific notation **-HULL** (see [6.10.4]).

Additional class notation	Reference for definition	Reference in Part F	Remarks
RISK MITIGATION (...)	[6.14.33]	NA	
ROUTE DEPENDENT LASHING (start date - end date)	[6.14.5]	Pt F, Ch 13, Sec 5	
☾ SAHARA SAHARA	[6.14.32]	Pt F, Ch 13, Sec 20	
SELF-UNLOADING	[6.14.27]	NA	
SPM	[6.14.4]	Pt F, Ch 13, Sec 4	
SPS	[6.14.26]	NA	
SRTP	[6.14.22]	NA	
STAR	[6.2.4]	Part F, Chapter 1	This cumulative notation supersedes the notations STAR-HULL and STAR-MACH , when both are assigned
STAR-HULL	[6.2.2]	Pt F, Ch 1, Sec 1	
STAR-MACH	[6.2.3]	Pt F, Ch 1, Sec 2	
STRENGTHBOTTOM	[6.14.1]	Pt F, Ch 13, Sec 1	
SYS-COM	[6.5.4]	Pt F, Ch 4, Sec 3	
SYS-IBS	[6.5.3]	Pt F, Ch 4, Sec 2	(1)
SYS-NEQ SYS-NEQ-1	[6.5.2]	Pt F, Ch 4, Sec 1	(1)
TAS	[6.14.28]	NA	
TEMPORARY REFUGE (RISKS)	[6.14.39]	NA	
VCS	[6.14.7]	Pt F, Ch 13, Sec 7	(3)
WINTERIZATION (temp)	[6.12.1]	Part F, Chapter 11	
<p>(1) A construction mark is added to this notation.</p> <p>(2) This notation may be completed by the specific notations -PRECOOLING, -QUICKFREEZE and/or -AIRCONT (see [6.9.5]).</p> <p>(3) This notation may be completed by the specific notations -MIDSHIP and -TRANSFER (see [6.14.7]).</p> <p>(4) When ships are assigned the notations CLEAN-SEA and CLEAN-AIR, the two separate notations are superseded by the cumulative additional class notation GREEN STAR 3 DESIGN (see [6.8.4]).</p> <p>(5) This notation may be completed by the specific features: sequential, flow-through, dilution.</p> <p>(6) This notation may be completed by the specific notation -HULL (see [6.10.4]).</p>			

ASSIGNMENT, MAINTENANCE, SUSPENSION AND WITHDRAWAL OF CLASS

SECTION 1	ASSIGNMENT OF CLASS
SECTION 2	MAINTENANCE OF CLASS
SECTION 3	SUSPENSION AND WITHDRAWAL OF CLASS
APPENDIX 1	CMS AND PMS: SURVEYS CARRIED OUT BY THE CHIEF ENGINEER
APPENDIX 2	THICKNESS MEASUREMENTS: EXTENT, DETERMINATION OF LOCATIONS AND ACCEPTANCE CRITERIA
APPENDIX 3	THICKNESS MEASUREMENTS: NUMBER, LOCATIONS AND ACCEPTANCE CRITERIA FOR SHIPS BUILT UNDER THE COMMON STRUCTURAL RULES
APPENDIX 4	CRITERIA FOR LONGITUDINAL STRENGTH OF THE HULL GIRDER

SECTION 1

ASSIGNMENT OF CLASS

1 General

1.1 Main cases of assignment of class

1.1.1 Assignment of class (1/1/2015)

Class is assigned to a ship upon a survey, with the associated operations, which is held in order to verify whether it is eligible to be classed on the basis of the Rules of the Society (see Ch 1, Sec 1, [1.3.2]). This may be achieved through:

- the completion of the new building, during which a survey has been performed, or
- a survey carried out according to the IACS Procedural Requirement PR 1A, when ships change class from one QSCS Classification Society (see Note 1) to the Society or
- a survey carried out according to the IACS Procedural Requirement PR 1B, when the Society's class is added to a ship already in class with another QSCS Classification Society, or
- a survey carried out according to the IACS Procedural Requirement PR1D, when ships change class from one non-QSCS Classification Society (see Note 1) to the Society or is not classed at all.

Note 1: The obligations of the Procedural Requirements PR1A, PR1B and PR1D apply as pertinent to QSCS Classification Societies.

1.1.2 Reassignment of class (1/1/2015)

Reassignment of class is that part of the process of classification consisting in all the steps aimed at issuing a Certificate of Classification to a ship previously classed with the Society but which had the class withdrawn.

Four cases are considered for reassignment of class:

- a) ship in service classed by another QSCS Classification Society,
- b) ship in service not classed by another QSCS Classification Society,
- c) ship no longer in service since the withdrawal of the class by the Society,
- d) ship no longer in service since the withdrawal of the class by another Society, QSCS or not.

2 New building procedure

2.1 Ships surveyed by the Society during construction

2.1.1 When a ship is surveyed by the Society during construction, it is to comply with those requirements of the Rules which are in force and applicable depending on the class of the ship, taking into account the provisions of Ch 1, Sec 1, [2.2].

2.1.2 The Society:

- approves the plans and documentation submitted as required by the Rules
- proceeds, if required, with the appraisal of the design of materials and equipment used in the construction of the ship and their inspection at works
- carries out surveys or obtains appropriate evidence to satisfy itself that the scantlings and construction meet the rule requirements in relation to the approved drawings
- attends tests and trials provided for in the Rules
- assigns the construction mark \boxtimes ; refer to Ch 1, Sec 2, [3.2.1].

2.1.3 The Society defines in specific Rules which materials and equipment used for the construction of ships built under survey are, as a rule, subject to appraisal of their design and to inspection at works, and according to which particulars.

2.1.4 Determination of number of Surveyor(s) (1/7/2016)

When a Tanker or a Bulk Carrier, subjected to SOLAS Chapter II-1 Part A-1 Regulation 3-10, is surveyed by the Society during construction, the Society will assign adequate number of suitable qualified surveyor(s) for new building projects according to the construction progress of the ship to meet appropriate coverage of the examination and testing activities as agreed in the Survey Plan.

2.1.5 As part of his interventions during the ship's construction, the Surveyor will:

- conduct an overall examination of the parts of the ship covered by the Rules
- examine the construction methods and procedures when required by the Rules
- check selected items covered by the rule requirements
- attend tests and trials where applicable and deemed necessary.

2.1.6 Use of materials, machinery, appliances and items

As a general rule, all materials, machinery, boilers, auxiliary installations, equipment, items etc. (generally referred to as "products") which are covered by the class and used or fitted on board ships surveyed by the Society during construction are to be new and, where intended for essential services as defined in Ch 1, Sec 1, [1.2.1], tested by the Society.

Second hand materials, machinery, appliances and items may be used subject to the specific agreement of the Society and the Owner.

The requirements for the selection of materials to be used in the construction of the various parts of a ship, the character-

istics of products to be used for such parts and the checks required for their acceptance are to be as stated in Part C and Part D, as applicable, or in other Parts of the Rules or as specified on approved plans. In particular, the testing of products manufactured according to quality assurance procedures approved by the Society and the approval of such procedures are governed by the requirements of Pt D, Ch 1, Sec 1, [3] of the Rules.

2.1.7 Defects or deficiencies and their repair

The Society may, at any time, reject items found to be defective or contrary to rule requirements or require supplementary inspections and tests and/or modifications, notwithstanding any previous certificates issued.

All repairs are subject to the preliminary agreement of the Society. When the limits of tolerance for defects are specified in the Rules concerned or by the Manufacturer, they are to be taken into account for repairs.

It is incumbent upon the Interested Party to notify the Society of any defects noted during the construction of the ship and/or of any item not complying with the applicable requirements or in any case unsatisfactory. Proposals regarding remedial actions intended to be adopted to eliminate such defects or unsatisfactory items are to be submitted to the Society and, if accepted, carried out to the Surveyor's satisfaction.

2.1.8 Equivalence of Rule testing under certain conditions

Notwithstanding the provisions of [2.1.6], the Society may, at its discretion and subject to conditions and checks deemed appropriate, accept certain materials, appliances or machinery which have not been subjected to rule testing.

2.1.9 Equivalence of design approval by another QSCS Classification Society under certain conditions (1/7/2009)

The Society may, at its discretion and subject to conditions and checks deemed appropriate, accept the plans and documentation approved by another QSCS Classification Society, as far as classification is concerned and according to the principle of equivalence of Rules in Ch 1, Sec 1, [2.1]

2.1.10 Interim Certificate of Classification (1/7/2007)

Upon satisfactory completion of the survey during construction, the Surveyor issues to the shipyard an interim Certificate of Classification valid not more than 5 months. This certificate indicates the class notations.

The certificate is issued with a letter where all outstanding recommendations and significant memoranda are recorded; class notations requested by the shipyard and not assigned due to pending items are clearly indicated together with the relevant pending items.

It is the shipyard's duty to provide the Owner with the interim Certificate of Classification and a copy of the letter.

2.1.11 Certificate of Classification (1/7/2007)

Upon satisfactory review of the survey reports, the Society issues to the shipyard the Certificate of Classification valid for the whole period of class. The certificate indicates the class notations.

The Certificate of Classification may be provided directly to the Owner upon request, subject to written authorisation from the shipyard.

All outstanding recommendations, significant memoranda and pending items for class notations not assigned are made available in the ship status.

2.2 Other cases

2.2.1 When the procedure adopted does not comply with that detailed in [2.1] but the Society deems that it is acceptable for the assignment of class, the construction mark ● is assigned in accordance with Ch 1, Sec 2, [3.2.3].

2.3 Documentation

2.3.1 Documentation relevant to the class applied for is to be submitted for the approval of the Society.

2.3.2 (1/7/2009)

The design data, calculations and plans to be submitted are listed in the relevant chapters of the Rules.

The Society may also call for additional information according to the specific nature of the ship to be classed.

The documentation requested in the various Chapters of the Rules in hard copy may, as an alternative, be submitted in electronic format to be agreed with the Society.

2.3.3 The documentation submitted to the Society is examined in relation to the class applied for in the request for classification.

Note 1: Should the Interested Party subsequently wish to have the class, in particular the service notation or navigation notation, granted to the ship modified, plans and drawings are generally to be re-examined.

2.3.4 A copy of the submitted plans will be returned duly stamped, with remarks related to the compliance with the rule requirements should the need arise.

2.3.5 As a rule, modifications of the approved plans regarding items covered by classification are to be submitted.

2.3.6 Design data to be submitted to the Society are to incorporate all information necessary for the assessment of the design of the ship for the purpose of assignment of class. It is the responsibility of the Interested Party to ascertain that the design data are correct, complete and compatible with the use of the ship.

2.3.7 Design calculations are to be provided, when called for, as supporting documents to the submitted plans.

2.3.8 Design data and calculations are to be adequately referenced. It is the duty of the Interested Party to ascertain that the references used are correct, complete and applicable to the design of the ship.

2.3.9 The submitted plans are to contain all necessary information for checking the compliance with the requirements of the Rules.

2.3.10 In the case of conflicting information, submitted documentation will be considered in the following order of precedence: design data, plans, design calculations.

2.3.11 It is the responsibility of the Interested Party to ascertain that drawings used for the procurement, construction and other works are in accordance with the approved plans.

3 Ships classed after construction

3.1 General

3.1.1 (1/1/2015)

When an Owner applies to the Society for a ship already in service to be admitted to class, the application will be processed differently depending on whether the ship is:

- classed with a QSCS Classification Society, or
- not classed with a QSCS Classification Society, or
- not classed at all.

3.2 Transfer to the Society's class of a ship in service classed by another QSCS Classification Society (IACS PR 1A)

3.2.1 Documentation to be submitted and design assessment (1/7/2016)

As a rule, the minimum documentation to be supplied for filing purposes is listed hereinafter. The Society may carry out a design assessment on a case-by-case basis (additional documentation may be requested).

- a) Main plans:
 - 1) general arrangement,
 - 2) capacity plan,
 - 3) hydrostatic curves,
 - 4) loading manual where required,
 - 5) damage stability calculation, where required.
- b) Hull structure plans:
 - 1) midship section,
 - 2) scantling plan,
 - 3) decks,
 - 4) shell expansion,
 - 5) transverse bulkheads,
 - 6) rudder and rudder stock,
 - 7) hatch covers,
 - 8) for CSR ships, plans showing, for each structural element, both as-built and renewal thicknesses and any thickness for "voluntary addition".
- c) Machinery plans:
 - 1) machinery arrangement,
 - 2) intermediate, thrust and screw shafts,
 - 3) propeller,
 - 4) main engines, propulsion gears and clutch systems (or Manufacturer's make, model and rating information),

- 5) for steam turbine ships: main boilers, superheaters and economisers (or Manufacturer's make, model and rating information) and steam piping,
 - 6) bilge and ballast piping diagram,
 - 7) wiring diagram,
 - 8) steering gear system piping and arrangements and steering gear (or Manufacturer's make and model information),
 - 9) torsion vibration calculations for ships less than two years old,
 - 10) plans for flexible couplings and/or torque limiting shafting devices in the propulsion line shafting (or Manufacturer's make, model and rating information), for ships assigned with one of the ice additional class notations described in Ch 1, Sec 2, [6.10.2],
 - 11) pumping arrangements at the forward and after ends, drainage of cofferdams and pump rooms for oil tankers.
- d) Plans required for ships assigned one of the additional class notations for Automated Machinery Systems:
 - 1) instrument and alarm list,
 - 2) fire alarm system,
 - 3) list of automatic safety functions (e.g. slowdowns, shutdowns, etc),
 - 4) function testing plan.
 - e) Additional Documents required for approval of Alternative Design and Arrangements:
 - 1) Additional Documents required for approval of Alternative Design and Arrangements.

Alternative technical data may be accepted by the Society in lieu of specific items of the listed documentation not available at the time of the transfer of class.

3.2.2 Basic conditions of IACS Procedural Requirement No. 1A (1/7/2007)

This Procedural Requirement is applicable, unless stated otherwise, to ships of over 100 GT of whatever type, self-propelled or not, restricted or unrestricted navigation, except for "inland waterway" ships.

The age of the ship considered in the procedure for transfer of class is the age calculated from the date of delivery to the "Date Request for class was received" in IACS Form G Part A - Survey Status Request.

The obligations of the Procedural Requirement continue to apply when a ship's class is suspended by the losing Society and for 6 months following withdrawal of a ship's class by the losing Society.

Cases concerning ships of 100 GT or less are dealt with by the Society on a case-by-case basis.

Whenever the Society is requested by an Owner to accept a ship in service into class:

- a) the relevant surveys specified in Ch 3, Sec 2, [1.1.2] are to be satisfactorily completed for entry into class;
- b) for ships less than 15 years of age, an Interim Certificate of Classification can be issued only after the Society has completed all overdue surveys and all overdue recom-

mendations previously issued against the ship as specified to the Owner by the losing Society;

- c) for ships 15 years of age and over, an Interim Certificate of Classification can be issued only after the losing Society has completed all overdue surveys and all overdue recommendations previously issued against the ship;
- d) any outstanding recommendations are to be dealt with by their due dates;
- e) the principles given in a), b) and c) above apply to any additional recommendations issued against the ship arising from surveys which were not included in the initial survey status provided to the Society by the losing Society because the surveys were carried out in close proximity to the request for transfer of class. If received after the issuance of the Interim Certificate of Classification by the Society and overdue, such additional recommendations are to be dealt with at the first port of call by the relevant Society depending on the age of the ship;
- f) copies of the plans listed in [3.2.1] are to be provided to the Society as a prerequisite to obtaining a full term Certificate of Classification. If the Owner is unable to provide all of the required plans, the losing Society is to be authorised by the Owner to transfer copies of such of these plans as it may possess directly to and upon request from the Society.

3.2.3 Conditions of IACS Procedural Requirement No. 1A, preventing issue of the Interim Certificate of Classification (1/1/2014)

Prior to issuing an Interim Certificate of Classification, the Society is to obtain:

- a) from the Owner, a written request for transfer of class, containing an authorisation for the Society to obtain the current classification status from the losing Society; and
- b) the current classification survey status from the Headquarters of the losing Society or one of its designated control or management centres.

If the Society does not receive the classification survey status from the losing Society within 3 working days from the request, the Society may utilise the losing Society's survey status information provided by the Owner and, after complying with the other relevant provisions of the Procedural Requirement, issue an Interim Certificate of Classification. In such cases the conditions in [3.2.2] are still applicable (a statement is normally included in the Interim Certificate of Classification for this purpose).

The Society cannot issue an Interim Certificate of Classification, or other documents enabling the ship to trade:

- 1) until all overdue surveys and all overdue recommendations previously issued against the subject ship, as specified to the Owner by the losing Society, have been completed and rectified either by the Society for ships less than 15 years of age or by the losing Society for ships 15 years of age and above;
- 2) until all relevant surveys specified in Ch 3, Sec 2, [1.1.2] have been satisfactorily completed; when facilities are not available in the first port of survey, an Interim Certificate of Classification may be issued to allow the ship to undertake a direct voyage to a port

where facilities are available to complete surveys required in Ch 3, Sec 2, [1.1.2]. In such cases the surveys specified in Ch 3, Sec 2, [1.1.2] are to be carried out to the maximum extent practicable at the first port of survey, but in no case less than the scope of annual hull surveys and machinery surveys as required in Ch 3, Sec 2, [1.1.2] b);

- 3) before giving the opportunity to the flag Administration to provide any further instructions within 3 working days, in compliance with the requirements of Art. 10.5 of the Regulation (EC) No 391/2009.

3.2.4 Limitations of IACS Procedural Requirement No. 1A for the Certificate of Classification (1/7/2007)

The validity of the Interim Certificate of Classification and the subsequent Certificate of Classification is subject to any outstanding recommendations previously issued against the ship being completed by the due date and as specified by the losing Society. Any outstanding recommendations with their due dates are stated on the Survey Endorsement Sheets and ship status when the full term Certificate of Classification is issued.

If additional information regarding overdue surveys or recommendations is received from the losing Society after the Interim Certificate of Classification has been issued, these are to be dealt with at the first port of call by the Society for ships less than 15 years of age or by the losing Society for ships 15 years of age or over. If this is not accomplished, the Interim Certificate of Classification is withdrawn immediately unless the Owner agrees to proceed directly, without further trading, to a suitable port where any overdue surveys or overdue recommendations are to be carried out by the relevant Society based on the age of the ship.

3.2.5 Surveys (1/7/2007)

The Surveyor:

- a) checks that the outcome of the design assessment (if any), survey instructions and losing Society's ship status are available,
- b) surveys the ship to check that it complies with the outcome of the design assessment (if any) and with the requirements of Ch 3, Sec 2, [1.1.2].

3.2.6 Interim Certificate of Classification (1/7/2007)

Upon satisfactory completion of the survey for assignment of class, the Surveyor issues to the Owner an interim Certificate of Classification valid not more than 5 months, provided that the conditions in [3.2.2] to [3.2.5] are met. This certificate indicates the class notations.

The certificate is issued with a Survey Endorsement Sheet where all outstanding recommendations and significant memoranda are recorded; class notations requested by the Owner and not assigned due to pending items are clearly indicated together with the relevant pending items.

3.2.7 Certificate of Classification (1/7/2007)

Upon satisfactory review of the survey reports, the Society issues to the Owner the Certificate of Classification valid for the whole period of class, provided that the conditions in

[3.2.2] to [3.2.5] are met. The certificate indicates the class notations.

All outstanding recommendations, significant memoranda and pending items for class notations not assigned are made available in the ship status.

3.3 Transfer to the Society's class of a ship surveyed during construction by another QSCS Classification Society at ship's delivery (IACS PR 1A)

3.3.1 Documentation to be submitted and design assessment (1/1/2008)

The requirements of [3.2.1] apply.

3.3.2 Basic conditions of IACS Procedural Requirement No. 1A (1/1/2008)

The Procedural Requirements for transfer of class at ship's delivery (see Note 1) are applicable when the Society which carried out the new construction technical review and surveys (i.e. the losing Society) has issued its first Certificate of Classification (see Note 2). Unless stated otherwise, the provisions apply to ships of over 100 GT of whatever type, self-propelled or not, restricted or unrestricted service, except for "inland waterway" ships. Cases concerning ships of 100 GT or less are dealt with by the Society on a case-by-case basis.

Whenever the Society is requested by an Owner to accept a ship into class at its delivery, the Society immediately notifies the Owner in writing that:

- a) any outstanding recommendations are to be dealt with by their due dates;
- b) copies of the plans listed in [3.2.1] are to be provided to the Society as a prerequisite to obtaining a full term Certificate of Classification.

If the Owner is unable to provide all of the required plans, the Society requests that the Owner authorises the losing Society to transfer copies of such of these plans as it may possess directly to and upon request from the Society, with the advice that the losing Society will invoice the Society and the Society may, in turn, charge the associated costs to the Owner.

Note 1: "At ship's delivery" means that the new construction survey process is completed and the ship has not departed from the yard.

Note 2: "First Certificate of Classification" means either the Interim Certificate of Classification or full term Certificate of Classification or another document serving the same purpose.

3.3.3 Conditions of IACS Procedural Requirement No. 1A, preventing issue of the Interim Certificate of Classification (1/1/2014)

Prior to issuing an Interim Certificate of Classification on the date of the ship's delivery, the Society is to obtain:

- a) from the Owner, a written request for transfer of class at ship's delivery, containing an authorisation for the Society to obtain a copy of the first Certificate of Classification from the losing Society; and
- b) the first Certificate of Classification from the Headquarters of the losing Society or one of its designated control or management centres or from the attending Surveyor

at the builder's yard, including any outstanding recommendations and information normally contained in the classification status.

If the Society does not receive the above documents from the losing Society on the date of the ship's delivery, the Society may utilise the losing Society's said documents provided by the Owner and, after complying with the other relevant provisions of this Procedural Requirement, issue an Interim Certificate of Classification on the date of the ship's delivery. In such cases, the conditions in [3.3.2] are still applicable (a statement is normally included in the Interim Certificate of Classification for this purpose).

The Society cannot issue an Interim Certificate of Classification, or other documents enabling the ship to trade:

- 1) until all relevant surveys specified in Ch 3, Sec 2, [1.2.1] have been satisfactorily completed; and
- 2) before giving the opportunity to the flag Administration to provide any further instructions within 3 working days, in compliance with the requirements of Art. 10.5 of the Regulation (EC) No 391/2009.

3.3.4 Limitations of IACS Procedural Requirement No. 1A for the Certificate of Classification (1/1/2008)

The validity of the Interim Certificate of Classification and the subsequent full term Certificate of Classification issued by the Society is subject to any outstanding recommendations previously issued against the ship being completed by the due dates and as specified by the losing Society. Any outstanding recommendations with their due dates and information normally contained in the classification status are to be clearly stated on the:

- a) first Certificate of Classification or an attachment to the first Certificate of Classification and/or the Survey Endorsement Sheet available on board
- b) survey status when the full term Certificate of Classification is issued.

3.3.5 Surveys (1/1/2008)

The Surveyor:

- a) checks that the outcome of the design assessment (if any), survey instructions and the first Certificate of Classification or an attachment to the first Certificate of Classification and/or a class survey record from the losing Society are available,
- b) surveys the ship to check that it complies with the outcome of the design assessment (if any) and with the requirements of Ch 3, Sec 2, [1.2.1].

3.3.6 Interim Certificate of Classification (1/1/2008)

Upon satisfactory completion of the survey for assignment of class, the Surveyor issues to the Owner an Interim Certificate of Classification valid not more than 5 months, provided that the conditions in [3.3.2] to [3.3.5] are met. This certificate indicates the class notations.

The certificate is issued with a Survey Endorsement Sheet where all outstanding recommendations and significant memoranda are recorded; class notations requested by the Owner and not assigned due to pending items are clearly indicated together with the relevant pending items.

3.3.7 Certificate of Classification (1/1/2008)

Upon satisfactory review of the survey reports, the Society issues to the Owner the Certificate of Classification valid for the whole period of class, provided that the conditions in [3.3.2] to [3.3.5] are met. The certificate indicates the class notations.

All outstanding recommendations, significant memoranda and pending items for class notations not assigned are made available in the ship status.

3.4 Addition of the Society's class to a ship in service classed by another QSCS Classification Society (IACS PR 1B)

3.4.1 Documentation to be submitted and design assessment (1/7/2007)

The requirements of [3.2.1] apply.

3.4.2 Basic conditions of IACS Procedural Requirement No. 1B (1/7/2009)

This Procedural Requirement is applicable, unless stated otherwise, to ships of over 100 GT of whatever type, self-propelled or not, restricted or unrestricted service, except for "inland waterway" ships.

The obligations of the Procedural Requirement continue to apply when a ship's class is suspended by the losing Society and for 6 months following withdrawal of a ship's class by the losing Society.

Cases concerning ships of 100 GT or less are dealt with by the Society on a case-by-case basis.

Whenever the Society is requested by an Owner to accept a ship in service already classed by another QSCS Classification Society into its class under double or dual class arrangement, the following applies:

- a) the Society only accepts a ship that is free from any overdue surveys or recommendations;
- b) the Owner is to inform the first Society of his request to the Society;
- c) the Owner is to authorise the first Society to submit to the Society its current classification status and documents as listed in Annex 3 of IACS PR1 Annex - "Content of Vessel's History Report Regarding Class Items" for information and use by the Society in conducting its assignment of class surveys;
- d) when the Owner decides to leave the double or dual class arrangement and prior to withdrawing from the class of either of the Societies, he is to inform the Societies of his intended actions;
- e) when the Owner is advised that one of the Societies involved in double or dual class arrangement is suspending or withdrawing class, he is to inform the remaining Society of the action taken by the other Society without delay;
- f) copies of the plans listed in [3.2.1] are to be provided to the Society as a prerequisite to obtaining a full term Certificate of Classification. If the Owner is unable to provide all of the required plans, the first Society is to be authorised by the Owner to transfer copies of such of

these plans as it may possess directly to and upon request from the Society.

3.4.3 Conditions of IACS Procedural Requirement No. 1B, preventing issue of the Interim Certificate of Classification (1/7/2009)

Prior to issuing an Interim Certificate of Classification the Society is to:

- a) obtain from the Owner, a written application for entry into the Society's class, containing an authorisation for the Society to obtain the current classification status from the first Society;
- b) obtain the first Certificate of Classification from the Headquarters of the first Society or from one of its designated control or management centres or from the attending Surveyor at the yard of the builders, including any outstanding recommendations/conditions of class and information normally contained in the classification status; and
- c) carry out and satisfactorily complete all relevant surveys specified in Ch 3, Sec 2, [2.1].

3.4.4 Limitations of IACS Procedural Requirement No. 1B for the Certificate of Classification (1/7/2007)

The validity of the Interim Certificate of Classification and the subsequent Certificate of Classification is subject to any outstanding recommendations previously issued against the ship being completed by the due dates and as specified by the first Society. Any outstanding recommendations with their due dates are stated on the Survey Endorsement Sheets and ship status when the full term Certificate of Classification is issued.

3.4.5 Surveys (1/7/2007)

The Surveyor:

- a) checks that the outcome of the design assessment (if any), survey instructions and first Society's ship status are available,
- b) surveys the ship to check that it complies with the outcome of the design assessment (if any) and with the requirements of Ch 3, Sec 2, [1.1.2].

3.4.6 Interim Certificate of Classification (1/7/2007)

Upon satisfactory completion of the survey for assignment of class, the Surveyor issues to the Owner an Interim Certificate of Classification valid not more than 5 months, provided that the conditions in [3.4.2] to [3.4.5] are met. This certificate indicates the class notations.

The certificate is issued with a Survey Endorsement Sheet where all outstanding recommendations and significant memoranda are recorded; class notations requested by the Owner and not assigned due to pending items are clearly indicated together with the relevant pending items.

3.4.7 Certificate of Classification (1/7/2007)

Upon satisfactory review of the survey reports, the Society issues to the Owner the Certificate of Classification valid for the whole period of class, provided that the conditions in

[3.4.2] to [3.4.5] are met. The Certificate indicates the class notations.

All outstanding recommendations, significant memoranda and pending items for class notations not assigned are made available in the ship status.

3.5 Addition of the Society's class to a ship surveyed during construction by another QSCS Classification Society at the ship's delivery (IACS PR 1B)

3.5.1 Documentation to be submitted and design assessment (1/1/2008)

The requirements of [3.2.1] apply.

3.5.2 Basic conditions of IACS Procedural Requirement No. 1B (1/7/2009)

The Procedural Requirements for adding class at ship's delivery are applicable when the Society which carried out the new construction technical review and surveys (i.e. the first Society) has issued its first Certificate of Classification (see Note 2 to item [3.3.2]). Unless stated otherwise, the provisions apply to ships of over 100 GT of whatever type, self-propelled or not, restricted or unrestricted service, except for "inland waterway" ships. Cases concerning ships of 100 GT or less are dealt with by the Society on a case-by-case basis.

Whenever the Society is requested by an Owner to accept a ship already classed by another QSCS Classification Society (the first Society) into its class under double or dual class arrangement at ship's delivery, the following applies:

- a) the Owner is to inform the first Society of his request to the Society;
- b) the Owner is to authorise the first Society to submit to the Society its Certificate of Classification;
- c) when the Owner decides to leave the double or dual class arrangement and prior to withdrawing from the class of either of the Societies, he is to inform the Societies of his intended actions;
- d) when the Owner is advised that one of the Societies involved in double or dual class arrangement is suspending or withdrawing class, he is to inform the remaining Society of the action taken by the other Society without delay;
- e) copies of the plans listed in [3.2.1] are to be provided to the Society as a prerequisite to obtaining a full term Certificate of Classification. If the Owner is unable to provide all of the required plans, the Society requests that the Owner authorise the first Society to transfer copies of such of these plans as it may possess directly to and upon request from the Society, with the advice that the first Society will invoice the Society and the Society may, in turn, charge the associated costs to the Owner.

3.5.3 Conditions of IACS Procedural Requirement No. 1B, preventing issue of the Interim Certificate of Classification (1/7/2009)

Prior to issuing an Interim Certificate of Classification on the date of the ship's delivery, the Society is:

- a) obtain from the Owner, a written request for entry into the Society's class at ship's delivery, containing an authorisation for the Society to obtain a copy of the first Certificate of Classification from the first Society; and
- b) obtain the first Certificate of Classification from the Headquarters of the first Society or one of its designated control or management centres or from the attending Surveyor at the builder's yard, including any outstanding recommendations and information normally contained in the classification status;
- c) carry out and satisfactorily complete all relevant surveys specified in Ch 3, Sec 2, [2.2.1].

3.5.4 Limitations of IACS Procedural Requirement No. 1B for the Certificate of Classification (1/1/2008)

Prior to final entry into its class, the Society is obligated to obtain plans and information in accordance with the requirements of [3.2.1].

3.5.5 Surveys (1/1/2008)

The Surveyor:

- a) checks that the outcome of the design assessment (if any), survey instructions and the first Certificate of Classification or an attachment to the first Certificate of Classification and/or a class survey record from the first Society are available,
- b) surveys the ship to check that it complies with the outcome of the design assessment (if any) and with the requirements of Ch 3, Sec 2, [2.2.1].

3.5.6 Interim Certificate of Classification (1/1/2008)

Upon satisfactory completion of the survey for assignment of class, the Surveyor issues to the Owner an interim Certificate of Classification valid not more than 5 months, provided that the conditions in [3.5.2] to [3.5.5] are met. This certificate indicates the class notations.

The certificate is issued with a Survey Endorsement Sheet where all outstanding recommendations and significant memoranda are recorded; class notations requested by the Owner and not assigned due to pending items are clearly indicated together with the relevant pending items.

3.5.7 Certificate of Classification (1/1/2008)

Upon satisfactory review of the survey reports, the Society issues to the Owner the Certificate of Classification valid for the whole period of class, provided that the conditions in [3.5.2] to [3.5.5] are met. The certificate indicates the class notations.

All outstanding recommendations, significant memoranda and pending items for class notations not assigned are made available in the ship status.

3.6 Ships in service not classed with a QSCS Society or not classed at all (PR1D)

3.6.1 General (1/1/2015)

In the case of a ship not classed with a QSCS Classification Society, or not classed at all, the requirements of [3.6.2] to [3.6.10] apply.

3.6.2 Documentation to be submitted and design assessment (1/7/2007)

As a rule, the minimum documentation to be supplied is listed hereinafter. The Society will carry out a plan appraisal before the Interim Certificate of Classification is issued:

- a) Main plans:
 - 1) general arrangement,
 - 2) capacity plan,
 - 3) loading manual, where required, which is to contain, as a minimum, loading cases, calculations of still water bending moments, and relevant documents, particulars of loading calculator and instruction booklet as per the Society's requirements, according to the case,
 - 4) hydrostatic curves and stability documentation, as applicable (refer to Part B, Chapter 3),
 - 5) damage stability calculations, where required.
- b) Hull structure plans:
 - 1) midship section,
 - 2) scantling plans,
 - 3) profile and decks plan,
 - 4) shell expansion,
 - 5) watertight bulkheads, transverse and longitudinal (if any),
 - 6) rudder and rudder stock,
 - 7) hatch covers,
 - 8) for CSR ships, plans showing, for each structural element, both as-built and renewal thicknesses and any thickness for "voluntary addition".
- c) Machinery plans:
 - 1) engine room general arrangement,
 - 2) diagram of fuel- (transfer, service), bilge-, ballast-, lubricating oil-, cooling-, steam- and feed-, general service and starting compressed air piping,
 - 3) intermediate, thrust- and screw shafts,
 - 4) propeller,
 - 5) main engines, propulsion gears and clutch systems (or Manufacturer make, model and rating information),
 - 6) for steam turbine vessels, main boilers, superheaters and economisers (or Manufacturer make, model and rating information) and steam piping,
 - 7) drawings of boilers and air receivers,
 - 8) drawings of steering gear systems, piping and arrangements and steering gear Manufacturer make and model information,

- 9) torsional vibration calculations as per conditions laid down in Pt C, Ch 1, Sec 9; such documents are required only for ships less than 2 years old or for older ships the propelling system of which has been modified during the two years preceding the classification.
- d) Electrical installation plans and wiring diagrams:
 - 1) master plan of power distribution, lighting and emergency power circuits,
 - 2) single line diagram of networks and switchboards,
 - 3) location and arrangement of electrical equipment in hazardous areas.
- e) Additional requirements for vessels with ice class notation:
 - 1) plans for flexible couplings and/or torque limiting shafting devices in the propulsion line shafting (or manufacturer make, model and rating information).
- f) Additional plans required for oil tankers:
 - 1) pumping arrangement at the forward and after ends and drainage of cofferdams and pump rooms.
- g) Additional plans required in order to assign unattended machinery space notation:
 - 1) instrument and alarm list;
 - 2) fire alarm system;
 - 3) list of automatic safety functions (e.g. slowdowns, shutdowns, etc.);
 - 4) function testing plan.

Alternative technical data may be accepted by the Society in lieu of specific items of the listed documentation not available at the time of the transfer of class.

Additional documentation may be required according to Flag Administration requirements.

3.6.3 Basic conditions of IACS Procedural Requirement PR1D (1/1/2015)

IACS Procedural Requirement PR1D contains procedures and requirements pertaining to class entry of ships not subject to IACS Procedural Requirement PR1A or IACS Procedural Requirement PR1B and is applicable, unless stated otherwise, to ships in service not classed with a QSCS Classification Society or not classed at all, of over 100 GT of whatever type, self-propelled or not, restricted or unrestricted service, except for "inland waterway" vessels.

Cases concerning ships of 100 GT or less are dealt with by the Society on a case-by-case basis.

Cases concerning ships to which the class is reassigned are to be dealt with according to [5].

Whenever the Society is requested by an Owner to accept a ship in service into class:

- a) the relevant surveys specified in Ch 3, Sec 2, [3.1.2] are to be satisfactorily completed for entry into class;
- b) the copies of the plans listed in [3.6.2] are to be provided to the gaining Society as a prerequisite to obtaining an Interim or Full Term Certificate of Class;
- c) required plan appraisal is to be satisfactorily completed for entry into class.

3.6.4 Conditions of IACS Procedural Requirement PR1D, preventing issue of the Interim Certificate of Classification (1/1/2015)

Prior to issuing an Interim Certificate of Classification, the Society is to obtain a written request to class the vessel from the Owner.

The Society cannot issue an Interim Certificate of Classification, or other documents enabling the ship to trade under its classification:

- a) until all required surveys specified in Ch 3, Sec 2, [3.1.2] have been completed,
- b) until the appraisal of the plans listed in [3.6.2] as required by the Society to verify compliance with its applicable classification Rules, has been carried out. Where issues remain outstanding, the Society may impose a Recommendation/Condition of Class for a limited period in accordance with Sec 2, [2.14],
- c) before giving the opportunity to the flag Administration to provide any further instructions within 3 working days, in compliance with the requirements of Art. 10.5 of Regulation (EC) No 391/2009.

3.6.5 Surveys (1/1/2015)

The Surveyor:

- a) checks that the outcome of the plan appraisal and survey instructions are available,
- b) surveys the ship to check that it complies with the outcome of the plan appraisal and with the requirements of Ch 3, Sec 2, [3.1.2],
- c) attends tests and trials provided for in the Rules.

3.6.6 Interim Certificate of Classification (1/7/2007)

Upon satisfactory completion of the survey for assignment of class, the Surveyor issues to the Owner an Interim Certificate of Classification valid not more than 5 months. This certificate indicates the class notations.

The certificate is issued with a Survey Endorsement Sheet where all outstanding recommendations and significant memoranda are recorded; class notations requested by the Owner and not assigned due to pending items are clearly indicated together with the relevant pending items.

3.6.7 Certificate of Classification (1/7/2007)

Upon satisfactory review of the survey reports, the Society issues to the Owner the Certificate of Classification valid for the whole period of class. The certificate indicates the class notations.

All outstanding recommendations, significant memoranda and pending items for class notations not assigned are made available in the ship status.

3.6.8 Equivalence criterion

Where appropriate within reasonable limits, a proven service record of satisfactory performance during a period of adequate length may be used as a criterion of equivalence. Special consideration will be given to ships of recent construction.

3.6.9 Additional service and/or class notations

For installations or equipment covered by additional service and/or class notations, the Society will determine the documentation to be submitted.

3.6.10 Other documentation

In addition, the Society may base its judgement upon documentation such as certificates issued or accepted by the former Classification Society, if any, and statutory certificates issued by the flag Administration or by a recognised organisation on its behalf; moreover, other documents and/or plans may be specifically required to be supplied to the Society in individual cases.

4 Date of initial classification

4.1 Definitions

4.1.1 Date of build (1/1/2012)

- a) For new construction:

For a new building the date of build is the year, month and day at which the new construction survey process is completed.

Where there is a substantial delay between the completion of the construction survey process and the ship commencing active service, the date of commissioning may also be specified.

- b) After modifications:

After modifications are completed, the "date of build" remains assigned to the ship.

Where a complete replacement or addition of a major portion of the ship (see Note 1) is involved, the following applies:

- 1) the "date of build" associated with each major portion of the ship is indicated on the Certificate of Classification where it has been agreed that the newer structure is on a different survey cycle;
- 2) survey requirements are based on the "date of build" associated with each major portion of the ship;
- 3) survey due dates may be aligned, where appropriate.

Note 1: For example, a major portion of the ship may include a complete forward or after section, a complete main cargo section (which may comprise a complete hold / tank of a cargo ship), a complete block of deck structure of a passenger ship or a structural modification of a single hull to a double hull ship.

4.1.2 Date of initial classification for new buildings

As a general rule, for new buildings the date of initial classification coincides with the date of build.

4.1.3 Date of initial classification for existing ships

In principle, for existing ships the date of initial classification is the date of completion of the admission to class survey.

4.1.4 Period of class (1/7/2009)

The assigned period of class is never to exceed five (5) years. The 5-year period is granted only upon completion of the new building procedure and, for ships classed after con-

struction, upon satisfactory outcome of a survey with the scope of a renewal survey.

If a ship classed after construction was previously classed with a QSCS Classification Society [3.2], the assigned period of class is never to go beyond the due date of the renewal survey assigned by the previous Society.

5 Reassignment of class

5.1 Ships in service classed by a QSCS Classification Society

5.1.1 Documentation to be submitted and design assessment (1/1/2007)

The requirements of [3.2.1] apply.

5.1.2 Conditions, Surveys and Certificate of Classification (1/1/2007)

The requirements of [3.2.2] to [3.2.7] apply.

5.2 Ships in service not classed by a QSCS Classification Society

5.2.1 Documentation to be submitted and design assessment (1/1/2015)

The requirements of [3.6.1] apply.

5.2.2 Conditions, Surveys and Certificate of Classification (1/1/2015)

The requirements of [3.6.2] to [3.6.9] apply.

5.3 Ships in service not classed by a QSCS Classification Society, but previously classified by a QSCS Classification Society

5.3.1 General (1/1/2015)

The following two cases are considered:

- a) the date of the class withdrawal, by the last QSCS Classification Society, falls within the time window of six months counted from the date of the classification request: the provisions of [5.1] apply;
- b) the date of the class withdrawal, by the last QSCS Classification Society, does not fall within the time window of six months counted from the date of the classification request: the provisions of [5.2] apply.

When the ship was previously classed by the Society and since the withdrawal of the Society's class no conversion or significant modification of the ship or altera-

tion of the ship's class has been made, a design assessment may nevertheless be required.

5.4 Ships no longer in service since class withdrawal by the Society

5.4.1 General (1/1/2015)

This paragraph is applicable, based on the premise that after the class was withdrawn by the Society, the ship:

- a) never resumed its trade
- b) has not been classified by any other Classification Society.

5.4.2 Conditions, Surveys and Certificate of Classification (1/1/2015)

The requirements of Sec 3, [1.4] apply

5.5 Ships no longer in service since class withdrawal by a QSCS Classification Society or by a non-QSCS Classification Society

5.5.1 Documentation to be submitted and design assessment (1/1/2015)

The requirements of [3.6.1] apply.

5.5.2 Conditions, Surveys and Certificate of Classification (1/1/2015)

The requirements of [3.6.2] to [3.6.9] apply.

6 Double or dual class procedures

6.1 Definitions

6.1.1 Double class (1/7/2003)

A double class ship is one which is classed by two Societies, where each one works as if it is the only Society classing the ship and does all surveys in accordance with its own requirements and schedule.

6.1.2 Dual class (1/7/2010)

A dual class ship is one which is classed by two Societies between which there is a written agreement regarding sharing of work.

6.2 Procedures

6.2.1 (1/7/2009)

The procedures of admission to class of a ship already classed with another QSCS Classification Society under double or dual class arrangement are those indicated in [3.4] and [3.5].

SECTION 2

MAINTENANCE OF CLASS

1 General principles of surveys

1.1 Survey types

1.1.1 Classed ships are submitted to surveys for the maintenance of class. These surveys include the class renewal survey, intermediate and annual survey, bottom survey (either survey in dry condition or in-water survey), tailshaft survey, boiler survey, and surveys for the maintenance of additional class notations, where applicable. Such surveys are carried out at the intervals and under the conditions laid down in this Section. In addition to the above periodical surveys, ships are to be submitted to occasional surveys whenever the circumstances so require; refer to [11].

1.1.2 The different types of periodical surveys are summarised in Tab 1. The intervals at which the periodical surveys are carried out are given in the items referred to in the second column of Tab 1. The relevant extent and scope are given in Chapter 3 and Chapter 4 for all ships and for service notations, respectively, while surveys related to additional class notations are given in Chapter 5.

Where there are no specific survey requirements for additional class notations assigned to a ship, equipment and/or arrangements related to these additional class notations are to be examined, as applicable, to the Surveyor's satisfaction at each class renewal survey for the main class.

The surveys are to be carried out in accordance with the relevant requirements in order to confirm that the hull, machinery, equipment and appliances comply with the applicable Rules and will remain in satisfactory condition based on the understanding and assumptions mentioned in Ch 1, Sec 1, [3.3].

Where the conditions for the maintenance of main class, service notations and additional class notations are not complied with, the main class and/or the service notation and/or the additional class notations as appropriate will be suspended and/or withdrawn in accordance with the applicable Rules given in Sec 3.

Note 1: It is understood that requirements for surveys apply to those items that are required according to the Rules or, even if not required, are fitted on board.

1.1.3 Unless specified otherwise, any survey other than bottom survey and tailshaft survey may be effected by carrying out partial surveys at different times to be agreed upon with the Society, provided that each partial survey is adequately extensive. The splitting of a survey into partial surveys is to be such as not to impair its effectiveness.

1.2 Change of periodicity, postponement or advance of surveys

1.2.1 The Society reserves the right, after due consideration, to change the periodicity, postpone or advance surveys, taking into account particular circumstances.

Table 1 : List of periodical surveys (1/1/2016)

Type of survey	Reference in this Section	Reference to scope of survey
Class renewal - hull	[4]	Ch 3, Sec 5 and Chapter 4 (1)
Class renewal - machinery	[4]	Ch 3, Sec 5 and Chapter 4 (1)
Annual - hull	[5.1]	Ch 3, Sec 3 and Chapter 4 (1)
Annual - machinery	[5.1]	Ch 3, Sec 3 and Chapter 4 (1)
Intermediate - hull	[6.1]	Ch 3, Sec 4 and Chapter 4 (1)
Intermediate - machinery	[6.1]	Ch 3, Sec 4 and Chapter 4 (1)
Bottom - dry condition	[7.1]	Ch 3, Sec 6
Bottom - in water	[7.1]	Ch 3, Sec 6
Shaft - Method 1,2,3,4	[8.1]	Ch 3, Sec 7
Boiler - complete	[9.1]	Ch 3, Sec 8
(1) As applicable, according to the service notation assigned to the ship		

1.2.2 When a survey becomes overdue during a voyage, the following applies:

- a) In the case of a class renewal survey, the Society may, under exceptional circumstances, grant an extension to allow for completion of this survey provided there is documented agreement to such an extension prior to the expiry date of the Certificate of Classification, adequate arrangements have been made for the attendance of the Surveyor at the first port of call and the Society is satisfied that there is technical justification for such an extension. Such an extension will be granted only until arrival at the first port of call after the expiry date of the Certificate of Classification
- b) In the case of annual and intermediate surveys, no postponement is granted. Such surveys are to be completed within their prescribed windows; see [2.1.3]
- c) In the case of all other periodical surveys and recommendations, extension of class may be granted until the arrival of the ship at the port of destination.

1.3 Extension of scope of survey

1.3.1 The Society and/or its Surveyors may extend the scope of the provisions in Chapter 3 to Chapter 5, which set forth the technical requirements for surveys, whenever and so far as considered necessary, or modify them in the case of special ships or systems.

1.3.2 The extent of any survey also depends upon the condition of the ship and its equipment. Should the Surveyor have any doubt as to the maintenance or condition of the ship or its equipment, or be advised of any deficiency or damage which may affect the class, then further examination and testing may be conducted as considered necessary.

1.4 General procedure of survey

1.4.1 The general procedure of survey consists in:

- an overall examination of the parts of the ship covered by the rule requirements
- checking selected items covered by the rule requirements
- attending tests and trials where applicable and deemed necessary by the Surveyor.

1.4.2 The Society's survey requirements cannot be considered as a substitute for specification and acceptance of repairs and maintenance, which remain the responsibility of the Owner.

1.4.3 In accordance with the provisions of Ch 1, Sec 1, [3.1.5], the Society will, at the request of the Owner, apply the regulations of Administrations concerning the scope and periodicity of surveys when they differ from those laid down in Part A.

1.4.4 During the surveys, the Surveyor does not check that the spare parts are kept on board, maintained in working order and suitably protected and lashed.

1.4.5 (1/7/2006)

As a general rule, all materials, machinery, boilers, auxiliary installations, equipment, items etc. (generally referred to as "products") which are covered by the class and used or fitted on board ships inspected by the Society during surveys after construction are to be new and, where intended for essential services as defined in Ch 1, Sec 1, [1.2.1], tested by the Society.

Second hand materials, machinery, appliances and items may be used subject to the specific agreement of the Society and the Owner.

The requirements for the selection of materials to be used in the construction or repair of the various parts of existing ships, the characteristics of products to be used for such parts and the checks required for their acceptance are to be as stated in Part C and Part D, as applicable, or in other Parts of the Rules or as specified on approved plans. In particular, the testing of products manufactured according to quality assurance procedures approved by the Society and the approval of such procedures are governed by the requirements of Pt D, Ch 1, Sec 1, [3].

1.5 Appointment of another Surveyor

1.5.1 In compliance with the provisions of Ch 1, Sec 1, [2.5.1], should a disagreement arise between the Owner and the Surveyor during a survey, the Society may, at the request of the Owner, designate another Surveyor.

2 Definitions and procedures related to surveys

2.1 General

2.1.1 Period of class

Period of class means the period starting either from the date of the initial classification, see Sec 1, [5], or from the credited date of the last class renewal survey, and expiring at the limit date assigned for the next class renewal survey.

2.1.2 Anniversary date

Anniversary date means the day of the month of each year in the period of class which corresponds to the expiry date of the period of class.

2.1.3 Survey time window

Survey time window, or more simply window, mean the fixed period during which annual and intermediate surveys are to be carried out.

2.1.4 Overdue surveys (1/7/2001)

Each periodical survey is assigned a limit date specified by the relevant requirements of the Rules (end of survey interval or end date of window) by which it is to be completed.

A survey becomes overdue when it has not been completed by its limit date.

Examples:

- Anniversary date: 15th April
The 2000 annual survey can be validly carried out from 16th January 2000 to 15th July 2000. If not completed by 15th July 2000, the annual survey becomes overdue.
- Last bottom survey 20th October 2000 (periodicity 2.5 years, with a maximum interval between successive examinations not exceeding 3 years)
The next bottom survey is to be carried out before 20th October 2003. If not completed by 20th October 2003, the bottom survey becomes overdue.

2.1.5 Recommendations (1/7/2008)

A recommendation is a requirement to the effect that specific measures, repairs and/or surveys are to be carried out within a specific time limit in order to retain classification. A recommendation is pending until it is cleared. Where it is not cleared by its limit date, the recommendation is overdue.

2.1.6 Memoranda

Those defects and/or deficiencies which do not affect the maintenance of class and which may therefore be cleared at the Owner's convenience and any other information deemed noteworthy for the Society's convenience are indicated as memoranda. Memoranda are not to be regarded as recommendations.

2.1.7 Exceptional circumstances (1/7/2005)

'Exceptional circumstances' means unavailability of dry-docking facilities; unavailability of repair facilities; unavailability of essential materials, equipment or spare parts; or delays incurred by action taken to avoid severe weather conditions.

2.1.8 Force Majeure (1/7/2005)

'Force Majeure' means damage to the ship; unforeseen inability of the Society to attend the ship due to government restrictions on right of access or movement of personnel; unforeseeable delays in port or inability to discharge cargo due to unusually lengthy periods of severe weather, strikes or civil strife; acts of war; or other force majeure.

2.2 Terminology related to hull survey

2.2.1 Common Structural Rules (1/7/2015)

Where in these Rules the term "Common Structural Rules" is used, the pertinent edition of the Common Structural Rules is to be applied as follows:

- for bulk carriers, having notation "**bulk carrier ESP CSR**", contracted for construction on or after 1 April 2006 but before 1 July 2015, reference is to be made to the "Common Structural Rules for Bulk Carriers" in force at the date of contract for construction;
- for oil tankers, having notation "**oil tanker ESP CSR**", contracted for construction on or after 1 April 2006 but before 1 July 2015, reference is to be made to the "Common Structural Rules for Double Hull Oil Tankers" in force at the date of contract for construction; and
- for bulk carriers, having notation "**bulk carrier ESP CSR**" and oil tankers, having notation "**oil tanker ESP CSR**", contracted for construction on or after 1 July 2015, reference is to be made to the "Common Structural Rules for Bulk Carriers and Oil Tankers" in force at the date of contract for construction.

2.2.2 Ballast tanks (1/1/2010)

a) Ships with the ESP notation:

As far as oil tankers and chemical tankers are concerned, a Ballast Tank is a tank which is used solely for the carriage of salt water ballast.

As far as oil tankers and chemical tankers are concerned, a Combined Cargo/Ballast Tank is a tank which is used for the carriage of cargo or ballast water as a routine part of the vessel's operation and will be treated as a Ballast Tank. Cargo tanks in which water ballast might be carried only in exceptional cases according to MARPOL I/18.3 are to be treated as cargo tanks.

As far as bulk carriers are concerned, a Ballast Tank is a tank which is used solely for salt water ballast, or, where applicable, a space which is used for both cargo and ballast will be treated as a Ballast tank when substantial corrosion has been found in that space.

As far as double skin bulk carriers are concerned, a Ballast Tank is a tank which is used solely for salt water ballast, or, where applicable, a space which is used for both cargo and ballast will be treated as a Ballast tank when substantial corrosion has been found in that space. A Double Side Tank is to be considered as a separate tank even if it is in connection with either the top-side tank or the hopper side tank.

b) Other ships:

A Ballast Tank is a tank that is being used primarily for salt water ballast.

2.2.3 Spaces (1/1/2008)

Spaces are separate compartments including holds, tanks, cofferdams and void spaces bounding cargo holds, decks and the outer hull.

2.2.4 Overall survey

An overall survey is a survey intended to report on the overall condition of the hull structure and determine the extent of additional close-up surveys.

2.2.5 Close-up survey

A close-up survey is a survey where the details of structural components are within the close visual inspection range of the Surveyor, i.e. normally within reach of hand.

2.2.6 Transverse section

A transverse section includes all longitudinal members contributing to longitudinal hull girder strength, such as plating, longitudinals and girders at the deck, side shell, bottom, inner bottom, longitudinal bulkheads, and sloped plating in upper and lower side tanks, as well as relevant longitudinals, as applicable for the different ships. For a transversely framed ship, a transverse section includes adjacent frames and their end connections in way of transverse sections.

2.2.7 Representative tanks or spaces (1/7/2006)

Representative tanks or spaces are those which are expected to reflect the condition of other tanks or spaces of similar type and service and with similar corrosion prevention systems. When selecting representative tanks or spaces,

account should be taken of the service and repair history on board and identifiable critical structural areas and/or suspect areas.

2.2.8 Renewal thickness (1/7/2012)

Renewal thickness (t_{ren}) is the minimum allowable thickness, in mm, below which renewal of structural members is to be carried out.

2.2.9 Substantial corrosion (1/7/2012)

Substantial corrosion is an extent of corrosion such that assessment of the corrosion pattern indicates a wastage in excess of 75% of allowable margins, but within acceptable limits.

For ships built under the Common Structural Rules, substantial corrosion is an extent of corrosion such that the assessment of the corrosion pattern indicates a measured thickness between $t_{ren} + 0,5\text{mm}$ and t_{ren} .

2.2.10 Suspect areas

Suspect areas are locations showing substantial corrosion and/or considered by the Surveyor to be prone to rapid wastage.

2.2.11 Critical Structural Area (1/7/2006)

Critical Structural Areas are locations which have been identified from calculations to require monitoring and/or which, from the service history of the subject ship or from similar or sister ships (if available), have been identified as sensitive to cracking, buckling or corrosion which would impair the structural integrity of the ship.

2.2.12 Corrosion Prevention System (1/7/2008)

A Corrosion Prevention System is normally considered a full hard protective coating.

Hard Protective Coating is usually to be epoxy coating or equivalent. Other coating systems which are neither soft nor semi-hard coatings may be considered acceptable as alternatives provided that they are applied and maintained in compliance with the Manufacturer's specifications.

2.2.13 Coating condition (1/7/2006)

Coating condition is defined as follows:

- good: condition with only minor spot rusting
- fair: condition with local breakdown at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for poor condition
- poor: condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.

Note 1: For oil tankers ESP, both single and double hull, and chemical tankers ESP, reference is made to IACS Recommendation No.87 "Guidelines for Coating Maintenance & Repairs for Ballast Tanks and Combined Cargo / Ballast Tanks on Oil Tankers".

2.2.14 Cargo area (ships carrying liquid cargo in bulk)

The cargo area is that part of the ship which contains cargo tanks, slop tanks and cargo/ballast pump rooms, cofferdams, ballast tanks and void spaces adjacent to cargo tanks

and also deck areas throughout the entire length and breadth of the part of the ship over the above-mentioned spaces.

2.2.15 Cargo length area (dry cargo ships) (1/7/2006)

The cargo length area is that part of the ship which includes all cargo holds and adjacent areas including fuel tanks, cofferdams, ballast tanks and void spaces.

2.2.16 Cargo area (ships carrying liquefied gases in bulk) (1/7/2008)

Cargo area is that part of the ship which contains cargo tanks, cargo/ballast pump rooms, compressor rooms, cofferdams, ballast tanks and void spaces adjacent to cargo tanks and also deck areas throughout the entire length and breadth of the part of the ship over the above-mentioned spaces.

2.2.17 Prompt and Thorough Repair (1/7/2001)

A Prompt and Thorough Repair is a permanent repair completed at the time of survey to the satisfaction of the Surveyor, therein removing the need for the imposition of any associated recommendation.

2.2.18 Double hull oil tanker (1/7/2008)

A double hull oil tanker is a ship which is constructed primarily for the carriage of oil (see Note 1) in bulk, which has the cargo tanks protected by a double hull which extends for the entire length of the cargo area, consisting of double sides and double bottom spaces for the carriage of water ballast or spaces other than tanks that carry oil (see Note 1).

Note 1: MARPOL Annex I cargoes. The requirements relevant to these ships given in Ch 4, Sec 4 are also applicable to existing double hull tankers not complying with MARPOL Regulation 13F, but having a U-shaped midship section.

2.2.19 Double hull oil tanker with independent tanks (1/1/2009)

A double hull oil tanker with independent tanks is a ship which is constructed for the carriage of oil, as per MARPOL Annex I cargoes, in bulk, which is fitted with independent cargo tanks located at distances from the outer shell in accordance with the requirements of MARPOL Annex I Regulation 19, for the entire length of the cargo area.

2.2.20 Double hull oil tanker for heavy grade oils (1/7/2008)

A double hull oil tanker for heavy grade oils is a ship which is constructed primarily for the carriage of oil (see Note 1) in bulk, which has the cargo tanks dedicated to the carriage of heavy grade oils (see Note 2) protected by a double hull which extends for the entire length of the cargo area, consisting of the following:

- double bottom spaces for the carriage of water ballast or spaces other than tanks that carry oil and
- double side spaces for the carriage of water ballast or spaces other than tanks that carry heavy grade oils.

The capacity of each cargo tank is not to exceed 700 m³.

Note 1: MARPOL Annex I cargoes. The requirements relevant to these ships given in Ch 4, Sec 4 are also applicable to existing double hull tankers not complying with MARPOL Regulation 13F, but having a U-shaped midship section.

Note 2: MARPOL Annex I Regulation 21.2. Heavy grade oil means any of the following:

- crude oils having a density at 15°C higher than 900 kg/m³;
- oils, other than crude oils, having either a density at 15°C higher than 900 kg/m³ or a kinematic viscosity at 50°C higher than 180 mm²/s; or
- bitumen, tar and their emulsions.

2.2.21 Double skin bulk carrier (1/7/2012)

A double skin bulk carrier is a ship which is constructed generally with single deck, double bottom, topside tanks and hopper side tanks in cargo spaces, and is intended primarily to carry dry cargo in bulk, including such types as ore carriers and combination carriers (see Note 1), in which all cargo holds are bounded by a double side skin (regardless of the width of the wing space).

Ore and combination carriers are not covered by the Common Structural Rules.

Note 1: For combination carriers with longitudinal bulkheads, survey requirements are specified in both Ch 4, Sec 2 and Ch 4, Sec 3 or Ch 4, Sec 4, as applicable.

2.2.22 Bulk carrier (1/7/2012)

A bulk carrier is a ship which is constructed generally with single deck, double bottom, topside tanks and hopper side tanks in cargo spaces, and is intended primarily to carry dry cargo in bulk. Combination carriers are included (see

Note 1). Ore and combination carriers are not covered by the Common Structural Rules.

Note 1: For single skin combination carriers, survey requirements are specified in both Ch 4, Sec 2 and Ch 4, Sec 3.

2.2.23 Special consideration (1/7/2006)

Special consideration or specially considered (in connection with close-up surveys and thickness measurements) means sufficient close-up inspection and thickness measurements are to be taken to confirm the actual average condition of the structure under the coating.

2.2.24 Pitting corrosion (1/7/2012)

Pitting corrosion is defined as scattered corrosion spots/areas with local material reductions which are greater than the general corrosion in the surrounding area. Pitting intensity is defined in App 2, Fig 12.

2.2.25 Edge corrosion (1/7/2012)

Edge corrosion is defined as local corrosion at the free edges of plates, stiffeners, primary support members and around openings. An example of edge corrosion is shown in Fig 1.

2.2.26 Grooving corrosion (1/7/2012)

Grooving corrosion is typically local material loss adjacent to weld joints along abutting stiffeners and at stiffener or plate butts or seams. An example of groove corrosion is shown in Fig 2.

Figure 1 : Edge corrosion (1/7/2012)

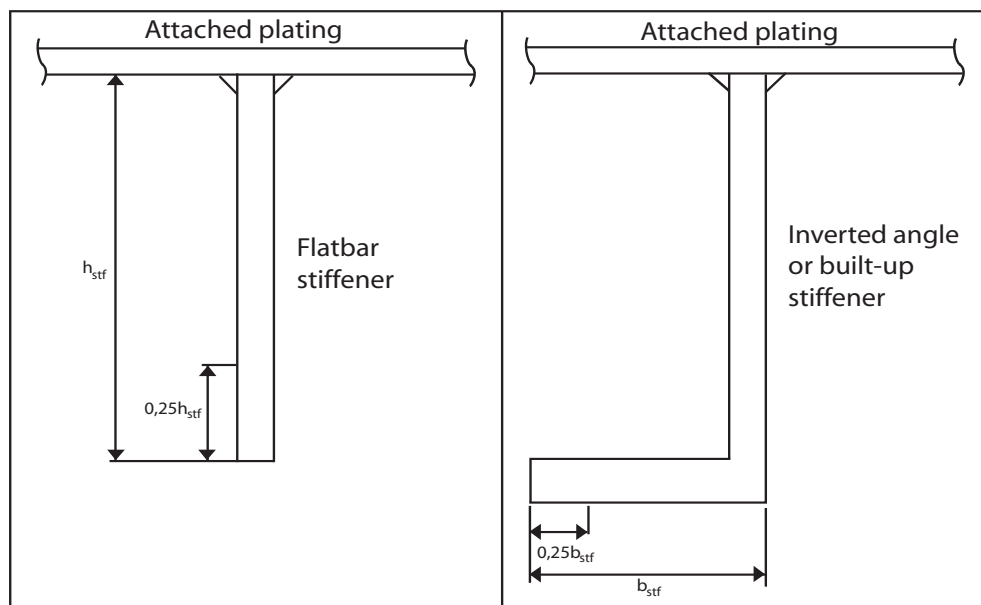
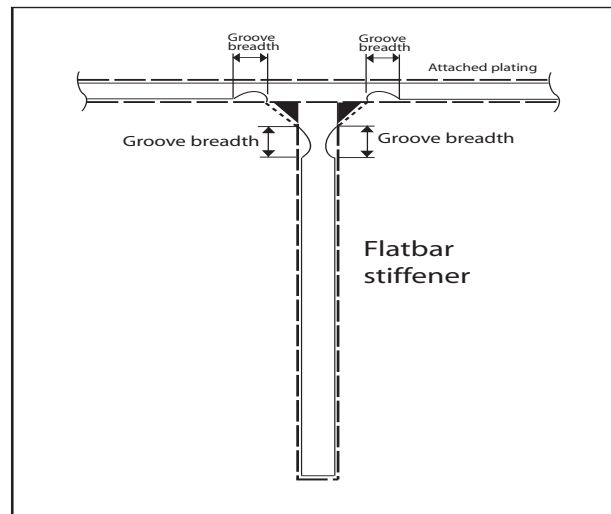


Figure 2 : Grooving corrosion (1/7/2012)



2.2.27 Air pipe heads (1/7/2006)

Air pipe heads installed on exposed decks are those extending above the freeboard deck or superstructure decks.

2.2.28 Remote Inspection Technique (1/1/2019)

Remote Inspection Technique (RIT) is a means of survey that enables examination of any part of the structure without the need for direct physical access of the Surveyor. Remote Inspection Technique may include the use of unmanned robot arm, Remotely Operated Vehicles (ROV), unmanned aerial vehicles/drones or other means acceptable to the Society.

2.3 Procedural requirements for thickness measurements

2.3.1 Control of the process (1/7/2008)

When required as per the scope of surveys defined below, thickness measurements are normally to be carried out under the responsibility of the Owner, in the presence of the Surveyor.

The thickness measurements required, if not carried out by the Society itself are to be witnessed by a Surveyor of the Society. The Surveyor is to be on board to the extent necessary to control the process.

This also applies to thickness measurements taken during voyages. The attendance of the Surveyor will be recorded.

Note 1: Also refer to IACS Recommendation no. 77 "Guidelines for the Surveyor on how to control the thickness measurement process".

2.3.2 Survey meeting (1/1/2010)

Prior to commencement of the intermediate and class renewal surveys, a meeting is to be held between the attending Surveyor(s), the master of the ship or an appropriately qualified representative appointed by the master or Company, the Owner's representative(s) in attendance and the thickness measurement firm's representative(s) so as to ensure the safe and efficient execution of the surveys and thickness measurements to be carried out on board.

Communication with the thickness measurement operator(s) and Owner's representative(s) is to be agreed during the meeting, with respect to the following:

- a) reporting of thickness measurements on a regular basis to the attending Surveyor
- b) prompt notification to the Surveyor in the case of following findings:
 - 1) excessive and/or extensive corrosion or pitting/grooving of any significance
 - 2) structural defects like buckling, fractures and deformed structures
 - 3) detached and/or holed structure
 - 4) corrosion of welds.

When thickness measurements are taken in association with intermediate or renewal survey, a documented record indicating where and when the meeting took place and who attended (the name of the surveyor(s), the master of the ship or an appropriately qualified representative appointed by the master or Company, the owner's representative(s) and the representative(s) of the thickness measurement firm(s)) is to be maintained.

2.3.3 Thickness measurements and close-up surveys (1/1/2019)

In any kind of survey, i.e. renewal, intermediate, annual or other surveys having the scope of the foregoing, thickness measurements, when required by:

- the relevant table giving the "Requirements for thickness measurements at class renewal survey" of the Ch 3, Sec 5, and
- the applicable table of the pertinent section of Chapter 4, in relation to the ship's service notation,

of structures in areas where close-up surveys are required are to be carried out simultaneously with close-up surveys.

For close-up surveys of ships other than those subject to the requirements of Ch 4, Sec 2, 3, 4 and 9, consideration may be given by the Surveyor to allow use of Remote Inspection Technique (RIT) as an alternative to close-up survey. Surveys conducted using a RIT are to be completed to the satisfac-

tion of the Surveyor. When RIT is used for a close-up survey, temporary means of access for the corresponding thickness measurements are to be provided unless such RIT is also able to carry out the required thickness measurements.

In all cases the extent of the thickness measurements is to be sufficient as to represent the actual average condition.

For structure built with a material other than steel, alternative thickness measurement requirements may be developed and applied as deemed necessary by the Society.

2.3.4 Approval of thickness measurement firms (1/7/2006)

Thickness measurements are to be carried out by a firm approved by the Society in accordance with the "Rules for the Certification of Service Suppliers", except that in respect of measurements of **non-ESP** ships less than 500 gross tonnage and all fishing vessels, the firm need not be so approved.

2.3.5 Monitoring of the thickness measurement process on board (1/7/2008)

The Surveyor will decide the final extent and location of thickness measurements after overall survey of representative spaces on board.

If the Owner prefers to commence the thickness measurements prior to the overall survey then the Surveyor will advise that the planned extent and locations of thickness measurements are subject to confirmation during the overall survey.

Based on findings, the Surveyor may require additional thickness measurements to be taken.

The Surveyor will direct the gauging operation by selecting locations such that, on average, readings taken represent the condition of the structure for that area.

Thickness measurements taken mainly to evaluate the extent of corrosion which may affect the hull girder strength are to be carried out systematically in all longitudinal structural members that are required to be gauged by the relevant provisions of the Rules.

Where thickness measurements indicate substantial corrosion or wastage in excess of allowable diminution, the Surveyor will direct locations for additional thickness measurements in order to delineate areas of substantial corrosion and to identify structural members for repairs/renewals.

2.3.6 Review and verification (1/7/2008)

Upon completion of the thickness measurements, the Surveyor will confirm that no further gaugings are needed, or specify additional gaugings.

If, where special consideration is allowed by the Rule requirements, the extent of thickness measurements is reduced, the Surveyor's special consideration will be reported.

If thickness measurements are partly carried out, the extent of the remaining measurements will be reported for the use of the next Surveyor.

2.3.7 Thickness measurement report (1/7/2006)

A thickness measurement report is to be prepared. The report is to give the location of measurements, the thickness measured and the corresponding original thickness. Furthermore, the report is to include the date when the measurements were carried out, the type of measuring equipment, the names and the qualification of the operators and their signatures.

The report is validated by the Surveyor.

For ships with the **ESP** notation and those ships subject to the requirements of Ch 4, Sec 8, the Surveyor is to review the final thickness measurement report and countersign the cover page.

2.3.8 Acceptance criteria (1/7/2013)

For acceptance criteria applicable to structural corrosion diminution levels, reference is to be made to:

- App 2,
- App 3, for ships built under Common Structural Rules (ships having their service notation completed by the additional service feature **CSR**).

2.3.9 Evaluation of longitudinal strength (1/7/2013)

The ship's longitudinal strength is to be evaluated by using the thickness of structural members measured, renewed and reinforced, as appropriate, during the class renewal survey carried out after the ship reached 10 years of age in accordance with the criteria for longitudinal strength of the ship's hull girder specified in App 4.

2.4 Agreement of firms for in-water survey

2.4.1 (1/1/2019)

The in-water surveys referred to in the Rules are to be carried out by a firm approved by the Society in accordance with the "Rules for the Certification of Service Suppliers".

2.5 Conditions for surveys

2.5.1 (1/1/2015)

The Owner is to provide the necessary facilities for the safe execution of the surveys, as per Ch 1, Sec 1, [3.2.2].

- a) In order to enable the attending Surveyors to carry out the survey, provisions for proper and safe access are to be agreed between the Owner and the Society, these are also to be in accordance with the provisions of IACS PR 37;
- b) in the case of ESP ships, details of the means of access are to be provided in the Survey Planning Questionnaire (see Ch 4, Sec 2, [4.10.3], Ch 4, Sec 3, [6.9.3], Ch 4, Sec 4, [4.9.3], Ch 4, Sec 5, [6.9.3], Ch 4, Sec 9, [4.9.3]);
- c) in cases where the provisions made for safety and required access are judged by the attending Surveyors to be inadequate, the survey of the spaces involved is not to proceed.

2.5.2 (1/1/2008)

Cargo holds, tanks and spaces are to be safe for access, gas-free and properly ventilated. Prior to entering a tank, void or enclosed space, it is to be verified that the atmosphere in that space is free from hazardous gas and contains sufficient oxygen.

2.5.3 (1/1/2008)

In preparation for survey and thickness measurements and to allow for a thorough examination, all spaces are to be cleaned, including removal from surfaces of all loose accumulated corrosion scale. Spaces are to be sufficiently clean and free from water, scale, dirt, oil residues etc. to reveal corrosion, deformation, fractures, damage, or other structural deterioration as well as the condition of the coating. However, those areas of structure whose renewal has already been decided by the Owner need only be cleaned and descaled to the extent necessary to determine the limits of the areas to be renewed.

2.5.4 (1/7/2006)

Sufficient illumination is to be provided to reveal corrosion, deformation, fractures, damage or other structural deterioration.

2.5.5 (1/7/2011)

When examination of associated structure is required, the following applies:

- a) ceilings in holds and floors in the engine room are to be lifted to the necessary extent for examination of the structure
- b) cement or other protective sheathing is to be removed when there is any doubt as to the condition of the plating underneath or when adherence to plating is not tight
- c) in the case of solid ballast spaces, the solid ballast is to be partially removed for examination of the condition of the structure in way. Should doubts arise, the Surveyor may require more extensive removal of the solid ballast
- d) in refrigerated cargo spaces the condition of the coating behind the insulation is to be examined at representative locations. The examination may be limited to verification that the protective coating remains effective and that there are no visible structural defects. Where poor coating condition is found, the examination is to be extended as deemed necessary by the Surveyor. The condition of the coating is to be reported. If indents, scratches, etc. are detected during surveys of shell plating from the outside, insulations in way are to be removed as required by the Surveyor, for further examination of the plating and adjacent frames
- e) where soft or semi-hard coatings have been applied, safe access is to be provided for the Surveyor to verify the effectiveness of the coating and to carry out an assessment of the conditions of internal structures which may include spot removal of the coating. When safe access cannot be provided, the soft or semi-hard coating is to be removed
- f) casings, ceilings or linings, and loose insulation, where fitted, are to be removed, as required by the Surveyor, for examination of plating and framing. Compositions on plating are to be examined and sounded, but need not be disturbed if found adhering satisfactorily to the plating.

2.6 Surveys by use of a Remote Inspection Technique (RIT)

2.6.1 (1/1/2019)

The survey conducted by use of a RIT is to provide the information normally obtained from a close-up survey.

An inspection plan for the use of a RIT, including any confirmatory survey/close-up survey/thickness measurements, is to be submitted for review and acceptance in advance of the survey, so that satisfactory arrangements can be agreed on with the Society.

Prior to the commencement of the survey, a meeting is to be held between the RIT operator, the owner's representative and the Surveyor for the purpose of ascertaining that all the arrangements detailed in the inspection plan are in place, so as to ensure the safe and efficient conduct of the survey to be carried out. The equipment and procedure for observing and reporting the survey using a RIT are to be discussed and agreed with the parties involved prior to the RIT survey, and suitable time is to be allowed to set-up, calibrate and test all equipment beforehand.

A RIT survey used as an alternative to a close-up survey, if not carried out by the Society itself, is to be conducted by a firm approved by the Society in accordance with the "Rules for the Certification of Service Suppliers" and to be witnessed by a Surveyor of the Society.

The structures to be examined using a RIT are to be sufficiently clean and the visibility is to be sufficient, to permit a meaningful examination. The Society is to be satisfied with the methods of orientation on the structures.

The Surveyor is to be satisfied with the method of data presentation including pictorial representation, and a good two-way communication between the Surveyor and the RIT operator is to be provided.

Confirmatory surveys/close-up surveys may be carried out by the Surveyor at selected locations to verify the results of the remote inspection technique.

Confirmatory thickness measurements may be requested by the Surveyor appropriately.

The use of RIT may be restricted or limited where there is a record or indication of abnormal deterioration or damage to the structures or the items to be surveyed.

The RIT may not be applicable if there are recommendations for repairs or conditions affecting the class of the vessel are found during the course of the survey.

If the RIT reveals damage or deterioration that requires attention, the Surveyor may require traditional survey without the use of a RIT to be undertaken.

2.7 Access to structures

2.7.1 For overall survey, means are to be provided to enable the Surveyor to examine the structure in a safe and practical way.

2.7.2 (1/7/2014)

For close-up survey, one or more of the following means for access, acceptable to the Surveyor, is to be provided:

- permanent staging and passages through structures
- temporary staging and passages through structures

- hydraulic arm vehicles such as conventional cherry pickers, lifts and moveable platforms
- boats or rafts
- portable ladders
- other equivalent means (see Note 1).

Note 1: For guidance refer to IACS Recommendation No. 91 "Guidelines for Approval / Acceptance of Alternative Means of Access".

2.7.3 (1/1/2019)

For surveys conducted by use of a Remote Inspection Technique, one or more of the following means for access, acceptable to the Surveyor, is to be provided:

- unmanned robot arm
- Remotely Operated Vehicles (ROV)
- unmanned Aerial Vehicles / drones
- other means acceptable to the Society.

2.8 Equipment for surveys

2.8.1 One or more of the following fracture detection methods may be required if deemed necessary by the Surveyor:

- radiography (X or γ rays)
- ultrasonic test
- magnetic particle test
- dye penetrant test.

2.8.2 (1/7/2003)

Thickness measurement is normally to be carried out by means of ultrasonic test equipment. The accuracy of the equipment is to be proven to the Surveyor as required.

2.8.3 (1/1/2008)

Explosimeter, oxygen-meter, breathing apparatus, lifelines, riding belts with rope and hook and whistles together with instructions and guidance on their use are to be made available during the survey. A safety checklist is to be provided.

2.8.4 (1/1/2008)

Adequate and safe lighting is to be provided for the safe and efficient conduct of the survey.

2.8.5 (1/1/2008)

Adequate protective clothing (e.g. safety helmet, gloves, safety shoes, etc) is to be made available and used during the survey.

2.9 Rescue and emergency response equipment

2.9.1 (1/1/2015)

If breathing apparatus and/or other equipment is used as rescue and emergency response equipment then it is recommended that the equipment be suitable for the configuration of the space being surveyed.

2.10 Surveys at sea and anchorage

2.10.1 Surveys at sea or at anchorage may be accepted provided the Surveyor is given the necessary assistance by the personnel on board. Precautions and procedures for carrying out the survey are to be in accordance with [2.5], [2.7] and [2.8].

2.10.2 (1/7/2006)

A communication system is to be arranged between the survey party in the tank or space and the responsible officer on deck.

This system is also to include the personnel in charge of ballast pump handling if boats or rafts are used.

2.10.3 (1/1/2008)

Surveys of tanks by means of boats or rafts may only be undertaken with the agreement of the Surveyor, who is to take into account the safety arrangements provided, including weather forecasting and ship response under foreseeable conditions and provided the expected rise of water within the tank does not exceed 0,25m.

2.10.4 (1/1/2010)

When rafts or boats are used for close-up survey, the following conditions are to be observed:

- only rough duty, inflatable rafts or boats, having satisfactory residual buoyancy and stability even if one chamber is ruptured, are to be used;
- the boat or raft is to be tethered to the access ladder and an additional person is to be stationed down the access ladder with a clear view of the boat or raft;
- appropriate lifejackets are to be available for all participants;
- the surface of water in the tank is to be calm (under all foreseeable conditions the expected rise of water within the tank is to not exceed 0,25 m) and the water level stationary. On no account is the level of the water to be rising while the boat or raft is in use;
- the tank, hold or space is to contain clean ballast water only. Even a thin sheen of oil on the water is not acceptable;
- at no time is the water level to be allowed to be within 1 m of the deepest under deck web face flat so that the survey team is not isolated from a direct escape route to the tank hatch. Filling to levels above the deck transverses is only to be contemplated if a deck access manhole is fitted and open in the bay being examined, so that an escape route for the survey party is available at all times. Other effective means of escape to the deck may be considered;
- if the tanks (or spaces) are connected by a common venting system, or inert gas system, the tank in which the boat or raft is to be used is to be isolated to prevent a transfer of gas from other tanks (or spaces).

2.10.5 (1/1/2007)

The requirements of items [2.10.5] to [2.10.7] only apply to ships with the **ESP** notation.

Rafts or boats alone may be allowed for inspection of the under deck areas for tanks or spaces, if the depth of the webs is 1,5 m or less.

2.10.6 (1/1/2007)

If the depth of the webs is more than 1,5 m, rafts or boats alone may be allowed only:

- a) when the coating of the under deck structure is in GOOD condition and there is no evidence of wastage; or
- b) if a permanent means of access is provided in each bay to allow safe entry and exit.

This means:

- 1) access direct from the deck via a vertical ladder and a small platform fitted approximately 2 m below the deck in each bay; or
- 2) access to deck from a longitudinal permanent platform having ladders to deck at each end of the tank. The platform is, for the full length of the tank, to be arranged level with, or above, the maximum water level needed for rafting of under deck structure. For this purpose, the ullage corresponding to the maximum water level is to be assumed not more than 3m from the deck plate measured at the mid-span of deck transverses and in the middle length of the tank (See Fig 3).

If neither of the above conditions are met, then staging or an "other equivalent means" is to be provided for the survey of the under deck areas.

2.10.7 (1/1/2007)

The use of rafts or boats alone in [2.10.5] and [2.10.6] does not preclude the use of boats or rafts to move about within a tank during a survey.

Note 1: Reference is made to IACS Recommendation 39 - Guidelines for the use of Boats or Rafts for Close-up surveys.

2.11 Repairs and maintenance during voyage

2.11.1 (1/7/2011)

Where repairs to hull, machinery or other equipment, which affect or may affect the class, are to be carried out by a riding crew during a voyage, they are to be planned in advance. A complete repair procedure including the extent of proposed repair and the need for the Surveyor's attendance during the voyage is to be submitted to the Society for approval sufficiently in advance. Failure to notify the Society in advance of the repairs may result in the suspension of class of the ship.

Where, in any emergency circumstance, emergency repairs are to be effected immediately, the repairs are to be documented in the ship's log and submitted thereafter to the Society for use in determining further survey requirements.

2.11.2 The above is not intended to include maintenance to and overhaul of the hull, machinery and equipment in accordance with the Manufacturer's recommended procedures and established marine practice, which does not require the Society's agreement. However, any repair result-

ing from such maintenance and overhauls which affects or may affect the class is to be noted in the ship's log and submitted to the attending Surveyor for use in determining further survey requirements.

2.12 Prompt and thorough repairs

2.12.1 (1/7/2006)

Any damage in association with wastage over the allowable limits (including buckling, grooving, detachment or fracture), or extensive areas of wastage over the allowable limits, which affects or, in the opinion of the Surveyor, will affect the ship's structural, watertight or weathertight integrity, is to be promptly and thoroughly (see [2.2.17]) repaired. Areas to be considered include, as far as applicable, the following:

- side structure and side plating;
- deck structure and deck plating;
- bottom structure and bottom plating;
- inner bottom structure and inner bottom plating;
- inner side structure and inner side plating;
- longitudinal bulkhead structure and longitudinal bulkhead plating, where fitted;
- transverse watertight or oiltight bulkhead structure and transverse watertight or oiltight bulkheads plating;
- hatch covers and hatch coamings, where fitted;
- weld connection between air pipes and deck plating;
- air pipe heads installed on the exposed decks;
- ventilators, including closing devices, if any;
- bunker and venting piping systems (only for ships subject to Ch 4, Sec 2 and Ch 4, Sec 9).

For locations where adequate repair facilities are not available, consideration may be given to allow the ship to proceed directly to a repair facility. This may require discharging the cargo and/or temporary repairs for the intended voyage.

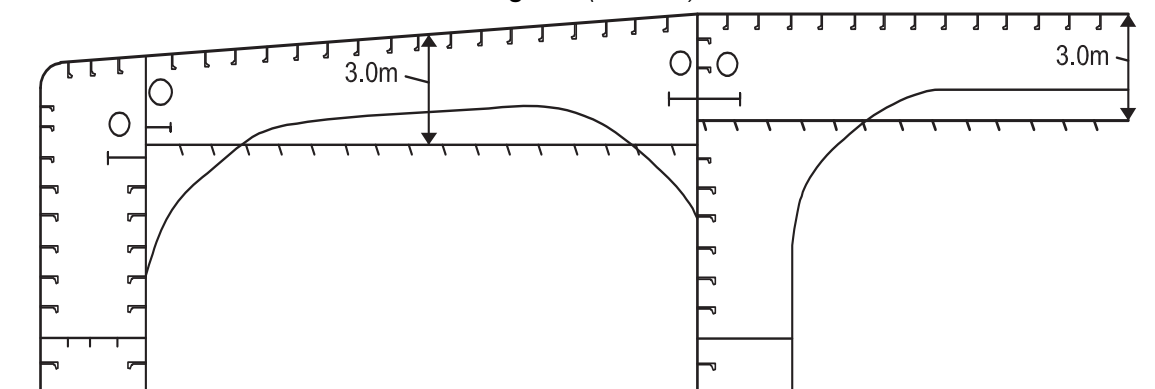
2.12.2 (1/7/2006)

Additionally, when a survey results in the identification of structural defects or corrosion, either of which, in the opinion of the Surveyor, will impair the ship's fitness for continued service, remedial measures are to be implemented before the ship continues in service.

2.12.3 (1/7/2012)

Where the damage found on structure mentioned in [2.12.1] is isolated and of a localised nature which does not affect the ship's structural integrity, consideration may be given by the surveyor to allow an appropriate temporary repair to restore watertight or weather tight integrity and impose a Recommendation in accordance with [2.14], with a specific time limit.

Figure 3 (1/1/2007)



2.13 Survey attendance requirements

2.13.1 Attendance by two exclusive Surveyors (1/1/2017)

On ships 20,000 tonnes dwt and above, subject to ESP, starting with class renewal survey no.3 at class renewal and intermediate, the survey of hull structure and piping systems (see Note 1) is to be carried out by at least two exclusive Surveyors. On bulk carriers 100,000 dwt and above of single side skin construction at the intermediate hull survey between 10 and 15 years of age the survey of hull structure and piping systems (see Note 1) is to be performed by at least two exclusive Surveyors.

This requires that at least two exclusive Surveyors attend on board at the same time to perform the required survey. This also applies to surveys carried out during voyages. Where compatible with relevant laws and regulations, on dual class ships, the requirement for two Surveyors may be fulfilled by having one Surveyor attend from each Society.

Though each attending Surveyor is not required to perform all aspects of the stipulated survey, they are required to consult with each other and to do joint overall and close-up surveys to the extent necessary to determine the condition of the vessel areas subjected to survey (see Note 1). The extent of these surveys will be sufficient for the Surveyors to agree on actions required to complete the survey with respect to renewals, repairs and other recommendations or conditions of class. Each Surveyor will co-sign the survey report or indicate their concurrence in an equivalent manner.

Note 1: hull structures and piping systems in way of cargo holds and/or cargo tanks, cofferdams, cargo pump rooms, pipe tunnels, void spaces, within the cargo length area and all ballast tanks. In the case of Bulk Carriers, selected fuel oil tanks within the cargo length area might be part of the areas to be surveyed according to the applicable provisions of the Ch 4, Sec 2 or Ch 4, Sec 9.

2.13.2 Surveys witnessed by one Surveyor (1/7/2008)

The following surveys may be witnessed by a single Surveyor:

- thickness measurements in accordance with the procedural requirements given in [2.3];

- tank testing in accordance with the applicable Rules for ESP ships;
- repairs carried out in association with intermediate and class renewal hull surveys, the extent of which have been agreed upon by the two Surveyors required during the course of the surveys.

2.13.3 Qualification of Surveyors (1/7/2008)

Surveyors used to fulfil this requirement are to be qualified for the survey processes involved.

2.13.4 Documentation of attendance on board (1/7/2008)

The attendance on board of the Surveyors will be documented according to the Society's procedures.

2.14 Procedure for imposing and clearing recommendations

2.14.1 Reasons for imposing recommendations (1/7/2008)

Recommendations are to be imposed for the following reasons:

- repairs and/or renewals related to damage that affect classification (e.g. grounding, structural damage, machinery damage, wastage over the allowable limits, etc.);
- supplementary survey requirements;
- temporary repairs.

2.14.2 Recommendations for repairs (1/7/2008)

For repairs not completed at the time of survey, a recommendation is to be imposed. In order to provide adequate information to the Surveyor attending for survey of the repairs, the recommendation is to be sufficiently detailed with identification of items to be repaired. For identification of extensive repairs, reference may be given to the survey report.

2.14.3 Recommendations with service limitations (1/7/2008)

Recommendations may require imposing limitations related to navigation and operation that are deemed necessary for continued operation under classification (e.g. loss of anchor and/or chain, etc.).

2.14.4 Issue of recommendations (1/7/2008)

Recommendations are to be given in writing with a time limit for completion to the Owner's representatives/Ship's Master, and are to be clearly stated on the Certificate of Classification or an attachment to the Certificate of Classification and/or class survey status or report.

2.14.5 Notification of recommendations (1/7/2008)

Owners will be notified of these dates and that the vessel's class will be subject to a suspension procedure if the item is not dealt with, or postponed, by the due date (refer to Sec 3, [1.2.12]).

2.14.6 Clearance of recommendations (1/7/2008)

Clearance of recommendations is to be supported by a survey report giving details of all associated repairs and/or renewals, or of the supplemental surveys carried out. Repairs carried out are to be reported with identification of:

- a) compartment and location
- b) structural member
- c) repair method
- d) repair extent
- e) NDT/Tests.

2.14.7 Recommendations partially dealt with (1/7/2008)

Partially dealt with recommendations are to be supported by a survey report giving details of repairs and/or renewals, or of that part of the supplemental surveys carried out and those parts remaining outstanding.

3 Certificate of Classification: issue, validity, endorsement and renewal

3.1 Issue of Certificate of Classification

3.1.1 (1/1/2001)

A Certificate of Classification, bearing the class notations assigned to the ship and an expiry date, is issued to any classed ship.

3.1.2 (1/1/2001)

A Provisional Certificate of Classification may serve as a Certificate of Classification in some cases, such as after an admission to class survey, or when the Society deems it necessary.

3.1.3 (1/1/2001)

The Certificate of Classification or Provisional Certificate of Classification is to be made available to the Society's Surveyors upon request.

3.2 Validity of Certificate of Classification, maintenance of class

3.2.1 According to Ch 1, Sec 1, [2.4], the Society alone is qualified to confirm the class of the ship and the validity of its Certificate of Classification.

3.2.2 During the class period, a Certificate of Classification is valid when it is not expired.

The class is maintained during a certain period or at a given date, when during the said period or at such date the conditions for suspension or withdrawal of class are not met.

3.2.3 At the request of the Owner, a statement confirming the maintenance of class may be issued by the Society based on the information in its records for that ship at the time.

This statement is issued on the assumption that the Owner has complied with the Rules, in particular with [11].

Should any information which would have prevented the Society from issuing the statement and which was not available at the time subsequently come to light, the statement may be cancelled.

Attention is drawn to Sec 3, [1.2], whereby the Society, upon becoming aware of a breach of the Rules, is empowered to suspend class from the date of the breach, which may be prior to the date of the statement.

3.2.4 According to the same conditions as in [3.2.3], a statement declaring that the class is maintained "clean and free from recommendation" may be issued by the Society when there is no pending recommendation at that date.

3.2.5 Classification-related documents and information are liable to be invalidated by the Society whenever their object is found to differ from that on which they were based or to be contrary to the applicable requirements. The Owner is liable for any damage which may be caused to any third party from improper use of such documents and information.

3.3 Endorsements of Class

3.3.1 Purpose of endorsements (1/7/2011)

The endorsements of class give official evidence of:

- a) class surveys carried out,
- b) class validity, and
- c) conditions imposed and/or main items out of service (if any).

3.3.2 Direct endorsement of the Certificate of Classification (1/7/2011)

The Certificate of Classification is directly endorsed before the vessel sails where an annual, intermediate or class renewal survey is completed, using the appropriate section of the Certificate of Classification.

A section is also available to record postponement of the class renewal survey.

3.3.3 Class Survey Endorsement Sheet (1/7/2011)

In addition to the direct endorsement of the Certificate of Classification as described in [3.3.2], a Class Survey Endorsement Sheet is issued before the ship sails where any class survey is carried out.

The Class Survey Endorsement Sheet is an attachment to the Certificate of Classification and, as such, it is to be available on board at any time.

3.3.4 Possible modifications to endorsements

The Society reserves the right to modify the endorsements made by Surveyors.

3.4 Status of surveys and recommendations

3.4.1 Information given in the Certificate of Classification, associated endorsements, Rules and specific documents enables the Owner to identify the status of surveys and recommendations.

3.4.2 The omission of such information does not absolve the Owner from ensuring that surveys are held by the limit dates and pending recommendations are cleared to avoid any inconvenience which is liable to result from the suspension or withdrawal of class; see Sec 3.

4 Class renewal survey

4.1 General principles

4.1.1 (1/7/2002)

The first class renewal survey is to be completed within 5 years from the date of the initial classification survey and thereafter 5 years from the credited date of the previous class renewal survey. However, consideration may be given by the Society to granting an extension for a maximum of three months after the limit date, in exceptional circumstances and provided that the ship is attended and the attending Surveyor so recommends. In such cases the next period of class will start from the limit date for the previous class renewal survey before the extension was granted.

4.1.2 For surveys completed within three months before the limit date of the class renewal survey, the next period of class will start from this limit date. For surveys completed more than three months before the limit date, the period of class will start from the survey completion date.

4.1.3 (1/1/2015)

In cases where the vessel has been laid up or has been out of service for a considerable period because of a major repair or modification and the owner elects to carry out only the overdue surveys, the next period of class will start from the expiry date of the renewal survey. If the owner elects to carry out the next special survey due, the period of class will start from the survey completion date.

4.1.4 A new period of class is assigned to the ship after the satisfactory completion of the class renewal survey, and a new Certificate of Classification with relevant annexes is issued for the new period of class.

4.1.5 (1/1/2009)

Concurrent crediting to both intermediate survey and class renewal survey for surveys and thickness measurements of spaces is not acceptable.

4.2 Normal system

4.2.1 When the normal system is applied, the class renewal survey may be commenced at the fourth annual survey and continued during the following year with a view to completion by its due date. In this case the survey may be

carried out by partial surveys at different times. The number of checks to be performed at each partial survey and the interval between partial surveys are to be agreed by the Society. In general, the first partial survey should include a significant number of thickness measurements, where required by the Rules.

4.2.2 A class renewal survey may be commenced before the fourth annual survey at the request of the Owner. In this case, the survey is to be completed within fifteen months. The conditions for the execution of partial surveys are the same as those referred to in [4.2.1].

4.3 Continuous survey system

4.3.1 The request by the Owner for admission to the continuous survey system will be considered by the Society and agreement depends on the type and age of hull and machinery. This system may apply to the class renewal survey of hull (CHS) and/or machinery (CMS).

4.3.2 The continuous survey system is not applicable to the class renewal survey of the hull of those ships subject to the Enhanced Survey Program (ESP), i.e. ships with the service notation **oil tanker, combination carrier, bulk carrier, ore carrier** or **chemical tanker**.

4.3.3 (1/7/2016)

In addition to the ships indicated in [4.3.2], the continuous survey system is not applicable to the class renewal survey of the hull of those ships subject to the requirements of Ch 4, Sec 8, i.e. general dry cargo ships.

4.3.4 For ships other than those referred to in [4.3.2] and [4.3.3], the continuous survey system is not applicable to the class renewal survey of the hull of ships over 20 years old. However, consideration may be given, at the discretion of the Society, to the applicability of the continuous survey system to the class renewal survey of the hull of ships over 20 years old.

4.3.5 (1/7/2006)

For ships more than 10 years of age, the ballast tanks are to be internally examined twice in each five-year class period, i.e. once within the scope of the intermediate survey and once within the scope of the continuous system for the class renewal survey of hull.

4.3.6 When the continuous survey system is applied, appropriate notations are entered in the Register of Ships.

4.3.7 Ships subject to the continuous survey system are provided with lists of items to be surveyed under this system.

4.3.8 (1/7/2005)

For items inspected under the continuous survey system, the following requirements generally apply:

- the interval between two consecutive surveys of each item is not to exceed five years
- the items are to be surveyed in rotation, so far as practicable ensuring that approximately equivalent portions are examined each year

- c) the Society may credit for continuous survey results of inspections carried out before the admission to the continuous survey scheme
- d) each item is to be surveyed at one time, as far as practicable; the Society may, however, allow possible repair work to be carried out within a certain period.
- e) the Surveyor may, at his discretion, extend the inspection to other items, if previous inspections carried out revealed any defects.

4.3.9 For ships under continuous survey, items not included in the continuous survey cycle are to be inspected according to the provisions given in [4.2].

4.3.10 (1/7/2017)

Upon application by the Owner, the Society may agree, subject to certain conditions, that some items of machinery which are included in the continuous survey cycle are examined by the Chief Engineer where the Society is not represented. The Chief Engineer examination is to be followed by a confirmatory survey carried out by a Surveyor. The conditions for the application of this procedure are given in App 1.

4.3.11 (1/7/2005)

Ships on the continuous survey system are not exempt from other periodical surveys.

4.3.12 A general examination of the ship, as detailed in Ch 3, Sec 3 for annual surveys, is to be carried out at the end of the period of class.

4.3.13 (1/7/2005)

The survey in dry dock may be held at any time within the five-year class period, provided all the requirements of Ch 3, Sec 6, [2] are also complied with.

4.3.14 For laid-up ships, specific requirements given in [13.1] apply.

4.3.15 The continuous survey system may be discontinued at any time at the discretion of the Society, or at the request of the Owner, and a specific arrangement devised.

4.4 Planned maintenance scheme (PMS/CBM) for machinery

4.4.1 A planned maintenance scheme may be considered as an alternative to the continuous survey system for machinery and is limited to components and systems covered by it. When such a system approved by the Society is implemented, a survey scheme other than those normally adopted and with intervals different from those of the continuous survey system as detailed in [4.3] may be accepted.

4.4.2 (1/1/2001)

The conditions for approval of the planned maintenance scheme, the determination of survey item intervals and the general scope of surveys are detailed in Pt F, Ch 12, Sec 1.

4.4.3 (1/7/2009)

When the planned maintenance scheme is applied, the notation **PMS** is entered on the Certificate of Classification and in the Register of Ships. If condition based maintenance is applied as per Pt F, Ch 12, Sec 1, Sec 2, 3, 4, 5 or Pt F, Ch 12, Sec 6, the notation **PMS-CM(PROP)**, **PMS-**

CM(HVAC), **PMS-CM(CARGO)**, **PMS-CM(ELE)** or **PMS-CM(FDS)**, respectively, as appropriate, is entered on the Certificate of Classification and in the Register of Ships.

4.4.4 The planned maintenance scheme does not supersede the annual surveys and other periodical surveys.

4.4.5 A general examination of the machinery, as detailed in Ch 3, Sec 3 for annual surveys, is to be carried out at the end of the period of class.

4.4.6 The planned maintenance scheme may be discontinued at any time at the discretion of the Society, or at the request of the Owner, and a specific arrangement devised.

5 Annual surveys

5.1

5.1.1 (1/7/2002)

In the five-year period of class, five annual surveys are to be carried out. The first to fourth annual surveys have a six-month window, i.e. from three months before to three months after each anniversary date, while the fifth annual survey has only a three-month window, i.e. from three months before to the fifth anniversary date.

6 Intermediate surveys

6.1

6.1.1 An intermediate survey, where applicable, is to be carried out within the window from three months before the second to three months after the third anniversary date.

6.1.2 The intermediate survey is applicable at any period of class to ships with the service notations **oil tanker**, **chemical tanker**, **FLS tanker**, **liquefied gas carrier**, **combination carrier/OBO** and **combination carrier/OOC**.

6.1.3 The intermediate survey is applicable at any period of class to ships other than those indicated in [6.1.2] which are five years old and over.

6.1.4 (1/7/2002)

The internal examination of ballast spaces, overall and/or close-up survey of ballast spaces and cargo holds or tanks, as applicable, carried out at the 2nd or 3rd annual survey are also credited towards the intermediate survey.

6.1.5 (1/1/2009)

Concurrent crediting to both intermediate survey and class renewal survey for surveys and thickness measurements of spaces is not acceptable.

7 Bottom survey

7.1 General

7.1.1 Bottom survey means the examination of the outside of the ship's bottom and related items. This examination may be carried out with the ship either in dry dock (or on a slipway) or afloat: in the former case the survey will be

referred to as dry-docking survey, while in the latter case as in-water survey.

7.1.2 The Owner is to notify the Society whenever the outside of the ship's bottom and related items can be examined in dry dock or on a slipway.

7.1.3 (1/7/2005)

There is to be a minimum of two examinations of the outside of the ship's bottom and related items during each five-year class renewal survey period. One such examination is to be carried out in conjunction with the class renewal survey. In all cases the interval between any two such examinations is not to exceed 36 months. An extension of examination of the ship's bottom of three months beyond the due date may be granted in exceptional circumstances (see [2.1.7]).

Note 1: Attention is drawn to the relevant requirements of Ch 1, Sec 1, [3.1], concerning application of national and international regulations.

7.1.4 (1/1/2012)

Examinations of the outside of ship's bottom and related items of ships are normally to be carried out with the ship in drydock. However, consideration may be given to alternate examination while the ship is afloat as an In-water Survey, subject to the provisions of Ch 3, Sec 6, [3]. Special consideration is to be given to ships of 15 years or over before being permitted to have such examinations. For ships with **ESP** notation of 15 years of age and over, such examinations are to be carried out with the ship in drydock.

7.1.5 (15/3/2018)

The interval between examinations of the outside of the ship's bottom and related items, as specified in [7.1.3] and [7.1.4], may be greater in one of the following cases:

- ships operating in fresh water
- ships operating in certain harbours
- non-propelled units.

In the above cases, the duration of intervals is defined by the Society on a case by case basis, taking into account:

- the age of the ship or unit,
- the operating history.

If necessary, in the above cases it is not required to meet the alternate examinations as mentioned in [7.1.4].

Sea chest inspections, as per Ch 3, Sec 6, [3.1.4], can be substituted by:

- external examination during IWS,
- sea chest box and valves examination form inside.

For ships of unusual characteristics or engaged on special services, means of underwater inspection equivalent to the bottom survey in dry condition may be considered as an alternative by the Society, particularly when a suitable high resistance paint is applied to the underwater portion of the hull or an approved system of impressed current for external cathodic protection is fitted.

7.1.6 (1/7/2003)

For ships with the **ESP** notation and those ships subject to the requirements of Ch 4, Sec 8, a bottom survey in dry condition is to be part of the class renewal survey.

7.1.7 (1/7/2003)

Compliance with the requirements of this item [7] and Ch 3, Sec 6 does not absolve the Owner from compliance with the requirements of SOLAS as amended, especially when shorter intervals between examinations of the ship's bottom are required for certain types of ships.

7.2 Extended dry docking (EDD) scheme

7.2.1 General (1/2/2019)

Ships meeting the below described requirements for the extended dry docking (EDD) scheme may carry out two consecutive in-water surveys. A minimum of two examinations of the outside of the ship's bottom are to be carried out during each five-year class renewal survey period and the interval between any two examinations is not to exceed 36 months.

The EDD scheme will operate based upon the ship's age when entering the program. For ships already in service, the EDD scheme may be implemented at any time up until a ship reaches 10 years of age. When the ship reaches 15 years of age, continuation of the scheme may be specially considered.

If an in-water survey reveals damage, deterioration or other conditions that require early attention, the surveyor may require that the ship is dry docked in order that a detailed survey can be undertaken and the necessary repairs carried out.

If temporary repairs carried out to any underwater parts are accepted, these shall be made permanent within a due date decided by the surveyor.

The following ships are not eligible for the EDD scheme:

- passenger vessels;
- ships subject to enhanced survey program;
- general dry cargo ships;
- ships fitted with propulsion thrusters, unless machinery condition monitoring is implemented or other alternative arrangements are adopted, deemed equivalent by the Society in accordance with Ch 1, Sec 1, [2.1.1];
- ships where the propeller connection is by means of a keyed taper;
- high speed crafts.

7.2.2 Application of the EDD scheme (1/2/2019)

Owners requesting a ship be considered for the EDD scheme are to apply to the Society in writing, confirming and describing compliance with the requirements specified in [7.2.4].

Upon review of the submitted documentation and the ship survey records, the Society will decide upon acceptance of the ship into the EDD scheme.

Prior to accepting a ship into the EDD scheme, the Society shall obtain the written agreement from the flag Administration.

7.2.3 Termination of the EDD scheme (1/2/2019)

The EDD scheme will be terminated in case of any change to the vessel's owner, management or flag, or if the require-

ments for applying the EDD scheme are no longer complied with.

Once the conditions for the EDD scheme are no longer present, the ship will return to the normal docking interval and any due bottom survey in dry-dock shall be carried out by the due date.

7.2.4 Requirements (1/2/2019)

Ships eligible for the EDD scheme are to comply with the requirements given here below; other equivalent alternative arrangements may be considered by the Society in accordance with Ch 1, Sec 1, [2.1.1].

- The ship is to be assigned the additional class notation **INWATERSURVEY**.
- The ship is to be assigned the additional class notation **MONSHAFT**.
- An impressed cathodic corrosion protection system is to be provided or, alternatively, the external hull sacrificial anodes are to be capable of being renewed when the ship is afloat.
- The impressed cathodic corrosion protection system, if any, is to be monitored for effectiveness as a part of the hull maintenance scheme implemented on board in accordance with the Safety Management System's requirements.
- Means are to be provided on all sea chests for the examination, when the ship is afloat, of the external sides of the sea connections and the sea valves.
- Arrangements are to be provided for the inspection, when the ship is afloat, of all sea valves, including scuppers, sanitary discharges and box coolers if any.
- Arrangements are to be provided for the maintenance of electric/electronic sensors, e.g. echo sounders, speed logs, draught readings, etc., when the ship is afloat.
- Arrangements are to be provided for the maintenance of thrusters and stabilizers, if any, when the ship is afloat.
- Lube oil analyses from auxiliary thrusters are to be provided at every bottom survey; alternatively, auxiliary thrusters shall be arranged for inspection from inside the hull without opening up from the seaside.
- The hull maintenance scheme implemented on board in accordance with Safety Management System's requirements is to take in high consideration the maintenance and inspection of all the compartments adjacent to the outer hull.
- The protective coating of the inner side of the side shell below the deepest load waterline is to be maintained in GOOD condition for the whole period for which the scheme is applied.
- Service experience to-date with hull coating system is to be provided to the Society, covered by the manufacturer's guarantee that the underwater coatings used are designed to last for the extended period since the coating is to remain effective for the extended dry docking period.

Compliance with the above requirements shall be verified before the ship enters the EDD scheme.

8 Shaft survey

8.1 General

8.1.1 (1/1/2016)

Shaft survey means survey of propeller shafts and tube shafts as well as survey of other propulsion systems.

8.2 Surveys of Propeller Shafts and Tube Shafts

8.2.1 Application (1/1/2016)

Unless alternative means are provided to ensure the condition of the propeller shaft assembly, these requirements apply to all vessels with conventional shafting fitted with a propeller.

Three survey methods, as detailed in Ch 3, Sec 7, [2], are considered for shafts lubricated by oil or fresh water in a closed loop system. The methods are to be applied according to the provisions of [8.2.3].

One survey method, as detailed in Ch 3, Sec 7, [2], is considered for shafts lubricated by water in an open loop system. The methods are to be applied according to the provisions of [8.2.4].

For surveys completed within 3 months before the shaft survey due date, the next period will start from the shaft survey due date.

Three kinds of survey extensions, as detailed in Ch 3, Sec 7, [2] may be applied to shafts lubricated by oil or fresh water in a closed loop system, according to the provisions of [8.2.3], in order to extend the shaft survey due date.

Two kinds of survey extensions, as detailed in Ch 3, Sec 7, [2] may be applied to shafts lubricated by water in an open loop system, according to the provisions of [8.2.4], in order to extend the shaft survey due date.

8.2.2 Definitions (see also Fig 4) (1/1/2016)

a) Shaft

Shaft is a general definition that includes:

- Propeller shaft
- Tube shaft

The definition does not include the intermediate shaft(s) which is(are) considered part of the propulsion shafting inside the vessel.

b) Propeller Shaft

Propeller shaft is the part of the propulsion shaft to which the propeller is fitted. It may also be called screwshaft or tailshaft.

c) Tube Shaft

Tube shaft is a shaft placed between the intermediate shaft and propeller shaft, normally arranged within a stern tube or running in open water.

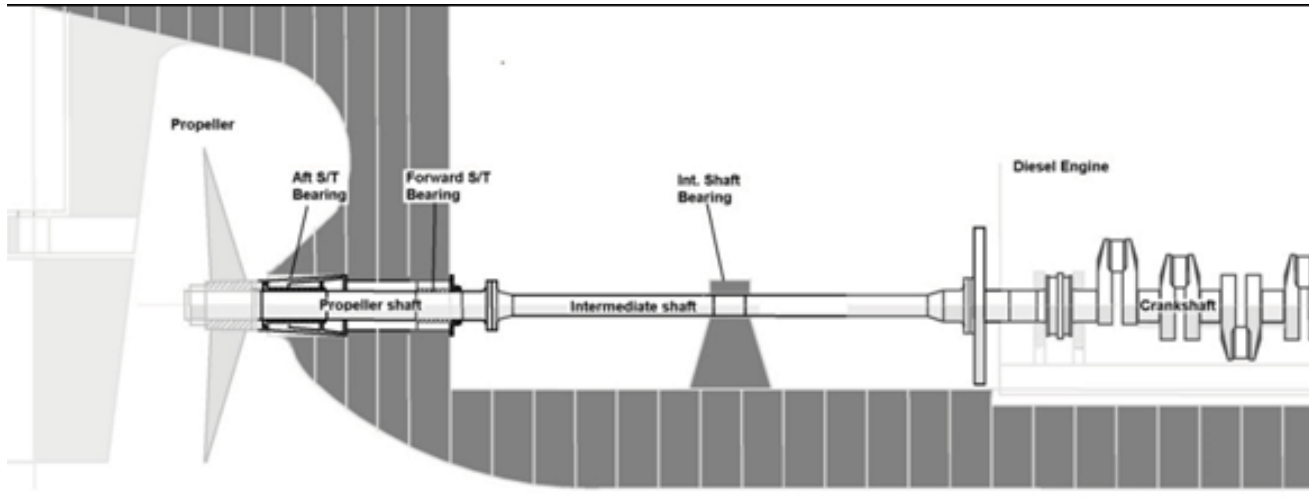
It may also be called Stern Tube Shaft.

d) Stern tube

Tube or pipe fitted in the shell of a ship at the stern (or rear part of the ship), below the waterline, through which the tube shaft or aftermost section of the propeller shaft passes. The stern tube is the housing of the shaft bearings, generally two (one aft and one fore), that sus-

- tain the shaft and allow its rotation with less frictional resistance. The stern tube also accommodates the shaft sealing arrangement.
- e) Closed Loop (system) Oil Lubricated bearing
Closed loop oil lubricating systems use oil to lubricate the bearings and are sealed against the environment (seawater) by adequate sealing/gland devices.
- f) Water Lubricated Bearing
Water lubricated bearings are bearings cooled/lubricated by water (fresh or salt).
- g) Closed Loop System Fresh Water Lubricated Bearing
Closed loop water lubricating systems use fresh water to lubricate the bearings and are sealed against the environment (such as seawater) by adequate sealing/gland devices.
- h) Open Systems (water)
Open water lubricating systems use water to lubricate the bearings and are exposed to the environment.
- i) Adequate means for protection against corrosion
An adequate means for protection against corrosion is an approved means for full protection of the core shaft against sea water intrusion and subsequent corrosion attack. Such means are used for the protection of common steel material against corrosion, particularly in combination with water lubricated bearings.
Typical means are for example:
- continuous metallic, corrosion resistant liners,
 - continuous cladding,
 - multiple layer synthetic coating,
 - multiple layer of fiberglass,
 - combinations of the above-mentioned,
 - rubber/elastomer covering coating.
- The means for protection against corrosion are installed/applied according to class approved procedures.
- j) Corrosion Resistant Shaft
The corrosion resistant shaft is made of approved corrosion resistant steel as core material for the shaft.
- k) Stern tube Sealing System
The stern tube sealing system is the equipment installed on the inboard extremity and, for closed systems, at the outboard extremity of the stern tube.
The inboard seal is the device fitted on the fore part of the stern tube that achieves a seal against possible leakage of the lubricant media within the ship's interior.
The outboard seal is the device fitted on the aft part of the stern tube that achieves a seal against possible sea water ingress and leakage of the lubricant media.
- l) Service records
Service records are regularly recorded data showing in-service conditions of the shaft(s) and may include, as applicable: lubricating oil temperature, bearing temperature and oil consumption records (for oil lubricated bearings) or water flow, water temperature, salinity, pH, make-up water and water pressure (for closed loop fresh water lubricated bearings depending on design).
- m) Oil sample examination
An oil sample examination is a visual examination of the stern tube lubricating oil taken in the presence of the surveyor with a focus on water contamination.
- n) Lubricating oil analysis
Lubricating oil analysis is to be carried out at regular intervals not exceeding six (6) months taking into account IACS Rec. 36.
The documentation on lubricating oil analysis is to be available on board.
Oil samples, to be submitted for the analysis, should be taken under service conditions.
- o) Fresh water sample test
The fresh water sample test should be carried out at regular intervals not exceeding six (6) months.
Samples are to be taken under service conditions and are to be representative of the water circulating within the stern tube.
Analysis results are to be retained on board and made available to the surveyor.
At the time of survey, the sample for the test is to be taken in the presence of the surveyor.
The fresh water sample test is to include the following parameters:
- chlorides content,
 - pH value,
 - presence of bearing particles or other particles (only for laboratory analysis, not required for tests carried out in the presence of the surveyor).
- p) Keyless connection
Keyless connection is the forced coupling methodology between the shaft and the propeller without a key, achieved through interference fit of the propeller boss on the shaft tapered end.
- q) Keyed connection
Keyed connection is the forced coupling methodology between the shaft and the propeller with a key and keyway, achieved through the interference fit of the propeller boss on the shaft tapered end.
- r) Flanged connection
Flanged connection is the coupling methodology, between the shaft and the propeller, achieved by a flange, built in at the shaft aft end, bolted to the propeller boss.
- s) Alternative means
Shafting arrangements such as, but not limited to, an approved Condition Monitoring Scheme and / or other reliable approved means for assessing and monitoring the condition of the tail shaft, bearings, sealing devices and the stern tube lubricant system capable to assure the condition of the propeller shaft assembly with an equivalent level of safety as obtained by survey methods as applicable in IACS UR Z21.
The shaft to which the additional class notation **MON-SHAFT** is assigned is to be considered as shafting having a configuration other than described in the present paragraph.

Figure 4 : Typical Shafting Arrangement (1/1/2016)



8.2.3 Oil Lubricated Shafts or Closed Loop System Fresh Water Lubricated Shafts (refer also to Table 2) (1/1/2016)

a) Oil lubricated shaft survey intervals

1) Flanged propeller connection

The following methods are applicable:

- Method 1 every 5 years, or
- Method 2 every 5 years (pre-requisites have to be fulfilled), or
- Method 3 every 5 years (pre-requisites have to be fulfilled)

2) Keyless propeller connection

The following methods are applicable:

- Method 1 every 5 years, or
- Method 2 every 5 years (pre-requisites have to be fulfilled), or
- Method 3 every 5 years (pre-requisites have to be fulfilled).

The maximum interval between two surveys carried out according to method 1 or method 2 is not to exceed 15 years, except in the case when one extension for no more than three months is granted

3) Keyed propeller connection

The following methods are applicable:

- Method 1 every 5 years, or
- Method 2 every 5 years (pre-requisites have to be fulfilled).

b) Fresh water lubricated shafts (closed loop system) survey intervals

For all types of coupling, the maximum interval between two surveys carried out according to method 1 is not to exceed 15 years. An extension for no more than three months can be granted

1) Flanged propeller connection

The following methods are applicable:

- Method 1 every 5 years, or
- Method 2 every 5 years (pre-requisites have to be fulfilled), or
- Method 3 every 5 years (pre-requisites have to be fulfilled)

2) Keyless propeller connection

The following methods are applicable:

- Method 1 every 5 years, or
- Method 2 every 5 years (pre-requisites have to be fulfilled), or
- Method 3 every 5 years with the maximum of two consecutive method 3 surveys (pre-requisites have to be fulfilled).

3) Keyed propeller connection

The following methods are applicable:

- Method 1 every 5 years, or
- Method 2 every 5 years (pre-requisites have to be fulfilled).

c) Survey extensions

For all types of propeller connections, the interval between two consecutive surveys may be extended after the execution of the extension survey as follows:

- 1) Extension up to a maximum of 2.5 years, no more than one extension can be granted. No further extension, of other type, can be granted.
- 2) Extension up to a maximum of 1 year, no more than two consecutive extensions can be granted. In the event an additional extension is requested the requirements of the "2.5 year extension" are to be carried out and the shaft survey due date, prior to the previous extension(s), is extended for a maximum of 2.5 years.
- 3) Extension up to a maximum of 3 months, no more than one "three months extension" can be granted. In the event an additional extension is requested the requirements of the "one year extension" or "2.5

years extension" are to be carried out and the shaft survey due date prior to the previous extension is extended for a maximum of one year or 2.5 years.

The extension survey should normally be carried out within 1 month of the shaft survey due date and the extension counts from the shaft survey due date.

If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of

extension counts from the date the extension survey was completed.

For fresh water lubricated shafts (closed loop system), the maximum interval between two surveys carried out according to method 1 is not to exceed 15 years, except in the case when one extension for no more than three months is granted.

Table 2 : Survey Intervals (closed systems) (1/1/2016)

SURVEY INTERVALS (closed systems)			
Oil Lubricated			
	Flanged Propeller Coupling	Keyless Propeller Coupling	Keyed Propeller Coupling (2)
Every five years (1)	Method 1 or Method 2 or Method 3	Method 1 or Method 2 or Method 3 (3)	Method 1 or Method 2
Extension 2,5 Y	Yes (4)	Yes (4)	Yes (4)
Extension 1 Y	Yes (5)	Yes (5)	Yes (5)
Extension 3 M	Yes (6)	Yes (6)	Yes (6)
Closed Loop System Fresh Water Lubricated			
	Flanged Propeller Coupling	Keyless Propeller Coupling	Keyed Propeller Coupling (2)
Every five years	Method 1 (7) or Method 2 or Method 3	Method 1 (7) or Method 2 or Method 3 (3)	Method 1 (7) or Method 2
Extension 2,5 Y	Yes (4)	Yes (4)	Yes (4)
Extension 1 Y	Yes (5)	Yes (5)	Yes (5)
Extension 3 M	Yes (6)	Yes (6)	Yes (6)
<p>General notes:</p> <p>For surveys (Method 1, Method 2 or Method 3) completed within 3 months before the shaft survey due date, the next period will start from the shaft survey due date.</p> <p>The extension survey should normally be carried out within 1 month of the shaft survey due date and the extension counts from the shaft survey due date. If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of extension counts from the date the extension survey was completed.</p> <p>Notes:</p> <p>(1) unless an Extension type (Extension 2,5 Y, Extension 1 Y, Extension 3 M) is applied in between.</p> <p>(2) Method 3 is not allowed.</p> <p>(3) The maximum interval between two surveys carried out according to Method 1 or Method 2 is not to exceed 15 years, except in the case when one extension for no more than three months is granted.</p> <p>(4) no more than one extension can be granted. No further extension of other type can be granted.</p> <p>(5) no more than two consecutive extensions can be granted. In the event an additional extension is requested the requirements of the 2.5 year extension are to be carried out and the shaft survey due date, prior to the previous extension(s), is extended for a maximum of 2.5 years.</p> <p>(6) no more than one three month extension can be granted. In the event an additional extension is requested, the requirements of the one year extension or 2.5 years extension are to be carried out and the shaft survey due date prior to the previous extension is extended for a maximum of one year or 2.5 years.</p> <p>(7) The maximum interval between two surveys carried out according to Method 1 is not to be more than 15 years.</p>			

8.2.4 Water Lubricated Shafts (open loop systems) (refer also to Table 3) (1/1/2016)

The following survey intervals between surveys according to Method 4 are applicable to all types of propeller connections. For keyless propeller connections, the maximum interval between two consecutive dismantling and verifications of the shaft cone by means of non-destructive examination (NDE) is not to exceed 15 years.

- a) Configurations allowing 5 year intervals
 - 1) Single shaft operating exclusively in fresh water.
 - 2) Single shaft provided with adequate means of corrosion protection, single corrosion resistant shaft.
 - 3) All kinds of multiple shaft arrangements.
- b) Other systems (3 year intervals)

Shaft not belonging to one of the configurations listed in [8.2.4]a) is to be surveyed according to Method 4 every 3 years.
- c) Survey extensions

For all types of propeller connections, the interval between two consecutive surveys may be extended after the execution of the extension survey as follows:

- 1) Extension up to a maximum of 1 year, no more than one extension can be granted. No further extension, of other type, can be granted.
- 2) Extension up to a maximum of 3 months: no more than one "three month extension" can be granted. In the event an additional extension is requested, the requirements of the "one year extension" are to be carried out and the shaft survey due date prior to the previous extension is extended for a maximum of one year.

The extension survey should normally be carried out within 1 month of the shaft survey due date and the extension counts from the shaft survey due date.

If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of extension counts from the date the extension survey was completed.

Table 3 : Survey Intervals (open systems) (1/1/2016)

SURVEY INTERVALS (open systems)			
<ul style="list-style-type: none"> • Single Shaft operating exclusively in fresh water • Single Shaft provided with adequate means of corrosion protection, Single corrosion resistant shaft • All kinds of multiple shaft arrangements 		Other shaft configuration.	
All kinds of Propeller Coupling (4)		All kinds of Propeller Coupling (4)	
Every five years (4)	Method 4	Every three years (1)	Method 4
Extension 1 Y	Yes (2)	Extension 1 Y	Yes (2)
Extension 3 M	Yes (3)	Extension 3 M	Yes (3)
<p>General notes:</p> <p>For surveys (Method 4) completed within 3 months before the shaft survey due date, the next period will start from the shaft survey due date.</p> <p>The extension survey should normally be carried out within 1 month of the shaft survey due date and the extension counts from the shaft survey due date. If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of extension counts from the date the extension survey was completed.</p> <p>Notes:</p> <p>(1) unless an Extension type (Extension 1 Y, Extension 3 M) is applied in between</p> <p>(2) no more than one extension can be granted. No further extension, of other type, can be granted</p> <p>(3) no more than one extension can be granted. In the event an additional extension is requested, the requirements of the one year extension are to be carried out and the shaft survey due date prior to the previous extension is extended for a maximum of one year</p> <p>(4) for keyless propeller connections, the maximum interval between two consecutive dismantling and verifications of the shaft cone by means of non-destructive examination (NDE) is not to exceed 15 years.</p>			

8.3 Tailshaft Monitoring System (MON-SHAFT)

8.3.1 (1/1/2016)

Where the additional class notation **MON-SHAFT** is assigned shaft need not be withdrawn provided that all condition monitoring data is found to be within permissible limits and the remaining requirements for the respective surveys are complied with.

8.4 Other propulsion systems

8.4.1 (1/1/2016)

Driving components serving the same purpose as the propulsion shaft in other propulsion systems, such as directional propellers, vertical axis propellers, water jet units, dynamic positioning systems and thruster assisted mooring systems, are to be submitted to periodical surveys at intervals not exceeding five years.

9 Boiler survey

9.1

9.1.1 (1/7/2016)

Water tube boilers used for main propulsion, including reheat boilers, all other boilers for essential service, and boilers for non-essential service having working pressure exceeding 0,35 N/mm² and a heating surface exceeding 4,5 m², are to be surveyed internally. There is to be a minimum of two internal examinations during each 5-year class renewal survey period. In all cases the interval between any two such examinations is not to exceed 36 months.

An extension of examination of the boiler of up to 3 months beyond the due date can be granted in exceptional circumstances (see Note 1).

Note 1: "Exceptional circumstances" means, for example, unavailability of repair facilities, unavailability of essential materials,

equipment or spare parts, or delays incurred by action taken to avoid severe weather conditions.

9.1.2 For ships of eight years of age and over fitted with one single boiler supplying steam for main propulsion, the interval between two boiler surveys may be specially considered.

9.1.3 (1/7/2006)

External survey of boilers including test of safety and protective devices and test of safety valves using their relieving gear, is to be carried out annually, within the window of the Annual Survey.

For exhaust gas heated economisers, the safety valves are to be tested by the Chief Engineer at sea within the annual survey window. This test is to be recorded in the log-book for review by the attending Surveyor prior to crediting the Annual Survey of Machinery.

9.1.4 (1/7/2016)

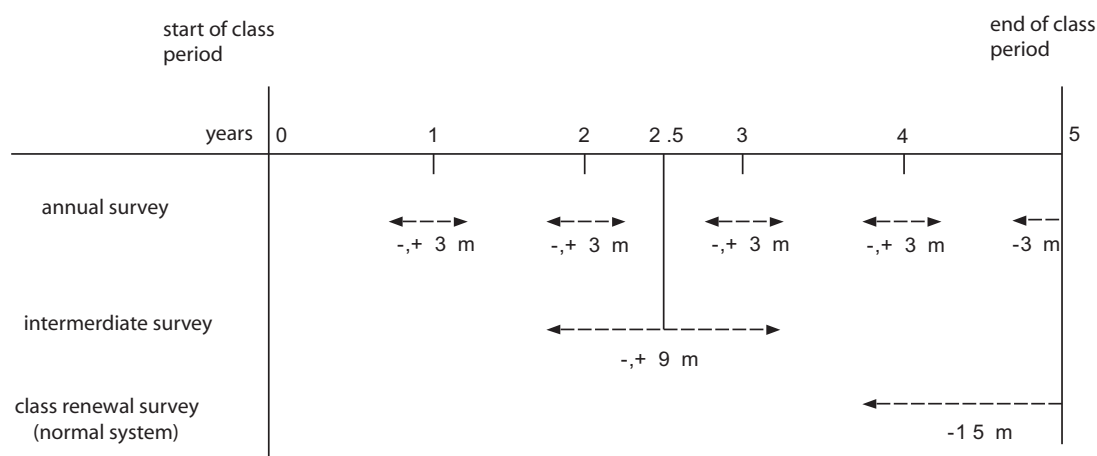
An extension may be granted by the Society, on the basis of [9.1.1], provided a survey is carried out in accordance with the provisions given in Ch 3, Sec 8, [1.1.6].

10 Links between anniversary dates and annual surveys, intermediate surveys and class renewal surveys

10.1

10.1.1 The link between the anniversary dates, the class renewal survey (when carried out according to the normal system), and the annual and intermediate surveys is given in Fig 5.

Figure 5 : Links between anniversary date and annual, intermediate and class renewal surveys (1/7/2002)



11 Occasional surveys

11.1 General

11.1.1 An occasional survey is any survey which is not a periodical survey. The survey may be defined as an occasional survey of hull, machinery, boilers, refrigerating plants, etc., depending on the part of the ship concerned.

Where defects are found, the Surveyor may extend the scope of the survey as deemed necessary.

11.1.2 Occasional surveys are carried out at the time of, for example:

- updating of classification documents (e.g. change of the Owner, name of the ship, flag)
- damage or suspected damage
- repair or renewal work
- Port State Control inspections
- alterations or conversion
- quality system audits
- postponement of surveys or recommendations.

11.2 Damage and repair surveys

11.2.1 In the event of damage which affects or may affect the class of the ship, the Owner is to apply to the Society for a survey. Such application is to be made as soon as possible to enable the Surveyor to ascertain the extent of the damage and necessary repairs, if any.

Note 1: Whenever a ship is fitted with an helicopter platform which is made in aluminium or other low melting metal construction which is not made equivalent to steel, and a fire occurred on the said platform or in close proximity, the platform is to be subject to a structural survey to determine its suitability for further use.

11.2.2 If, after sustaining damage, the ship calls at a port where the Society is not represented, the Owner is to notify the Society forthwith, supply all available information regarding the damage and make arrangements for the ship to be surveyed in the nearest port where the Society is represented.

11.2.3 All repairs to hull, machinery and equipment which may be required in order for a ship to retain its class are to be to the satisfaction of the Surveyor.

During repairs or maintenance work, the Owner is to arrange so that any damage, defects or non-compliance with the rule requirements are reported to the Surveyor during his survey.

11.2.4 Damages and partial or temporary repairs considered acceptable by the Surveyor for a limited period of time are the subject of an appropriate recommendation.

11.2.5 Damages or repairs required by the Surveyor to be re-examined after a certain period of time are the subject of an appropriate recommendation.

11.3 Port State Control survey

11.3.1 (1/1/2013)

An occasional survey is to be requested by the Owner wherever a ship is detained further to an inspection by a Port State Authority or the flag Administration, as described in Ch 1, Sec 1, [3.4].

11.4 Conversions, alterations and repairs

11.4.1 Conversions, alterations or repairs of/to structures and arrangements affecting the class are to be carried out in accordance with the requirements of the Society and to its satisfaction. Where necessary, documentation is to be submitted to the Society and/or made available to the attending Surveyor.

11.4.2 Materials and equipment used for conversions, alterations or repairs are generally to meet the requirements of the Rules for new ships built under survey; see Sec 1, [2.1.6].

11.5 Quality System audits

11.5.1 (1/7/2013)

The Society reserves the right to carry out occasional surveys in order to conduct audits either as deemed necessary in pursuance of its internal Quality System or as required by external organisations (e.g. European Union Commission, QACE - Quality Assessment and Certification Entity, Flag Administrations, IACS).

11.5.2 (1/7/2013)

These surveys may also be attended by auditors external to the Society (e.g. auditors and/or observers of the European Union Commission, QACE - Quality Assessment and Certification Entity, Flag Administrations, IACS).

11.5.3 The scope of these surveys is determined by the Society.

12 Change of ownership

12.1

12.1.1 In the case of change of ownership, the ship retains its current class with the Society provided that:

- the Society is informed of the change sufficiently in advance to carry out any survey deemed appropriate, and
- the new Owner signs the appropriate request, involving acceptance of the Society's general conditions and Rules. This request covers inter alia the condition of the ship when changing ownership.

Note 1: The ship's class is maintained without prejudice to those provisions in the Rules which are to be enforced in cases likely to cause suspension or withdrawal of the class such as particular damages or repairs to the ship of which the Society has not been advised by the former or, as the case may be, new Owner.

Note 2: No information whatsoever related to the class of the ship will be provided or confirmed to any third party, unless the appropriate request for information is duly completed and signed by the party making the request and the authorisation of the current Owner is obtained.

13 Lay-up and re-commissioning

13.1 General principles

13.1.1 A ship put out of commission may be subject to specific requirements for maintenance of class, as specified below, provided that the Owner notifies the Society of the fact.

If the Owner does not notify the Society of the laying-up of the ship or does not implement the lay-up maintenance program, the ship's class will be suspended and/or withdrawn when the due surveys are not carried out by their limit dates in accordance with the applicable requirements given in Sec 3.

13.1.2 The lay-up maintenance program provides for a "laying-up survey" to be performed at the beginning of lay-up and subsequent "annual lay-up condition surveys" to be performed in lieu of the normal annual surveys which are no longer required to be carried out as long as the ship remains laid-up. The minimum content of the lay-up maintenance program as well as the scope of these surveys are given in Ch 3, App 1. The other periodical surveys which become overdue during the lay-up period may be postponed until the re-commissioning of the ship.

13.1.3 Where the ship has an approved lay-up maintenance program and its period of class expires, the period of class is extended until it is re-commissioned, subject to the satisfactory completion of the annual lay-up condition surveys as described in [13.1.2].

13.1.4 The periodical surveys carried out during the lay-up period may be credited, either wholly or in part, at the discretion of the Society, having particular regard to their extent and dates. These surveys will be taken into account for the determination of the extent of surveys required for the re-commissioning of the ship and/or the expiry dates of the next periodical surveys of the same type.

13.1.5 (1/1/2015)

When a ship is re-commissioned, the Owner is to notify the Society and make provisions for the ship to be submitted to the following surveys:

- an occasional survey prior to re-commissioning, the scope of which depends on the duration of the lay-up period
- all periodical surveys which have been postponed in accordance with [13.1.2], taking into account the provisions of [13.1.4]. In all cases where the Owner elects to carry out the "next due" renewal survey, the due periodical hull and machinery surveys will be replaced by this one, Class period will be assigned in accordance with the provisions of [4.1.3].

13.1.6 Where the previous period of class expired before the re-commissioning and was extended as stated in [13.1.3], in addition to the provisions of [13.1.5] a complete class renewal survey is to be carried out prior to re-commissioning.

Those items which have been surveyed in compliance with the class renewal survey requirements during the 15 months preceding the re-commissioning may be credited. A new period of class is assigned from the completion of this class renewal survey.

13.1.7 The principles of intervals or limit dates for surveys to be carried out during the lay-up period, as stated in [13.1.1] to [13.1.6], are summarised in Fig 6.

13.1.8 The scope of the laying-up survey and annual lay-up condition surveys are described in detail in Ch 3, App 1.

14 Possible safety management system failures

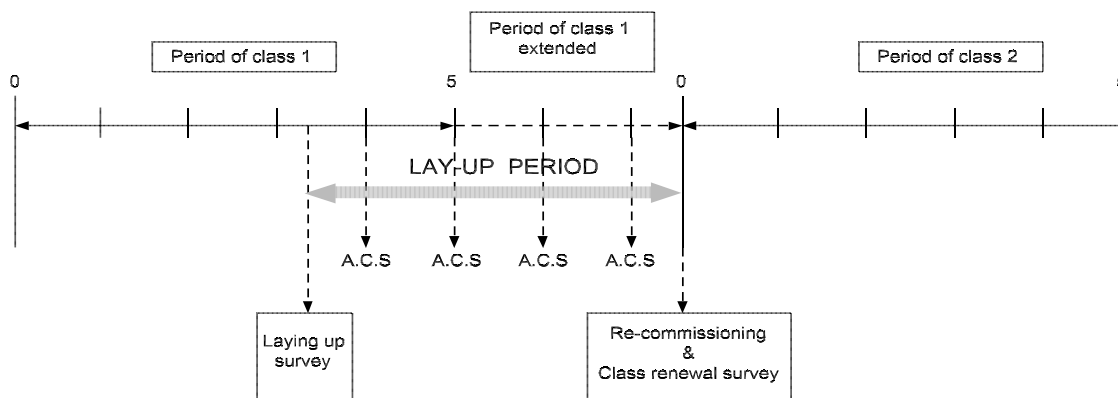
14.1

14.1.1 (1/7/2008)

When deficiencies relating to possible safety management system failures are identified by the Surveyor during a periodical (annual/intermediate/renewal) class survey or occasional class survey, statutory surveys, additional surveys relevant to Port State Control, flag State Inspections or any other occasion, a report is to be completed by the Surveyor so that the Organisation responsible for the issue of the SMC, if other than the Society, is notified.

Reporting and follow-up actions will be performed in accordance with the Society's procedures.

Figure 6 : Survey scheme of a case of a lay-up going beyond the expiry date of the period of class



Note 1: A. C. S. means annual lay-up condition survey.

SECTION 3

SUSPENSION AND WITHDRAWAL OF CLASS

1 General

1.1 Discontinuance of class

1.1.1 (1/1/2019)

The class may be discontinued either temporarily or permanently. In the former case, it is referred to as "suspension" of class, in the latter case as "withdrawal" of class. In both cases, the class is invalidated in all respects. Withdrawal, suspension and reinstating of class are confirmed in writing by the Society to the Owner and to the flag Administration.

1.2 Suspension of class

1.2.1 (1/1/2019)

The class may be suspended either automatically or following the decision of the Society.

Automatic suspension operates as from the date on which the circumstances causing the suspension occur.

Suspension following decision of the Society takes effect from the date when the conditions for suspension of class are met.

Suspension of class will remain in effect until such time as the class is reinstated once the cause giving rise to suspension has been removed, subject to any additional surveys that the Society deems necessary taking into account the condition of the ship and the cause of the suspension.

In any event, the ship will be considered as not retaining its class from the date of suspension until the date when class is reinstated irrespective of the date of the confirmation in writing pursuant to [1.1.1].

1.2.2 (1/1/2019)

The class is automatically suspended, in addition to the cases contemplated in [1.2.3], [1.2.4] and [1.2.5], when one or more of the following circumstances occur:

- when a ship is not operated in compliance with the rule requirements, such as in cases of services or conditions not covered by the service notation, or trade outside the navigation restrictions for which the class was assigned
- when a ship proceeds to sea with less freeboard than that assigned, or has the freeboard marks placed on the sides in a position higher than that assigned, or, in cases of ships where freeboards are not assigned, the draught is greater than that assigned
- when the Owner fails to inform the Society in order to submit the ship to a survey after defects or damages affecting the class have been detected
- when repairs, alterations or conversions affecting the class are carried out either without requesting the attendance of the Society or not to the satisfaction of the

Surveyor. For voyage repairs, reference is to be made to Sec 2, [2.11]

- when a ship undergoing a survey resumes trading before completion of the same survey or before pending items are dealt with.

1.2.3 Suspension and reinstatement of class in the case of overdue class renewal survey (1/1/2019)

The 5-year Certificate of Classification expires and classification is automatically suspended from the certificate expiry date in the event that the class renewal survey has not been completed or is not under attendance for completion, by the due date, but notwithstanding the above, Classification will be automatically suspended if the ship resumes trading prior to completion.

Classification will be reinstated upon satisfactory completion of the surveys due. The surveys to be carried out are to be based upon the survey requirements at the original date due and not on the age of the vessel when the survey is carried out. Such surveys are to be credited from the date originally due.

Under "exceptional circumstances", as defined in Sec 2, [2.1.7], the Society may grant an extension not exceeding three months to allow for completion of the class renewal survey provided that the ship is attended and the attending Surveyor(s) so recommend(s) after the following have been carried out:

- a) annual survey;
- b) re-examination of recommendations;
- c) progression of the class renewal survey as far as practicable.

In the case where dry-docking is due prior to the end of the class extension, an underwater examination is to be carried out by an approved diving company. An underwater examination by an approved company may be dispensed with in the case of an extension of the dry-docking survey not exceeding 36 months provided the ship is without outstanding recommendations regarding underwater parts.

If the Certificate of Classification will expire when the ship is expected to be at sea, an extension to allow for completion of the class renewal survey may be granted provided that there is documented agreement to such an extension prior to the expiry date of the certificate, that satisfactory arrangements have been made for attendance of the Surveyor at the first port of call, and that the Society is satisfied that there is technical justification for such an extension. Such an extension is to be granted only until arrival at the first port of call after the expiry date of the certificate. However, if owing to "exceptional circumstances" the class renewal survey cannot be completed at the first port of call, the procedure given above in the event of "exceptional circumstances" may be followed, but the total period of exten-

sion is in no case to be longer than three months after the original due date of the class renewal survey.

1.2.4 Suspension and reinstatement of class in the case of overdue intermediate survey (1/1/2019)

The Certificate of Classification becomes invalid, and classification is automatically suspended, if the intermediate survey has not been completed within three (3) months of the due date of the third annual survey in each periodical survey cycle, unless the ship is under attendance for completion of the intermediate survey but notwithstanding the above, classification will be automatically suspended if the ship resumes trading prior to completion.

Classification will be reinstated upon satisfactory completion of the surveys due. Such surveys are to be credited from the date originally due.

1.2.5 Suspension and reinstatement of class in the case of overdue annual survey (1/1/2019)

The Certificate of Classification becomes invalid, and classification is automatically suspended, if the annual survey has not been completed within three (3) months of the due date of the annual survey, unless the ship is under attendance for completion of the annual survey but notwithstanding the above, Classification will be automatically suspended if the ship resumes trading prior to completion.

Classification will be reinstated upon satisfactory completion of the surveys due. Such surveys are to be credited from the date originally due.

1.2.6 Suspension of class in the case of overdue continuous survey item(s) (1/7/2005)

Continuous survey item(s) due or overdue at the time of the annual survey is (are) to be dealt with. The ship's class will be subject to a suspension procedure if the item(s) is (are) not surveyed, or postponed by agreement.

1.2.7 Other cases of suspension of class (1/1/2019)

In addition to the circumstances for which automatic suspension may apply, the class of a ship may also be suspended following the decision of the Society:

- when one or more surveys are not held by their limit dates -see Sec 2, [2.1.4]- or the dates stipulated by the Society also taking into account any extensions granted in accordance with the provisions of Part A
- when, due to reported defects, the Society considers that a ship is not entitled to retain its class even on a temporary basis (pending necessary repairs or renewals, etc.)
- in other circumstances which the Society will consider on their merits (e.g. in the event of non-payment of fees or where the Owner fails to subject the ship to the occasional survey as per the requirement in Sec 2, [11.2.1]).

1.2.8 Laid-up ships (1/7/2009)

Ships laid-up in accordance with the requirements indicated in Sec 2, [13.1.1] prior to surveys becoming overdue

need not be suspended when surveys addressed above become overdue. However, ships which are laid-up after being suspended as a result of surveys going overdue, remain suspended until the overdue surveys are completed.

1.2.9 Voyage to demolition (1/7/2005)

When it is intended to take a ship on a demolition voyage with any periodical survey overdue, the ship's class suspension may be held in abeyance and consideration may be given to allowing the ship to proceed on a single direct ballast voyage from the lay-up or final discharge port to the demolition yard. In such cases a short-term Certificate of Classification with conditions for the voyage noted may be issued provided the attending Surveyor finds the ship in satisfactory condition to proceed on the intended voyage.

1.2.10 Force Majeure (1/7/2014)

If, due to circumstances beyond the Owner's or the Society's control, as defined in Sec 2, [2.1.8], the ship is not in a port where the overdue surveys can be completed at the expiry of the periods allowed above, the Society may allow the ship to sail, in class, directly to an agreed discharge port, and if necessary, from there, in ballast, to an agreed port at which the survey will be completed, provided the Society:

- a) examines the ship's records;
- b) carries out the due and/or overdue surveys and examination of recommendations at the first port of call when there is unforeseen inability of the Society to attend the ship in the present port, and
- c) has satisfied itself that the ship is in condition to sail for one trip to a discharge port and subsequent ballast voyage to a repair facility if necessary. (Where there is unforeseen inability of the Society to attend the ship in the present port, the Master is to confirm that his ship is in condition to sail to the nearest port of call.)

The surveys to be carried out are to be based upon the survey requirements at the original date due and not on the age of the vessel when the survey is carried out. Such surveys are to be credited from the date originally due.

If class has already been automatically suspended in such cases, it may be reinstated subject to the conditions prescribed in this item.

1.2.11 Single voyage for repair of laid-up ships (1/7/2013)

When a ship is intended for a single voyage from laid-up position to repair yard with any periodical survey overdue, the ship's class suspension may be held in abeyance and consideration may be given to allowing the ship to proceed on a single direct ballast voyage from the site of lay-up to the repair yard, upon agreement with the Flag Administration, provided the Society finds the ship in satisfactory condition after surveys, the extent of which are to be based on surveys overdue and duration of lay-up. A short-term Class Certificate with conditions for the intended voyage may be issued. This is not applicable to ships whose class was already suspended prior to being laid-up.

1.2.12 Suspension and reinstatement of class in the case of overdue recommendations (1/1/2019)

Each recommendation will be assigned a due date for completion. The ship's class will be subject to a suspension procedure if the recommendation is not dealt with, or postponed by agreement, by the due date.

Classification will be reinstated upon verification that the overdue recommendation has been satisfactorily dealt with.

1.2.13 Suspension and reinstatement of class of dual classed vessels (1/1/2019)

When a ship is dual classed and in the event that the Society takes action to suspend the class of the vessel for technical reasons, the Society will advise the "Other Society" (see Note 1) of the reasons for such action and the full circumstances within five (5) working days.

If the Society is advised that the "Other Society" has suspended the class for technical reasons, the Society will, upon receipt of this advice, also suspend the class of the vessel, unless it can otherwise document that such suspension is incorrect.

When the Society decides to reinstate class, it is to inform the "Other Society".

Note 1: "Other Society" means, the other classification Society which is involved in the dual class.

1.3 Withdrawal of class

1.3.1 (1/1/2019)

The Society will withdraw the class of a ship in the following cases:

- at the request of the Owner
- when the causes that have given rise to a suspension currently in effect have not been removed within six months of the date of suspension. However, the Society may withdraw the class of the ship before the end of the six-month period where it deems it appropriate.

A longer suspension may be granted at the Society's discretion when the ship is not trading as in cases of lay-up, awaiting disposition in the case of a casualty or attendance for reinstatement

- in case of transfer of ownership when the requirements under Sec 2, [12.1.1] are not complied with
- when the ship is reported as a constructive total loss
- when the ship is lost
- when the ship is reported scrapped.

Withdrawal of class takes effect from the date on which the circumstances causing such withdrawal occur.

1.3.2 When the withdrawal of class of a ship comes into effect, the Society will:

- forward the Owner written notice
- delete the ship from the Register of Ships
- notify the flag Administration
- make the information available to the Underwriters, at their request.

1.4 Reassignment of class following class withdrawal

1.4.1 (1/1/2019)

At the request of the Owner, a ship which was previously classed with the Society, subsequently withdrawn from class and that has not been further classed i.e.

- has never resumed its trade
- has not been classified by any other Classification Society

may have the class reassigned but the Society shall have the right to decline an application for re-assignment of class.

1.4.2 (1/1/2015)

The reassignment of Class may take place upon satisfactory:

- removal of the causes that led to class withdrawal
- execution of the surveys expired during the period of class withdrawal
- verification of additional ascertainments as deemed necessary by the Society according to the provisions of Ch 3, Sec 2, [4.1].

The new period of Class and the validity of the Certificate of Classification will be considered by the Society on a case by case basis.

1.5 Suspension/withdrawal of additional class notations

1.5.1 If the survey requirements related to maintenance of additional class notations are not complied with, the suspension or withdrawal may be limited to the notations concerned.

The same procedure may apply to service notations of ships which are assigned with more than one service notation.

1.5.2 The suspension or withdrawal of an additional class notation or a service notation (where a ship is assigned with more than one service notation) generally does not affect the class.

APPENDIX 1

CMS AND PMS: SURVEYS CARRIED OUT BY THE CHIEF ENGINEER

1 Documentation

1.1

1.1.1 The basic conditions for the acknowledgment of surveys carried out by Chief Engineers are specified hereafter. Consideration may be given to other conditions on a case by case basis.

1.1.2 (1/2/2016)

The Company is responsible for ensuring that the Chief Engineer is qualified to register and carry out maintenance on all class-related items.

1.1.3 (1/1/2017)

He is to hold a certificate of competency as provided by STCW 95 Convention for the power of the main propulsive installation of the ship. He is to have at least three years of seagoing experience as Senior Engineer Officer on ships of the type (motor or steam ship) for which he will be qualified.

1.1.4 (1/1/2017)

The Owner is to provide the Chief Engineer with a copy of this Appendix, enabling him to familiarise himself with the conditions, scope and limits of his interventions.

2 Limits of the interventions

2.1

2.1.1 (1/1/2008)

For ships where the CMS is implemented, the following items of the class renewal survey for machinery cannot be inspected by the Chief Engineer:

- pressure vessels (except class 2 and 3 heat exchangers)
- main and auxiliary turbines
- main reduction gears
- crankshafts, with associated main bearings and bottom end connecting rod bearings, of main propulsion internal combustion engines. However, bottom end connecting rod bearings of diesel engines having trunk pistons may be inspected by the Chief Engineer when the complete associated cylinder is inspected in the course of the engine maintenance program
- turbochargers of main propulsion internal combustion engines
- intermediate shafting and associated bearings
- steering gear system, including pumps.

Generally, within a 10-year cycle comprising two consecutive class cycles, all the items surveyed under CMS are to be inspected once by the Society's Surveyors.

The attention of Chief Engineers is drawn to the fact that surveys performed by them in ports which are under the jurisdiction of an office of the Society or during very short voyages between ports where Surveyors of the Society are available will not be credited.

2.1.2 (1/7/2013)

For ships where the PMS is implemented the items listed in [2.1.1] cannot be surveyed by the Chief Engineer.

Where a Planned Maintenance Scheme approved by the Society is implemented and Condition Based Maintenance complying with the requirements of Pt F, Ch 12, Sec 1, [6] is applied, the following items can be surveyed by the Chief Engineer, on condition that they are subjected to the Condition Based Maintenance (CBM) program:

- main and auxiliary turbines
- crankshafts, with associated main bearings and bottom end connecting rod bearings, of main propulsion internal combustion engines,
- turbochargers of main propulsion internal combustion engines,
- intermediate shafting and associated bearings

Moreover, in such case the confirmatory survey is to include the checks indicated in [5.1.4].

In no case may the surveys of the following items be carried out by the Chief Engineer:

- pressure vessels (except class 2 and 3 heat exchangers)
- main reduction gears
- steering gear system, including pumps.

2.1.3 In no case may the surveys of tailshafts and boilers, which are items not included in the scope of the class renewal survey, be carried out by the Chief Engineer.

3 Procedure for carrying out surveys

3.1 General

3.1.1 As regards the procedure for carrying out surveys, the Owner is to inform the Chief Engineer that surveys are to be conducted in accordance with the Rules of the Society and, specifically, the requirements for class renewal surveys related to machinery and systems contained in Ch 3, Sec 5, [3].

It is the responsibility of the ship's Master and Chief Engineer to decide the date and place for the survey of each component in order to avoid possible accidents (fire

included) in the event of damage to the unit(s) remaining in service.

Some guidelines for the Chief Engineer relevant to the dismantling and inspections of main components of the machinery installation are given below.

The items and/or machinery which, as a result of the surveys, are replaced due to wear, damage or defects, are to be kept on board until they are inspected by a Surveyor of the Society.

3.2 Main diesel engines

3.2.1 The following items are to be surveyed as indicated:

- the top and bottom halves of the main bearings are to be removed and inspected, and the clearances are to be taken, recorded and compared with the limits recommended by the engine builder
- the top and bottom halves of crankpin bearings are to be examined, and the clearances are to be taken, recorded and compared with the limits recommended by the engine builder
- crankpins, journals and webs are to be examined for crack detection, mainly at the fillets and in the vicinity of the lubricating oil holes
- crankshaft deflections are to be taken and recorded at regular intervals, enabling verification of the trend when they are taken in the presence of the Society's Surveyor. This operation is to be effected bearing in mind that during the readings the journals are to be steady on their bearings
- other parts exposed to wear or operating incidents are to be carefully examined and the results recorded. In particular, the wear of liners is to be measured and recorded.

3.3 Auxiliary diesel engines

3.3.1 The survey generally consists in the complete dismantling of the engine and a careful examination of those items most liable to be exposed to wear or operating incidents. In particular:

- crankshaft deflections and wear of cylinder liners are to be measured
- the crankshaft is to be checked by means of dye penetrant in way of fillets and lubricating oil holes
- all top halves of the main bearings together with at least two bottom halves are to be dismantled
- crankcase explosion relief valves, if fitted, are to be checked.

3.4 Reciprocating compressors

3.4.1 The survey is to include:

- the dismantling of pistons and valves for inspection
- the examination and testing of the nest of cooler tubes
- the verification of safety relief valves after reassembling.

3.5 Coolers, condensers, heaters

3.5.1 The survey is to include:

- the dismantling of the covers
- the examination of the nest of tubes
- the testing of the nest of tubes, if necessary.

3.6 Electrical switchboard

3.6.1 The survey is to include:

- the cleaning of the switchboard
- the verification of the connection assemblies, locking device tightening and busbar tightening
- the examination of the condition of the circuit-breakers, switches and fuses
- the verification of the contacts and screens
- the checking of the measuring instruments, which are to be re-calibrated or replaced, if inaccurate
- the megger test.

3.7 a.c. and d.c. generators

3.7.1 The survey is to include:

- the removal of protection plates and brush carriers
- the cleaning of field coils and armature windings
- the verification of proper contact of brushes, which are to be renewed if excessively worn
- the verification of commutators and sliprings
- the measurement of air gap clearances
- the checking of journals and bearings
- the megger test.

3.8 Other items (pumps, electric motors, etc.)

3.8.1 The survey is generally to include the complete dismantling for inspection of the main parts exposed to wear or operating incidents, such as bearings, casings, impellers and rotors.

4 Records of surveys carried out

4.1

4.1.1 The surveys carried out by the Chief Engineer are to be recorded in the engine/machinery log-book and a survey report is to be prepared for each item surveyed.

The report is generally to be drawn up in English; however, for ships trading in specific restricted areas the use of the language of the country concerned will be accepted.

The report may be provided in hard copy or using a computerised recording system.

4.1.2 (1/7/2017)

The report is to indicate the following information:

- identification data:
 - name of ship and register number
 - name of Chief Engineer
 - date and place (port or voyage leg) of the survey
 - reference of the item in the CMS or PMS list, and description of the item
- inspection conducted:
 - the type of inspection carried out: visual external examination, internal examination after dismantling, overhaul
 - readings performed, when applicable: clearances, measurements, working pressure, or other working parameters of the equipment
 - inspection findings: corrosion, fractures, pieces of equipment worn out, broken or missing
- maintenance and repairs carried out and parts replaced
- results of tests performed after the inspection, such as working test, pressure test.

For sake of completeness, other documentation such as sketches, photos, measurement reports may be attached to the report.

The report is to be signed by the Chief Engineer.

5 Confirmatory survey

5.1

5.1.1 A confirmatory survey, to be carried out by a Surveyor of the Society, is to be requested according to the following principle:

- for ships under the CMS, within a reasonably short time from the date of the surveys carried out by the Chief Engineer, and, in any case, in the first port which is under the jurisdiction of an Office of the Society;
 - for ships under the PMS, at the next annual survey (see Pt F, Ch 12, Sec 1, [4.2]).
- 5.1.2** The Surveyor is to be supplied with a copy of this survey report and also shown the engine log-book.
- 5.1.3** The Surveyor carries out an external examination of the relevant items and parts replaced and, if applicable, attends running tests. If doubts arise, the Surveyor may request dismantling as deemed necessary.
- 5.1.4** If the persons on board are authorised to survey the main engine crankshaft and bearings (see [2.1.2]), the Surveyor performs the following:
- check of condition monitoring records (see Pt F, Ch 12, Sec 1, [6])
 - check of crankshaft deflection readings
 - check of bearing clearances (where possible)
 - checks for signs of wiped or broken white metal in the crankcase or filters
 - check of the witness marks of shrink fits of crankshafts
 - check of the bedplate structure (inside and outside)
 - check that the condition of crankpins, journals and associated bearings is duly recorded.
- 5.1.5** Where the confirmatory survey is performed with an abnormal delay, the inspection is to be more extensive and, if necessary, the due surveys are to be completely repeated.
- 5.1.6** The date of the execution of the surveys will be assumed to be the date of the confirmatory survey.

APPENDIX 2

THICKNESS MEASUREMENTS: EXTENT, DETERMINATION OF LOCATIONS AND ACCEPTANCE CRITERIA

1 General

1.1 Aim of the Appendix

1.1.1 Thickness measurements are a major part of surveys to be carried out for the maintenance of class, and the analysis of these measurements is a prominent factor in the determination and extent of the repairs and renewals of the ship's structure.

1.1.2 The Appendix is intended to provide Owners, companies performing thickness measurements and the Society's Surveyors with a uniform means with a view to fulfilling Rule requirements for thickness measurements. In particular, it will enable all the above-mentioned parties to carry out:

- the planning and preparation
- the determination of extent and location, and
- the analysis

of the thickness measurements in cooperation.

1.1.3 It is to be noted that this Appendix also takes into account specific requirements for thickness measurements relevant to close-up surveys of ships which are subject to the Enhanced Survey Program (ESP).

1.1.4 This Appendix is also to be used for the thickness measurements of ships assigned the notation **STAR-HULL** (see Ch 5, Sec 2 and Part F, Chapter 1). However, the acceptance criteria for thickness measurements specific to this notation are given in Pt F, Ch 1, Sec 1.

1.1.5 (1/7/2013)

For ships built under the Common Structural Rules, the acceptance criteria are according to App 3.

1.2 Scope of the Appendix

1.2.1 Separate Articles below provide the following information:

- references to rule requirements and some additional information on the extent of the thickness measurements to be performed during surveys according to types of ships and related surveys (see [2])
- locations of the measurements for the main parts of the ship (see [3])
- how to analyse the results of thickness measurements (see [4]).

Tables and sketches are also given to detail the above points according to the types of ships.

2 Rule requirements for the extent of measurements

2.1 General

2.1.1 For the maintenance of class, thickness measurements may be required during annual, intermediate and class renewal surveys.

Tab 1 gives the references to the requirements for minimum thickness measurements indicated in Chapter 3 and Chapter 4 for each service notation and related to the different types of surveys.

Some additional explanations are also given about the wording used in the Rules as well as the general principles of the required thickness measurements during class renewal surveys.

2.2 Class renewal survey: all ships except those submitted to ESP

2.2.1 The thickness measurements required by the Rules consist of:

- systematic thickness measurements, i.e. measurements of different parts of the structure in order to assess the overall and local strength of the ship
- measurements of suspect areas as defined in Sec 2, [2.2.10]
- additional measurements on areas determined as affected by substantial corrosion as defined in Sec 2, [2.2.9].

2.3 Class renewal survey: ships submitted to ESP or equivalent

2.3.1 The thickness measurements required by the Rules consist of:

- systematic thickness measurements in order to assess the overall and local strength of the ship
- thickness measurements as indicated in the program of close-up survey
- measurements of elements considered as suspect areas as defined in Sec 2, [2.2.10]
- additional measurements on areas determined as affected by substantial corrosion as defined in Sec 2, [2.2.9].

2.3.2 For the determination of close-up surveys and relevant thickness measurements as well as the areas considered as suspect areas, reference is to be made to the relevant Sections of Chapter 4 according to the different service notations of the ships subject to ESP.

Table 1 : References to Rule requirements related to thickness measurements (1/7/2013)

SERVICE NOTATION	TYPE OF SURVEY		
	CLASS RENEWAL	INTERMEDIATE	ANNUAL
all service notations except those in other rows	Ch 3, Sec 5, [2.5] and Ch 3, Sec 5, Tab 2: systematic measurements and suspect areas Where substantial corrosion is found, the extent of thickness measurements may be increased to the Surveyor's satisfaction, using Ch 3, Sec 5, Tab 3 as guidance	Ch 3, Sec 4, Tab 1 : thickness measurements to be taken if deemed necessary by the Surveyor Where substantial corrosion is found, the extent of thickness measurements may be increased to the Surveyor's satisfaction, using Ch 3, Sec 5, Tab 3 as guidance	Ch 3, Sec 3, [2.4.1]: areas of substantial corrosion identified at previous surveys Where substantial corrosion is found, the extent of thickness measurements may be increased to the Surveyor's satisfaction, using Ch 3, Sec 5, Tab 3 as guidance
bulk carrier ESP ore carrier ESP	Ch 4, Sec 2, [4.1] and Ch 4, Sec 2, [4.5] : planning and general requirements Ch 4, Sec 2, Tab 5 : measurements of elements subjected to close-up survey Ch 4, Sec 2, Tab 6 : extent of systematic thickness measurements Ch 4, Sec 2, Tab 7 to Ch 4, Sec 2, Tab 11, according to the different locations, where substantial corrosion is found	Ch 4, Sec 2, Tab 3 for cargo holds Ch 4, Sec 2, Tab 4 for salt ballast tanks Ch 4, Sec 2, Tab 7 to Ch 4, Sec 2, Tab 11, according to the different locations, where substantial corrosion is found	Ch 4, Sec 2, Tab 1, note (2) for cargo holds and when deemed necessary by the Surveyor Ch 4, Sec 2, [2.3.2] for salt ballast tanks and when deemed necessary by the Surveyor Ch 4, Sec 2, Tab 7 to Ch 4, Sec 2, Tab 11, according to the different locations, where substantial corrosion is found
bulk carrier ESP - double skin	Ch 4, Sec 9, [4.1] and Ch 4, Sec 9, [4.5]: planning and general requirements Ch 4, Sec 9, Tab 2: measurements of elements subjected to close-up survey Ch 4, Sec 9, Tab 4: extent of systematic thickness measurements Ch 4, Sec 9, Tab 5 to Ch 4, Sec 9, Tab 8, according to the different locations, where substantial corrosion is found	Ch 4, Sec 9, Tab 1 for both cargo holds and salt ballast tanks Ch 4, Sec 9, Tab 4 to Ch 4, Sec 9, Tab 8, according to the different locations, where substantial corrosion is found	Ch 4, Sec 9, [2.5] limited to salt ballast tanks and when deemed necessary by the Surveyor Ch 4, Sec 9, Tab 4 to Ch 4, Sec 9, Tab 8, according to the different locations, where substantial corrosion is found
oil tanker ESP combination carrier/OBO ESP combination carrier/OOC ESP	Ch 4, Sec 3, [6.1] and Ch 4, Sec 3, [6.4] : planning and general requirements Ch 4, Sec 3, Tab 3 : measurements of elements subjected to close-up survey Ch 4, Sec 3, Tab 4 : extent of systematic thickness measurements Ch 4, Sec 3, Tab 5 to Ch 4, Sec 3, Tab 8, according to the different locations, where substantial corrosion is found	Ch 4, Sec 3, Tab 1 for both cargo and salt ballast tanks Ch 4, Sec 3, Tab 5 to Ch 4, Sec 3, Tab 8, according to the different locations, where substantial corrosion is found	Ch 4, Sec 3, [2.4.2] limited to salt ballast tanks and when deemed necessary by the Surveyor Ch 4, Sec 3, Tab 5 to Ch 4, Sec 3, Tab 8, according to the different locations, where substantial corrosion is found
oil tanker ESP double hull	Ch 4, Sec 4, [4.1] and Ch 4, Sec 4, [4.4]: planning and general requirements Ch 4, Sec 4, Tab 2: measurements of elements subjected to close-up survey Ch 4, Sec 4, Tab 3: extent of systematic thickness measurements Ch 4, Sec 4, Tab 4 to Ch 4, Sec 4, Tab 8, according to the different locations, where substantial corrosion is found	Ch 4, Sec 4, Tab 1 for both cargo and salt ballast tanks Ch 4, Sec 4, Tab 4 to Ch 4, Sec 4, Tab 8, according to the different locations, where substantial corrosion is found	Ch 4, Sec 4, [2.4.2] limited to salt ballast tanks and when deemed necessary by the Surveyor Ch 4, Sec 4, Tab 4 to Ch 4, Sec 4, Tab 8, according to the different locations, where substantial corrosion is found

SERVICE NOTATION	TYPE OF SURVEY		
	CLASS RENEWAL	INTERMEDIATE	ANNUAL
chemical tanker ESP	Ch 4, Sec 5, [6.1] and Ch 4, Sec 5, [6.4] : planning and general requirements Ch 4, Sec 5, Tab 3 : measurements of elements subjected to close-up survey Ch 4, Sec 5, Tab 4 : extent of systematic thickness measurements Ch 4, Sec 5, Tab 5 to Ch 4, Sec 5, Tab 8, according to the different locations, where substantial corrosion is found	Ch 4, Sec 5, Tab 2 for both cargo and salt ballast tanks Ch 4, Sec 5, Tab 5 to Ch 4, Sec 5, Tab 8, according to the different locations, where substantial corrosion is found	Ch 4, Sec 5, [2.4.2] limited to salt ballast tanks and when deemed necessary by the Surveyor Ch 4, Sec 5, Tab 5 to Ch 4, Sec 5, Tab 8, according to the different locations, where substantial corrosion is found
liquefied gas carrier	Ch 4, Sec 6, [6.2] and Ch 4, Sec 6, [6.4]: planning and general requirements Ch 4, Sec 6, Tab 2 : measurements of elements subjected to close-up survey Ch 4, Sec 6, Tab 3 : extent of systematic thickness measurements	Ch 4, Sec 6, Tab 1 : thickness measurements to be taken if deemed necessary by the Surveyor	Ch 4, Sec 6, [2.1.6] and limited to salt ballast tanks and when deemed necessary by the Surveyor
ro-ro cargo ships, ro-ro passenger ships	Ch 4, Sec 7, [3.1.2] measurements of shell and inner doors	-	-
general dry cargo ships	Ch 4, Sec 8, Tab 1 measurements of elements subjected to close-up survey Ch 4, Sec 8, Tab 2: extent of systematic thickness measurements Ch 4, Sec 8, Tab 3 according to the different locations, where substantial corrosion is found	Ch 4, Sec 8, [3.2.2] to Ch 4, Sec 8, [3.2.4] for both cargo holds and salt ballast tanks Ch 4, Sec 8, Tab 3 according to the different locations, where substantial corrosion is found	Ch 4, Sec 8, [2.1.5] for cargo holds Ch 4, Sec 8, [2.1.6] for salt ballast tanks Ch 4, Sec 8, Tab 3 according to the different locations, where substantial corrosion is found

3 Number and locations of measurements

3.1 General

3.1.1 Considering the extent of thickness measurements as required by the Rules and indicated in [2] above, the locations of the points to be measured are given here for the most important items of the structure. Thus the number of points can be estimated.

3.2 Locations of points

3.2.1 Tab 2 provides explanations and/or interpretations for the application of those requirements indicated in the Rules which refer to both systematic thickness measurements related to the calculation of global hull girder strength and specific measurements connected to close-up surveys.

Figures are also given to facilitate the explanations and/or interpretations given in the table. These figures show typical arrangements of cargo ships, bulk carriers and oil tankers. Due to the various designs of the other ship types, figures are not given to cover all the different cases. However, the figures provided here may be used as guidance for ships other than those illustrated.

4 Acceptance criteria for thickness measurements

4.1 General

4.1.1 (1/1/2003)

Acceptance criteria stipulate limits of wastage which are to be taken into account for reinforcements, repairs or renewals of steel structure. These limits are generally expressed for each structural item as a maximum percentage of acceptable wastage (W). When the maximum percentage of wastage is indicated, the renewal thickness t_{ren} (minimum acceptable thickness) is that resulting from applying this percentage to the rule thickness (t_{rule}), according to the following formula:

$$t_{ren} = \left(1 - \frac{W}{100}\right) t_{rule}$$

However, when the rule thickness is not available, the as-built thickness can be used.

Only for criteria related to an item (see [4.3.4] b), the Society may establish a list of renewal thicknesses tailored to the different structural items. In such a case these thicknesses are used in lieu of the minimum thicknesses calculated from the percentage of wastage.

Table 2 : Interpretations of rule requirements for the locations and number of points to be measured (1/7/2009)

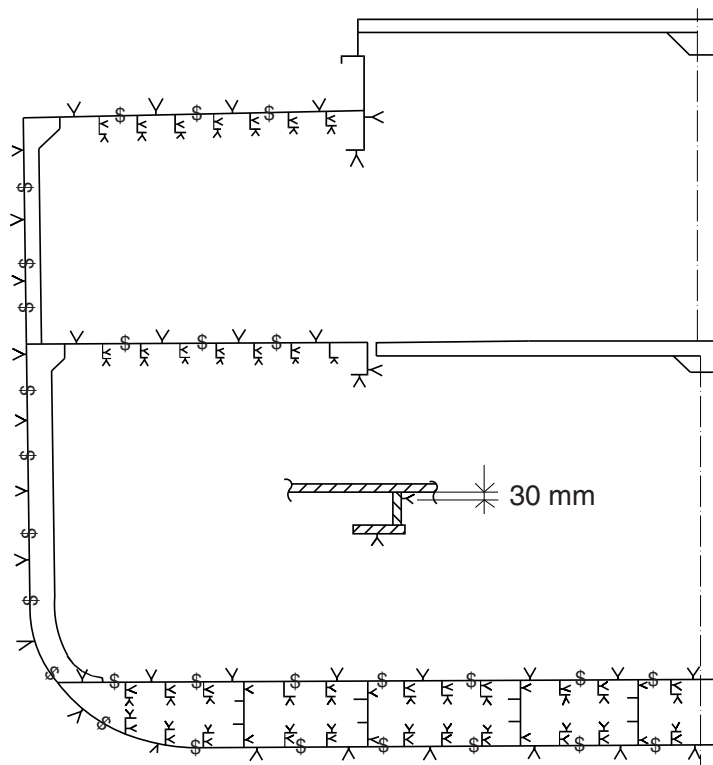
A) SYSTEMATIC MEASUREMENTS		
ITEM	INTERPRETATION	FIGURE
Selected plates on deck, tank top, bottom, double bottom and wind-and-water	"Selected" means at least a single point on one out of three plates, to be chosen on representative areas of average corrosion	No figure
All deck, tank top and bottom plates and wind-and-water strakes	At least two points on each plate to be taken either at each 1/4 extremity of plate or at representative areas of average corrosion	No figure
Transverse section	Refer to the definition given in Sec 2, [2.2.6]	Fig 1 for general cargo ships Fig 2 for bulk carriers Fig 3 for oil tankers For other ship types, see [3.2.1]
Cargo hold hatch covers and coamings		Fig 4 for ships fitted with hold hatch covers and coamings
Bulkheads on ships other than bulk carriers, oil tankers, chemical tankers and liquefied gas carriers (for these ships refer to B) and C) CLOSE-UP SURVEYS AND RELATED MEASUREMENTS)	"Selected bulkheads" means at least 50% of the bulkheads	Fig 5 for general cargo ships. It may also apply to other ship types (see [3.2.1])
Selected internal structure such as floors and longitudinals, transverse frames, web frames, deck beams, 'tweendecks, girders	The internal structural items to be measured in each space internally surveyed are to be at least 20% within the cargo area and 10% outside the cargo area	Fig 6 for general cargo ships. It may also apply to other ship types (see [3.2.1])
Transverse section of deck plating outside line of cargo hatch openings (for bulk carriers, ore carriers and combination carriers)	Two single points on each deck plate (to be taken either at each 1/4 extremity of plate or at representative areas of average corrosion) between the ship sides and hatch coamings in the transverse section concerned	No figure
One section of deck plating for the full beam of the ship within the cargo area (for oil tankers, chemical tankers and liquefied gas carriers)	Two single points on each deck plate (to be taken either at each 1/4 extremity of plate or at representative areas of average corrosion) in the transverse section concerned	No figure

B) CLOSE-UP SURVEYS AND RELATED MEASUREMENTS (for oil tankers, chemical tankers, gas carriers and combination carriers)		
ITEM	INTERPRETATION	FIGURE
Web frame ring (for oil tankers, chemical tankers and combination carriers)	Refer to the definition given in Ch 4, Sec 3, Tab 3 and Ch 4, Sec 5, Tab 3. "Adjacent structural members" means plating and stiffeners of deck, bottom, double bottom, sides and longitudinal bulkheads in the vicinity of the web frame ring	Extent of areas is shown as (1) in Ch 4, Sec 3, Fig 1 Locations of points are given in Fig 10
Transverse section (for chemical tankers and liquefied gas carriers)	Refer to the definitions given in Ch 4, Sec 5, Tab 3 and Ch 4, Sec 6, Tab 2. "Adjacent structural members" means plating and stiffeners of deck, bottom, double bottom, sides and longitudinal bulkheads in the vicinity of the web frame ring	No figure
Deck transverse	This is the upper part of the web frame ring including the adjacent structural members (see meaning given above). For chemical tankers it may be fitted on deck, i.e. outside the tank	Extent of areas is shown as (2) in Ch 4, Sec 3, Fig 1 Locations of points are given in Fig 10
Deck and bottom transverses (for oil tankers)	Refer to the definition given in Ch 4, Sec 3, Tab 3	Extent of areas is shown as (2) and (5) in Ch 4, Sec 3, Fig 1 Locations of points are given in Fig 10

B) CLOSE-UP SURVEYS AND RELATED MEASUREMENTS (for oil tankers, chemical tankers, gas carriers and combination carriers)		
ITEM	INTERPRETATION	FIGURE
Transverse bulkhead	“Complete” means the whole bulkhead including stringers and stiffeners and adjacent structural members as defined above	Extent of areas is shown as (3) in Ch 4, Sec 3, Fig 1 Locations of points are given in Fig 11
	“Lower part” means lower part of bulkhead up to 1/4 of ship’s depth or 2 metres above the lower stringer, whichever is the greater (stringers, stiffeners and adjacent structural members included)	Extent of areas is shown as (4) in Ch 4, Sec 3, Fig 1 Locations of points are given in Fig 11
All plating and internal structures (for chemical tankers)	Refer to the definitions given in Ch 4, Sec 5, Tab 3	No figure

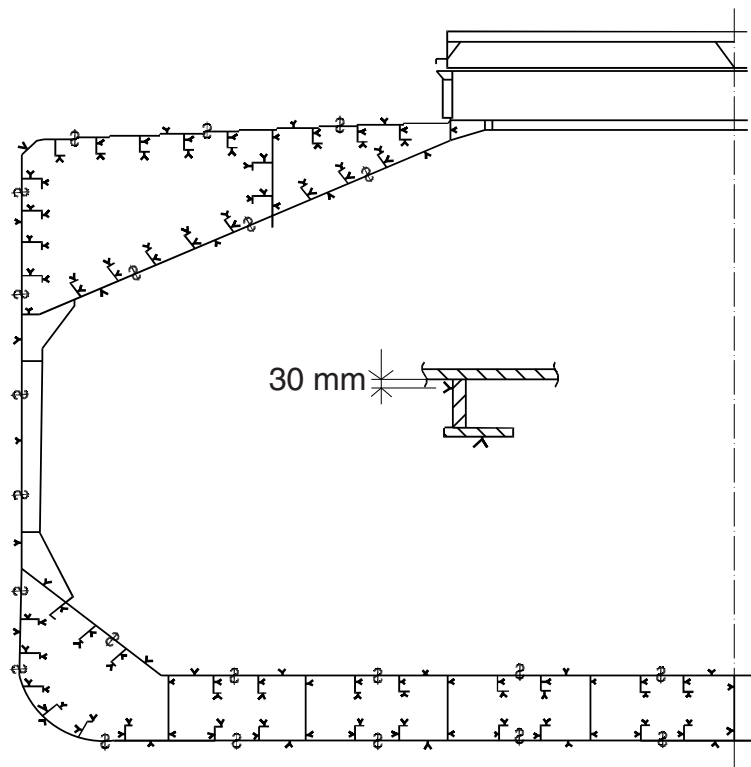
C) CLOSE-UP SURVEYS AND RELATED MEASUREMENTS (for bulk and ore carriers)		
ITEM	INTERPRETATION	FIGURE
Frames in cargo holds	25% of frames: one out of four frames should preferably be chosen throughout the cargo hold length on each side “Selected frames” means at least 3 frames on each side of cargo holds	Extent of areas is shown as (1) in Ch 4, Sec 2, Fig 1 Locations of points are given in Fig 7
Transverse bulkheads in cargo holds	Refer to the definition given in Ch 4, Sec 2, Tab 5 Two selected bulkheads: one is to be the bulkhead between the two foremost cargo holds and the second may be chosen in other positions	Areas of measurements are shown in Ch 4, Sec 2, Fig 2 Locations of points are given in Fig 8
One transverse bulkhead in each cargo hold	This means that the close-up survey and related thickness measurements are to be performed on one side of the bulkhead; the side is to be chosen based on the outcome of the overall survey of both sides. In the event of doubt, the Surveyor may also require (possibly partial) close-up survey on the other side	Areas of measurements are shown in Ch 4, Sec 2, Fig 2 Locations of points are given in Fig 8
Transverse bulkheads in one topside/side ballast tank	The ballast tank is to be chosen based on the history of ballasting among those prone to have the most severe conditions	Locations of points are given in Fig 9
Transverse webs in ballast tanks	Either of the representative tanks of each type (i.e. topside or hopper or side tank) is to be chosen in the forward part “Associated plating and longitudinals” means adjacent plating and longitudinals of deck, bottom, side shell, slope, hopper and longitudinal bulkhead, as applicable	Extent of areas is shown as (2) in Ch 4, Sec 2, Fig 1 Locations of points are given in Fig 7
Areas of deck plating inside line of hatch openings	“Selected” means at least a single point on one out of three plates, to be chosen on representative areas of average corrosion All deck plating means at least two points on each plate to be taken either at each 1/4 extremity of plate or at representative areas of average corrosion	Extent of areas is shown as (5) in Ch 4, Sec 2, Fig 1

Figure 1 : Transverse section of a general cargo ship



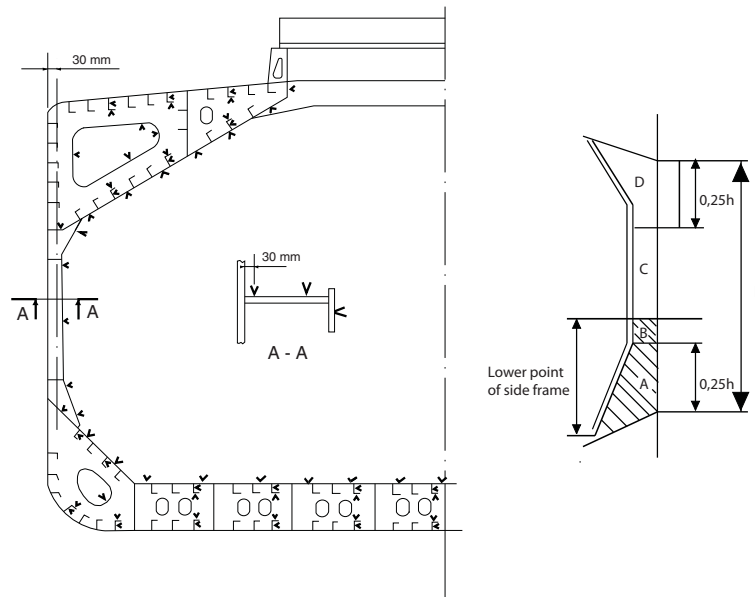
Measurements are to be taken on both port and starboard sides of the selected transverse section

Figure 2 : Transverse section of a bulk carrier



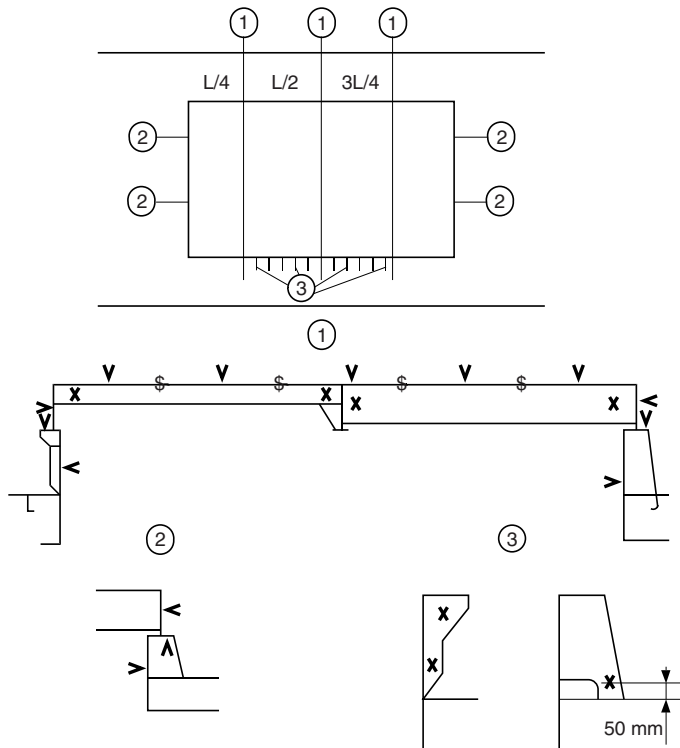
Measurements are to be taken on both port and starboard sides of the selected transverse section

Figure 3 : Transverse section of an oil tanker



Measurements are to be taken on both port and starboard sides of the selected transverse section

Figure 4 : Locations of measurements on hatch covers and coamings (valid for all ships fitted with hatch covers and coamings)



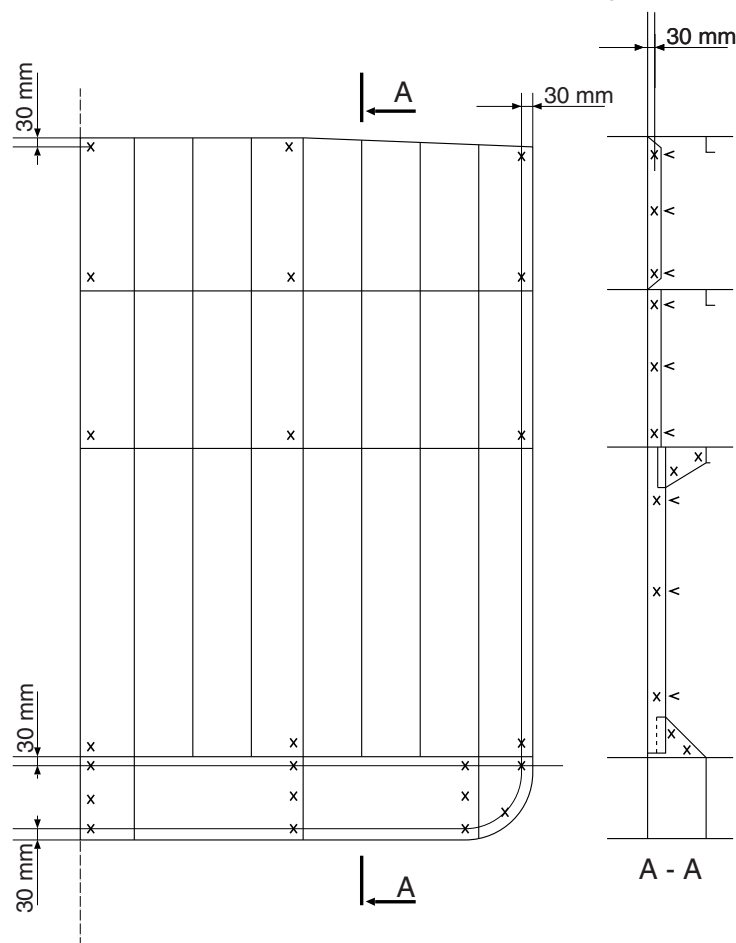
(1) Three sections at $L/4$, $L/2$, $3L/4$ of hatch cover length, including:

- one measurement of each hatch cover plate and skirt plate
- measurements of adjacent beams and stiffeners
- one measurement of coaming plates and coaming flange, each side

(2) Measurements of both ends of hatch cover skirt plate, coaming plate and coaming flange

(3) One measurement of one out of three hatch coaming brackets and bars, on both sides and both ends

Figure 5 : Locations of measurements on bulkheads of general cargo ships



Cargo hold bulkhead/watertight floor plating to be measured as per main view
 One stiffener out of three to be measured as per view A - A

Figure 6 : Locations of measurements on selected internal structural elements of general cargo ships

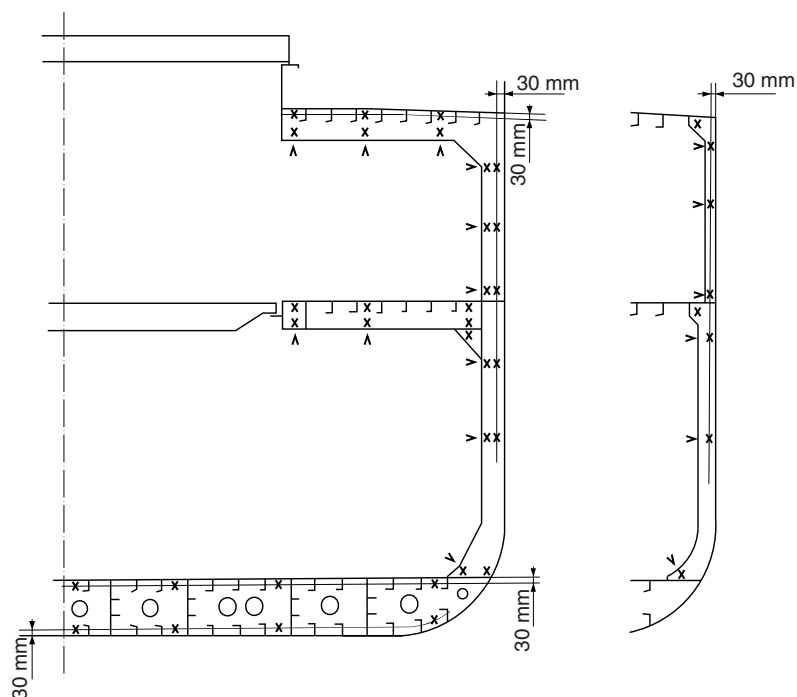


Figure 7 : Locations of measurements on structural members in cargo holds and ballast tanks of bulk carriers

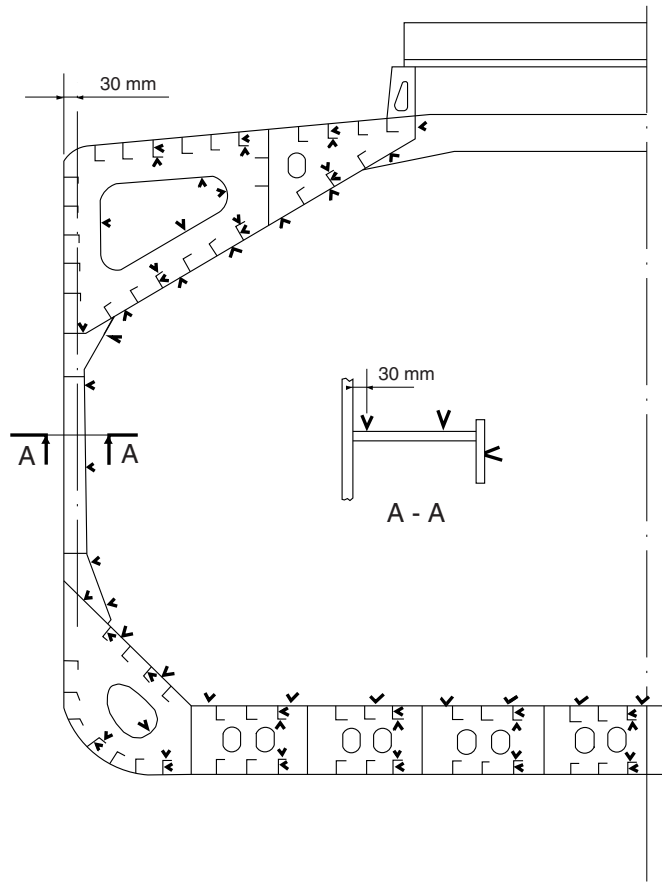
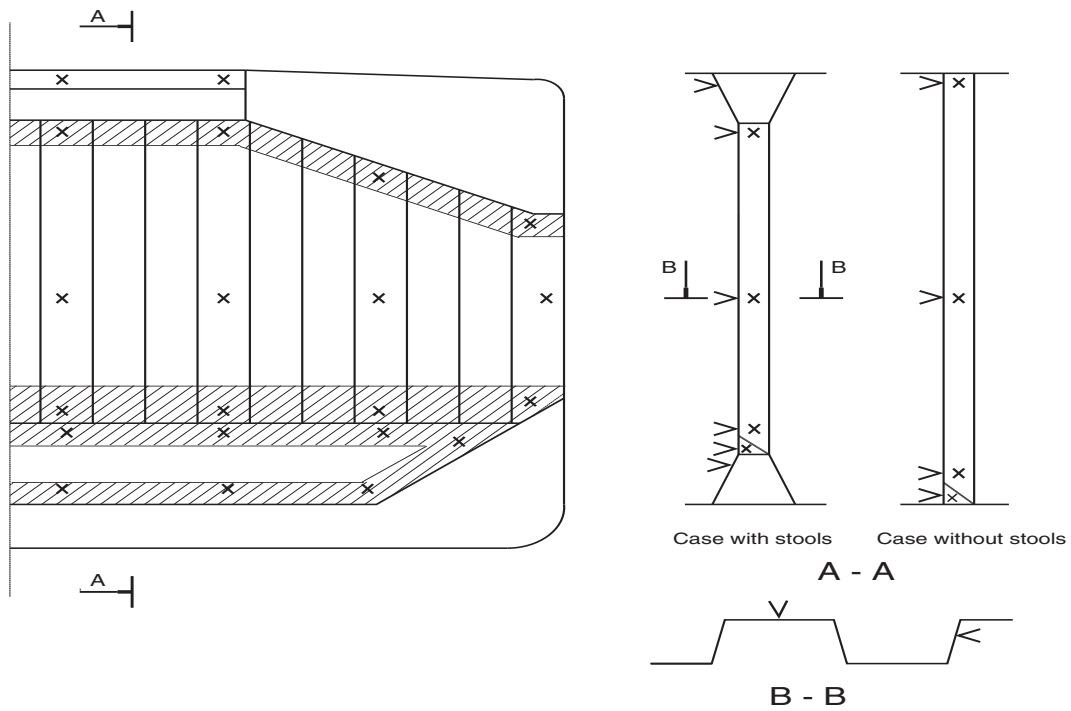
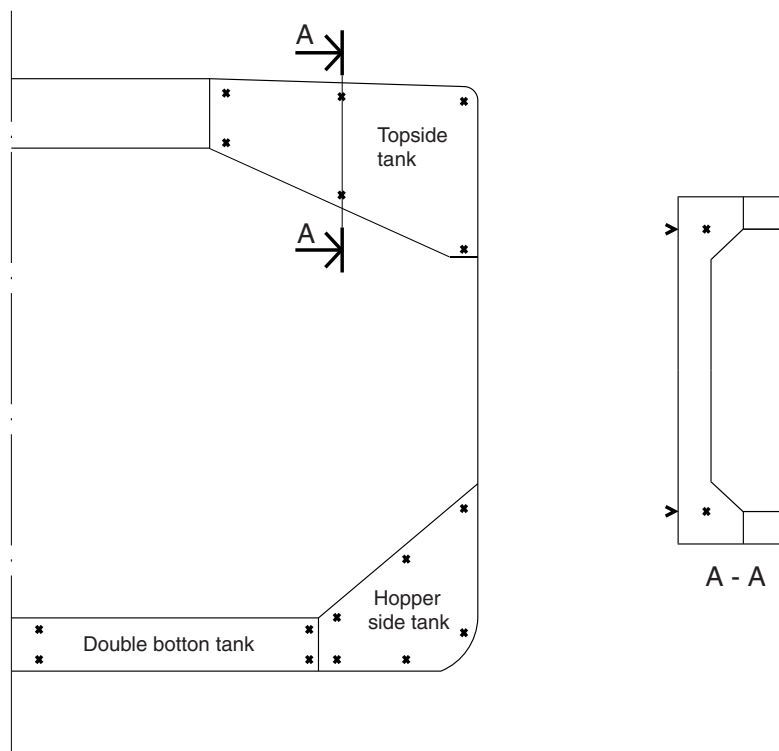


Figure 8 : Locations of measurements on cargo hold transverse bulkheads of bulk carriers



Measurements to be taken in each shaded area as per views A - A and B - B

Figure 9 : Locations of measurements on transverse bulkheads of topside, hopper and double bottom tanks of bulk carriers



Measurements to be taken in each vertical section as per view A - A

Figure 10 : Locations of measurements on web frame rings and longitudinal elements of oil tankers

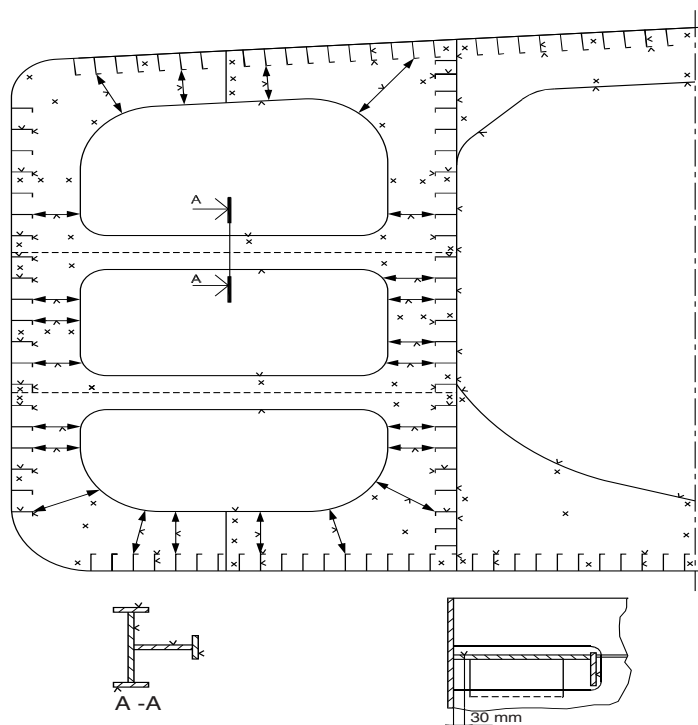
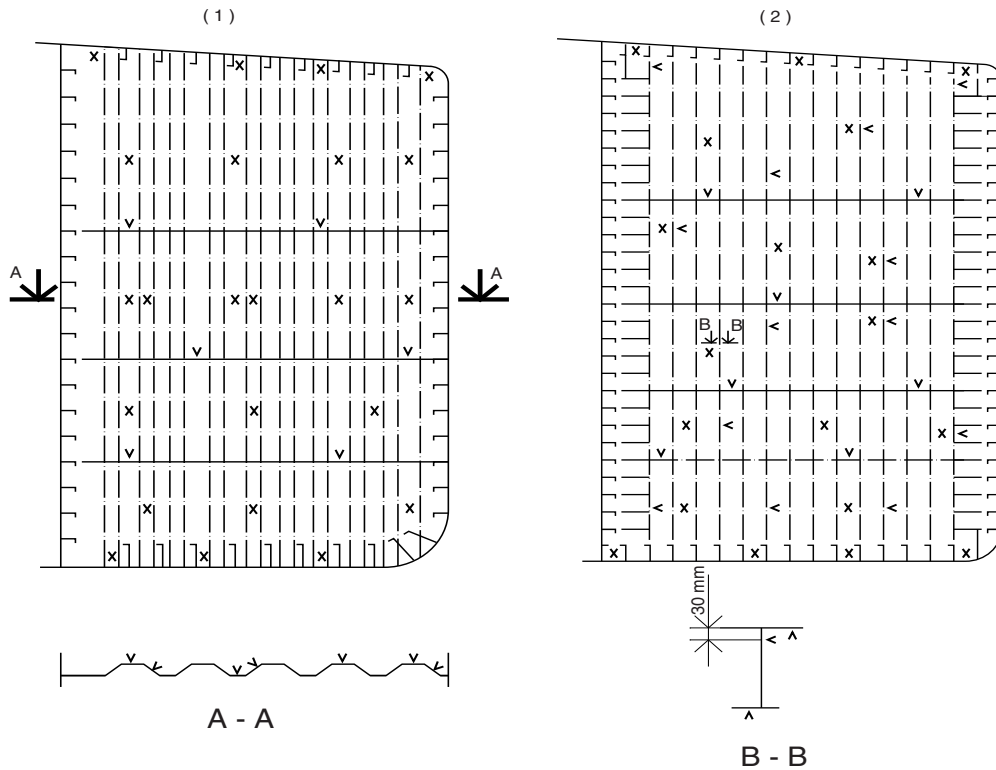


Figure 11 : Locations of measurements on transverse bulkheads of oil tankers



(1) : Corrugated bulkhead

(2) : Plane bulkhead

Measurements are to be taken in a similar way on the centre tank bulkheads

Measurements are to cover the different thicknesses of strakes over the height of the bulkhead

Measurements are to be taken of the adjacent structural members

4.1.2 In cases where the ship has some structural elements with reduced wear margins (e.g. due to ship conversion, increase of draught), the renewal thickness t_{ren} (minimum acceptable thickness) for these elements is to be calculated with reference to the rule scantlings without taking account of any reduction originally agreed.

4.1.3 Decisions on steel renewals are taken by the attending Surveyor applying the criteria given in this Article and based on his judgment and the actual condition of the ship. Should advice be needed to support his decision, the Surveyor may refer to the relevant technical office of the Society.

4.2 Criteria

4.2.1 The acceptance criteria for the minimum thicknesses are divided into:

- criteria on local and global strength, given in [4.3]
- criteria on buckling strength, given in [4.4]
- criteria on pitting, given in [4.5].

4.2.2 (1/7/2001)

Each measured structural item is to be checked against the following criteria, as far as applicable. Where any of the criteria are not met, reinforcements, repairs and renewals are to be carried out as appropriate.

4.3 Local and global strength criteria

4.3.1 Local and global strength criteria are given for the following ship types:

- general cargo ships
- bulk carriers
- oil tankers.

These criteria may also be used for other ship types taking into consideration the equivalence or similarity of structural elements and their contribution to local and/or global strength.

4.3.2 For the evaluation of the ship longitudinal strength, it is a prerequisite that fillet welding between longitudinal members and deck, side and bottom plating is maintained effective so as to keep continuity of hull structures.

4.3.3 (1/7/2009)

Each structural item to be assessed is illustrated in a typical transverse section (see Fig 13 for general cargo ships, Fig 14 for bulk carriers, Fig 15 for oil tankers).

These structural items are also listed in appropriate tables grouped according to their position and contribution to the local or global strength of the ship and separately for ships contracted for construction either before or on/after 1 June 2000 (Tab 5 for general cargo ships contracted for construction on/after 1 June 2000, Tab 6 for general cargo ships contracted for construction before 1 June 2000, Tab 7 for bulk

carriers contracted for construction on/after 1 June 2000, Tab 8 for bulk carriers contracted for construction before 1 June 2000, Tab 9 for oil tankers contracted for construction on/after 1 June 2000, Tab 10 for oil tankers contracted for construction before 1 June 2000).

4.3.4 Each structural item is to be assessed according to four different criteria which vary with regard to the domain under which it is considered, namely:

- a) an isolated area, which is meant as a part of a single structural item. This criterion takes into consideration very local aspects such as grooving of a plate or web, or local severe corrosion; however, it is not to be used for pitting for which separate criteria are considered (see [4.5])
- b) an item, which is meant as an individual element such as a plate, a stiffener, a web, etc. This criterion takes into consideration the average condition of the item, which is assessed by determining its average thickness using the various measurements taken on the same item
- c) a group of items, which is meant as a set of elements of the same nature (plates, longitudinals, girders) contributing either to the longitudinal global strength of the ship in a given zone or to the global strength of other primary transverse elements not contributing to the ship longitudinal strength, e. g. bulkheads, hatch covers, web frames
- d) a zone, which is meant as all and only longitudinal elements contributing to the longitudinal strength of the ship; in this regard, the three main zones are defined as deck zone, neutral axis zone and bottom zone. This criterion takes into consideration the average condition of all groups of items belonging to the same zone.

4.3.5 (1/7/2013)

The assessment of the thickness measurements is to be performed using the values given in the tables for each structural element with regard to the criteria defined above, in the following order:

- a) assessment of isolated areas (column 1 in all tables). If the criterion is not met, the wasted part of the item is to be dealt with as necessary.
- b) assessment of items (column 2 in all tables). If the criterion is not met, the item is to be dealt with as necessary in the measured areas as far as the average condition of the item concerned is satisfactory. In cases where some items are renewed, the average thicknesses of these items to be considered in the next step are the new thicknesses.

Example: to report the average value for each aft/forward deck plate, the criteria given in [4.3.5] b) are to be

met. Some isolated areas may be accepted according to the criteria given in [4.3.5] a).

- c) assessment of groups of items (column 3 in Tab 5, Tab 7 and Tab 9). If the criterion is not met, a sufficient number of elements are to be renewed in order to obtain an increased average thickness satisfying the considered criterion of the group (generally the elements to be renewed are those most wasted). As an example, for the assessment of the group "deck plates" all deck plates are measured and an average thickness of each of them is estimated. Then the average of all these values is to satisfy the criteria given for this group.
- d) assessment of zones (column 4 in in Tab 5, Tab 7 and Tab 9). In principle, the criterion of the zone is met when all groups of items belonging to the zone meet their own criteria (see c) above). However, a greater diminution than those given in column 3 may be accepted for one group of items if, considering the other groups of items belonging to the same zone, the overall diminution of the zone does not exceed the criterion given for it in column 4.

Example: The deck zone consists of two groups of items:

- deck plating, which has an average diminution of 12% (criterion 10%)
- deck longitudinals, which has an average diminution of 4% (criterion 10%)

Even though the deck plating group exceeds its acceptance criterion, the average diminution of the zone, which can be very roughly estimated at 8%, is acceptable and thus the deck plating group can be accepted as it is.

- e) assessment of zones (column 3 in Tab 6, Tab 8 and Tab 10, applicable to ships of 65 m in length and upwards). In principle, the criterion of the zone is met when the average diminution of all items belonging to the zone meets the criterion given for it in column 3.

Example: The deck zone consists of two groups of items:

- deck plating, which has an average diminution of 12%
- deck longitudinals, which have an average diminution of 4%.

The average diminution of the zone, which can be very roughly estimated at 8%, is acceptable.

- f) Evaluation of longitudinal strength

The hull girder strength assessment is to be performed in accordance with the criteria specified in App 4.

Table 3 : Buckling strength criterion (1/7/2009)

L > 120 m

ITEMS		RATIO	MATERIAL (R_{eH})					
			235		315		355 and 390	
			(1)	(2)	(1)	(2)	(1)	(2)
Bottom and deck plates		s / t	56,0	65,0	51,0	60,0	49,0	55,0
Longitudinal ordinary stiffeners	flat bar web	h_w / t_w	20,0	20,0	18,0	19,0	17,5	18,0
Flanged longitudinal / girders	web	h_w / t_w	56,0	65,0	51,0	60,0	49,0	55,0
Flanged longitudinal / girders	symmetrical flange	b_f / t_f	34,0	40,0	30,0	38,0	29,0	36,0
Flanged longitudinal / girders	asymmetrical flange	b_f / t_f	17,0	20,0	15,0	19,0	14,5	18,0
Symbols: R_{eH} : minimum yield stress of the material, in N/mm ² ; h_w : web height, in mm; t_w : web thickness, in mm; s : spacing, in mm, of ordinary stiffeners; b_f : flange breadth, in mm; t_f : flange thickness, in mm; t : actual plate thickness, in mm;								
(1) Applicable to ships contracted for construction on or after 1 June 2000 (2) Applicable to ships contracted for construction before 1 June 2000								

4.3.6 These criteria take into consideration two main aspects:

- the overall strength of the hull girder
- the local strength and integrity of the hull structure, such as hatch covers, bulkheads, etc.

As a rule, they are applicable to the structure within the cargo area of ships having a length greater than 90 metres. However, they may also be used for smaller ships and for structure outside the cargo area according to the following principles:

- for ships having a length less than 90 metres, the percentages of acceptable wastage given in the tables can be increased by 5 (%) (e.g. 15% instead of 10%, etc.), except for those of deck and bottom zones
- for structure outside the cargo area, the same 5 (%) increase can be applied

on the understanding, however, that both conditions cannot be applied at the same time.

4.4 Buckling strength criterion

4.4.1 This criterion is applicable to ships having a length greater than 120 metres.

In addition to the evaluation of structural elements according to [4.3] above, the structural items contributing to the longitudinal strength of the ship, such as deck and bottom plating, deck and bottom girders, etc., are also to be assessed with regard to their buckling strength. The values shown in Tab 3 are not to be exceeded.

Note 1: The minimum thickness will be specially considered for ships built with excess hull girder section modulus.

4.5 Pitting

4.5.1 The maximum acceptable depth for isolated pits is 35% of the as-built thickness.

4.5.2 (1/7/2001)

For areas with different pitting intensity, the intensity diagrams shown in Fig 12 are to be used to identify the percentage of affected areas.

For areas having a pitting intensity of 50% or more, the maximum acceptable average depth of pits is 20% of the as-built thickness. For intermediate values between isolated pits and 50% of affected area, the interpolation between 35% and 20% is made according to Tab 4.

Table 4 : Pitting intensity and corresponding maximum acceptable average depth of pitting (1/7/2001)

PITTING INTENSITY (%)	MAXIMUM ACCEPTABLE AVERAGE PITTING DEPTH (% of the as-built thickness)
Isolated	35,0
5	33,5
10	32,0
15	30,5
20	29,0
25	27,5
30	26,0
40	23,0
50	20,0

4.5.3 In addition, the thickness outside the pits in the area considered is to be assessed according to [4.3] and [4.4] above.

Note 1: Application of filler material (plastic or epoxy compounds) is recommended as a means to stop or reduce the corrosion pro-

cess, but it is not considered an acceptable repair for pitting exceeding the maximum allowable wastage limits. Welding repairs may be accepted when performed in accordance with procedures agreed with the Society.

Figure 12 : Pitting intensity diagrams (from 1% to 50% intensity)

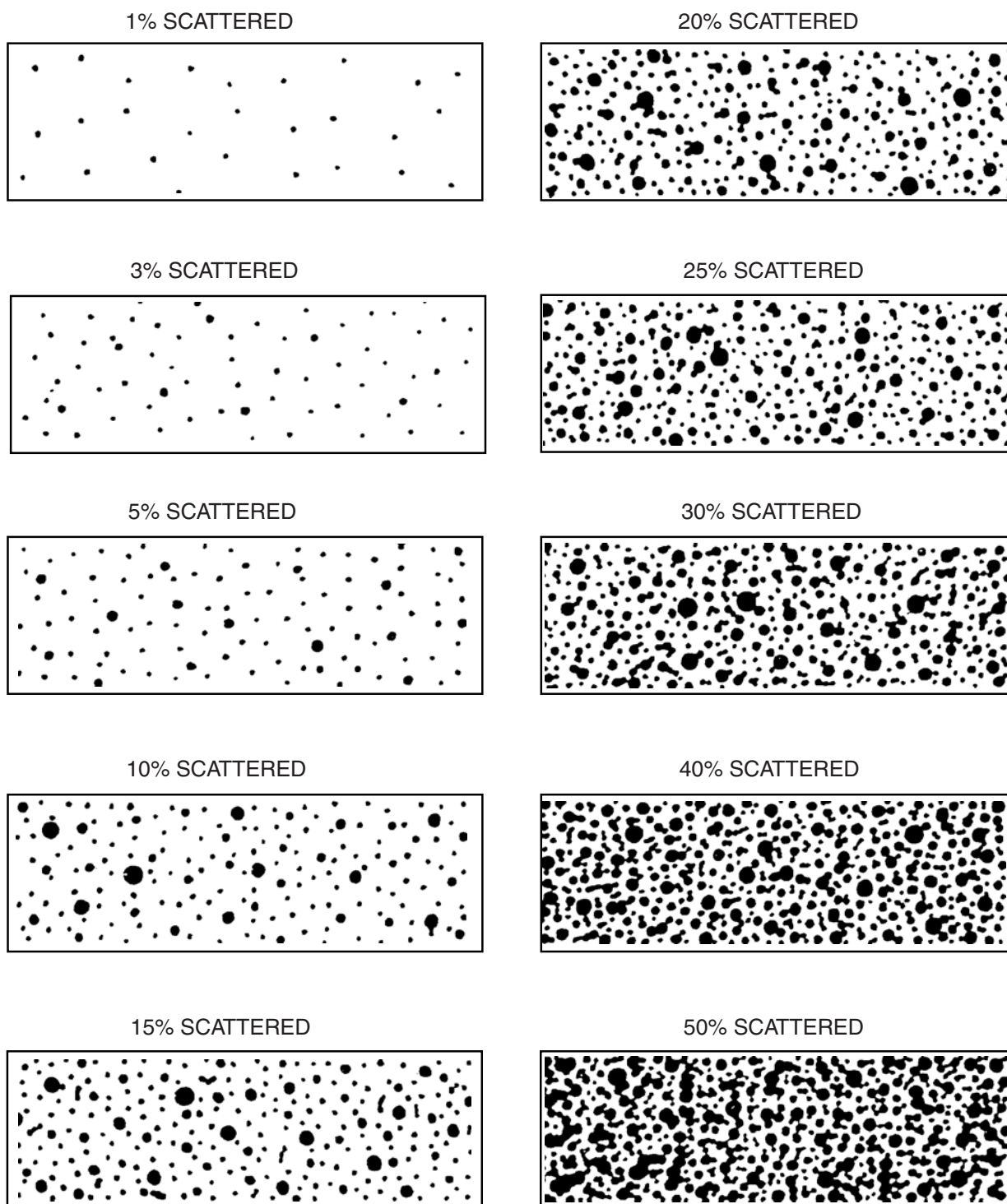


Figure 13 : General cargo ship: layout of items to be assessed

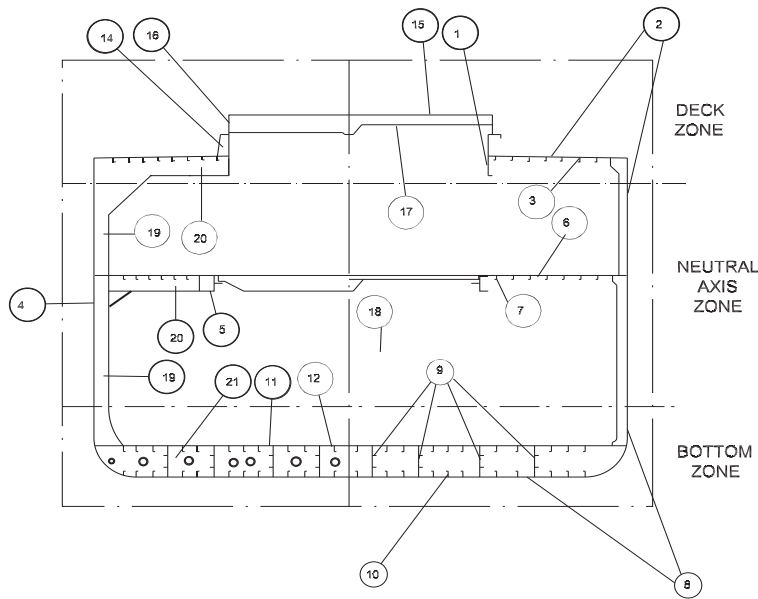


Table 5 : Local and global acceptance criteria for general cargo ships (given in % of wastage) (for ships contracted for construction on/after 1 June 2000) (1/7/2012)

Group of items	Description of items	1 Isolated area	2 Item	3 Group	4 Zone	
ITEMS CONTRIBUTING TO THE LONGITUDINAL STRENGTH (TRANSVERSE SECTION)						
DECK ZONE (1)		-	-	-	10	
1	Hatch coaming	-	-	10	-	
	underdeck girder web	25	20	-	-	
	underdeck girder flange	20	15	-	-	
2	Upperdeck plating, deck stringer plates and sheer strakes	30	20	10	-	
		-	-	-	-	
3	Deck longitudinals	30	20	10	-	
		web	30	20	-	-
	flange	25	15	-	-	
		-	-	-	-	
NEUTRAL AXIS ZONE (1)		-	-	-	15	
4	Side shell plating	25	20	15	-	
5	'Tweendeck hatch girder	-	-	15	-	
		web	25	20	-	-
		flange	20	15	-	-
6	'Tweendeck plating	30	20	15	-	
7	'Tweendeck longitudinals	-	-	15	-	
		web	30	20	-	-
		flange	25	15	-	-

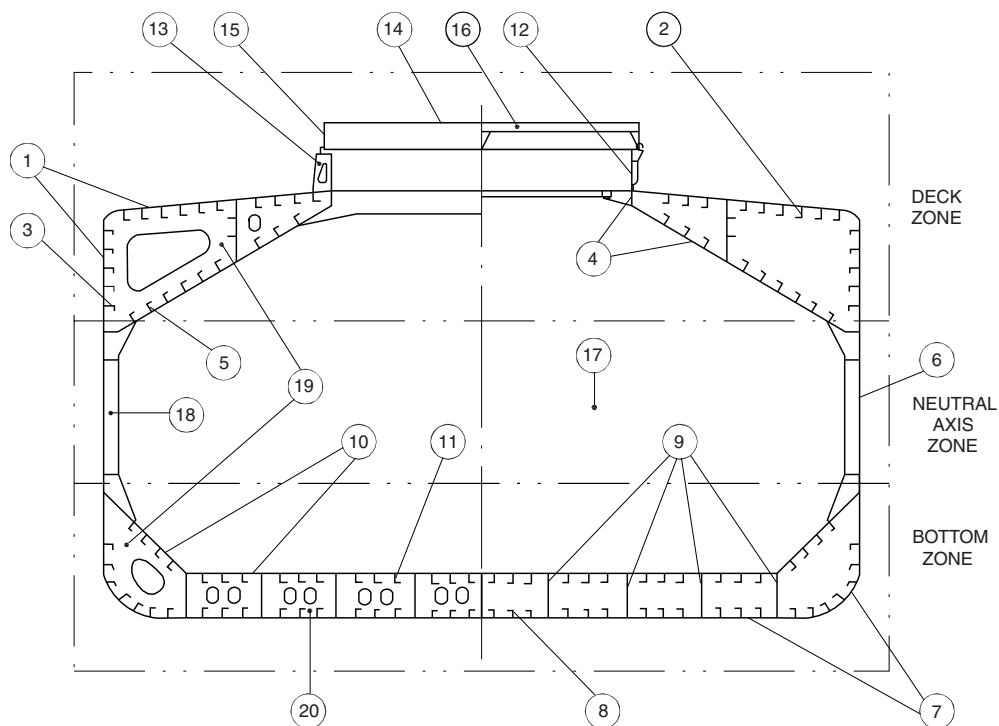
- (1) Each zone is to be evaluated separately.
- (2) If continuous, to be included in item 1.
- (3) For ships, contracted for construction on or after 1 July 2012, the renewal criteria of all cargo hatch covers are as follows:
- for single skin hatch covers and for the plating of double skin hatch covers, steel renewal is required where the gauged thickness is less than $t_{net} + 0,5$ mm. Where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal. Coating is to be maintained in good condition, as defined in Sec 2, [2.2.13].
 - For the internal structure of double skin hatch covers, thickness gauging is required when plating renewal is to be carried out or when this is deemed necessary, at the discretion of the Surveyor, on the basis of the plating corrosion or deformation condition. In these cases, steel renewal for the internal structures is required where the gauged thickness is less than t_{net} .
 - For weather deck hatches of container ships and passenger ships, the thickness for steel renewal is t_{net} and the thickness for coating or annual gauging is when gauged thickness is between t_{net} and $t_{net} + 0,5$ mm.
- (4) For deep tank bulkheads, the values "average of item" and "average of group" are to be increased by 5 (%).

Group of items	Description of items	1 Isolated area	2 Item	3 Group	4 Zone
BOTTOM ZONE (1)		-	-	-	10
8	Bilge and bottom strakes and keel plate	25	20	10	-
9	Bottom girders	25	20	10	-
10	Bilge and bottom longitudinals	-	-	10	-
	web	30	20	-	-
	flange	25	15	-	-
11	Inner bottom plating	30	20	10	-
12	Inner bottom longitudinals	-	-	10	-
	web	30	20	-	-
	flange	25	15	-	-
OTHER ITEMS					
13	Hatch coaming plating (2)	25	20	-	-
14	Hatch coaming brackets	30	25	-	-
15	Hatch cover top plating (3)	25	20	15	-
16	Hatch cover skirt plating (3)	30	20	-	-
17	Hatch cover stiffeners	30	20	-	-
18	Transverse bulkheads (4)				
	plating	30	20	15	-
	stringer web	30	20	-	-
	stringer flange	25	15	-	-
	stiffener web	30	20	-	-
	stiffener flange	25	15	-	-
19	brackets	30	20	-	-
	Side frames				
	web	30	20	-	-
20	flange	25	15	-	-
	brackets	30	20	-	-
	Deck/tweendeck frames				
21	web	30	20	-	-
	flange	25	15	-	-
22	Floors				
	plating	30	20	-	-
22	Forward and aft peak bulkheads				
	plating	30	20	15	-
	stiffener web	30	20	-	-
	stiffener flange	25	15	-	-
<p>(1) Each zone is to be evaluated separately.</p> <p>(2) If continuous, to be included in item 1.</p> <p>(3) For ships, contracted for construction on or after 1 July 2012, the renewal criteria of all cargo hatch covers are as follows:</p> <ul style="list-style-type: none"> for single skin hatch covers and for the plating of double skin hatch covers, steel renewal is required where the gauged thickness is less than $t_{net} + 0,5$ mm. Where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal. Coating is to be maintained in good condition, as defined in Sec 2, [2.2.13]. <p>For the internal structure of double skin hatch covers, thickness gauging is required when plating renewal is to be carried out or when this is deemed necessary, at the discretion of the Surveyor, on the basis of the plating corrosion or deformation condition. In these cases, steel renewal for the internal structures is required where the gauged thickness is less than t_{net}.</p> <p>For weather deck hatches of container ships and passenger ships, the thickness for steel renewal is t_{net} and the thickness for coating or annual gauging is when gauged thickness is between t_{net} and $t_{net} + 0,5$ mm.</p> <p>(4) For deep tank bulkheads, the values "average of item" and "average of group" are to be increased by 5 (%).</p>					

Table 6 : Local and global acceptance criteria for general cargo ships (given in % of wastage) (for ships contracted for construction before 1 June 2000)

Group of items	Description of items	1 Isolated area	2 Item	3 Zone
ITEMS CONTRIBUTING TO THE LONGITUDINAL STRENGTH (TRANSVERSE SECTION)				
DECK ZONE (1)		-	-	10
1	Hatch coaming underdeck girder web and flange	- 25	- 20	- -
2	Upperdeck plating, deck stringer plates and sheer strakes	25	20	-
3	Deck longitudinals web and flange	25	20	-
NEUTRAL AXIS ZONE (1)		-	-	-
4	Side shell plating	25	20	-
5	'Tweendeck hatch girder web and flange	-	-	-
6	'Tweendeck plating	25	20	-
7	'Tweendeck longitudinals web and flange	25	20	-
BOTTOM ZONE (1)		-	-	10
8	Bilge and bottom strakes and keel plate	25	20	-
9	Bottom girders	25	20	-
10	Bilge and bottom longitudinals web and flange	25	20	-
11	Inner bottom plating	25	20	-
12	Inner bottom longitudinals web and flange	25	20	-
OTHER ITEMS				
13	Hatch coaming plating (2)	30	25	-
14	Hatch coaming brackets	30	25	-
15	Hatch cover top plating	30	25	-
16	Hatch cover skirt plating	30	25	-
17	Hatch cover stiffeners	30	25	-
18	Transverse bulkheads (3) plating stringer web and flange stiffener web and flange brackets	30 30 30 30	25 25 25 25	- - - -
19	Side frames web and flange brackets	30 30	25 25	- -
20	Deck/tweendeck frames web and flange	30	25	-
21	Floors plating	30	25	-
22	Forward and aft peak bulkheads plating stiffener web and flange	30 30	25 25	- -
<p>(1) Each zone is to be evaluated separately.</p> <p>(2) If continuous, to be included in item 1.</p> <p>(3) For deep tank bulkheads, the values "average of item" are to be increased by 5 (%).</p>				

Figure 14 : Bulk carrier: layout of items to be assessed



**Table 7 : Local and global acceptance criteria for bulk carriers (given in % of wastage)
(for ships contracted for construction on/after 1 June 2000) (1/7/2009)**

Group of items	Description of items	1 Isolated area	2 Item	3 Group	4 Zone
ITEMS CONTRIBUTING TO THE LONGITUDINAL STRENGTH (TRANSVERSE SECTION)					
DECK ZONE (1)					
		-	-	-	10
1	Strength deck plating, deck stringer, sheer strake and part of side shell plating in way of top side tanks	25	20	10	-
2	Deck longitudinals	-	-	10	-
	web	25	20	-	-
	flange	20	15	-	-
3	Side shell longitudinals in way of top side tanks	-	-	10	-
	web	25	20	-	-
	flange	20	15	-	-
4	Top side tank sloped plating, including horizontal and vertical strakes	25	20	10	-
5	Longitudinals connected to top side tank sloped plating	-	-	10	-
	web	25	20	-	-
	flange	20	15	-	-
NEUTRAL AXIS ZONE (1)					
		-	-	-	15
6	Side shell plating	25	20	15	-
BOTTOM ZONE (1)					
		-	-	-	10
7	Bilge and bottom plating and keel plate	25	20	10	-
8	Bilge and bottom longitudinals	-	-	10	-
	web	25	20	-	-
	flange	20	15	-	-
9	Bottom girders	25	15	10	-

- (1) Each zone is to be evaluated separately.
- (2) If continuous, to be included in item 1.
- (3) For vertically corrugated transverse bulkheads in cargo holds:
- For ships indicated in Ch 6, Sec 2, [1.1] which are to comply with the retroactive requirements according to the schedule given in Ch 6, Sec 2, [1.2], the bulkhead between the two foremost cargo holds is to be assessed based on the criteria given in Ch 6, Sec 2, [1.3].
 - For ships indicated in Pt E, Ch 4, Sec 3, [7.1.1], contracted for construction on or after 1 July 1998, all bulkheads are to be repaired by steel renewal where the gauged thickness is less than $t_{net} + 0,5$ mm, where t_{net} is the thickness obtained by applying the strength criteria given in Pt E, Ch 4, Sec 3, [7.1]. However, where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal.
- (4) For ships indicated in Ch 1, Sec 2, [4.3.2], contracted for construction before 1 January 2004, the renewal criteria of all cargo hatch covers are as follows:
- for single skin hatch covers and for the plating of pontoon covers, steel renewal is required where the gauged thickness is less than $t_{net} + 0,5$ mm. Where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal. For the internal structure of pontoon hatch covers, thickness gauging is required when plating renewal is to be carried out or when this is deemed necessary, at the discretion of the Surveyor, on the basis of the plating corrosion or deformation condition. In these cases, steel renewal for the internal structures is required where the gauged thickness is less than t_{net} .
- (5) For ships indicated in Ch 1, Sec 2, [4.3.2] to Ch 1, Sec 2, [4.3.7], contracted for construction on or after 1 January 2004, the renewal criteria of forward and side hatch coamings on exposed decks in position 1, as defined in ILCC, are as follows:
- steel renewal is required where the gauged thickness is less than $t_{net} + 0,5$ mm. Where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal. Coating is to be maintained in good condition, as defined in Sec 2, [2.2.13].
- (6) For ships indicated in Ch 1, Sec 2, [4.3.2] to Ch 1, Sec 2, [4.3.7], contracted for construction on or after 1 January 2004, the renewal criteria of all cargo hatch covers are as follows:
- for single skin hatch covers and for the plating of double skin hatch covers, steel renewal is required where the gauged thickness is less than $t_{net} + 0,5$ mm. Where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal. Coating is to be maintained in good condition, as defined in Sec 2, [2.2.13]. For the internal structure of double skin hatch covers, thickness gauging is required when plating renewal is to be carried out or when this is deemed necessary, at the discretion of the Surveyor, on the basis of the plating corrosion or deformation condition. In these cases, steel renewal for the internal structures is required where the gauged thickness is less than t_{net} .

Group of items	Description of items	1 Isolated area	2 Item	3 Group	4 Zone
10	Inner bottom plating and hopper tank sloped plating	25	20	10	-
11	Longitudinals connected to inner bottom and hopper tank sloped plating	-	-	10	-
	web	25	20	-	-
	flange	20	15	-	-
OTHER ITEMS					
12	Hatch coaming plating (2) (5)	25	20	-	-
13	Hatch coaming brackets (5)	30	25	-	-
14	Hatch cover top plating (4) (6)	25	20	15	-
15	Hatch cover skirt plating (4) (6)	25	20	-	-
16	Hatch cover stiffeners (4) (6)	25	20	-	-
17	Transverse bulkheads (3)				
	plating	25	20	15	-
	stiffener web	25	20	-	-
	stiffener flange	20	15	-	-
18	Side shell frames				
	web	25	20	-	-
	flange	20	15	-	-
	brackets	20	15	-	-
19	Topside and hopper tank web frames				
	web	25	20	-	-
	flange	20	15	-	-

- (1) Each zone is to be evaluated separately.
- (2) If continuous, to be included in item 1.
- (3) For vertically corrugated transverse bulkheads in cargo holds:
- For ships indicated in Ch 6, Sec 2, [1.1] which are to comply with the retroactive requirements according to the schedule given in Ch 6, Sec 2, [1.2], the bulkhead between the two foremost cargo holds is to be assessed based on the criteria given in Ch 6, Sec 2, [1.3].
 - For ships indicated in Pt E, Ch 4, Sec 3, [7.1.1], contracted for construction on or after 1 July 1998, all bulkheads are to be repaired by steel renewal where the gauged thickness is less than $t_{net} + 0,5$ mm, where t_{net} is the thickness obtained by applying the strength criteria given in Pt E, Ch 4, Sec 3, [7.1]. However, where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal.
- (4) For ships indicated in Ch 1, Sec 2, [4.3.2], contracted for construction before 1 January 2004, the renewal criteria of all cargo hatch covers are as follows:
- for single skin hatch covers and for the plating of pontoon covers, steel renewal is required where the gauged thickness is less than $t_{net} + 0,5$ mm. Where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal. For the internal structure of pontoon hatch covers, thickness gauging is required when plating renewal is to be carried out or when this is deemed necessary, at the discretion of the Surveyor, on the basis of the plating corrosion or deformation condition. In these cases, steel renewal for the internal structures is required where the gauged thickness is less than t_{net} .
- (5) For ships indicated in Ch 1, Sec 2, [4.3.2] to Ch 1, Sec 2, [4.3.7], contracted for construction on or after 1 January 2004, the renewal criteria of forward and side hatch coamings on exposed decks in position 1, as defined in ILCC, are as follows:
- steel renewal is required where the gauged thickness is less than $t_{net} + 0,5$ mm. Where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal. Coating is to be maintained in good condition, as defined in Sec 2, [2.2.13].
- (6) For ships indicated in Ch 1, Sec 2, [4.3.2] to Ch 1, Sec 2, [4.3.7], contracted for construction on or after 1 January 2004, the renewal criteria of all cargo hatch covers are as follows:
- for single skin hatch covers and for the plating of double skin hatch covers, steel renewal is required where the gauged thickness is less than $t_{net} + 0,5$ mm. Where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal. Coating is to be maintained in good condition, as defined in Sec 2, [2.2.13]. For the internal structure of double skin hatch covers, thickness gauging is required when plating renewal is to be carried out or when this is deemed necessary, at the discretion of the Surveyor, on the basis of the plating corrosion or deformation condition. In these cases, steel renewal for the internal structures is required where the gauged thickness is less than t_{net} .

Group of items	Description of items	1 Isolated area	2 Item	3 Group	4 Zone
20	Floors plating	25	15	-	-
21	Forward and aft peak bulkheads plating	25	20	15	-
	stiffener web	25	20	-	-
	stiffener flange	20	15	-	-
<p>(1) Each zone is to be evaluated separately.</p> <p>(2) If continuous, to be included in item 1.</p> <p>(3) For vertically corrugated transverse bulkheads in cargo holds:</p> <ul style="list-style-type: none"> For ships indicated in Ch 6, Sec 2, [1.1] which are to comply with the retroactive requirements according to the schedule given in Ch 6, Sec 2, [1.2], the bulkhead between the two foremost cargo holds is to be assessed based on the criteria given in Ch 6, Sec 2, [1.3]. For ships indicated in Pt E, Ch 4, Sec 3, [7.1.1], contracted for construction on or after 1 July 1998, all bulkheads are to be repaired by steel renewal where the gauged thickness is less than $t + 0,5$ mm, where t_{net} is the thickness obtained by applying the strength criteria given in Pt E, Ch 4, Sec 3, [7.1]. However, where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal. <p>(4) For ships indicated in Ch 1, Sec 2, [4.3.2], contracted for construction before 1 January 2004, the renewal criteria of all cargo hatch covers are as follows:</p> <ul style="list-style-type: none"> for single skin hatch covers and for the plating of pontoon covers, steel renewal is required where the gauged thickness is less than $t_{net} + 0,5$ mm. Where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal. For the internal structure of pontoon hatch covers, thickness gauging is required when plating renewal is to be carried out or when this is deemed necessary, at the discretion of the Surveyor, on the basis of the plating corrosion or deformation condition. In these cases, steel renewal for the internal structures is required where the gauged thickness is less than t_{net}. <p>(5) For ships indicated in Ch 1, Sec 2, [4.3.2] to Ch 1, Sec 2, [4.3.7], contracted for construction on or after 1 January 2004, the renewal criteria of forward and side hatch coamings on exposed decks in position 1, as defined in ILCC, are as follows:</p> <ul style="list-style-type: none"> steel renewal is required where the gauged thickness is less than $t_{net} + 0,5$ mm. Where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal. Coating is to be maintained in good condition, as defined in Sec 2, [2.2.13]. <p>(6) For ships indicated in Ch 1, Sec 2, [4.3.2] to Ch 1, Sec 2, [4.3.7], contracted for construction on or after 1 January 2004, the renewal criteria of all cargo hatch covers are as follows:</p> <ul style="list-style-type: none"> for single skin hatch covers and for the plating of double skin hatch covers, steel renewal is required where the gauged thickness is less than $t_{net} + 0,5$ mm. Where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal. Coating is to be maintained in good condition, as defined in Sec 2, [2.2.13]. For the internal structure of double skin hatch covers, thickness gauging is required when plating renewal is to be carried out or when this is deemed necessary, at the discretion of the Surveyor, on the basis of the plating corrosion or deformation condition. In these cases, steel renewal for the internal structures is required where the gauged thickness is less than t_{net}. 					

Table 8 : Local and global acceptance criteria for bulk carriers (given in % of wastage)(for ships contracted for construction before 1 June 2000)

Group of items	Description of items	1 Isolated area	2 Item	3 Zone
ITEMS CONTRIBUTING TO THE LONGITUDINAL STRENGTH (TRANSVERSE SECTION)				
DECK ZONE (1)		-	-	10
1	Strength deck plating, deck stringer, sheer strake and part of side shell plating in way of top side tanks	25	20	-
2	Deck longitudinals, web and flange	25	20	-
3	Side shell longitudinals in way of top side tanks, web and flange	25	20	-
4	Top side tank sloped plating, including horizontal and vertical strakes	25	20	-
5	Longitudinals connected to top side tank sloped plating, web and flange	25	20	-
NEUTRAL AXIS ZONE (1)		-	-	-
6	Side shell plating	25	20	-
BOTTOM ZONE (1)		-	-	10
7	Bilge and bottom plating and keel plate	25	20	-
8	Bilge and bottom longitudinals, web and flange	25	20	-
9	Bottom girders	25	20	-
10	Inner bottom plating and hopper tank sloped plating	25	20	-
11	Longitudinals connected to inner bottom and hopper tank sloped plating, web and flange	25	20	-
OTHER ITEMS				
12	Hatch coaming plating (2)	30	25	-
13	Hatch coaming brackets	30	25	-
14	Hatch cover top plating (5)	30	25	-
15	Hatch cover skirt plating (5)	30	25	-
16	Hatch cover stiffeners (5)	30	25	-
17	Transverse bulkheads (3) plating stiffener web and flange	25 25	20 20	- -
<p>(1) Each zone is to be evaluated separately.</p> <p>(2) If continuous, to be included in item 1.</p> <p>(3) For vertically corrugated transverse bulkheads in cargo holds:</p> <ul style="list-style-type: none"> • For ships indicated in Ch 6, Sec 2, [1.1] which are to comply with the retroactive requirements according to the schedule given in Ch 6, Sec 2, [1.2], the bulkhead between the two foremost cargo holds is to be assessed based on the criteria given in Ch 6, Sec 2, [1.3]. • For ships indicated in Pt E, Ch 4, Sec 3, [7.1.1], contracted for construction on or after 1 July 1998, all bulkheads are to be repaired by steel renewal where the gauged thickness is less than $t_{net} + 0,5$ mm, where t_{net} is the thickness obtained by applying the strength criteria given in Pt E, Ch 4, Sec 3, [7.1]. However, where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal. <p>(4) For ships whose side shell frames are to comply with the retroactive requirements given in Ch 6, Sec 2, [7] the acceptance criteria for the thickness diminution of the webs of frames and brackets are not to be considered the values indicated in the Table (20% of wastage), but rather the specific value obtained by the structural assessment carried out in accordance with the criteria given in Ch 6, Sec 2, [7]. For flanges, the acceptance criteria indicated in the Table (20% of wastage) are to be applied in addition to the criteria given in Ch 6, Sec 2, [7].</p> <p>(5) For ships indicated in Ch 1, Sec 2, [4.3.2], contracted for construction on or after 1 July 1998, the renewal criteria of all cargo hatch covers are as follows:</p> <ul style="list-style-type: none"> • for single skin hatch covers and for the plating of pontoon covers, steel renewal is required where the gauged thickness is less than $t_{net} + 0,5$ mm. Where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal. <p>For the internal structure of pontoon hatch covers, thickness gauging is required when plating renewal is to be carried out or when this is deemed necessary, at the discretion of the Surveyor, on the basis of the plating corrosion or deformation condition. In these cases, steel renewal for the internal structures is required where the gauged thickness is less than t_{net}.</p>				

Group of items	Description of items	1 Isolated area	2 Item	3 Zone
18	Side shell frames (4) web and flange brackets	25 25	20 20	- -
19	Topside and hopper tank web frames, web and flange	25	20	-
20	Floors plating	25	20	-
21	Forward and aft peak bulkheads plating stiffener web and flange	25 25	20 20	- -

- (1) Each zone is to be evaluated separately.
- (2) If continuous, to be included in item 1.
- (3) For vertically corrugated transverse bulkheads in cargo holds:
- For ships indicated in Ch 6, Sec 2, [1.1] which are to comply with the retroactive requirements according to the schedule given in Ch 6, Sec 2, [1.2], the bulkhead between the two foremost cargo holds is to be assessed based on the criteria given in Ch 6, Sec 2, [1.3].
 - For ships indicated in Pt E, Ch 4, Sec 3, [7.1.1], contracted for construction on or after 1 July 1998, all bulkheads are to be repaired by steel renewal where the gauged thickness is less than $t_{net} + 0,5$ mm, where t_{net} is the thickness obtained by applying the strength criteria given in Pt E, Ch 4, Sec 3, [7.1]. However, where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal.
- (4) For ships whose side shell frames are to comply with the retroactive requirements given in Ch 6, Sec 2, [7] the acceptance criteria for the thickness diminution of the webs of frames and brackets are not to be considered the values indicated in the Table (20% of wastage), but rather the specific value obtained by the structural assessment carried out in accordance with the criteria given in Ch 6, Sec 2, [7]. For flanges, the acceptance criteria indicated in the Table (20% of wastage) are to be applied in addition to the criteria given in Ch 6, Sec 2, [7].
- (5) For ships indicated in Ch 1, Sec 2, [4.3.2], contracted for construction on or after 1 July 1998, the renewal criteria of all cargo hatch covers are as follows:
- for single skin hatch covers and for the plating of pontoon covers, steel renewal is required where the gauged thickness is less than $t_{net} + 0,5$ mm. Where the gauged thickness is within the range $t_{net} + 0,5$ mm and $t_{net} + 1,0$ mm, coating (applied in accordance with the coating Manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal.
- For the internal structure of pontoon hatch covers, thickness gauging is required when plating renewal is to be carried out or when this is deemed necessary, at the discretion of the Surveyor, on the basis of the plating corrosion or deformation condition. In these cases, steel renewal for the internal structures is required where the gauged thickness is less than t_{net} .

Figure 15 : Oil tanker: layout of items to be assessed

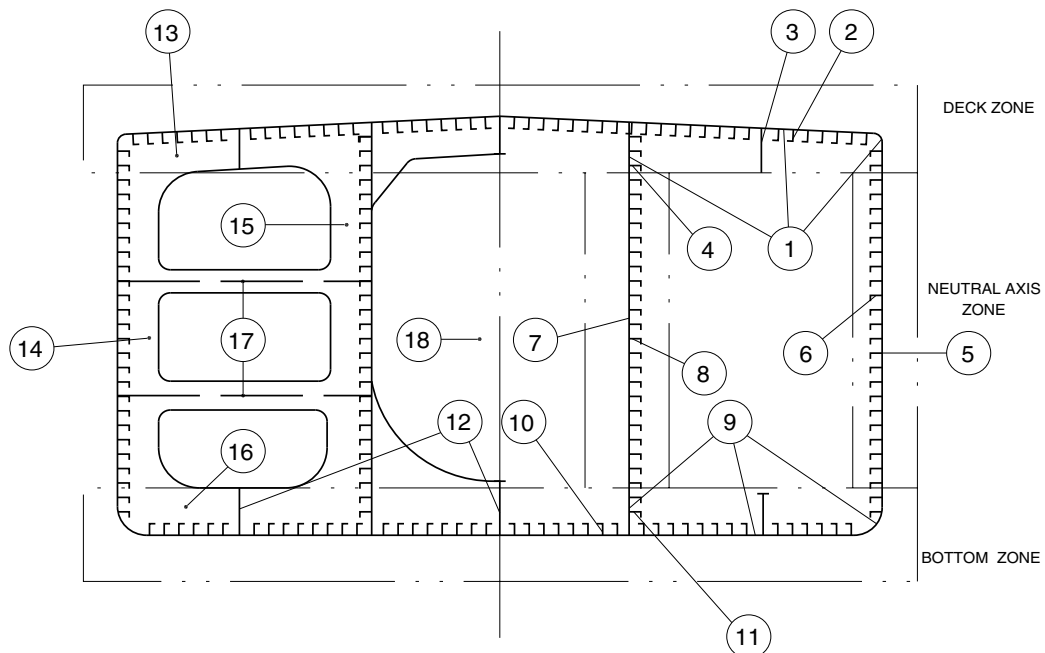


Table 9 : Local and global acceptance criteria for oil tankers (given in % of wastage)(for ships contracted for construction on/after 1 June 2000) (1/7/2009)

Group of items	Description of items	1 Isolated area	2 Item	3 Group	4 Zone
ITEMS CONTRIBUTING TO THE LONGITUDINAL STRENGTH (TRANSVERSE SECTION)					
DECK ZONE (1)		-	-	-	10
1	Deck plating, deck stringer, sheer strake and longitudinal bulkhead upper strake (2)	25	20	10	-
2	Deck and sheer strake longitudinals web flange	- 25 20	- 20 15	10 - -	- - -
3	Deck longitudinal girders web flange	- 25 20	- 20 15	10 - -	- - -
4	Longitudinals connected to long. bulkhead upper strake (2) web flange	- 25 20	- 20 15	10 - -	- - -
NEUTRAL AXIS ZONE (1)		-	-	-	15
5	Side shell plating (2)	25	20	15	-
6	Side shell longitudinals and stringers (2) web flange	- 25 20	- 20 15	15 - -	- - -
7	Longitudinal bulkhead plating	25	20	15	-
8	Longitudinal bulkhead longitudinals and stringers web flange	- 25 20	- 20 15	15 - -	- - -
BOTTOM ZONE (1)		-	-	-	10
9	Bilge and bottom strakes, longitudinal bulkhead lower strake and keel plate (2)	25	20	10	-
10	Bilge and bottom longitudinals (2) web flange	- 25 20	- 20 15	10 - -	- - -
11	Longitudinals connected to longitud. bulkhead lower strake web flange	- 25 20	- 20 15	10 - -	- - -
12	Bottom girders web flange	- 25 20	- 20 15	10 - -	- - -
OTHER ITEMS					
13	Deck transverse web frame web flange brackets / stiffeners	25 20 25	20 15 20	- - -	- - -
14	Side shell web frame web flange brackets / stiffeners	25 20 25	20 15 20	- - -	- - -
<p>(1) Each zone is to be evaluated separately.</p> <p>(2) For double hull oil tankers, the structural elements of the inner skin (plating, longitudinals, girders, bulkheads) are to be included in the corresponding elements of the outer skin.</p> <p>(3) Including swash bulkheads, forward and aft peak bulkheads.</p>					

Group of items	Description of items	1 Isolated area	2 Item	3 Group	4 Zone
15	Longitudinal bulkhead web frame web flange brackets / stiffeners	25 20 25	20 15 20	- - -	- - -
16	Bottom transverse web frame web flange brackets / stiffeners	25 20 25	20 15 20	- - -	- - -
17	Cross tie web flange brackets / stiffeners	25 20 20	15 15 15	- - -	- - -
18	Transverse bulkheads (3) plating stringer web stringer flange stiffener web stiffener flange	25 25 20 30 25	20 20 15 20 15	15 - - - -	- - - - -

(1) Each zone is to be evaluated separately.
(2) For double hull oil tankers, the structural elements of the inner skin (plating, longitudinals, girders, bulkheads) are to be included in the corresponding elements of the outer skin.
(3) Including swash bulkheads, forward and aft peak bulkheads.

**Table 10 : Local and global acceptance criteria for oil tankers (given in % of wastage)
(for ships contracted for construction before 1 June 2000)**

Group of items	Description of items	1 Isolated area	2 Item	3 Zone
ITEMS CONTRIBUTING TO THE LONGITUDINAL STRENGTH (TRANSVERSE SECTION)				
DECK ZONE (1)				
		-	-	10
1	Deck plating, deck stringer, sheer strake and longitudinal bulkhead upper strake (2)	25	20	-
2	Deck and sheer strake longitudinals, web and flange	25	20	-
3	Deck longitudinal girders, web and flange	25	20	-
4	Longitudinals connected to long. bulkhead upper strake (2) web and flange	25	20	-
NEUTRAL AXIS ZONE (1)				
		-	-	-
5	Side shell plating (2)	25	20	-
6	Side shell longitudinals and stringers (2) web and flange	25	20	-
7	Longitudinal bulkhead plating	25	20	-
8	Longitudinal bulkhead longitudinals and stringers, web and flange	25	20	-
BOTTOM ZONE (1)				
		-	-	10
9	Bilge and bottom strakes, longitudinal bulkhead lower strake and keel plate (2)	25	20	-

(1) Each zone is to be evaluated separately.
(2) For double hull oil tankers, the structural elements of the inner skin (plating, longitudinals, girders, bulkheads) are to be included in the corresponding elements of the outer skin.
(3) Including swash bulkheads, forward and aft peak bulkheads.

Group of items	Description of items	1 Isolated area	2 Item	3 Zone
10	Bilge and bottom longitudinals (2) web and flange	25	20	-
11	Longitudinals connected to longitud. bulkhead lower strake, web and flange	25	20	-
12	Bottom girders, web and flange	25	20	-
OTHER ITEMS				
13	Deck transverse web frame web and flange brackets / stiffeners	25	20	-
		25	20	-
14	Side shell web frame web and flange brackets / stiffeners	25	20	-
		25	20	-
15	Longitudinal bulkhead web frame web and flange brackets / stiffeners	25	20	-
		25	20	-
16	Bottom transverse web frame web and flange brackets / stiffeners	25	20	-
		25	20	-
17	Cross tie web and flange brackets / stiffeners	25	20	-
		25	20	-
18	Transverse bulkheads (3) plating stringer web and flange stiffener web and flange	25	20	-
		25	20	-
		25	20	-
<p>(1) Each zone is to be evaluated separately.</p> <p>(2) For double hull oil tankers, the structural elements of the inner skin (plating, longitudinals, girders, bulkheads) are to be included in the corresponding elements of the outer skin.</p> <p>(3) Including swash bulkheads, forward and aft peak bulkheads.</p>				

APPENDIX 3

THICKNESS MEASUREMENTS: NUMBER, LOCATIONS AND ACCEPTANCE CRITERIA FOR SHIPS BUILT UNDER THE COMMON STRUCTURAL RULES

1 General

1.1 Field of application

1.1.1 (1/1/2016)

This App 3 applies to ships subject to:

- Chapter 13 of the "Common Structural Rules for Bulk Carriers" (see Note 1), or
- Section 12 of the "Common Structural Rules for Double Hull Oil Tankers" (see Note 1), or
- Part 1 Chapter 13 Section 2 of the "Common Structural Rules for Bulk Carriers and Oil Tankers", (see Note 1).

Note 1: see Sec 2, [2.2.1].

1.2 Aim of the Appendix

1.2.1 (1/7/2013)

Thickness measurements are a major part of surveys to be carried out for the maintenance of class, and the analysis of these measurements is a prominent factor in the determination and extent of the repairs and renewals of the ship's structure.

1.2.2 (1/7/2013)

The Appendix is intended to provide Owners, companies performing thickness measurements and the Society's Surveyors with a uniform means with a view to fulfilling Rule requirements for thickness measurements. In particular, it will enable all the above-mentioned parties to carry out:

- the planning and preparation
- the determination of extent and location, and
- the analysis

of the thickness measurements in cooperation.

1.2.3 (1/7/2013)

It is to be noted that this Appendix also takes into account specific requirements for thickness measurements relevant to close-up surveys of the Enhanced Survey Program (ESP).

1.2.4 (1/7/2013)

This Appendix is also to be used for the thickness measurements of ships assigned the notation **STAR-HULL** (see Ch 5, Sec 2 and Part F, Chapter 1). However, the acceptance criteria for thickness measurements specific to this notation are given in Pt F, Ch 1, Sec 1.

1.3 Scope of the Appendix

1.3.1 (1/7/2013)

The articles below provide the following information:

- references to rule requirements and some additional information on the extent of the thickness measurements to be performed during surveys according to types of ships and related surveys
- locations of the measurements for the main parts of the ship
- how to analyse the results of thickness measurements.

Tables and sketches are also given to detail the above points according to the types of ships.

2 Rule requirements for the extent of measurements

2.1 General

2.1.1 (1/7/2013)

For the maintenance of class, thickness measurements may be required during annual, intermediate and class renewal surveys. Tab 1 gives the references to the requirements for minimum thickness measurements indicated in Chapter 3 and Chapter 4 for each service notation and related to the different types of surveys.

Some additional explanations are also given about the wording used in the Rules as well as the general principles of the required thickness measurements during class renewal surveys.

2.2 Class renewal survey: ships submitted to ESP built under CSR

2.2.1 (1/7/2013)

The thickness measurements required by the Rules consist of:

- systematic thickness measurements in order to assess the overall and local strength of the ship
- thickness measurements as indicated in the program of close-up survey
- measurements of elements considered as suspect areas as defined in Sec 2, [2.2.10]
- additional measurements on areas determined as affected by substantial corrosion as defined in Sec 2, [2.2.9].

2.2.2 (1/7/2013)

For the determination of close-up surveys and relevant thickness measurements as well as the areas considered as suspect areas, reference is to be made to the relevant Sections of Chapter 4 according to the different service notations of the ships subject to ESP.

Table 1 : References to Rule requirements related to thickness measurements (1/7/2013)

SERVICE NOTATION	TYPE OF SURVEY		
	CLASS RENEWAL	INTERMEDIATE	ANNUAL
all service notations	Ch 3, Sec 5, [2.5] and Ch 3, Sec 5, Tab 2: systematic measurements and suspect areas Where substantial corrosion is found, the extent of thickness measurements may be increased to the Surveyor's satisfaction, using Ch 3, Sec 5, Tab 3 as guidance	Ch 3, Sec 4, Tab 1: thickness measurements to be taken if deemed necessary by the Surveyor Where substantial corrosion is found, the extent of thickness measurements may be increased to the Surveyor's satisfaction, using Ch 3, Sec 5, Tab 3 as guidance	Ch 3, Sec 3, [2.4.1]: areas of substantial corrosion identified at previous surveys Where substantial corrosion is found, the extent of thickness measurements may be increased to the Surveyor's satisfaction, using Ch 3, Sec 5, Tab 3 as guidance
bulk carrier ESP CSR	Ch 4, Sec 2, [4.1] and Ch 4, Sec 2, [4.2]: planning and general requirements Ch 4, Sec 2, Tab 5 : measurements of elements subjected to close-up survey Ch 4, Sec 2, Tab 6: extent of systematic thickness measurements Ch 4, Sec 2, Tab 7 to Ch 4, Sec 2, Tab 11, according to the different locations, where substantial corrosion is found	Ch 4, Sec 2, Tab 3 for cargo holds Ch 4, Sec 2, Tab 4 for salt ballast tanks Ch 4, Sec 2, Tab 7 to Ch 4, Sec 2, Tab 11, according to the different locations, where substantial corrosion is found	Ch 4, Sec 2, Tab 1, note (2) for cargo holds and when deemed necessary by the Surveyor Ch 4, Sec 2, [2.5] for salt ballast tanks and when deemed necessary by the Surveyor Ch 4, Sec 2, Tab 7 to Ch 4, Sec 2, Tab 11, according to the different locations, where substantial corrosion is found
bulk carrier ESP CSR - double skin	Ch 4, Sec 9, [4.1] and Ch 4, Sec 9, [4.5]: planning and general requirements Ch 4, Sec 9, Tab 2: measurements of elements subjected to close-up survey Ch 4, Sec 9, Tab 4: extent of systematic thickness measurements Ch 4, Sec 9, Tab 5 to Ch 4, Sec 9, Tab 8, according to the different locations, where substantial corrosion is found	Ch 4, Sec 9, Tab 1 for both cargo holds and salt ballast tanks Ch 4, Sec 9, Tab 4 to Ch 4, Sec 9, Tab 8, according to the different locations, where substantial corrosion is found	Ch 4, Sec 9, [2.5] limited to salt ballast tanks and when deemed necessary by the Surveyor Ch 4, Sec 9, Tab 4 to Ch 4, Sec 9, Tab 8, according to the different locations, where substantial corrosion is found
oil tanker ESP CSR double hull	Ch 4, Sec 4, [4.1] and Ch 4, Sec 4, [4.4]: planning and general requirements Ch 4, Sec 4, Tab 2: measurements of elements subjected to close-up survey Ch 4, Sec 4, Tab 3: extent of systematic thickness measurements Ch 4, Sec 4, Tab 4 to Ch 4, Sec 4, Tab 8, according to the different locations, where substantial corrosion is found	Ch 4, Sec 4, Tab 1 for both cargo holds and salt ballast tanks Ch 4, Sec 4, Tab 4 to Ch 4, Sec 4, Tab 8, according to the different locations, where substantial corrosion is found	Ch 4, Sec 4, [2.4.2] limited to salt ballast tanks and when deemed necessary by the Surveyor Ch 4, Sec 4, Tab 4 to Ch 4, Sec 4, Tab 8, according to the different locations, where substantial corrosion is found

3 Single skin bulk carriers

3.1 Number and locations of measurements

3.1.1 Application (1/1/2016)

This item [3] only applies to ships built under the Common Structural Rules for Bulk Carriers or the "Common Structural Rules for Bulk Carriers and Oil Tankers". For ships not built under the Common Structural Rules, the requirements for number and locations of measurements are according to App 2 or other specific requirements established by the Society.

3.1.2 Number of measurements (1/7/2012)

Considering the extent of thickness measurements according to the different structural elements of the ship and surveys (special, intermediate and annual), the locations of the points to be measured are given for the most important items of the structure.

3.1.3 Locations of measurements (1/7/2012)

Tab 2 provides explanations and/or interpretations for the application of those requirements indicated in the Rules, which refer to both systematic thickness measurements related to the calculation of global hull girder strength and specific measurements connected to close-up surveys.

Fig 1 to Fig 6 are provided to facilitate the explanations and/or interpretations given in Tab 2, to show typical arrangements of single side skin bulk carriers.

3.2 Acceptance criteria

3.2.1 General (1/1/2016)

For ships built under Common Structural Rules, the Acceptance Criteria is according to:

- Chapter 13 of the "Common Structural Rules for Bulk Carriers" for ships having notation "**bulk carrier ESP CSR**", contracted for construction on or after 1 April 2006 but before 1 July 2015, or
- Part 1 Chapter 13 Section 2 of the "Common Structural Rules for Bulk Carriers and Oil Tankers" for ships having notation "**bulk carrier ESP CSR**", contracted for construction on or after 1 July 2015

and as specified in [3.2.2], [3.2.3] and [3.2.4].

For ships not built under the Common Structural Rules, the acceptance criteria are according to App 2 or other specific requirements established by the Society.

3.2.2 Acceptance criteria for pitting corrosion of CSR ships (1/1/2019)

a) Side structures

If pitting intensity in an area where coating is required, according to Ch 3, Sec 5 of the Common Structural Rules for Bulk Carriers or Part 1 Ch 3 Sec 4 of "Common Structural Rules for Bulk Carriers and Oil Tankers", is higher than 15% (see App 2, Fig 12), thickness measurements are to be performed to check the extent of pitting corrosion. The 15% is based on pitting or grooving on only one side of a plate.

In cases where pitting is exceeding 15%, as defined above, an area of 300 mm or more, at the most pitted part of the plate, is to be cleaned to bare metal and the thickness is to be measured in way of the five deepest pits within the cleaned area. The least thickness measured in way of any of these pits is to be taken as the thickness to be recorded.

The minimum remaining thickness in pits, grooves or other local areas is to be greater than the following without being greater than the renewal thickness (t_{ren}):

- 75% of the as-built thickness, in the frame and end brackets webs and flanges
- 70% of the as-built thickness, in the side shell, hopper tank and topside tank plating attached to the each side frame, over a width up to 30 mm from each side of it.

b) Other structures

For plates with pitting intensity less than 20%, see App 2, Fig 12, the measured thickness, t_m of any individual measurement is to meet the lesser of the following criteria:

$$t_m \geq 0,7 (t_{as-built} - t_{vol add}) \text{ mm}$$

$$t_m \geq t_{ren} - 1 \text{ mm}$$

where:

$t_{as-built}$: As-built thickness of the member, in mm

$t_{vol add}$: Voluntary thickness addition; thickness, in mm, voluntarily added as the Owner's extra margin for corrosion wastage in addition to t_c

t_{ren} : Renewal thickness; minimum allowable thickness, in mm, below which renewal of structural members is to be carried out

t_c : Total corrosion addition, in mm, defined in Ch 3, Sec 3 of the "Common Structural Rules for Bulk Carriers" or Part 1 Ch 3 Sec 3 of "Common Structural Rules for Bulk Carriers and Oil Tankers"

t_m : Measured thickness, in mm, on one item, i.e. average thickness on one item using the various measurements taken on this same item during periodical ship's in service surveys.

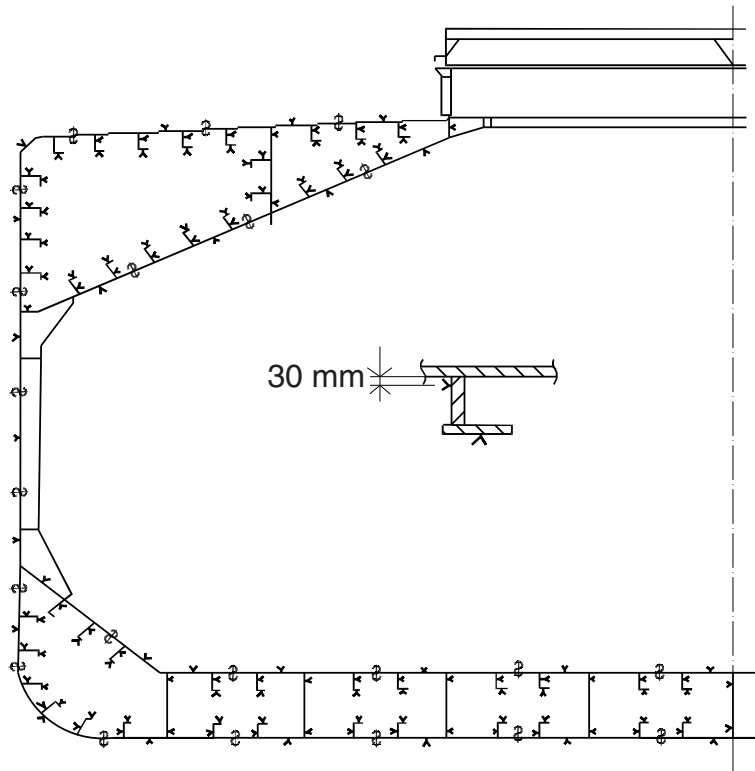
The average thickness across any cross section in the plating is not to be less than the renewal criteria for general corrosion given in Chapter 13 of the Common Structural Rules for Bulk Carriers" or Part 1 Ch 13 of "Common Structural Rules for Bulk Carriers and Oil Tankers".

Table 2 : Interpretations of rule requirements for the locations and number of points to be measured for CSR bulk carriers (single skin) (1/7/2012)

Item	Interpretation	Figure reference
Selected plates on deck, tank top, bottom, double bottom and wind-and- water area	"Selected" means at least a single point on one out of three plates, to be chosen on representative areas of average corrosion	
All deck, tank top and bottom plates and wind-and-water strakes	At least two points on each plate to be taken either at each 1/4 extremity of plate or at representative areas of average corrosion	
Transverse section	A transverse section includes all longitudinal members such as plating, longitudinals and girders at the deck, side, bottom; inner bottom and hopper side plating, longitudinal bulkhead and bottom plating in top wing tanks.	Fig 1
All cargo hold hatch covers and coamings	Including plates and stiffeners	Locations of points are given in Fig 2

Item	Interpretation	Figure reference
Transverse section of deck plating outside line of cargo hatch openings	Two single points on each deck plate (to be taken either at each 1/4 extremity of plate or at representative areas of average corrosion) between the ship sides and hatch coamings in the transverse section concerned	
All deck plating and underdeck structure inside line of hatch openings between cargo hold hatches	"All deck plating" means at least two points on each plate to be taken either at each 1/4 extremity of plate or at representative areas of average corrosion. "Under deck structure": at each short longitudinal girder: three points for web plating (fwd/middle/aft), single point for face plate, one point for web plating and one point for face plating of transverse beam in way. At each ends of transverse beams, one point for web plating and one point for face plating	Extent of areas is shown in Ch 4, Sec 2, Fig 1 Location of points are given in Fig 6
Selected side shell frames in cargo holds	Includes side shell frame, upper and lower end attachments and adjacent shell plating. 25% of frames: one out of four frames should preferably be chosen throughout the cargo hold length on each side. 50% of frames: one out of two frames should preferably be chosen throughout the cargo hold length on each side. "Selected frames" means at least 3 frames on each side of cargo holds	Extent of areas is shown in Ch 4, Sec 2, Fig 1 Locations of points are given in Fig 3
Transverse bulkheads in cargo holds	Includes bulkhead plating, stiffeners and girders, including internal structure of upper and lower stools, where fitted. Two selected bulkheads: one is to be the bulkhead between the two foremost cargo holds and the second may be chosen in other positions	Areas of measurements are shown in Ch 4, Sec 2, Fig 1 Locations of points are given in Fig 4
One transverse bulkhead in each cargo hold	This means that the close-up survey and related thickness measurements are to be performed on one side of the bulkhead; the side is to be chosen based on the outcome of the overall survey of both sides. In the event of doubt, the Surveyor may also require (possibly partial) close-up survey on the other side	Areas of measurements are shown in Ch 4, Sec 2, Fig 1 Locations of points are given in Fig 4
Transverse bulkheads in one topside, hopper and double bottom ballast tank	Includes bulkhead and stiffening systems. The ballast tank is to be chosen based on the history of ballasting among those prone to have the most severe conditions	Locations of points are given in Fig 5
Transverse webs in ballast tanks	Includes web plating, face plates, stiffeners and associated plating and longitudinals. One of the representative tanks of each type (i.e. topside or hopper or side tank) is to be chosen in the forward part	Areas of measurements are shown in Ch 4, Sec 2, Fig 1 Locations of points are given in Fig 3

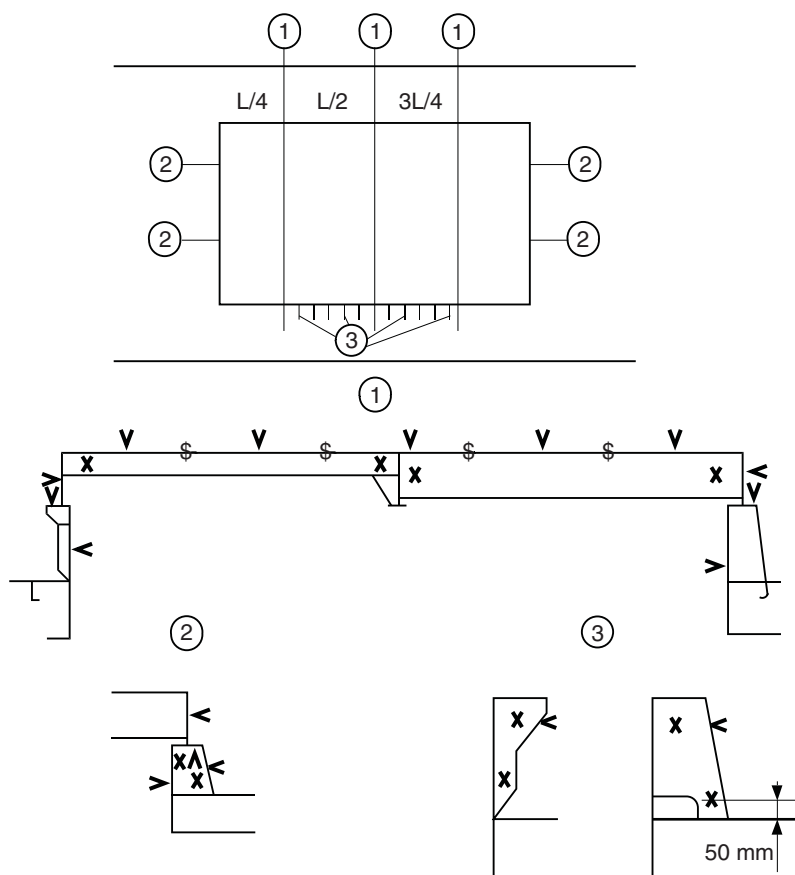
Figure 1 : Transverse section of a single skin bulk carrier (1/7/2012)



Single side bulk carriers

Measurements are to be taken on both port and starboard sides of the selected transverse section.

Figure 2 : Locations of measurements on hatch covers and coamings (1/7/2012)



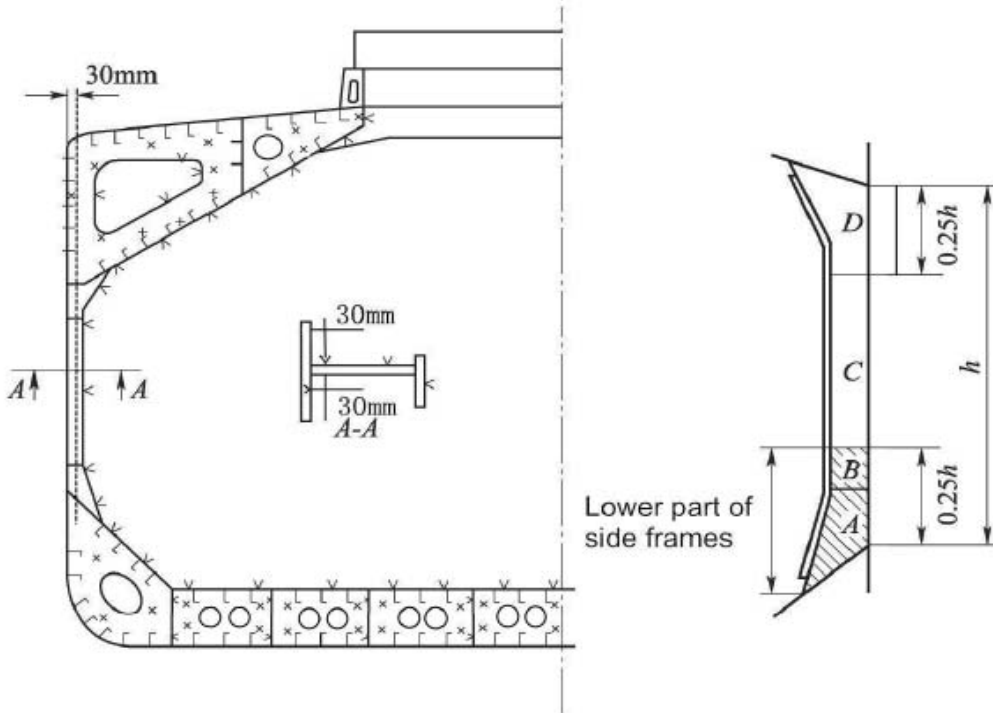
(1) Three sections at $L/4$, $L/2$, $3L/4$ of hatch cover length, including:

- one measurement of each hatch cover plate and skirt plate
- measurements of adjacent beams and stiffeners
- one measurement of coaming plates and coaming flange, each side

(2) Measurements of both ends of hatch cover skirt plate, coaming plate and coaming flange

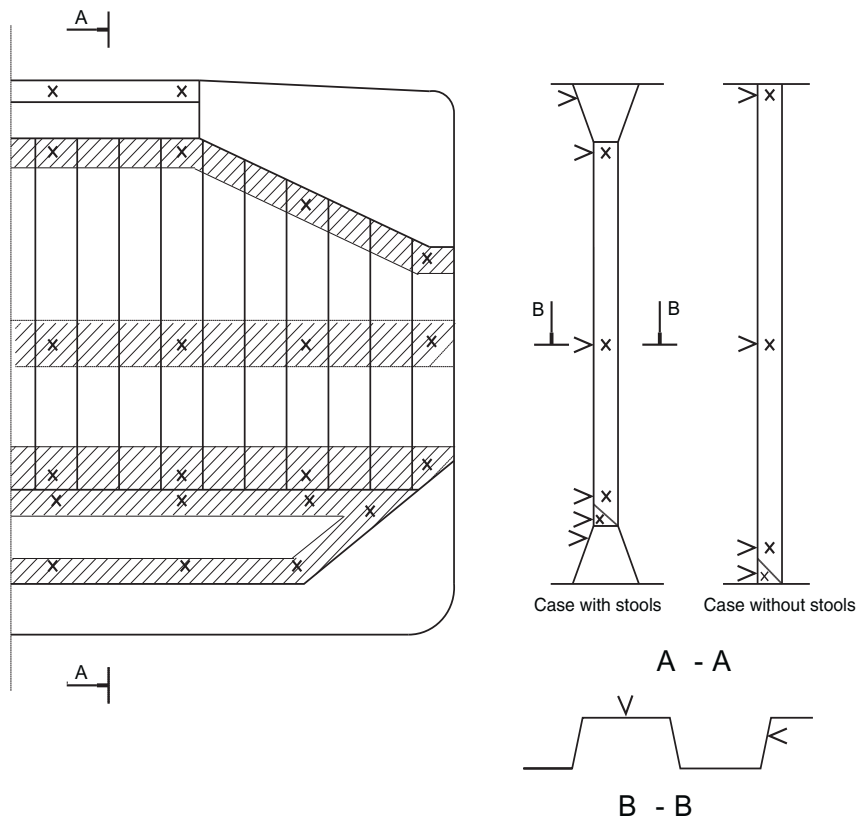
(3) One measurement of one out of three hatch coaming brackets and bars, on both sides and both ends

Figure 3 : Locations of measurements on structural members in cargo holds and ballast tanks of single side skin bulk carriers (1/1/2019)



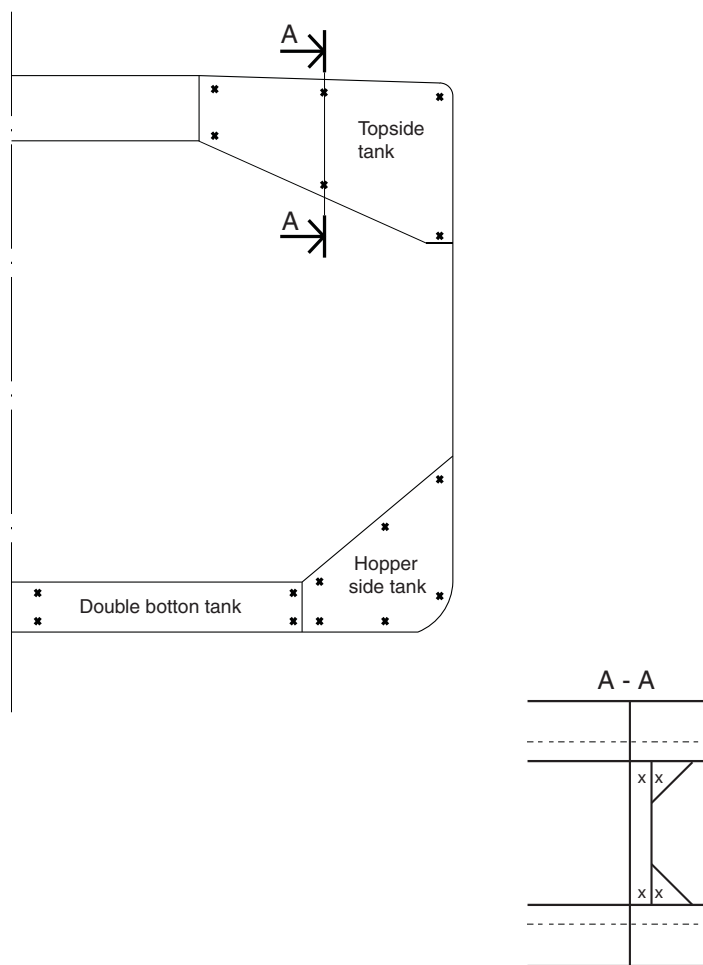
Note: The gauging pattern for web plating is to be a three point pattern for zones A, C and D, and a two point pattern for zone B (see figure). The gauging report is to reflect the average reading. The average reading is to be compared with the allowable thickness. If the web plating has general corrosion then this pattern is to be expanded to a five-point pattern.

Figure 4 : Locations of measurements on cargo hold transverse bulkheads (additional measurements to internal structure of upper and lower stools to be added, e. g. two points in the upper and two points in the lower stools to be indicated in section A - A) (1/7/2012)



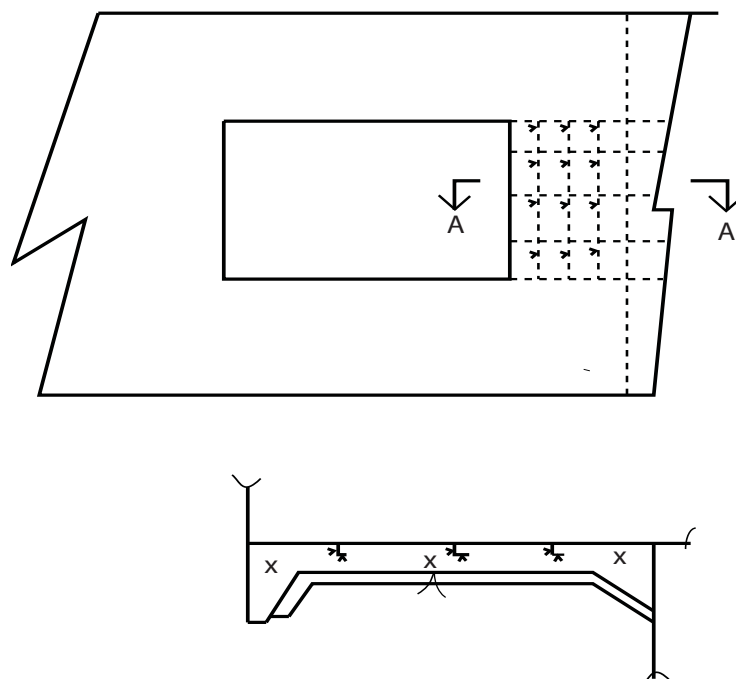
Note: Measurements to be taken in each shaded area as per views A - A and B - B

Figure 5 : Locations of measurements on transverse bulkheads of topside, hopper and double bottom tanks (two additional measurements to internal structure of double bottom tank to be added at midspan) (1/7/2012)



Note: Measurements to be taken in each vertical section as per view A - A

Figure 6 : Locations of measurements on underdeck structure (1/7/2012)



3.2.3 Acceptance criteria for edge corrosion of CSR ships (1/1/2019)

Provided that the overall corroded height of the edge corrosion of the flange, or web in the case of flat bar stiffeners, is less than 25%, see Sec 2, Fig 1, of the stiffener flange breadth or web height, as applicable, the measured thickness, t_m , is to meet the lesser of the following criteria:

$$t_m \geq 0,7 (t_{as-built} - t_{vol.add}) \text{ mm}$$

$$t_m \geq t_{ren} - 1 \text{ mm}$$

The average measured thickness across the breadth or height of the stiffener is not to be less than that defined in Chapter 13 of the "Common Structural Rules for Bulk Carriers" or Part 1 Ch 13 of "Common Structural Rules for Bulk Carriers and Oil Tankers".

Plate edges at openings for manholes, lightening holes etc. may be below the minimum thickness given in Chapter 13 of the "Common Structural Rules for Bulk Carriers" or Part 1 Ch 13 of "Common Structural Rules for Bulk Carriers and Oil Tankers" provided that the maximum extent of the reduced plate thickness, below the minimum given in Chapter 13 of the "Common Structural Rules for Bulk Carriers" or Part 1 Ch 13 of "Common Structural Rules for Bulk Carriers and Oil Tankers" from the opening edge is not more than 20% of the smallest dimension of the opening and does not exceed 100 mm.

Rough or uneven edges may be cropped-back provided that the maximum dimension of the opening is not increased by more than 10% and the remaining thickness of the new edge is not less than $t_{ren} - 1$ mm.

3.2.4 Acceptance criteria for grooving corrosion of CSR ships (1/1/2019)

a) Where the groove breadth is a maximum of 15% of the web height, but not more than 30mm, see Sec 2, Fig 2, the measured thickness, t_m , in the grooved area is to meet the lesser of the following criteria:

$$t_m \geq 0,75 (t_{as-built} - t_{vol.add}) \text{ mm}$$

$$t_m \geq t_{ren} - 0,5 \text{ mm}$$

but is not to be less than

$$t_m = 6 \text{ mm}$$

b) Structural members with areas of grooving greater than those in a) are to be assessed based on the criteria for general corrosion as defined in Chapter 13 of the "Common Structural Rules for Bulk Carriers" or Part 1 Ch 13 of "Common Structural Rules for Bulk Carriers and Oil Tankers" using the average measured thickness across the plating/stiffener.

4 Double skin bulk carriers

4.1 Number and Locations of measurements

4.1.1 Application (1/1/2016)

This item [4] only applies to ships built under the Common Structural Rules of Bulk Carriers or the "Common Structural Rules for Bulk Carriers and Oil Tankers". For ships not built under the Common Structural Rules, the requirements for number and locations of measurements are according to

Appendix 2 or other specific requirements established by the Society.

4.1.2 Number of measurements (1/7/2012)

Considering the extent of thickness measurements according to the different structural elements of the ship and surveys (special, intermediate and annual), the locations of the points to be measured are given for the most important items of the structure.

4.1.3 Locations of measurements (1/7/2012)

Tab 3 provides explanations and/or interpretations for the application of those requirements indicated in the Rules, which refer to both systematic thickness measurements related to the calculation of global hull girder strength and specific measurements connected to close-up surveys.

Fig 7 to Fig 12 are provided to facilitate the explanations and/or interpretations given in Tab 3, to show typical arrangements of double side skin bulk carriers.

4.2 Acceptance criteria

4.2.1 General (1/1/2016)

For vessels built under the Common Structural Rules, the Acceptance Criteria is according to:

- Chapter 13 of the "Common Structural Rules for Bulk Carriers" for ships having notation "**bulk carrier ESP CSR - double skin**", contracted for construction on or after 1 April 2006 but before 1 July 2015, or
- Part 1 Chapter 13 Section 2 of the "Common Structural Rules for Bulk Carriers and Oil Tankers" for ships having notation "**bulk carrier ESP CSR - double skin**", contracted for construction on or after 1 July 2015

and as specified in [4.2.2], [4.2.3] and [4.2.4].

For ships not built under the Common Structural Rules, the acceptance criteria are according to App 2 or other specific requirements established by the Society.

4.2.2 Acceptance criteria for pitting corrosion of CSR ships (1/1/2019)

a) Side structures

If pitting intensity in an area where coating is required, according to Ch 3, Sec 5 of the "Common Structural Rules for Bulk Carriers" or Part 1 Ch 3 Sec 4 of the "Common Structural Rules for Bulk Carriers and Oil Tankers", is higher than 15% (see App 2, Fig 12), thickness measurements are to be performed to check the extent of pitting corrosion. The 15% is based on pitting or grooving on only one side of a plate.

In cases where pitting is exceeding 15%, as defined above, an area of 300 mm or more, at the most pitted part of the plate, is to be cleaned to bare metal and the thickness is to be measured in way of the five deepest pits within the cleaned area. The least thickness measured in way of any of these pits is to be taken as the thickness to be recorded.

The minimum remaining thickness in pits, grooves or other local areas is to be greater than 70% of the as-built thickness, in the side shell, hopper tank and topside tank plating attached to the each side frame, over a

width up to 30 mm from each side of it, without being greater than t_{ren} .

b) Other structures

For plates with pitting intensity less than 20%, see App 2, Fig 12, the measured thickness, t_m of any individual measurement is to meet the lesser of the following criteria:

$$t_m \geq 0,7 (t_{as-built} - t_{vol.add}) \text{ mm}$$

$$t_m \geq t_{ren} - 1 \text{ mm}$$

Where:

$t_{as-built}$: As-built thickness of the member, in mm

$t_{vol.add}$: Voluntary thickness addition; thickness, in mm, voluntarily added as the Owner's extra margin for corrosion wastage in addition to t_c

t_{ren} : Renewal thickness; minimum allowable thickness, in mm, below which renewal of structural members is to be carried out

t_c : Total corrosion addition, in mm, defined in Ch 3, Sec 3 of the "Common Structural Rules for Bulk Carriers" or Part 1 Ch 3 Sec 3 of "Common Structural Rules for Bulk Carriers and Oil Tankers"

t_m : Measured thickness, in mm, on one item, i.e. average thickness on one item using the various measurements taken on this same item during periodical ship's in service surveys.

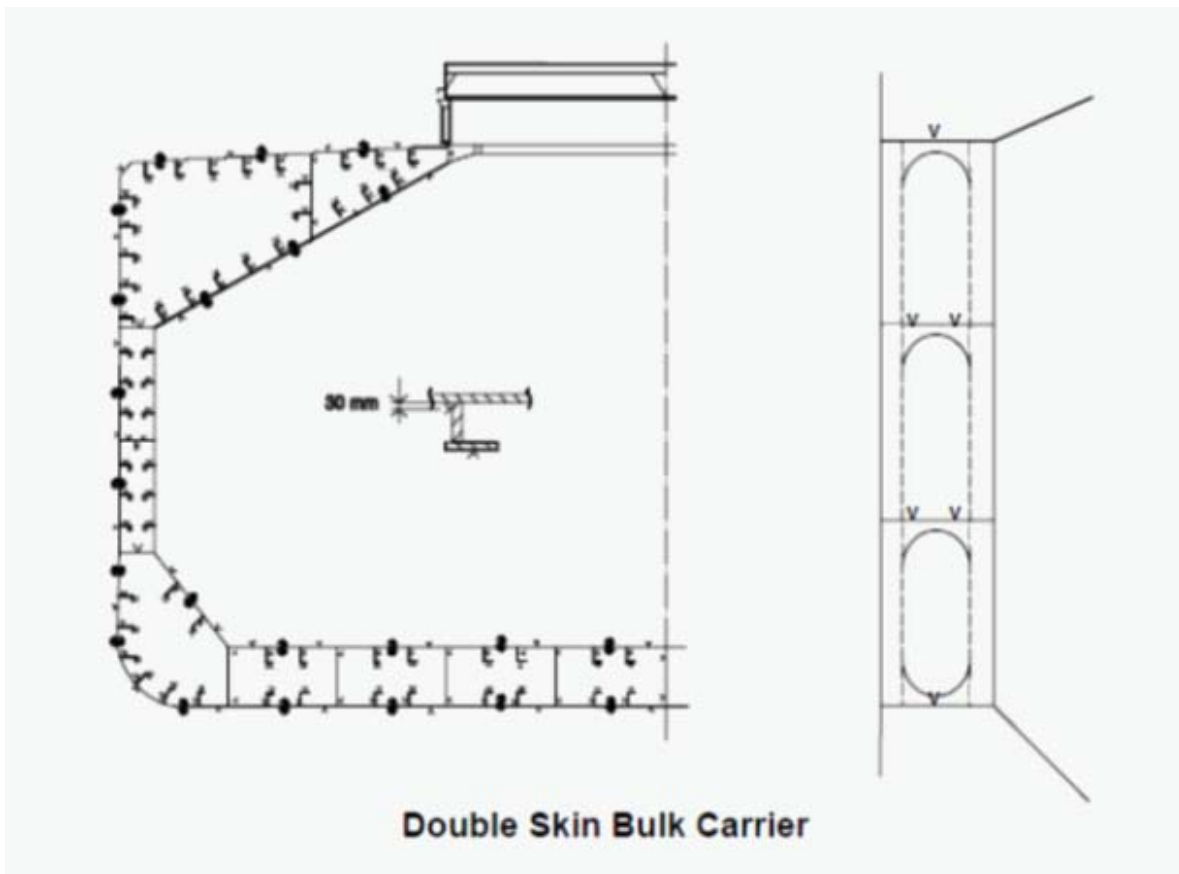
The average thickness across any cross section in the plating is not to be less than the renewal criteria for general corrosion given in Chapter 13 of the "Common Structural Rules for Bulk Carriers" or Part 1 Ch 13 of "Common Structural Rules for Bulk Carriers and Oil Tankers".

Table 3 : Interpretations of rule requirements for the locations and number of points to be measured for CSR bulk carriers (double skin) (1/7/2012)

Item	Interpretation	Figure reference
Selected plates on deck, tank top, bottom, double bottom and wind-and-water area	"Selected" means at least a single point on one out of three plates, to be chosen on representative areas of average corrosion	
All deck, tank top and bottom plates and wind-and-water strakes	At least two points on each plate to be taken either at each 1/4 extremity of plate or at representative areas of average corrosion	
Transverse section	A transverse section includes all longitudinal members such as plating, longitudinals and girders at the deck, sides, bottom, inner bottom, hopper sides, inner sides and top wing inner sides.	Fig 7
All cargo hold hatch covers and coamings	Including plates and stiffeners	Locations of points are given in Fig 8
Transverse section of deck plating outside line of cargo hatch openings	Two single points on each deck plate (to be taken either at each 1/4 extremity of plate or at representative areas of average corrosion) between the ship sides and hatch coamings in the transverse section concerned	
All deck plating and underdeck structure inside line of hatch openings between cargo hold hatches	"All deck plating" means at least two points on each plate to be taken either at each 1/4 extremity of plate or at representative areas of average corrosion. "Under deck structure": at each short longitudinal girder: three points for web plating (fwd/middle/aft), single point for face plate, one point for web plating and one point for face plating of transverse beam in way. At each ends of transverse beams, one point for web plating and one point for face plating	Extent of areas is shown in Ch 4, Sec 9, Fig 1 Locations of points are given in Fig 12
Transverse frame in double skin tank		Fig 7
Transverse bulkheads in cargo holds	Includes bulkhead plating, stiffeners and girders, including internal structure of upper and lower stools, where fitted. Two selected bulkheads: one is to be the bulkhead between the two foremost cargo holds and the second may be chosen in other positions	Areas of measurements are shown in Ch 4, Sec 9, Fig 1 Locations of points are given in Fig 10

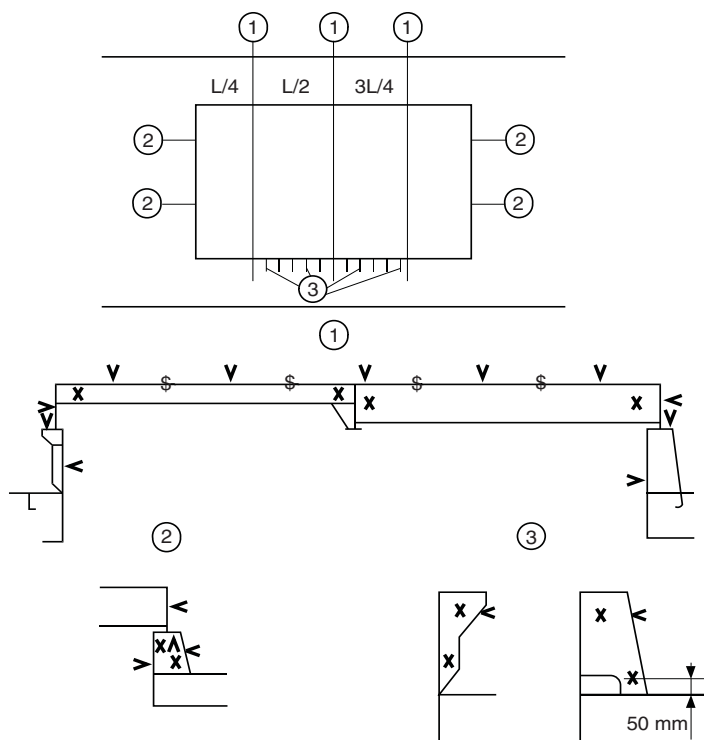
Item	Interpretation	Figure reference
One transverse bulkhead in each cargo hold	This means that the close-up survey and related thickness measurements are to be performed on one side of the bulkhead; the side is to be chosen based on the outcome of the overall survey of both sides. In the event of doubt, the Surveyor may also require (possibly partial) close-up survey on the other side	Areas of measurements are shown in Ch 4, Sec 9, Fig 1 Locations of points are given in Fig 10
Transverse bulkheads in one topside, hopper and double bottom ballast tank	Includes bulkhead and stiffening systems. The ballast tank is to be chosen based on the history of ballasting among those prone to have the most severe conditions	Locations of points are given in Fig 11
Transverse webs in ballast tanks	Includes web plating, face plates, stiffeners and associated plating and longitudinals. One of the representative tanks of each type (i.e. topside or hopper or side tank) is to be chosen in the forward part	Areas of measurements are shown in Ch 4, Sec 9, Fig 1 Locations of points are given in Fig 9

Figure 7 : Transverse section of a double skin bulk carrier (1/7/2016)



Note: Measurements are to be taken on both port and starboard sides of the selected transverse section.

Figure 8 : Locations of measurements on hatch covers and coamings (1/7/2012)



(1) Three sections at L/4, L/2, 3L/4 of hatch cover length, including:

- one measurement of each hatch cover plate and skirt plate
- measurements of adjacent beams and stiffeners
- one measurement of coaming plates and coaming flange, each side

(2) Measurements of both ends of hatch cover skirt plate, coaming plate and coaming flange

(3) One measurement of one out of three hatch coaming brackets and bars, on both sides and both ends

Figure 9 : Locations of measurements on structural members in ballast tanks of double skin bulk carriers (topside or hopper or side tanks) (1/7/2016)

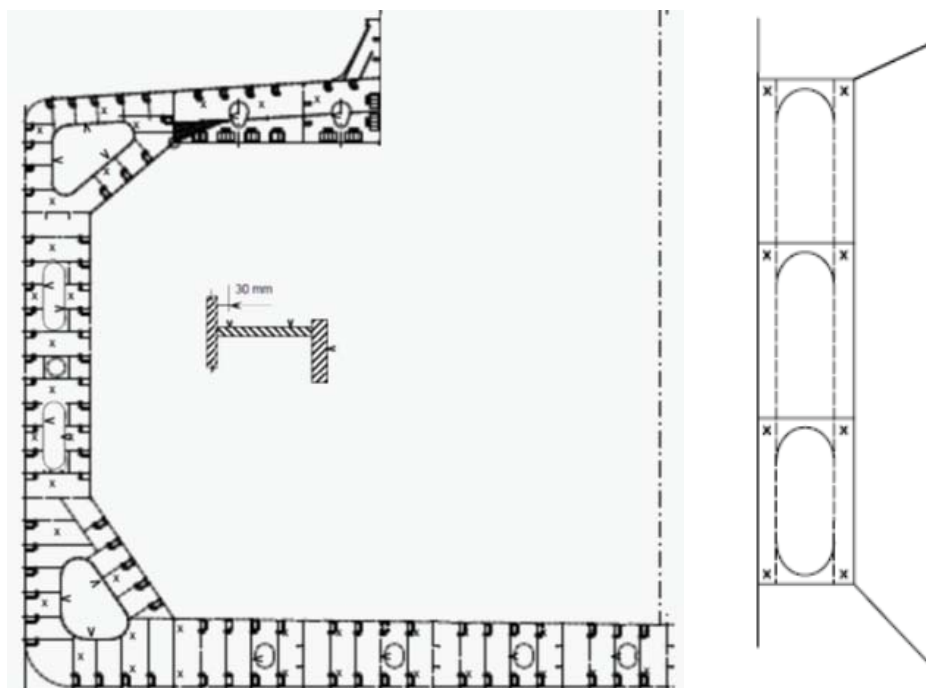
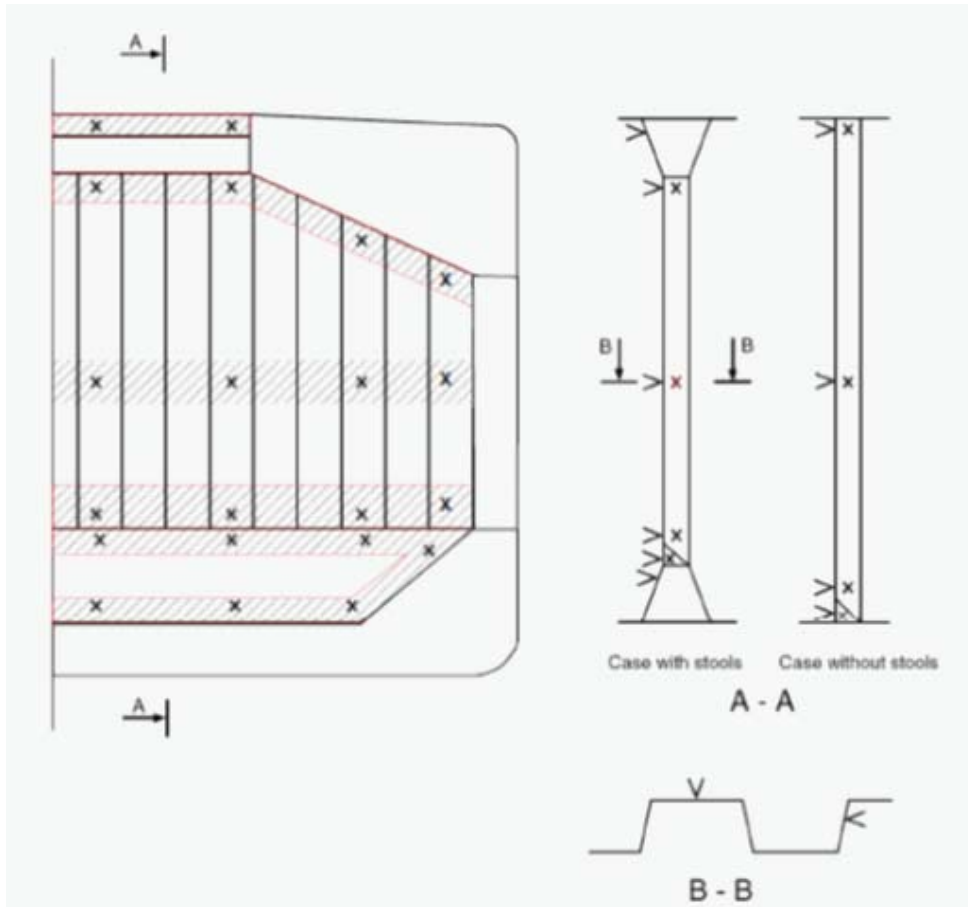
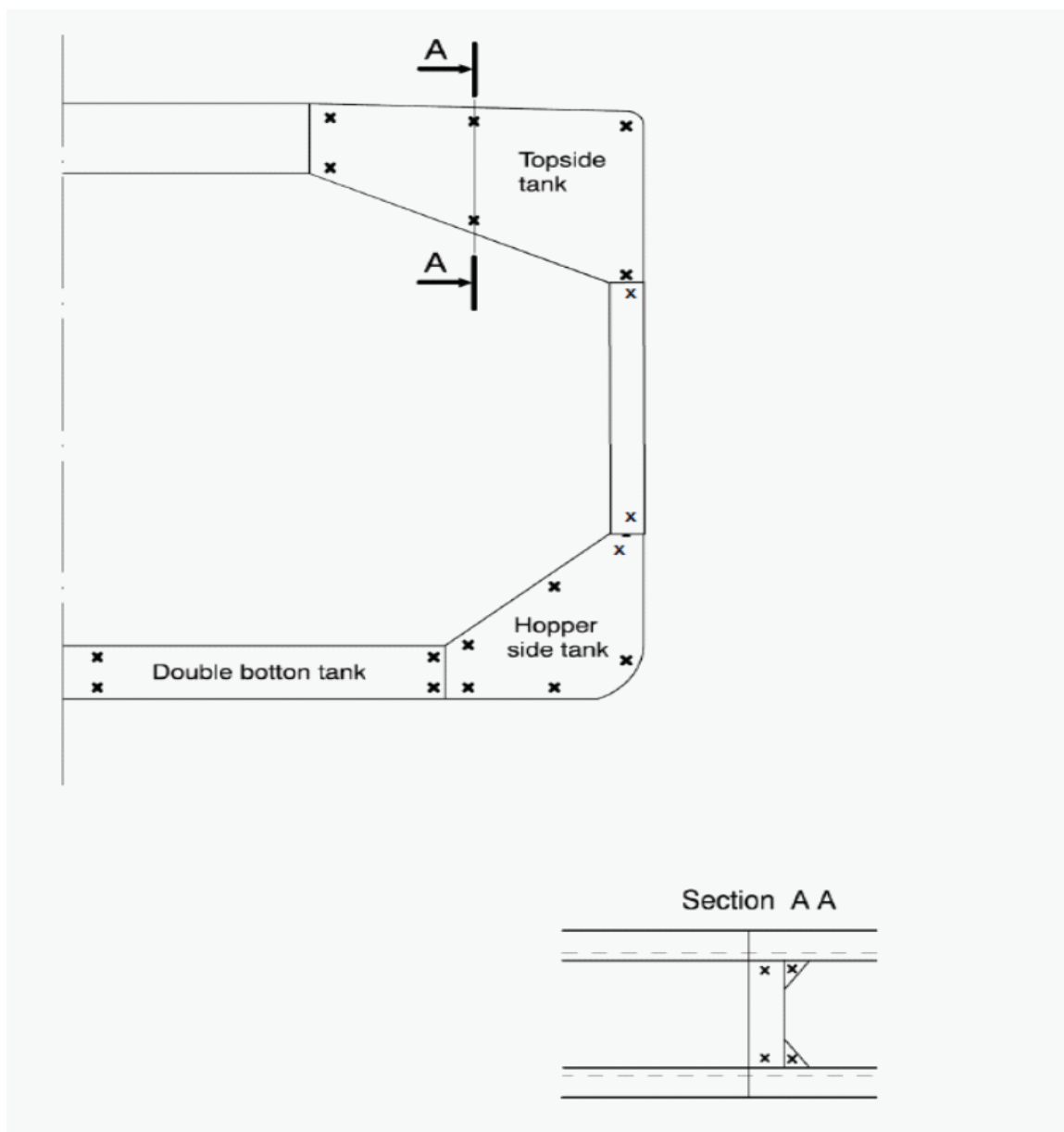


Figure 10 : Locations of measurements on cargo hold transverse bulkheads (additional measurements to internal structure of upper and lower stools to be added, e.g. two points in the upper and two points in the lower stools to be indicated in section A - A) (1/7/2016)



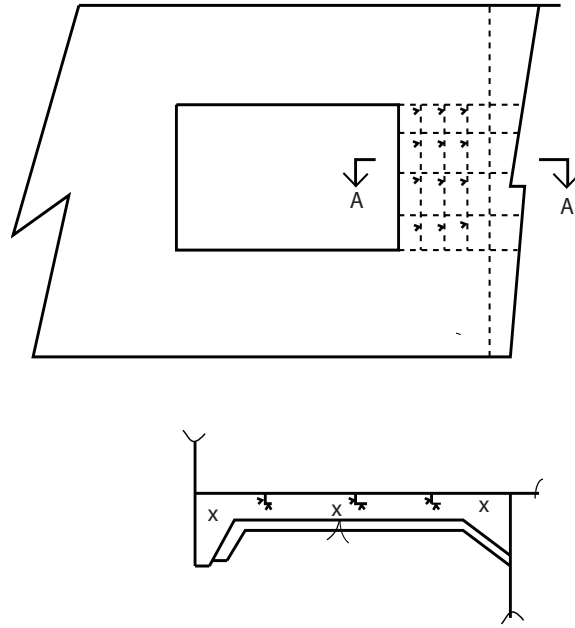
Note: Measurements to be taken in each shaded area as per views A - A and B - B

Figure 11 : Locations of measurements on transverse bulkheads of topside, hopper and double bottom tanks (two additional measurements to internal structure of double bottom tank to be added at midspan) (1/7/2016)



Note: Measurements to be taken in each vertical section as per view A - A

Figure 12 : Locations of measurements on underdeck structure (1/7/2012)



4.2.3 Acceptance criteria for edge corrosion of CSR ships (1/1/2019)

Provided that the overall corroded height of the edge corrosion of the flange, or web in the case of flat bar stiffeners, is less than 25%, see Sec 2, Fig 1, of the stiffener flange breadth or web height, as applicable, the measured thickness, t_m , is to meet the lesser of the following criteria:

$$t_m \geq 0,7 (t_{as-built} - t_{vol add}) \text{ mm}$$

$$t_m \geq t_{ren} - 1 \text{ mm}$$

The average measured thickness across the breadth or height of the stiffener is not to be less than that defined in Chapter 13 of the "Common Structural Rules for Bulk Carriers" or Part 1 Ch 13 of "Common Structural Rules for Bulk Carriers and Oil Tankers".

Plate edges at openings for manholes, lightening holes etc. may be below the minimum thickness given in Chapter 13 of the "Common Structural Rules for Bulk Carriers" or Part 1 Ch 13 of "Common Structural Rules for Bulk Carriers and Oil Tankers" provided that:

- the maximum extent of the reduced plate thickness, below the minimum given in Chapter 13 of the "Common Structural Rules for Bulk Carriers" or Part 1 Ch 13 of "Common Structural Rules for Bulk Carriers and Oil Tankers", from the opening edge is not more than 20% of the smallest dimension of the opening and does not exceed 100 mm.
- rough or uneven edges may be cropped-back provided that the maximum dimension of the opening is not increased by more than 10% and the remaining thickness of the new edge is not less than $t_{ren} - 1$ mm.

4.2.4 Acceptance criteria for grooving corrosion of CSR ships (1/1/2019)

- Where the groove breadth is a maximum of 15% of the web height, but not more than 30mm, see Sec 2, Fig 2,

the measured thickness, t_m , in the grooved area is to meet the lesser of the following criteria:

$$t_m \geq 0,75 (t_{as-built} - t_{vol add}) \text{ mm}$$

$$t_m \geq t_{ren} - 0,5 \text{ mm}$$

but is not to be less than

$$t_m = 6 \text{ mm}$$

- Structural members with areas of grooving greater than those in a) are to be assessed based on the criteria for general corrosion as defined in Chapter 13 of the "Common Structural Rules for Bulk Carriers" or Part 1 Ch 13 of "Common Structural Rules for Bulk Carriers and Oil Tankers" using the average measured thickness across the plating/stiffener.

5 Double hull oil tankers

5.1 Number and locations of measurements

5.1.1 Application (1/1/2016)

This item [5] only applies to ships built under the Common Structural Rules of Double Hull Oil Tankers or the "Common Structural Rules for Bulk Carriers and Oil Tankers". For ships not built under the Common Structural Rules, the requirements for number and locations of measurements are according to App 2 or other specific requirements established by the Society.

5.1.2 Number of measurements (1/7/2012)

Considering the extent of thickness measurements according to the different structural elements of the ship and surveys (special, intermediate and annual), the locations of the points to be measured are given for the most important items of the structure.

5.1.3 Locations of measurements (1/7/2012)

Tab 4 provides explanations and/or interpretations for the application of those requirements indicated in the Rules, which refer to both systematic thickness measurements

related to the calculation of global hull girder strength and specific measurements connected to close-up surveys.

Fig 13 to Fig 16 are provided to facilitate the explanations and/or interpretations given in Tab 4, to show typical arrangements of double hull oil tankers.

Table 4 : Interpretations of rule requirements for the locations and number of points to be measured (1/7/2012)

Item	Interpretation	Figure reference
Selected plates	"Selected" means at least a single point on one out of three plates, to be chosen on representative areas of average corrosion	
Deck, bottom plates and wind-and-water strakes	At least two points on each plate to be taken either at each 1/4 extremity of plate or at representative areas of average corrosion	
Transverse section	Measurements to be taken on all longitudinal members such as plating, longitudinals and girders at the deck, side, bottom, longitudinal bulkheads, inner bottom and hopper. One point to be taken on each plate. Both web and flange to be measured on longitudinals, if applicable. For tankers older than 10 years of age: within 0,1D (where D is the ship's moulded depth) of the deck and bottom at each transverse section to be measured, every longitudinal and girder is to be measured on the web and face plate, and every plate is to be measured at one point between longitudinals.	Fig 13
Transverse rings (see (1)) in cargo and ballast tanks	At least two points on each plate in a staggered pattern and two points on the corresponding flange where applicable. Minimum 4 points on the first plate below deck. Additional points in way of curved parts. At least one point on each of two stiffeners between stringers / longitudinal girders.	Fig 14
Transverse bulkheads in cargo tanks	At least two points on each plate. Minimum 4 points on the first plate below main deck. At least one point on every third stiffener to be taken between each stringer. At least two points on each plate of stringers and girders, and two points on the corresponding flange. Additional points in way of curved part. Two points of each diaphragm plate of stools if fitted.	Fig 15
Note 1: Transverse rings means all transverse material appearing in a cross-section of the ship's hull, in way of a double bottom floor, vertical web and deck transverse (definition from the Common Structural Rules)		

Item	Interpretation	Figure reference
Transverse bulkheads in ballast tanks	<p>At least 4 points on plates between stringers / longitudinal girders, or per plate if stringers / girders not fitted.</p> <p>At least two points on each plate of stringers and girders, and two points on the corresponding flange. Additional points in way of curved part.</p> <p>At least one point on two stiffeners between each stringer / longitudinal girder.</p>	Fig 16
Adjacent structural members	On adjacent structural members one point per plate and one point on every third stiffener / longitudinal.	
<p>Note 1: Transverse rings means all transverse material appearing in a cross-section of the ship's hull, in way of a double bottom floor, vertical web and deck transverse (definition from the Common Structural Rules)</p>		

Figure 13 : Transverse section (1/7/2012)

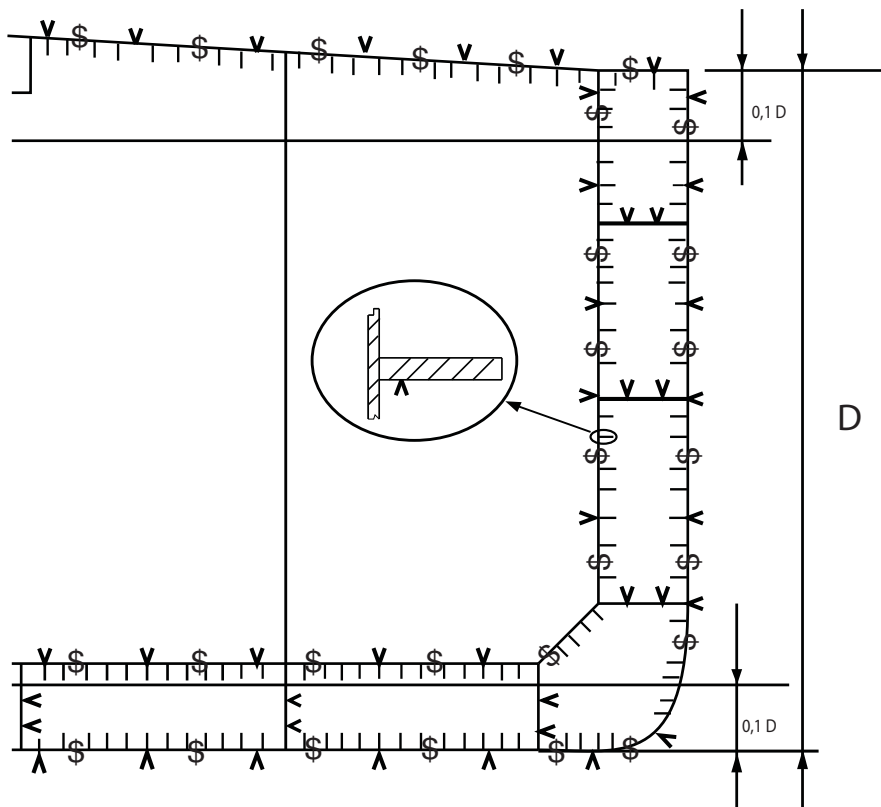


Figure 14 : Transverse rings in cargo and ballast tanks (1/7/2012)

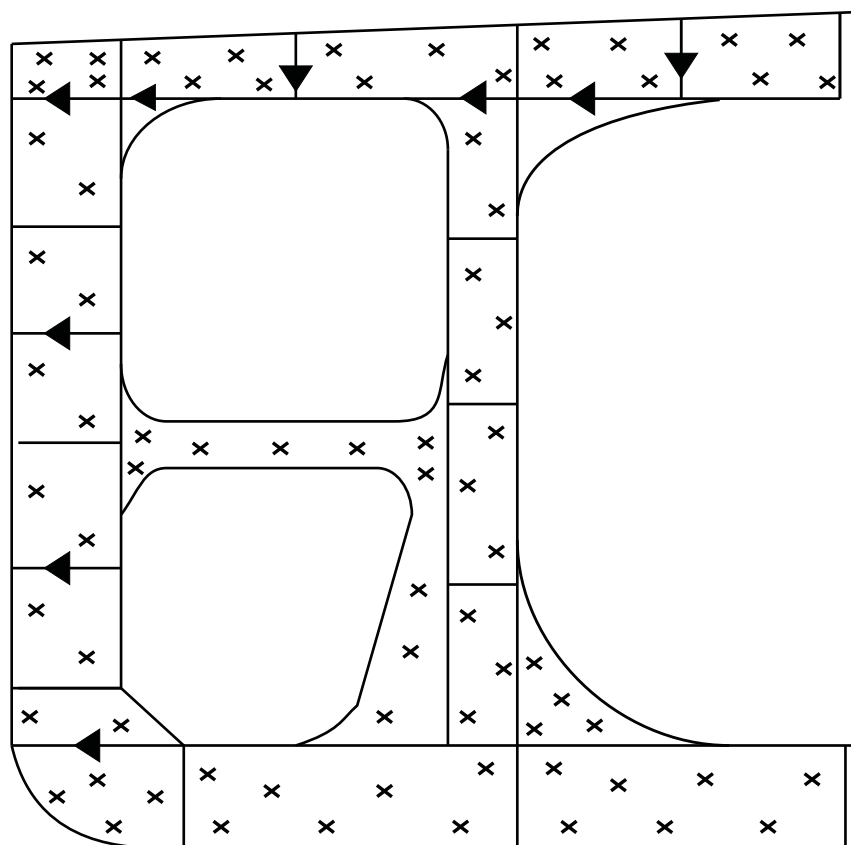


Figure 15 : Transverse bulkheads in cargo tanks (1/7/2012)

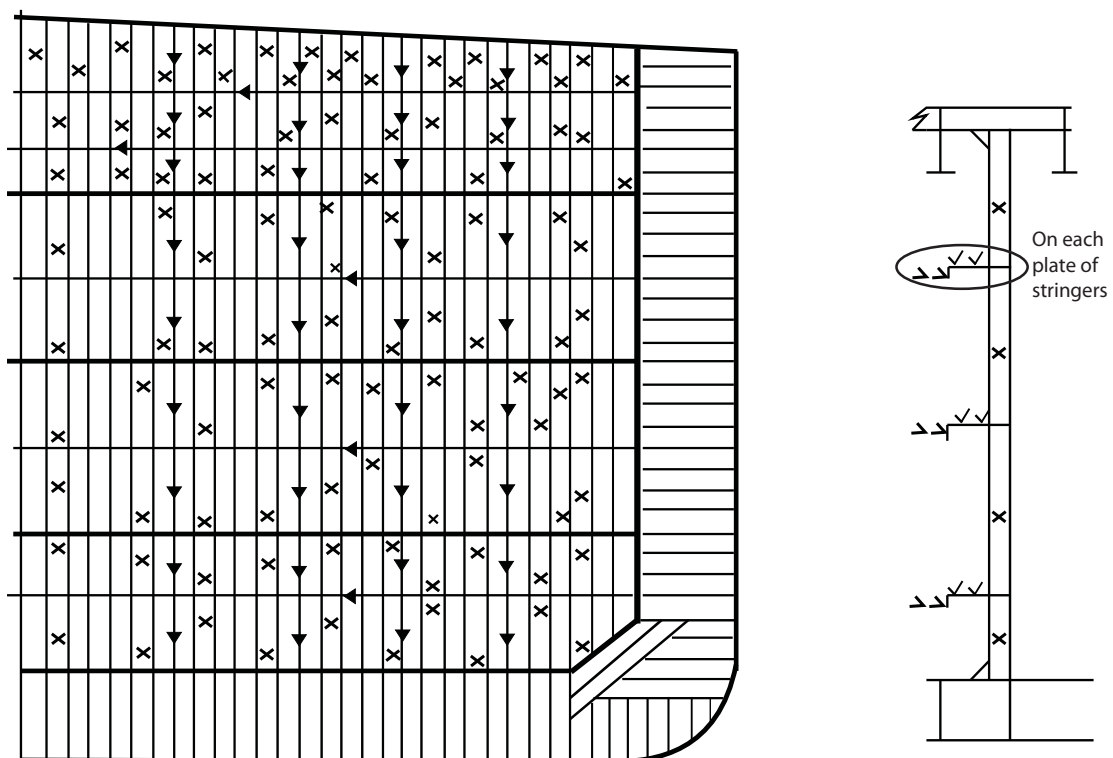
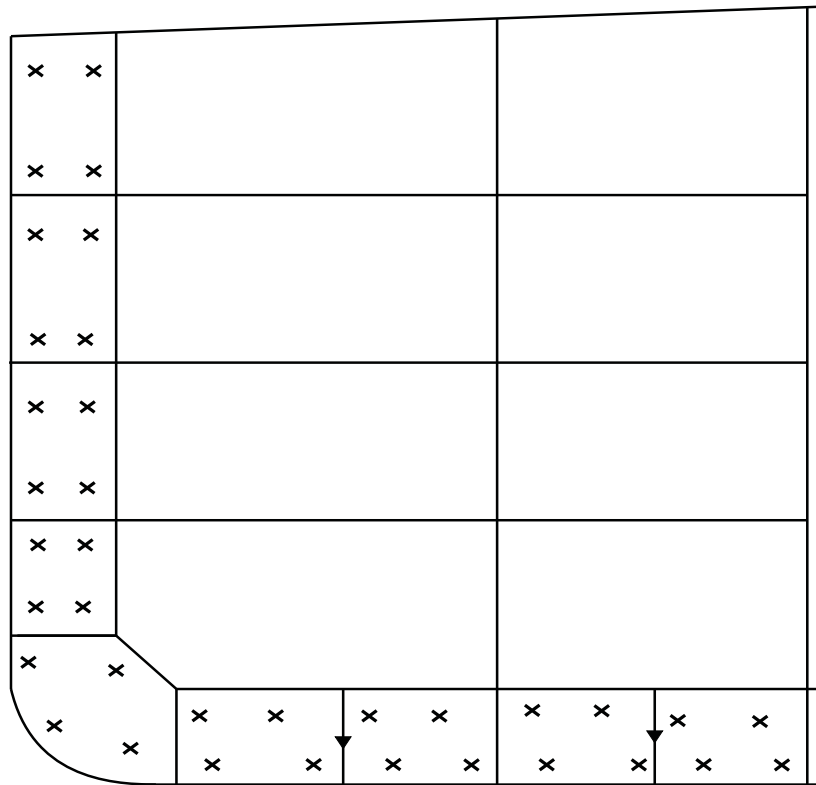


Figure 16 : Transverse bulkheads in ballast tanks (1/7/2012)



5.2 Acceptance criteria

5.2.1 General (1/1/2019)

For vessels built under the Common Structural Rules, the Acceptance Criteria is according to:

- Section 12 - Ship in Operation Renewal Criteria of the "Common Structural Rules for Double Hull Oil Tankers" for ships having notation "Oil Tanker ESP CSR - double hull", contracted for construction on or after 1 April 2006 but before 1 July 2015, or
- Part 1 Chapter 13 of the "Common Structural Rules for Bulk Carriers and Oil Tankers" for ships having notation "Oil Tanker ESP CSR - double hull", contracted for construction on or after 1 July 2015

and as specified in [5.2.2], [5.2.3] and [5.2.4].

For ships not built under the Common Structural Rules, the acceptance criteria are according to App 2 or other specific requirements established by the Society

5.2.2 Acceptance criteria for pitting corrosion of CSR ships (1/1/2019)

For plates with pitting intensity less than 20%, see App 2, Fig 12, the measured thickness, t_m , in mm, of any individual measurement is to meet the lesser of the following criteria:

$$t_m \geq 0,7 (t_{as-built} - t_{vol add})$$

$$t_m \geq t_{ren} - 1$$

where:

$t_{as-built}$: As-built thickness of the member, in mm

$t_{vol add}$: Voluntary thickness addition; thickness, in mm, voluntarily added as the Owner's extra margin for corrosion wastage in addition to t_c

t_{ren} : Renewal criteria for general corrosion as defined in [1.4.2.1] of Section 12 of "Common Structural Rules for Double Hull Oil Tankers" or [2.1.1] of Section 2 Chapter 13 Part 1 of the "Common Structural Rules for Bulk Carriers and Oil Tankers"

The average thickness across any cross section in the plating is not to be less than the renewal criteria for general corrosion given in [1.4.2.1] of Section 12 of the "Common Structural Rules for Double Hull Oil Tankers" or [2.1.1] of Section 2 Chapter 13 Part 1 of the "Common Structural Rules for Bulk Carriers and Oil Tankers".

5.2.3 Acceptance criteria for edge corrosion of CSR ships (1/1/2019)

Provided that the overall corroded height of the edge corrosion of the flange, or web in the case of flat bar stiffeners, is less than 25%, see Sec 2, Fig 1, of the stiffener flange breadth or web height, as applicable, the measured thickness, t_m , in mm, is to meet the lesser of the following criteria:

$$t_m \geq 0,7 (t_{as-built} - t_{vol add})$$

$$t_m \geq t_{ren} - 1$$

where:

$t_{as-built}$: As-built thickness of the member, in mm

- $t_{vol\ add}$: Voluntary thickness addition; thickness, in mm, voluntarily added as the Owner's extra margin for corrosion wastage in addition to t_c
- t_{ren} : Renewal criteria for general corrosion as defined in [1.4.2.1] of Section 12 of the "Common Structural Rules for Double Hull Oil Tankers" or [2.1.1] of Section 2 Chapter 13 Part 1 of the "Common Structural Rules for Bulk Carriers and Oil Tankers".

The average measured thickness across the breadth or height of the stiffener is not to be less than that defined in [1.4.2] of Section 12 of the "Common Structural Rules for Double Hull Oil Tankers" or [2.1] of Section 2 Chapter 13 Part 1 of the "Common Structural Rules for Bulk Carriers and Oil Tankers".

Plate edges at openings for manholes, lightening holes etc. may be below the minimum thickness given in [1.4.2] of Section 12 of the "Common Structural Rules for Double Hull Oil Tankers" or [2.1] of Section 2 Chapter 13 Part 1 of the "Common Structural Rules for Bulk Carriers and Oil Tankers" provided that:

- the maximum extent of the reduced plate thickness, below the minimum given in [1.4.2] of Section 12 of the "Common Structural Rules for Double Hull Oil Tankers" or [2.1] of Section 2 Chapter 13 Part 1 of the "Common Structural Rules for Bulk Carriers and Oil Tankers", from the opening edge is not more than 20% of the smallest dimension of the opening and does not exceed 100 mm
- rough or uneven edges may be cropped-back provided that the maximum dimension of the opening is not increased by more than 10% and the remaining thickness of the new edge is not less than $t_{ren} - 1$ mm.

5.2.4 Acceptance criteria for grooving corrosion of CSR ships (1/1/2019)

- Where the groove breadth is a maximum of 15% of the web height, but not more than 30 mm, see Sec 2, Fig 2, the measured thickness, t_m , in mm, in the grooved area is to meet the lesser of the following criteria:

$$t_m \geq 0,75 (t_{as-built} - t_{vol\ add})$$

$$t_m \geq t_{ren} - 0,5$$

but is not to be less than

$$t_m = 6 \text{ mm}$$

where:

- $t_{as-built}$: As-built thickness of the member, in mm
- $t_{vol\ add}$: Voluntary thickness addition; thickness, in mm, voluntarily added as the Owner's extra margin for corrosion wastage in addition to t_c
- t_{ren} : Renewal criteria for general corrosion as defined in [1.4.2.1] of Section 12 of "Common Structural Rules for Double Hull Oil Tankers" or [2.1.1] of Section 2 Chapter 13 Part 1 of the "Common Structural Rules for Bulk Carriers and Oil Tankers".

- Structural members with areas of grooving greater than those in a) are to be assessed based on the criteria for general corrosion as defined in [1.4.2] of Section 12 of the "Common Structural Rules for Double Hull Oil Tankers" or [2.1] of Section 2 Chapter 13 Part 1 of the "Common Structural Rules for Bulk Carriers and Oil Tankers" using the average measured thickness across the plating/stiffener.

APPENDIX 4

CRITERIA FOR LONGITUDINAL STRENGTH OF THE HULL GIRDER

1 General

1.1

1.1.1 (1/7/2005)

These criteria are to be used for the evaluation of longitudinal strength of the ship's hull girder as required by Sec 2, [2.3.9].

In order for the evaluation of the ship's longitudinal strength to be recognised as valid, fillet welding between longitudinal internal members and hull envelopes is to be in sound condition so as to keep integrity of longitudinal internal members with hull envelopes.

Items [1.1.2] and [6] only apply to oil tankers.

1.1.2 (1/7/2005)

On oil tankers, both for single and double hull construction, of 130 m in length and upwards and of over 10 years of age, the longitudinal strength of the ship's hull girder is to be evaluated in compliance with the requirements of this App 4 on the basis of the thickness measured, renewed or reinforced, as appropriate, during the class renewal survey.

The condition of the hull girder for longitudinal strength evaluation is to be determined in accordance with the methods specified in [6].

1.1.3 (1/7/2015)

This App 4 does not apply to ships contracted for construction on or after 1 April 2006 but before 1 July 2015 having the notation **bulk carrier ESP CSR**; for these ships Chapter 13 of the "Common Structural Rules for Bulk Carriers" applies.

1.1.4 (1/7/2015)

Except for the provisions of item [6], this App 4 does not apply to ships contracted for construction on or after 1 April 2006 but before 1 July 2015 having the notation **oil tanker ESP CSR**; for these ships Section 12 of the "Common Structural Rules for Double Hull Oil Tankers" applies.

1.1.5 (1/7/2015)

Except for the provisions of item [6], this App 4 does not apply to ships contracted for construction on or after 1st July 2015 having the notation **bulk carrier ESP CSR** or **oil tanker ESP CSR**; for these ships Chapter 13 of the "Common Structural Rules for Bulk Carriers and Oil Tankers" applies.

2 Calculation of transverse sectional areas of deck and bottom flanges of hull girder

2.1

2.1.1 (1/7/2002)

The transverse sectional areas of deck zones and bottom zones (as defined in App 2, [4.3.4]) of the ship's hull girder are to be calculated by using the thickness measured, renewed or reinforced, as appropriate, during the class renewal survey.

2.1.2 (1/7/2002)

If the diminution of sectional areas of either deck or bottom zones exceeds 10 % of their respective as-built area (i.e. original sectional area when the ship was built), either of the following measures is to be taken:

- renewal or reinforcement of the deck or bottom zones so that the actual sectional area is not less than 90% of the as-built area; or
- calculation of the actual section moduli (Z_{act}) of the transverse section of the ship's hull girder by applying the calculation method specified in [4], using the thickness measured, renewed or reinforced, as appropriate, during the class renewal survey.

3 Requirements for transverse section modulus of hull girder

3.1

3.1.1 (1/7/2002)

The actual section moduli (Z_{act}) of the transverse section of the ship's hull girder calculated in accordance with [2.1.2] b) above is not to be less than 90% of the required section modulus Z_R or $Z_{R,MIN}$ for new buildings specified in Pt B, Ch 6, Sec 2, [4.2], whichever is the greater, provided that in no case is Z_{act} less than the diminution limit of the minimum section modulus (Z_{MC}) as specified in [5].

4 Calculation criteria of section moduli of midship section of hull girder

4.1

4.1.1 (1/7/2002)

When calculating the transverse section modulus of the ship's hull girder, the sectional area of all continuous longitudinal strength members is to be taken into account.

4.1.2 (1/7/2002)

Large openings, i.e. openings exceeding 2,5m in length or 1,2m in breadth and scallops, where scallop welding is applied, are always to be deducted from the sectional areas used in the section modulus calculation.

4.1.3 (1/7/2002)

Smaller openings (manholes, lightening holes, single scallops in way of seams, etc.) need not be deducted provided that the sum of their breadths or shadow area breadths in one transverse section does not reduce the section modulus at deck or bottom by more than 3% and provided that the height of lightening holes, draining holes and single scallops in longitudinals or longitudinal girders does not exceed 25% of the web depth, for scallops of maximum 75mm.

4.1.4 (1/7/2002)

A deduction-free sum of smaller opening breadths in one transverse section in the bottom or deck area of $0,06(B - \Sigma b)$ (where B = breadth of ship, Σb = total breadth of large openings) may be considered equivalent to the above reduction in section modulus.

4.1.5 (1/7/2002)

The shadow area is to be obtained by drawing two tangent lines with an opening angle of 30° .

4.1.6 (1/7/2002)

The deck modulus is related to the moulded deck line at side.

4.1.7 (1/7/2002)

The bottom modulus is related to the base line.

4.1.8 (1/7/2002)

Continuous trunks and longitudinal hatch coamings are to be included in the longitudinal sectional area provided they are effectively supported by longitudinal bulkheads or deep girders. The deck modulus is then to be calculated by dividing the moment of inertia by the following distance, provided this is greater than the distance to the deck line at side:

$$y_L = y(0,9 + 0,2x/B)$$

where:

- y : distance from neutral axis to top of continuous strength member,
 x : distance from top of continuous strength member to centreline of the ship.

x and y to be measured to the point giving the largest value of y_L .

4.1.9 (1/7/2002)

Longitudinal girders between multi-hatchways are to be considered by means of special calculations.

5 Diminution limit of minimum longitudinal strength of ships in service**5.1****5.1.1 (1/7/2002)**

The diminution limit of the minimum section modulus Z_{mc} in cm^3 , of ships in service is given by the following formula:

$$Z_{mc} = cL^2B(C_b + 0,7)k$$

where:

L : length of ships. L is the distance, in meters, on the summer load waterline from the fore side of the stem to the after side of the rudder post, or the centre of the rudder stock if there is no rudder post. L is not to be less than 96%, and need not be greater than 97%, of the extreme length on the summer load waterline. In ships with unusual stern and bow arrangement the length L may be specially considered.

B : greatest moulded breadth in metres.

C_b : moulded block coefficient at draught d corresponding to summer load waterline, based on L and B . C_b is not to be taken less than 0.60, according to the formula:

$$C_b = \frac{\text{moulded displacement (m}^3\text{) at draught } d}{LBd}$$

c : 0,9 c_n (the value of C_n is given in Tab 1)

k : material factor, e.g:

$k = 1$ for mild steel with yield stress of 235 N/mm^2 and over;

$k = 0,78$ for high tensile steel with yield stress of 315 N/mm^2 and over,

$k = 0,72$ for high tensile steel with yield stress of 355 N/mm^2 and over.

5.1.2 (1/7/2002)

Scantlings of all continuous longitudinal members of the ship's hull girder based on the section modulus requirement in [5.1.1] above are to be maintained within 0,4 L amidships. However, in special cases, based on consideration of the type of ship, hull form and loading conditions, the scantlings may be gradually reduced towards the end of 0,4 L part, bearing in mind the desire not to inhibit the ship's loading flexibility.

5.1.3 (1/7/2002)

However, the above standard may not be applicable to ships of unusual type or design, e.g. for ships of unusual main proportions and/or weight distributions.

Table 1 : Values of C_n

	$L < 90$	$90 \leq L < 300$	$300 \leq L \leq 350$	$350 < L \leq 500$
C_n	$(118 - 0,36L) \cdot L/1000$	$10,75 - [(300 - L)/100]^{1,5}$	10,75	$10,75 - [(L - 350)/150]^{1,5}$

6 Oil tankers - Sampling method of thickness measurements for longitudinal strength evaluation and repair methods

6.1 Extent of longitudinal strength evaluation

6.1.1 (1/7/2005)

Longitudinal strength is to be evaluated within 0,4L amidships for the extent of the hull girder length that contains tanks therein and within 0,5L amidships for adjacent tanks which may extend beyond 0,4L amidships, where tanks means ballast tanks and cargo tanks.

6.2 Sampling method of thickness measurement

6.2.1 (1/7/2005)

Pursuant to the requirements of Ch 4, Sec 3, [6.4], for single hull oil tanker or Ch 4, Sec 4, [4.4] for double hull oil tankers, transverse sections are to be chosen such that thickness measurements can be taken for as many different tanks in corrosive environments as possible, e.g. ballast tanks sharing a common plane boundary with cargo tanks fitted with heating coils, other ballast tanks, cargo tanks permitted to be filled with sea water and other cargo tanks. Ballast tanks sharing a common plane boundary with cargo tanks fitted with heating coils and cargo tanks permitted to be filled with sea water are to be selected where present.

6.2.2 (1/7/2005)

The minimum number of transverse sections to be sampled is to be in accordance with Ch 4, Sec 3, Tab 4 for single hull oil tankers or Ch 4, Sec 4, Tab 3 for double hull oil tankers. The transverse sections are to be located where the largest thickness reductions are suspected to occur or are revealed from deck and bottom plating measurements prescribed in [6.2.3] and are to be clear of areas which have been locally renewed or reinforced.

6.2.3 (1/7/2005)

At least two points are to be measured on each deck plate and/or bottom shell plate required to be measured within the cargo area in accordance with the requirements of Ch 4, Sec 3, Tab 4 for single hull oil tankers or Ch 4, Sec 4, Tab 3 for double hull oil tankers.

6.2.4 (1/7/2005)

Within 0,1D (where D is the ship's moulded depth) of the deck and bottom at each transverse section to be measured in accordance with the requirements of Ch 4, Sec 3, Tab 4 for single hull oil tankers or Ch 4, Sec 4, Tab 3 for double hull oil tankers, every longitudinal and girder is to be measured on the web and face plate, and every plate is to be measured at one point between longitudinals.

6.2.5 (1/7/2005)

For longitudinal members other than those specified in [6.2.4] to be measured at each transverse section in accordance with the requirements of Ch 4, Sec 3, Tab 4 for single hull oil tankers or Ch 4, Sec 4, Tab 3 for double hull oil tankers, every longitudinal and girder is to be measured on

the web and face plate, and every plate is to be measured at least in one point per strake.

6.2.6 (1/7/2005)

The thickness of each component is to be determined by averaging all of the measurements taken in way of the transverse section on each component.

6.3 Additional measurements where the longitudinal strength is deficient

6.3.1 (1/7/2005)

Where one or more of the transverse sections are found to be deficient in respect of the longitudinal strength requirements given in this App 4, the number of transverse sections for thickness measurement is to be increased such that each tank within the 0,5L amidships region has been sampled. Tank spaces that are partially within, but extend beyond, the 0,5L region are to be sampled.

6.3.2 (1/7/2005)

Additional thickness measurements are also to be performed on one transverse section forward and one aft of each repaired area to the extent necessary to ensure that the areas bordering the repaired section also comply with the requirements of Ch 4, Sec 3 for single hull oil tankers or Ch 4, Sec 4 for double hull oil tankers.

6.4 Effective repair methods

6.4.1 (1/7/2005)

The extent of renewal or reinforcement carried out to comply with this App 4 is to be in accordance with [6.4.2].

6.4.2 (1/1/2016)

The minimum continuous length of a renewed or reinforced structural member is to be not less than twice the spacing of the primary members in way. In addition, the thickness diminution in way of the butt-joint of each joining member forward and aft of the replaced member (plates, stiffeners, girder webs and flanges, etc.) is not to be within the substantial corrosion range (i.e.:

- for non CSR ships 75% of the allowable diminution associated with the deck plating member, or;
- for ships provided with the service notation **Oil Tanker ESP CSR** the limits indicated in:
 - Section 12 of the "Common Structural Rules for Double Hull Oil Tankers" for ships contracted for construction on or after 1 April 2006 but before 1 July 2015, or
 - Part 1 Chapter 13 of the "Common Structural Rules for Bulk Carriers and Oil Tankers" for ships contracted for construction on or after 1 July 2015).

Where differences in thickness at the butt-joint exceed 15% of the lower thickness, a transition taper is to be provided.

6.4.3 (1/1/2016)

Alternative repair methods involving the fitting of straps or structural member modification are subject to special consideration. When considered, the fitting of straps is to be limited to the following conditions:

- a) to restore and/or increase longitudinal strength;

- b) the thickness diminution of the deck or bottom plating to be reinforced is not within the substantial corrosion range (i.e.:
- for non CSR ships 75% of the allowable diminution associated with the deck plating member, or;
 - for ships provided with the service notation **Oil Tanker ESP** the limits indicated in:
 - Section 12 of the "Common Structural Rules for Double Hull Oil Tankers" for ships contracted for construction on or after 1 April 2006 but before 1 July 2015, or
 - Part 1 Chapter 13 of the "Common Structural Rules for Bulk Carriers and Oil Tankers" for ships contracted for construction on or after 1 July 2015).
- c) the alignment and arrangement, including the termination of the straps, are in accordance with a standard recognised by the Society;
- d) the straps are continuous over the entire 0,5L amidships length; and
- e) continuous fillet welding and full penetration welds are used for butt welding and, depending on the width of the strap, for slot welds. The welding procedures applied are acceptable to the Society.

6.4.4 (1/7/2005)

The existing structure, adjacent to replacement areas and in conjunction with the fitted straps, etc., is to be capable of withstanding the applied loads, taking into account the buckling resistance and the condition of welds between the longitudinal members and hull envelope plating.

Part A
Classification and Surveys

Chapter 3

SCOPE OF SURVEYS (all ships)

SECTION 1	SURVEY FOR NEW CONSTRUCTION
SECTION 2	SURVEY FOR ASSIGNMENT OF CLASS OF A SHIP IN SERVICE
SECTION 3	ANNUAL SURVEY
SECTION 4	INTERMEDIATE SURVEY
SECTION 5	CLASS RENEWAL SURVEY
SECTION 6	BOTTOM SURVEY
SECTION 7	SHAFT SURVEY
SECTION 8	BOILER SURVEY
SECTION 9	GAS FUELLED SHIPS
APPENDIX 1	CLASS REQUIREMENTS AND SURVEYS OF LAID-UP SHIPS

SECTION 1

SURVEY FOR NEW CONSTRUCTION

1 Hull

1.1 General

1.1.1 Scope (1/7/2016)

The scope of this Article [1] includes the following main activities:

- a) Examination of the parts of the ship covered by classification Rules and by applicable statutory regulations for hull construction, to obtain appropriate evidence that they have been built in compliance with the Rules and regulations, taking account of the relevant approved drawings.
- b) Appraisal of the manufacturing, construction, control and qualification procedures, including welding consumables, weld procedures, weld connections and assemblies, with indication of relevant approval tests.
- c) Witnessing inspections and tests as required in the classification Rules used for ship construction including materials, welding and assembling, with specification of the items to be examined and/or tested, the methods (e.g. by hydrostatic, hose or leak testing, non-destructive examination, verification of geometry) and who is to carry out such inspections and tests.

Appraisal of materials and equipment used for ship construction and their inspection at works is not included in this Article [1]. Details of requirements for hull and machinery steel forgings and castings and for normal and higher strength hull structural steel are given in Pt D, Ch 2, Sec 3, Pt D, Ch 2, Sec 4 and Pt D, Ch 2, Sec 1, [2] respectively. Acceptance of these items is verified through the survey process carried out at the Manufacturer's works and the issuing of the appropriate certificates.

In addition to above, for Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10 (Goal-based ship construction standards for bulk carriers and oil tankers), see also Sec 2.

1.2 Definitions

1.2.1 Hull structure (1/1/2008)

The hull structure (see Note 1) is defined as follows:

- a) hull envelope including all internal and external structures,
- b) superstructures, deckhouses and casings,
- c) welded foundations, e.g. main engine seatings,
- d) hatch coamings, bulwarks,

- e) all penetrations fitted and welded into bulkheads, decks and shell,
- f) the fittings of all connections to decks, bulkheads and shell, such as air pipes and ship side valves - all items of ILLC 1966, as amended,
- g) welded attachments to shell, decks and primary members, e.g. crane pedestals, bits and bollards, but only as regards their interaction on the hull structure.

Note 1: A glossary of hull terms and hull survey terms can be found in IACS Recommendation 82.

1.2.2 Documents (1/1/2008)

Reference to documents also includes electronic transmission or storage.

1.2.3 Survey methods (1/7/2016)

The survey methods which the Surveyor is directly involved in are as follows:

- a) Patrol is defined as the act of checking on an independent and unscheduled basis that the applicable processes, activities and associated documentation of the shipbuilding functions identified in Tab 1 continue to conform to classification and statutory requirements.
- b) Review is defined as the act of examining documents in order to determine traceability and identification, and to confirm that processes continue to conform to classification and statutory requirements.
- c) Witness is defined as the attendance at scheduled inspections in accordance with the agreed Inspection and Test Plans to the extent necessary to check compliance with the survey requirements.

1.3 Application

1.3.1 Classification items (1/1/2008)

This Article [1] covers the survey of all new construction of steel ships intended for classification and for international voyages except for:

- a) those defined in SOLAS I/3
- b) high speed craft as defined in I/1.3.1 of the 2000 High Speed Craft Code
- c) Mobile Offshore Drilling Units as defined in I/1.2.1 of the MODU Code.

1.3.2 Statutory items (1/7/2010)

This Article [1] covers all delegated statutory items relevant to the hull structure and coating, i.e. Load Line and SOLAS Safety Construction.

1.3.3 Equipment, fittings and appendages (1/1/2008)

This Article [1] does not cover the manufacture of equipment, fittings and appendages regardless of whether they are made inside or outside the shipyard, examples being as follows:

- a) hatch covers,
- b) doors and ramps integral with the shell and bulkheads,
- c) rudders and rudder stock,
- d) all forgings and castings integral to the hull.

Evidence of acceptance is to be provided by accompanying documentation from the Surveyor at the Manufacturer's and verified at the shipyard.

1.3.4 Installation, welding and testing (1/1/2008)

This Article [1] applies to the installation in the ship, welding and testing of:

- a) the items listed in [1.3.3] above
- b) equipment forming part of the watertight and weather-tight integrity of the ship.

1.3.5 Location of construction (1/7/2010)

This Article [1] applies to the hull structures and coating constructed:

- a) at the shipbuilder's facilities,
- b) by subcontractors at the shipbuilder's facilities,
- c) by subcontractors at their own facilities or at other remote locations.

1.4 Personnel

1.4.1 Qualification and monitoring of exclusive Surveyors (1/7/2010)

The Society's Surveyors are to confirm through patrol, review and witness, as defined in [1.2.3], that ships are built using approved plans in accordance with the relevant Rules and statutory requirements. The Surveyors are to be qualified to be able to carry out their tasks, and procedures are to be in place to ensure that their activities are monitored.

1.5 Survey of the hull structure

1.5.1 Surveyable items (1/7/2010)

Tab 1 provides a list of surveyable items for the hull structure and coating covered by this Article [1], including:

- a) description of the shipbuilding functions;
- b) classification and statutory survey requirements;
- c) survey method required for classification;
- d) relevant Society Rule and statutory requirement references;
- e) documentation to be available for the Surveyor during construction. The shipbuilder is to provide the Surveyors with access to documentation required by the Society; this includes documentation retained by the shipbuilder or other third parties. The list of documents approved or

reviewed by the Society for the specific new construction is as follows:

- 1) plans and supporting documents,
 - 2) examination and testing plans,
 - 3) NDE plans,
 - 4) welding consumable details,
 - 5) welding procedure specifications,
 - 6) welding plan or details,
 - 7) welders' qualification records,
 - 8) NDE operators' qualification records;
- f) documents to be inserted into the ship construction file. Refer to [1.10] for details;
- g) a list of specific activities which are relevant to the shipbuilding functions. This list is not exhaustive and can be modified to reflect the construction facilities or specific ship type.

1.5.2 Materials and equipment supplied (1/7/2015)

During the construction process as required, evidence is also to be made available by the shipbuilder to the Surveyor to prove that the materials and equipment supplied to the ship have been built or manufactured under survey relevant to the classification Rules and statutory requirements.

Evidence that no material containing asbestos has been installed on board is to be provided to the Surveyor.

1.6 Review of the shipyard

1.6.1 Review of the construction facilities (1/7/2010)

The Society is to familiarise itself with the yard's production facilities, management processes and safety for consideration in terms of compliance with the requirements of Tab 1 (see Note 1) prior to any steelwork or construction taking place in the following circumstances:

- a) where the Society has no, or no recent, experience of the construction facilities - typically after a one year lapse - or when significant new infrastructure has been added,
- b) where there has been significant management or personnel restructuring having an impact on the ship construction process, or
- c) where the shipbuilder contracts to construct a ship of a different type or substantially different in design.

Note 1: Reference is made to [1.11] - Shipyard review record, as an example.

1.7 Newbuilding survey planning

1.7.1 Kick-off meeting (1/7/2016)

Prior to commencement of surveys for any newbuilding project, the Society is to discuss with the shipbuilder at a kick-off meeting the items listed in Tab 1. The purpose of the meeting is to review and agree how the list of specific activities shown in Tab 1 is to be addressed. The meeting is to take into account the shipbuilder's construction facilities and ship type, including the list of proposed subcontractors. A record of the meeting is to be made, based on the contents of Tab 1. Tab 1 itself can be used as the record with

comments made in the appropriate column. If the Society has appointed a Surveyor for a specific newbuilding project then this Surveyor is to attend the kick-off meeting. The builder should agree to undertake ad hoc investigations during construction as may be requested by Class where areas of concern arise and to keep the Society advised of the progress of any such investigation. Whenever an investigation is undertaken, the builder is to be requested, in principle, to agree to suspend relevant construction activities if warranted by the severity of the problem.

1.7.2 Delegated statutory requirements (1/1/2008)

The records are to take note of specific published Administration requirements and interpretations of delegated statutory requirements.

1.7.3 Construction progress records (1/7/2016)

The shipyard shall be requested to advise of any changes to the activities agreed at the kick-off meeting and these are to be documented in the survey plan. For instance, if the shipbuilder chooses to use or change subcontractors, or to incorporate any modifications necessitated by changes in production or inspection methods, rules and regulations, structural modifications, or in the event where increased inspection requirements are deemed necessary as a result of a substantial non-conformance or otherwise.

1.7.4 Fabrication quality standard (1/7/2010)

Shipbuilding quality standards for the hull structure during new construction are to be reviewed and agreed during the kick-off meeting. Structural fabrication is to be carried out in accordance with IACS Recommendation 47, "Shipbuilding and Repair Quality Standard", or a recognised fabrication standard which has been accepted by the Society prior to the commencement of fabrication/construction. The work is to be carried out in accordance with the Rules and under survey of the Society.

1.7.5 Other attendees at the kick-off meeting (1/1/2008)

The kick-off meeting may be attended by other parties, such as the Owner or Administrations, subject to agreement by the shipbuilder.

1.7.6 Special cases of kick-off meeting (1/7/2016)

In the event of series ship production, production (see Note 1), the requirement for a kick off meeting [1.7.1] may be waived for the second and subsequent ships provided that no changes to the specific activities agreed in the kick off meeting for the first ship are introduced. If any changes are introduced, these are to be agreed in a new dedicated meeting and documented in a record of such meeting.

Note 1: Series Ship Production: vessels in the series subsequent to the first one (prototype), i.e. sister ships built in the same shipyard.

1.8 Examination and test plan for newbuilding activities

1.8.1 Plans to be provided (1/1/2008)

The shipbuilder is to provide plans of the items which are intended to be examined and tested. These plans need not

be submitted for approval and examination at the time of the kick-off meeting. They are to include:

- a) proposals for the examination of completed steelwork - generally referred to as the block plan and including details of joining blocks together at the pre-erection and erection stages or at other relevant stages;
- b) proposals for fit-up examinations where necessary;
- c) proposals for testing of the structure (leak and hydrostatic) as well as for all watertight and weathertight closing appliances;
- d) proposals for non-destructive examination;
- e) any other proposals specific to the ship type or to the statutory requirements.

1.8.2 Submittal of plans to the Surveyors (1/7/2016)

The plans and any modifications to them are to be submitted to the Surveyors in sufficient time to allow review before the relevant survey activity commences.

In addition to above, for Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10 see also [2].

1.9 Proof of the consistency of surveys

1.9.1 Evidence for survey planning and activities (1/1/2008)

Inspection and test records, checklists etc are to be kept in order to provide evidence that the Society's Surveyors have complied with the requirements of the newbuilding survey planning and duly participated in the relevant activities shown in the shipbuilder's examination and test plans.

1.9.2 Recording of patrolling activities (1/7/2016)

In addition, the classification society is to maintain records of deficiencies found during the patrolling activities required in Table 1 and described in [1.2.3].

Records shall include the date when deficiency was found, description of the deficiency and the date the deficiency was cleared.

1.10 Ship Construction File

1.10.1 (1/7/2016)

The purposes of this paragraph are applicable to all ships except the Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10 for which the [3] of Appendix 2 is to be applied.

1.10.2 Document provider (1/7/2010)

The shipbuilder is to deliver documents for the Ship Construction File. In the event that items have been provided by another Party such as the Shipowner, and where separate arrangements have been made for document delivery excluding the shipbuilder, that Party has the responsibility.

The Ship Construction File is to be reviewed for content in accordance with the requirements of [1.10.3].

1.10.3 Contents of the Ship Construction File (1/1/2016)

It is recognised that the purpose of documents held in the Ship Construction File on board the ship is to facilitate surveys and repairs and maintenance, and, therefore, in addi-

tion to those listed in Tab 1, such documents are to include, but not be limited to, the following:

- a) as-built structural drawings including scantling details, material details and, as applicable, wastage allowances, location of butts and seams, cross-section details and locations of all partial and full penetration welds, areas identified for close attention and rudders;
- b) manuals required for classification and statutory requirements, e.g. loading and stability, bow doors, inner doors, side shell doors and stern doors - operations and maintenance manuals (Pt B, Ch 9, Sec 5 and Pt B, Ch 9, Sec 6);
- c) ship structure access manual, as applicable;
- d) copies of certificates of forgings and castings welded into the hull (Pt D, Ch 2, Sec 3 and Pt D, Ch 2, Sec 4);
- e) details of equipment forming part of the watertight and weathertight integrity of the ship;
- f) tank testing plan including details of the test requirements (Pt B, Ch 12, Sec 3);
- g) corrosion protection specifications (Pt B, Ch 11, Sec 1 and Pt E, Ch 4, Sec 3, [11]);
- h) details for the in-water survey, if applicable, information for divers, clearance measurement instructions etc, tank and compartment boundaries;
- i) docking plan and details of all penetrations normally examined at dry-docking;
- j) Coating Technical File, for ships subject to compliance with the IMO Performance Standard for Protective Coat-

ings (PSPC), as a class requirement under the Common Structural Rules.

1.11 Shipyard review record

1.11.1 Contents of the shipyard review record (1/1/2008)

The shipyard review record is to contain the following information, for which the Society form "Shipyard review record" is to be filled in as appropriate:

- a) name and location of shipyard
- b) details of any management systems
- c) construction facilities
- d) shipyard control of qualified welders
- e) features of construction procedure
- f) quality control system
- g) measures for safety and health
- h) control system of non-destructive examination (NDE)
- i) quality control on production line.

Table 1 : New construction survey activities (1/1/2018)

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
1	Welding:								

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
1.1	Welding consumables	Approved by Society separately at the Manufacturer's	Review approval status and patrol, verify storage, handling and treatment in accordance with Manufacturer's requirements	Pt D, Ch 5, Sec 2		Consumable specification and approval status	Not required	Identify consumables against approved list	
								Verify temporary and permanent storage facilities	E.g. kept dry, covered, where applicable heated
								Verify traceability	E.g. random batch number checking
1.2	Welder qualification	Qualified welders	Review of welder certification and patrol	Guide for Welding		Shipyard's records with individual's identification	Not required	Verify welder qualification standard, e.g. class or recognised standard approval	
								Verify welder approved for weld position	
								Verify validity of qualification certificate	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
1.3	Welding - mechanical properties (welding procedures)	All weld joint configurations, positions and materials to be covered by weld procedures approved by the Society or by another QSCS Classification Society available	Review and patrol	Pt D, Ch 5, Sec 4		Approved weld procedure specification and welding plan relevant to the ship project or process	Not required	Verify procedures are available at relevant workstations	
		The Society witnesses all new weld procedure qualification tests carried out in the shipyard whenever the Society is surveying in the shipyard	Witness					Verify weld procedure records have been approved and cover all weld processes and positions in accordance with classification or recognised standards and are available for the Surveyor's reference	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
1.3a	Welding equipment	Correctly calibrated and maintained	Patrol and review			Ship-builder's maintenance and calibration records	Not required	Verify condition of machinery and equipment	
								Verify machines are calibrated by appropriate staff	
								Verify calibration carried out in accordance with Manufacturer's recommendations	
								Verify calibration in accordance with maintenance schedule	
1.3b	Welding environment	Satisfactory environment	Patrol	Guide for welding			Not required	Verify welding areas clean, dry, well lit	
								Confirm relevant measures taken for any pre- or post- heat treatment, drying of surfaces prior to welding	
								Confirm shielding gases, fluxes protected	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
1.3c	Welding	Sufficient number of skilled supervisors	Review and Patrol	- Guide for welding - Rules for carrying out non-destructive examinations of welding				Verify supervision is effective	
1.4	Welding- surface discontinuities	Substantially free from significant indications, satisfactory profile and size	Visual examination, surface detection techniques, review of documents and patrol of operator	- Guide for welding - Rules for carrying out non-destructive examinations of welding		Ship-builder's and recognised standards and Rules as applicable, welding and NDT plans, NDT reports, operator qualifications	Not required	Identify workstations where NDT is carried out, e.g. panel line butt welds, castings into hull structure	
								Verify NDT carried out in accordance with approved plans where applicable	
								Verify suitability of NDT methods	
								Verify operators suitably qualified, particularly where sub-contractors have been employed	
								Verify NDT is carried out according to the acceptable process	
								Review NDT records	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project	
1.5	Welding - embedded discontinuities	NDT is to be carried out by qualified operators capable of ensuring that welds are substantially free from significant indications	Radiography and ultrasonic testing, review of documents and patrol of operator, examination of films	- Guide for Welding - Rules for carrying out non-destructive examinations of welding		Ship-builder's and recognised standards and Rules as applicable, welding and NDT plans, NDT reports, operator qualifications	Not required	Identify workstations where NDT is carried out, e.g. panel line butt welds, castings into hull structure		
								Verify NDT carried out in accordance with approved plans, where applicable		
									Verify suitability of NDT methods	
									Verify operators suitably qualified, particularly where sub-contractors have been employed	
									Verify that records have been completed and in accordance with recognised standards, e.g. IQI and sensitivity recorded	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
1.5 Cont'd	Welding - embedded discontinuities							Verify that reports and radiographs have been evaluated correctly by the ship-builder. Systematic review of radiographs carried out by the Surveyor	
								Verify equipment calibration is satisfactory and in accordance with Manufacturer's and recognised standards and requirements	
								Verify NDT is carried out according to the acceptable process	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project	
2	Steel preparation and fit up:									
2.1	Surface preparation, marking and cutting	Traceability and acceptability of material, check of steel plates and profiles, material type, scantling identification, testing marks	Patrol	Guide for welding		Material certificates, ship-builder's marking/cutting production documents at the work stage - documents retained at the facility	Not required	Verify stockyard storage satisfactory		
									Verify material traceability, e.g. stamping identification against material certification, archiving of records	
									Verify transfer marking after treatment line	
									Verify standard of shot-blasting and priming	
									Verify suitability of primer	
									Verify that steel grades can be identified	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
2.1 Cont'd	Surface preparation, marking and cutting							Verify machinery is adjusted to stay within the Society's or Manufacturer's recommendations	
								Verify accuracy of marking and cutting	
								Verify storage of piece parts	
2.2	Straightening	Maintain material properties. Acceptance of forming method against improper deformations	Patrol and review	Guide for welding		Recognised standards, approved procedures	Not required	Verify that straightening processes are approved for the grade and type of steel, e.g. thermo mechanical control process (tmcp), Z plate	
								Verify that plates and sections are within recognised tolerances	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
2.3	Forming	Maintain material properties. Acceptance of forming method against improper deformations	Patrol	Guide for welding		Ship-builder's procedure for hot forming	Not required	Verify that temperature control is exercised by the operator	
								Verify that suitable methods of temperature control are available when forming special steels and materials	
								Verify that forming processes are acceptable	
2.4	Conformity with alignment/fit-up/gap criteria	Check alignment/fit-up/gap against reference standards	Patrol	Guide for welding		Ship-builder's and recognised standards and Rules as applicable	Not required	Verify the processes to ensure satisfactory fit-up and alignment at all workstations	
								Verify that edge preparations are re-instated where lost during fitting operations	
								Verify remedial procedures are in place to compensate for wide gaps and alignment deviations	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
2.5	Conformity for critical areas, when defined, with alignment/fit-up or weld configuration	Check alignment/fit-up/gap against approved drawings	Witness and review	Guide for welding		Ship-builder's and recognised standards and Rules as applicable, approved plan or standard, builder's records	Approved plans of critical areas, if applicable	Verify that the information relevant to the latest approved drawings is available at the workstations	
								Verify the processes to ensure satisfactory fit-up and alignment at all workstations	
								Verify that edge preparations are re-instated where lost during fitting operations	
								Verify remedial procedures are in place to compensate for wide gaps and alignment deviations	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project	
3	Steelwork process, e.g. sub-assembly, block, grand and mega block assembly, pre-erection and erection, closing plates	Compliance with approved drawings, visual examination of welding and material, check of alignment and deformations	Patrol of the process and witness of the completed item	Guide for welding		Approved plans, ship-builder's inspection records, ship-builder's and recognised standards and Rules as applicable, construction plan (steel-work sub-division)		Verify that the information relevant to the latest approved drawings is available at the workstations		
									Verify that correct weld sizes have been adopted	
									Verify operation of the welding processes at the different work stages is satisfactory	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
3 Cont'd	Steelwork process, e.g. sub-assembly, block, grand and mega block assembly, pre-erection and erection, closing plates							Verify that piece parts are identifiable	
								Verify that fit-ups are within recognised tolerances	
								Verify that correct welding requirements specified in reference 1 of this table have been adopted	
								Verify processes for closing plates are acceptable	
								Confirm that steelwork is in accordance with the approved plan	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
4	Remedial work and alteration	Welding, check against deformation, alignment	Review records and witness	Guide for welding		Permanent record of shipyard surveyable item		Verify that records have been maintained of significant deviations from the approved plans, for situations such as mis-cut openings, re-routing outfit items	
								Verify that all deviations brought to the attention of the Society by the ship-builder are acceptable	
5	Tightness testing, including leak and hose testing, hydro-pneumatic testing	Absence of leaks	Review and witness of the test	Pt B, Ch 12, Sec 3	Reg. II-1/11 of SOLAS as amended	Approved tank testing plan, ship-builder's inspection records	Approved tank testing plan	Confirm that tank testing is carried out in accordance with the approved plan	
								Confirm the methods used to carry out leak testing	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
5 Cont'd	Tightness testing, including leak and hose testing, hydropneumatic testing							Confirm that correct test pressures maintained for leak, hose and hydro and hydropneumatic testing are satisfactory	
								Verify that adequate records of the tank testing have been maintained	
6	Structural testing	Structural adequacy of the design	Review and witness of the test	Pt B, Ch 12, Sec 3	Reg. II-1/11 of SOLAS as amended	Approved tank testing plan, ship-builder's inspection records	Approved tank testing plan	Confirm that tank testing is carried out in accordance with the approved plan	
								Confirm that correct test pressures maintained for testing are satisfactory	
								Verify that adequate records of the tank testing have been maintained	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
7	Corrosion protection systems, e.g. coatings, cathodic protection, impressed current, except for coating system subject to PSPC	Salt water ballast tanks with boundaries formed by the hull envelope, and also bulk carrier hold internal surfaces, coamings and hatch covers are to have an efficient protective coating. Safety aspects of cathodic systems to be dealt with separately.	Review and report on builder's & Manufacturer's documentation	Pt B, Ch 11, Sec 1 and Pt E, Ch 4, Sec 3, [11]	Reg. II-1/3-2 of SOLAS as amended	Manufacturer's and builder's specification	Corrosion protection specifications	Verify that applied coatings are approved and review records of application	
									Verify that adequate records have been maintained and copied to the ship construction file
	Application Antifouling Systems		Review		AFS Convention	Painting specification	Paint specification and Mfq declaration	Verify that adequate records have been maintained and copied to the ship construction file	
7.1	Application of protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers subject to PSPC	Monitor implementation of the coating inspection requirements	Patrolling and review	UI SC223.	Reg. II-1/3-2 of SOLAS as amended	Signed and Verified Tripartite Agreement	Coating technical file	Verify that applied coatings are approved and review records of application in accordance with Chapter 7 of Annex to MSC.215(82).	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
8	Installation, welding and testing of the following:								
8.1	Hatch covers	Tightness and securing	Witness	Pt B, Ch 12, Sec 3	Reg. 13-14-15 and 16 of ILLC '66	Approved tank testing plan, ship-builder's inspection records	Details required, structural drawings	Confirm leak test of hatch covers	
								Confirm operation and securing test	
8.2	Doors and ramps integral with the shell and bulkheads	Tightness and securing	Witness	Pt B, Ch 12, Sec 3	Reg. II-1/18 of SOLAS as amended; Reg. 12 and 21 of ILLC '66	Approved tank testing plan, ship-builder's inspection records	Details required	Confirm leak test	
								Confirm operation and securing test	
								Confirm safety device operation	
								Ensure correct maintenance logs/manuals supplied with the ship construction file	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
8.3	Rudders	Fitting	Witness	Pt B, Ch 12, Sec 3		Approved plan, ship-builder's inspection records	Details required, structural drawings	Confirm alignment and mounting and fitting up to the connection to the tiller	
								Confirm function test	
								Verify fitting of pintles and all securing bolts	
								Verify all fit-up records including all clearances maintained and placed into ship construction file	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
8.4	Forgings and castings	Compliance with approved drawings, visual examination of welding and material, check alignment and deformations	Patrol of the process and witness of the completed item	Pt D, Ch 2, Sec 3 and Pt D, Ch 2, Sec 4		Approved plans, ship-builder's inspection records, ship-builder's and recognised standards and Rules as applicable, construction plan (steel-work sub-division)	Copies of certificates of forgings and castings	Verify castings and forgings against material certificate	
								Verify that correct welding and fit-up requirements specified in reference 1, 2.4 and 2.5 of this table have been adopted	
								Verify that material certificates are included in the ship construction file	
8.5	Appendages							Verify that correct welding and fit-up requirements specified in reference 1, 2.4 and 2.5 of this table have been adopted	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
8.6	Equipment forming the watertight and weather-tight integrity of the ship, e.g. overboard discharges, air pipes, ventilators	Tightness and securing	Witness		Reg. II-1/16 and Reg II-1/16-1 of SOLAS as amended; Reg. 17-18-19-20-22-23 of ILLC '66	Approved tank testing plan, ship-builder's inspection records	Details required	Verify that correct welding and fit-up requirements specified in reference 1, 2.4 and 2.5 of this table have been adopted	
								Verify compliance with Load line Convention 1966 as amended - i.e. all fittings in accordance with the record of freeboard assignment	
				Pt C, Ch 1, Sec 10				Verify air pipes, vents etc. closing devices are approved type	
								Verify material certificates for overboard discharges, where applicable	
								Verify record of freeboard assignment and all material certificates included in the ship construction file	

No.	Shipbuilding quality control function	Survey Requirements for Classification	Survey Method required for Classification	Society Rule reference	Statutory requirements and relevant reference	Documentation available to Surveyor during construction	Documentation for Ship Construction File	Specific activities	Society proposals for the project
9	Freeboard marks and draught marks	Within allowable tolerances and in accordance with the freeboard assignment	Witness		Reg. 4-5-6-7 and 8 of ILLC '66		Details required	Verify freeboard marks in accordance with load line assignment	
								Verify draught marks in accordance with the agreed tolerances specified by the builder unless more onerous flag State requirements	
10	Principal dimensions	Within allowable tolerances	Review and witness	Guide for welding		Details required		Verify principal dimensions in accordance with recognised standards	
								Verify dimensions included in ship construction file	
11	Safety Construction certification	No outstanding imperfections or defects	Witness		Reg I/7 or Reg. I/10 of SOLAS as amended, as appropriate			Verify that Administration requirements have been incorporated into the hull structure	

2 Requirements for Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10

2.1 Examination and test plan for newbuilding activities

2.1.1 Plans to be provided (1/7/2016)

The shipbuilder is to provide plans of the items which are intended to be examined and tested in a document known as the Survey Plan, taking into account the ship type and design. This Survey Plan shall be reviewed at the time of the kick off meeting, and are to include:

- a) a set of requirements, including specifying the extent and scope of the construction survey(s) and identifying areas that need special attention during the survey(s), to ensure compliance of construction with mandatory ship construction standards including:
 - 1) Types of surveys (visual, non-destructive examination, etc.) depending on location, materials, welding, casting, coatings, etc.
 - 2) Establishment of a construction survey schedule for all assembly stages from the kick-off meeting, through all major construction phases, up to delivery.
 - 3) Inspection/survey plan, including provisions for critical areas identified during design approval.
 - 4) Inspection criteria for acceptance.
 - 5) Interaction with shipyard, including notification and documentation of survey results.
 - 6) Correction procedures to remedy construction defects.
 - 7) List of items that would require scheduling or formal surveys.
 - 8) Determination and documentation of areas that need special attention throughout ship's life, including criteria used in making the determination.
- b) a description of the requirements for all types of testing during survey, including test criteria.

2.2 Design Transparency

2.2.1 (1/7/2016)

For ships subject to compliance with IMO Res. MSC.287(87), IMO Res. MSC.290(87), IMO Res. MSC.296(87) and IMO MSC.1/Circ.1343, readily available documentation is to include the main goal-based parameters and all relevant design parameters that may limit the operation of the ship.

2.3 Ship Construction File (SCF)

2.3.1 Classification items (1/7/2016)

A Ship Construction File (SCF) with specific information on how the functional requirements of the Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers have been applied in the ship design and construction is to be provided upon delivery of a new ship, and kept on board

the ship and/or ashore and updated as appropriate throughout the ship's service. The contents of the Ship Construction File are to conform to the requirements below:

- a) The following design specific information is to be included in the Ship Construction File (SCF):
 - 1) Areas requiring special attention throughout the ship's life. (including critical structural areas).
 - 2) All design parameters limiting the operation of a ship.
 - 3) Any alternatives to the rules, including structural details and equivalency calculations.
 - 4) "As built" drawings and information which are verified to incorporate all alterations approved by the recognized organization or flag State during the construction process including scantling details, material details, location of butts and seams, cross section details and locations of all partial and full penetration welds.
 - 5) Net (renewal) scantlings for all the structural constituent parts, as built scantlings and voluntary addition thicknesses.
 - 6) Minimum hull girder section modulus along the length of the ship which has to be maintained throughout the ship's life, including cross section details such as the value of the area of the deck zone and bottom zone, the renewal value for the neutral axis zone.
 - 7) A listing of materials used for the construction of the hull structure, and provisions for documenting changes to any of the above during the ship's service life.
 - 8) Copies of testing certificates of forgings and castings welded into the hull (Pt D, Ch 5, Sec 4).
 - 9) Details of equipment forming part of the watertight and weather tight integrity of the ship.
 - 10) Tank testing plan including details of the test requirements (Pt B, Ch 12, Sec 3).
 - 11) Details for the in-water survey, when applicable, information for divers, clearances measurements instructions etc., tank and compartment boundaries.
 - 12) Docking plan and details of all penetrations normally examined at dry-dock.
 - 13) Coating Technical File, for ships subject to compliance with the IMO Performance Standard for Protective Coatings (PSPC2).
- b) Refer to Tab 2 for details of information to be further included. This information has to be kept on board the ship and/or ashore and updated as appropriate throughout the ship's life in order to facilitate safe operation, maintenance, survey, repair and emergency measure.
- c) It is to be noted that parts of the content of the SCF may be subject to various degrees of restricted access and that such documentation may be appropriately kept ashore.
- d) The SCF has to include the list of documents constituting the SCF and all information listed in Tab 2, which is required for a ship's safe operation, maintenance, sur-

vey, repair and in emergency situations. Details of specific information that is not considered to be critical to safety might be included directly or by reference to other documents.

- e) When developing an SCF, all of the columns in Tab 2 of this Appendix have to be reviewed to ensure that all necessary information has been provided.
- f) It may be possible to provide information listed in the annex under more than one Tier II (see Note 1) functional requirement as a single item within the SCF, for example, the Coating Technical File required by the PSPC (see Note 2) is relevant for both "Coating life" and "Survey during construction".

Note 1: Tier II items means the functional requirements included in the International Goal-based Ship Construction Standards for

Bulk Carriers and Oil Tankers (GBS), adopted by IMO Res. MSC 287(87).

- Note 2: Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers, adopted by IMO Res. MSC 215(82), as amended and Performance standard for protective coatings for cargo oil tanks of crude oil tankers, adopted by IMO Res. MSC 288(87), as amended.
- g) The SCF has to remain with the ship and, in addition, be available to its classification society and flag State throughout the ship's life. Where information not considered necessary to be on board is stored ashore, procedures to access this information should be specified in the onboard SCF. The intellectual property provisions within the SCF should be duly complied with.
 - h) The SCF should be updated throughout the ship's life at any major event, including, but not limited to, substantial repair and conversion, or any modification to the ship structure.

Table 2 : List of Information to be Included in the Ship Construction File (SCF) (1/7/2016)

Tier II Items		Information to be included	Further explanation of the content	Example documents	Normal storage location
DESIGN					
1	Design life	<ul style="list-style-type: none"> • assumed design life in years 	<ul style="list-style-type: none"> • statement or note on midship section 	<ul style="list-style-type: none"> • SCF-specific • midship section plan 	<ul style="list-style-type: none"> on board ship on board ship
2	Environmental conditions	<ul style="list-style-type: none"> • assumed environmental conditions 	<ul style="list-style-type: none"> • statement referencing data source or Rule (specific rule and data) or; • in accordance with Rule (date and revision) 	<ul style="list-style-type: none"> • SCF-specific 	<ul style="list-style-type: none"> on board ship
3	Structural strength				
<p>Notes:</p> <p>(1) "SCF-specific" means documents to be developed especially to meet the requirements of the GBS guidelines (MSC.1/Circ.1343).</p> <p>(2) "Key construction plans" means plans such as midship section, main O.T. and W.T. transverse bulkheads, construction profiles/plans, shell expansions, forward and aft sections in cargo tank (or hold) region, engine-room construction, forward construction and stern construction drawings.</p> <p>(3) "Yard plans" means a full set of structural drawings, which include scantling information of all structural members.</p> <p>(4) "Hull form" means a graphical or numerical representation of the geometry of the hull. Examples would include the graphical description provided by a lines plan and the numerical description provided by the hull form data stored within an onboard computer.</p> <p>(5) "Lines plan" means a special drawing which is dedicated to show the entire hull form of a ship.</p> <p>(6) "Equivalent (to Lines plan)" means a set of information of hull form to be indicated in key construction plans for SCF purposes. Sufficient information should be included in the drawings to provide the geometric definition to facilitate the repair of any part of the hull structure.</p> <p>(7) "Normal storage location" means a standard location where each SCF information item should be stored. However, those items listed as being on board in the table above should be on board as a minimum to ensure that they are transferred with the ship on a change of owner.</p> <p>(8) "Shore archive" is to be operated in accordance with applicable international standards.</p>					

Tier II Items		Information to be included	Further explanation of the content	Example documents	Normal storage location
3.1	General design	<ul style="list-style-type: none"> applied Rule (date and revision) 	<ul style="list-style-type: none"> applied design method alternative to Rule and subject structure(s) 	<ul style="list-style-type: none"> SCF-specific 	on board ship
		<ul style="list-style-type: none"> applied alternative to Rule 		<ul style="list-style-type: none"> capacity plan 	on board ship
3.2	Deformation and failure modes	<ul style="list-style-type: none"> calculating conditions and results 	<ul style="list-style-type: none"> allowable loading pattern 	<ul style="list-style-type: none"> loading manual 	on board ship
		<ul style="list-style-type: none"> assumed loading conditions 		<ul style="list-style-type: none"> maximum allowable hull girder bending moment and shear force 	<ul style="list-style-type: none"> trim and stability booklet
3.3	Ultimate strength	<ul style="list-style-type: none"> operational restrictions due to structural strength 	<ul style="list-style-type: none"> maximum allowable cargo density or storage factor 	<ul style="list-style-type: none"> loading instruction manual 	on board ship
				<ul style="list-style-type: none"> operations and maintenance manuals 	on board ship
				<ul style="list-style-type: none"> strength calculation 	on shore archive

Notes:

- (1) "SCF-specific" means documents to be developed especially to meet the requirements of the GBS guidelines (MSC.1/Circ.1343).
- (2) "Key construction plans" means plans such as midship section, main O.T. and W.T. transverse bulkheads, construction profiles/plans, shell expansions, forward and aft sections in cargo tank (or hold) region, engine-room construction, forward construction and stern construction drawings.
- (3) "Yard plans" means a full set of structural drawings, which include scantling information of all structural members.
- (4) "Hull form" means a graphical or numerical representation of the geometry of the hull. Examples would include the graphical description provided by a lines plan and the numerical description provided by the hull form data stored within an onboard computer.
- (5) "Lines plan" means a special drawing which is dedicated to show the entire hull form of a ship.
- (6) "Equivalent (to Lines plan)" means a set of information of hull form to be indicated in key construction plans for SCF purposes. Sufficient information should be included in the drawings to provide the geometric definition to facilitate the repair of any part of the hull structure.
- (7) "Normal storage location" means a standard location where each SCF information item should be stored. However, those items listed as being on board in the table above should be on board as a minimum to ensure that they are transferred with the ship on a change of owner.
- (8) "Shore archive" is to be operated in accordance with applicable international standards.

Tier II Items		Information to be included	Further explanation of the content	Example documents	Normal storage location
3.4	Safety margins	<ul style="list-style-type: none"> strength calculation results 	<ul style="list-style-type: none"> bulky output of strength calculation 	<ul style="list-style-type: none"> areas prone to yielding and/or buckling 	on board ship
			<ul style="list-style-type: none"> plan showing highly stressed areas (e.g. critical structural areas) prone to yielding and/or buckling 		
		<ul style="list-style-type: none"> gross hull girder section modulus 			
		<ul style="list-style-type: none"> minimum hull girder section modulus along the length of the ship to be maintained throughout the ship's life, including cross section details such as the value of the area of the deck zone and bottom zone, the renewal value for the neutral axis zone 		<ul style="list-style-type: none"> general arrangement plan 	on board ship
		<ul style="list-style-type: none"> gross scantlings of structural constituent parts 	<ul style="list-style-type: none"> structural drawings 	<ul style="list-style-type: none"> key construction plans 	on board ship
		<ul style="list-style-type: none"> net scantlings of structural constituent parts, as built scantlings and voluntary addition thicknesses 	<ul style="list-style-type: none"> rudder and stern frame 		
			<ul style="list-style-type: none"> structural details of typical members 	<ul style="list-style-type: none"> rudder and rudder stock plans 	on board ship
				<ul style="list-style-type: none"> structural details 	on board ship
		<ul style="list-style-type: none"> yard plans 	on shore archive		
		<ul style="list-style-type: none"> dangerous area plan 	on board ship		

Notes:

- (1) "SCF-specific" means documents to be developed especially to meet the requirements of the GBS guidelines (MSC.1/Circ.1343).
- (2) "Key construction plans" means plans such as midship section, main O.T. and W.T. transverse bulkheads, construction profiles/plans, shell expansions, forward and aft sections in cargo tank (or hold) region, engine-room construction, forward construction and stern construction drawings.
- (3) "Yard plans" means a full set of structural drawings, which include scantling information of all structural members.
- (4) "Hull form" means a graphical or numerical representation of the geometry of the hull. Examples would include the graphical description provided by a lines plan and the numerical description provided by the hull form data stored within an onboard computer.
- (5) "Lines plan" means a special drawing which is dedicated to show the entire hull form of a ship.
- (6) "Equivalent (to Lines plan)" means a set of information of hull form to be indicated in key construction plans for SCF purposes. Sufficient information should be included in the drawings to provide the geometric definition to facilitate the repair of any part of the hull structure.
- (7) "Normal storage location" means a standard location where each SCF information item should be stored. However, those items listed as being on board in the table above should be on board as a minimum to ensure that they are transferred with the ship on a change of owner.
- (8) "Shore archive" is to be operated in accordance with applicable international standards.

Tier II Items		Information to be included	Further explanation of the content	Example documents	Normal storage location
3.4 cont.		<ul style="list-style-type: none"> hull form 	<ul style="list-style-type: none"> hull form information indicated in key construction plans 	<ul style="list-style-type: none"> lines plan or	on shore archive
			<ul style="list-style-type: none"> hull form data stored within an onboard computer necessary for trim and stability and longitudinal strength calculations 		equivalent
4	Fatigue life	<ul style="list-style-type: none"> applied Rule (date and revision) 	<ul style="list-style-type: none"> applied design method alternative to Rule and subject structures 	<ul style="list-style-type: none"> SCF-specific 	on board ship
		<ul style="list-style-type: none"> applied alternative to Rule 			
		<ul style="list-style-type: none"> calculating conditions and results 	<ul style="list-style-type: none"> assumed loading conditions and rates 	<ul style="list-style-type: none"> structural details 	on board ship
		<ul style="list-style-type: none"> assumed loading conditions 			
		<ul style="list-style-type: none"> fatigue life calculation results 	<ul style="list-style-type: none"> bulky output of fatigue life calculation 	<ul style="list-style-type: none"> fatigue life calculation results 	on shore archive
<ul style="list-style-type: none"> plan showing areas (e.g. critical structural areas) prone to fatigue 	<ul style="list-style-type: none"> areas prone to fatigue 	on board ship			
5	Residual strength	<ul style="list-style-type: none"> applied Rule (date and revision) 		<ul style="list-style-type: none"> SCF-specific 	on board ship
6	Protection against corrosion				
Notes: (1) "SCF-specific" means documents to be developed especially to meet the requirements of the GBS guidelines (MSC.1/Circ.1343). (2) "Key construction plans" means plans such as midship section, main O.T. and W.T. transverse bulkheads, construction profiles/plans, shell expansions, forward and aft sections in cargo tank (or hold) region, engine-room construction, forward construction and stern construction drawings. (3) "Yard plans" means a full set of structural drawings, which include scantling information of all structural members. (4) "Hull form" means a graphical or numerical representation of the geometry of the hull. Examples would include the graphical description provided by a lines plan and the numerical description provided by the hull form data stored within an onboard computer. (5) "Lines plan" means a special drawing which is dedicated to show the entire hull form of a ship. (6) "Equivalent (to Lines plan)" means a set of information of hull form to be indicated in key construction plans for SCF purposes. Sufficient information should be included in the drawings to provide the geometric definition to facilitate the repair of any part of the hull structure. (7) "Normal storage location" means a standard location where each SCF information item should be stored. However, those items listed as being on board in the table above should be on board as a minimum to ensure that they are transferred with the ship on a change of owner. (8) "Shore archive" is to be operated in accordance with applicable international standards.					

Tier II Items		Information to be included	Further explanation of the content	Example documents	Normal storage location
6.1	Coating life	<ul style="list-style-type: none"> coated areas and target coating life and other measures for corrosion protection in holds, cargo and ballast tanks, other structure-integrated deep tanks and void spaces 	<ul style="list-style-type: none"> plans showing areas (e.g. critical structural areas) prone to excessive corrosion 	<ul style="list-style-type: none"> SCF-specific 	on board ship
6.2	Corrosion addition			<ul style="list-style-type: none"> Coating Technical File required by PSPC (Performance standard for protective coatings for dedicated seawater ballast tanks in all types of ships and double-side skin spaces of bulk carriers, adopted by IMO Resolution MSC.215(82), as amended and Performance standard for protective coatings for cargo oil tanks of crude oil tankers, adopted by IMO Resolution MSC.288(87), as amended) 	on board ship

Notes:

- (1) "SCF-specific" means documents to be developed especially to meet the requirements of the GBS guidelines (MSC.1/Circ.1343).
- (2) "Key construction plans" means plans such as midship section, main O.T. and W.T. transverse bulkheads, construction profiles/plans, shell expansions, forward and aft sections in cargo tank (or hold) region, engine-room construction, forward construction and stern construction drawings.
- (3) "Yard plans" means a full set of structural drawings, which include scantling information of all structural members.
- (4) "Hull form" means a graphical or numerical representation of the geometry of the hull. Examples would include the graphical description provided by a lines plan and the numerical description provided by the hull form data stored within an onboard computer.
- (5) "Lines plan" means a special drawing which is dedicated to show the entire hull form of a ship.
- (6) "Equivalent (to Lines plan)" means a set of information of hull form to be indicated in key construction plans for SCF purposes. Sufficient information should be included in the drawings to provide the geometric definition to facilitate the repair of any part of the hull structure.
- (7) "Normal storage location" means a standard location where each SCF information item should be stored. However, those items listed as being on board in the table above should be on board as a minimum to ensure that they are transferred with the ship on a change of owner.
- (8) "Shore archive" is to be operated in accordance with applicable international standards.

Tier II Items		Information to be included	Further explanation of the content	Example documents	Normal storage location
6.2 cont.		<ul style="list-style-type: none"> specification for coating and other measures for corrosion protection in holds, cargo and ballast tanks, other structure-integrated deep tanks and void spaces 		<ul style="list-style-type: none"> areas prone to excessive corrosion 	on board ship
		<ul style="list-style-type: none"> gross scantlings of structural constituent parts 		<ul style="list-style-type: none"> key construction plans 	on board ship
		<ul style="list-style-type: none"> net scantlings of structural constituent parts, as built scantlings and voluntary addition thicknesses 			
7	Structural redundancy	<ul style="list-style-type: none"> applied Rule (date and revision) 		<ul style="list-style-type: none"> SCF-specific 	on board ship
8	Watertight and weathertight integrity	<ul style="list-style-type: none"> applied Rule (date and revision) 		<ul style="list-style-type: none"> SCF-specific 	on board ship
		<ul style="list-style-type: none"> key factors for watertight and weathertight integrity 	<ul style="list-style-type: none"> details of equipment forming part of the watertight and weathertight integrity 	<ul style="list-style-type: none"> structural details of hatch covers, doors and other closings integral with the shell and bulkheads 	on board ship
9	Human element considerations	<ul style="list-style-type: none"> list of ergonomic design principles applied to ship structure design to enhance safety during operations, inspections and maintenance of ship 		<ul style="list-style-type: none"> SCF-specific 	on board ship

Notes:

- (1) "SCF-specific" means documents to be developed especially to meet the requirements of the GBS guidelines (MSC.1/Circ.1343).
- (2) "Key construction plans" means plans such as midship section, main O.T. and W.T. transverse bulkheads, construction profiles/plans, shell expansions, forward and aft sections in cargo tank (or hold) region, engine-room construction, forward construction and stern construction drawings.
- (3) "Yard plans" means a full set of structural drawings, which include scantling information of all structural members.
- (4) "Hull form" means a graphical or numerical representation of the geometry of the hull. Examples would include the graphical description provided by a lines plan and the numerical description provided by the hull form data stored within an onboard computer.
- (5) "Lines plan" means a special drawing which is dedicated to show the entire hull form of a ship.
- (6) "Equivalent (to Lines plan)" means a set of information of hull form to be indicated in key construction plans for SCF purposes. Sufficient information should be included in the drawings to provide the geometric definition to facilitate the repair of any part of the hull structure.
- (7) "Normal storage location" means a standard location where each SCF information item should be stored. However, those items listed as being on board in the table above should be on board as a minimum to ensure that they are transferred with the ship on a change of owner.
- (8) "Shore archive" is to be operated in accordance with applicable international standards.

Tier II Items		Information to be included	Further explanation of the content	Example documents	Normal storage location
10	Design transparency	<ul style="list-style-type: none"> applied Rule (date and revision) 		<ul style="list-style-type: none"> intellectual property provisions 	on board ship
		<ul style="list-style-type: none"> applicable industry standards for design transparency and IP protection 			
		<ul style="list-style-type: none"> reference to part of SCF information kept ashore 		<ul style="list-style-type: none"> summary, location and access procedure for part of SCF information on shore 	on board ship
CONSTRUCTION					
11	Construction quality procedure	<ul style="list-style-type: none"> applied construction quality standard 	<ul style="list-style-type: none"> recognized national or international construction quality standard 	<ul style="list-style-type: none"> SCF-specific 	on board ship
12	Survey during construction	<ul style="list-style-type: none"> survey regime applied during construction (to include all owner and class scheduled inspections during construction) 	<ul style="list-style-type: none"> applied Rules (date and revision) 	<ul style="list-style-type: none"> SCF-specific 	on board ship
			<ul style="list-style-type: none"> copies of certificates of forgings and castings welded into the hull 	<ul style="list-style-type: none"> tank testing plan 	on board ship
		<ul style="list-style-type: none"> information on non-destructive examination 		<ul style="list-style-type: none"> non destructive testing plan Coating Technical File required by PSPC 	on board ship
IN-SERVICE CONSIDERATIONS					
<p>Notes:</p> <p>(1) "SCF-specific" means documents to be developed especially to meet the requirements of the GBS guidelines (MSC.1/Circ.1343).</p> <p>(2) "Key construction plans" means plans such as midship section, main O.T. and W.T. transverse bulkheads, construction profiles/plans, shell expansions, forward and aft sections in cargo tank (or hold) region, engine-room construction, forward construction and stern construction drawings.</p> <p>(3) "Yard plans" means a full set of structural drawings, which include scantling information of all structural members.</p> <p>(4) "Hull form" means a graphical or numerical representation of the geometry of the hull. Examples would include the graphical description provided by a lines plan and the numerical description provided by the hull form data stored within an onboard computer.</p> <p>(5) "Lines plan" means a special drawing which is dedicated to show the entire hull form of a ship.</p> <p>(6) "Equivalent (to Lines plan)" means a set of information of hull form to be indicated in key construction plans for SCF purposes. Sufficient information should be included in the drawings to provide the geometric definition to facilitate the repair of any part of the hull structure.</p> <p>(7) "Normal storage location" means a standard location where each SCF information item should be stored. However, those items listed as being on board in the table above should be on board as a minimum to ensure that they are transferred with the ship on a change of owner.</p> <p>(8) "Shore archive" is to be operated in accordance with applicable international standards.</p>					

Tier II Items		Information to be included	Further explanation of the content	Example documents	Normal storage location
13	Survey and maintenance	<ul style="list-style-type: none"> • maintenance plans specific to the structure of the ship where higher attention is called for 	<ul style="list-style-type: none"> • plan showing highly stressed areas (e.g. critical structural areas) prone to yielding, buckling, fatigue and/or excessive corrosion 	<ul style="list-style-type: none"> • SCF-specific 	on board ship
				<ul style="list-style-type: none"> • operation and maintenance manuals (e.g. hatch covers and doors) 	on board ship
		<ul style="list-style-type: none"> • preparations for survey 	<ul style="list-style-type: none"> • arrangement and details of all penetrations normally examined at dry-docking 	<ul style="list-style-type: none"> • docking plan 	on board ship
		<ul style="list-style-type: none"> • gross hull girder section modulus 	<ul style="list-style-type: none"> • details for dry-docking 	<ul style="list-style-type: none"> • dangerous plan 	on board ship
		<ul style="list-style-type: none"> • minimum hull girder section modulus along the length of the ship to be maintained throughout the ship's life, including cross section details such as the value of the area of the deck zone and bottom zone, the renewal value for the neutral axis zone 	<ul style="list-style-type: none"> • details for in-water survey 	<ul style="list-style-type: none"> • Ship Structure Access Manual 	on board ship
				<ul style="list-style-type: none"> • Means of access to other structure-integrated deep tanks • Coating Technical File required by PSPC 	on board ship
			<ul style="list-style-type: none"> • gross scantlings of structural constituent parts 		<ul style="list-style-type: none"> • key construction plans

Notes:

- (1) "SCF-specific" means documents to be developed especially to meet the requirements of the GBS guidelines (MSC.1/Circ.1343).
- (2) "Key construction plans" means plans such as midship section, main O.T. and W.T. transverse bulkheads, construction profiles/plans, shell expansions, forward and aft sections in cargo tank (or hold) region, engine-room construction, forward construction and stern construction drawings.
- (3) "Yard plans" means a full set of structural drawings, which include scantling information of all structural members.
- (4) "Hull form" means a graphical or numerical representation of the geometry of the hull. Examples would include the graphical description provided by a lines plan and the numerical description provided by the hull form data stored within an onboard computer.
- (5) "Lines plan" means a special drawing which is dedicated to show the entire hull form of a ship.
- (6) "Equivalent (to Lines plan)" means a set of information of hull form to be indicated in key construction plans for SCF purposes. Sufficient information should be included in the drawings to provide the geometric definition to facilitate the repair of any part of the hull structure.
- (7) "Normal storage location" means a standard location where each SCF information item should be stored. However, those items listed as being on board in the table above should be on board as a minimum to ensure that they are transferred with the ship on a change of owner.
- (8) "Shore archive" is to be operated in accordance with applicable international standards.

Tier II Items		Information to be included	Further explanation of the content	Example documents	Normal storage location
13 cont.		<ul style="list-style-type: none"> net scantlings of structural constituent parts, as built scantlings and voluntary addition thicknesses 		<ul style="list-style-type: none"> rudder and rudder stock 	on board ships
				<ul style="list-style-type: none"> structural details 	on board ships
				<ul style="list-style-type: none"> yard plans 	on shore archive
		<ul style="list-style-type: none"> hull form 	<ul style="list-style-type: none"> hull form information indicated in key construction plans 	<ul style="list-style-type: none"> lines plans 	on shore archive
				or equivalent	on board ships
14	Structural accessibility	<ul style="list-style-type: none"> means of access to holds, cargo and ballast tanks and other structure-integrated deep tanks 	<ul style="list-style-type: none"> plans showing arrangement and details of means of access 	<ul style="list-style-type: none"> Ship Structure Access Manual 	on board ships
				<ul style="list-style-type: none"> means of access to other structure-integrated deep tanks 	on board ships
RECYCLING CONSIDERATIONS					
15	Recycling	<ul style="list-style-type: none"> identification of all materials that were used in construction and may need special handling due to 	<ul style="list-style-type: none"> list of materials used for the construction of the hull structure 	<ul style="list-style-type: none"> SCF-specific 	on board ship
<p>Notes:</p> <p>(1) "SCF-specific" means documents to be developed especially to meet the requirements of the GBS guidelines (MSC.1/Circ.1343).</p> <p>(2) "Key construction plans" means plans such as midship section, main O.T. and W.T. transverse bulkheads, construction profiles/plans, shell expansions, forward and aft sections in cargo tank (or hold) region, engine-room construction, forward construction and stern construction drawings.</p> <p>(3) "Yard plans" means a full set of structural drawings, which include scantling information of all structural members.</p> <p>(4) "Hull form" means a graphical or numerical representation of the geometry of the hull. Examples would include the graphical description provided by a lines plan and the numerical description provided by the hull form data stored within an onboard computer.</p> <p>(5) "Lines plan" means a special drawing which is dedicated to show the entire hull form of a ship.</p> <p>(6) "Equivalent (to Lines plan)" means a set of information of hull form to be indicated in key construction plans for SCF purposes. Sufficient information should be included in the drawings to provide the geometric definition to facilitate the repair of any part of the hull structure.</p> <p>(7) "Normal storage location" means a standard location where each SCF information item should be stored. However, those items listed as being on board in the table above should be on board as a minimum to ensure that they are transferred with the ship on a change of owner.</p> <p>(8) "Shore archive" is to be operated in accordance with applicable international standards.</p>					

2.3.2 (1/1/2018)

The SCF is to be reviewed (see Note 1), at the time of new building, in accordance with the requirements of items [2.3.1] a) and [2.3.1] b) and the normal storage location is to be distinguished.

For the SCF stored on board ship, the surveyor is to verify that the information is placed on board the ship, upon completion of ship construction.

For the SCF stored on shore archive, the surveyor is to verify that the information is stored on shore archive by examining the list of information included on shore archive, upon completion of ship construction.

Note 1:

"Review" means the examination of the SCF that is carried out by the surveyor, at the end of the newbuilding process, in order to confirm that:

- drawings and documents required under the item [2.3], plus
- the possible additional drawings/documents provided by the shipyard, as per the Ship Constructional File (SCF) list of drawings/documents

are present in the copies of the SCF stored on board and in the ashore archive.

The "review" is not to be intended as an assessment of the drawings/documents in order to verify their compliances with the applicable Rules.

3 Machinery and systems

3.1 General

3.1.1 Scope (1/1/2013)

The scope of this article [3] includes the following main activities:

- a) Examination of the parts of the ship covered by classification Rules and by applicable delegated statutory regulations for machinery construction, to obtain appropriate evidence that they have been built in compliance with the Rules and regulations, taking account of the relevant approved drawings.
- b) Appraisal of the manufacturing, construction, control and qualification procedures, including welding consumables, weld procedures, weld connections and assemblies, with indication of relevant approval tests (e.g for piping systems).
- c) Witnessing inspections and tests as required in the classification Rules for machinery and systems including materials, welding and assembly, the inspection and testing methods (e.g. by hydrostatic, leak testing, non-destructive examination, verification of geometry) and by whom.

Appraisal of materials and equipment used for machinery and systems and their inspection at works is not included in this Article [3]. Details of requirements for machinery and systems and equipment are given in:

- Part C, Chapter 1 for machinery equipment and piping systems,
- Part C, Chapter 2 for electrical systems,
- Part C, Chapter 3 for automation systems,
- Part D for materials and welding,
- Part B for anchoring and mooring system,
- Part E requirements for the specific Service Notations,
- Part F requirements for the Additional Class Notations.

3.2 Definitions

3.2.1 Machinery (1/1/2013)

The Machinery components are generally defined as follows:

- a) Main and auxiliary engines, turbines and boilers
- b) Reduction gears, main thrust, intermediate shafts, tail-shafts and propellers
- c) Main and auxiliary systems for steering
- d) Pumps and other machinery items
- e) Systems in machinery spaces and in cargo areas
- f) Electrical equipment and installations
- g) Fire protection, detection and extinction (limited to the items covered by Classification, see Note 1 in Ch 1, Sec 1, [1.1.2])
- h) Automation systems
- i) Machinery system for mooring and anchoring
- j) Machinery systems required by specific Service Notation

- k) Machinery systems required by specific Additional Class Notations.

3.2.2 Documents (1/1/2013)

Reference to documents also includes electronic transmission or storage.

3.2.3 Survey methods (1/1/2013)

The survey methods involving the Surveyor directly are as follows:

- a) Patrol is defined as the act of checking on an independent and unscheduled basis that the applicable processes, activities and associated documentation of the shipbuilding functions continue to conform to classification and delegated statutory requirements.
- b) Review is defined as the act of examining documents in order to determine traceability and identification, and to confirm that processes continue to conform to classification and delegated statutory requirements.
- c) Witness is defined as the attendance at scheduled inspections and tests in accordance with the agreed Inspection and Test Plans or equivalent to the extent necessary to check compliance with the survey requirements.

3.3 Application

3.3.1 Classification items (1/1/2013)

This Article [3] covers the survey of all new construction of steel ships intended for classification and for international voyages except for:

- a) those defined in SOLAS I/3
- b) high speed craft as defined in I/1.3.1 of the 2000 High Speed Craft Code
- c) Mobile Offshore Drilling Units as defined in I/1.2.1 of the MODU Code.

3.3.2 Delegated statutory items (1/1/2013)

This Article [3] covers all delegated statutory items relevant to the machinery items, i.e. SOLAS Safety Construction.

3.3.3 Location of construction (1/1/2013)

This Article [2] applies to the machinery items, as defined in [3.2.1] whether constructed and/or installed:

- a) at the shipbuilder's facilities
- b) by subcontractors/suppliers at the shipbuilder's facilities
- c) by subcontractors/suppliers at their own facilities or at other remote locations
- d) by machinery item manufacturers at the shipbuilder's facilities
- e) by machinery item manufacturers at their own facilities or at other remote locations.

3.4 Personnel

3.4.1 Qualification and monitoring of exclusive Surveyors (1/1/2013)

The Society's Surveyors are to confirm through patrol, review and witness, as defined in [3.2.3], that machinery items are built and installed using approved plans in

accordance with the relevant Rules and delegated statutory requirements. The Surveyors are to be qualified to be able to carry out their tasks, and procedures are to be in place to ensure that their activities are monitored.

3.5 Survey of Machinery installations

3.5.1 Surveyable items (1/1/2013)

The items of machinery to undergo survey during their:

- a) construction/manufacturing
- b) installation on board the new ship

are those covered by the pertinent Parts of the Rules, as defined in [3.1.1], and delegated statutory requirements.

3.5.2 Materials and equipment supplied (1/7/2015)

During the construction and installation processes as required, evidence is also to be made available by the shipbuilder to the Surveyor to prove that the materials and equipment supplied to the ship have been built or manufactured under survey relevant to the classification Rules and delegated statutory requirements.

Evidence that no material containing asbestos has been installed on board is to be provided to the Surveyor.

3.6 Newbuilding survey planning

3.6.1 Kick-off meeting (1/1/2013)

Prior to commencement of surveys for any machinery installation, the Society is to discuss with the shipbuilder at a kick-off meeting referred to in [1.7.1] the items related to the building and/or installation activities of machinery as per item [3.2.1] as applicable. The purpose of the meeting is to agree on how the list of specific activities is to be addressed. The meeting is to take into account the shipbuilder's construction facilities and ship type, including the list of proposed manufacturers, subcontractors and suppliers. A record of the meeting is to be made. If the Society has appointed a Surveyor for a specific newbuilding project or for the task of machinery installation surveillance, then this Surveyor is to attend the kick-off meeting. The shipbuilder is to be asked to agree to undertake ad hoc investigations during construction where areas of concern arise and to keep the Society advised of the progress of any such investigation. Whenever an investigation is undertaken, the builder is to be requested, in principle, to agree to suspend relevant construction activities if warranted by the severity of the problem.

3.6.2 Delegated statutory requirements (1/1/2013)

The records are to take note of specific published Administration requirements and interpretations of delegated statutory requirements.

3.6.3 Construction progress records (1/1/2013)

The shipyard shall be requested to advise of any changes to the activities agreed at the kick-off meeting and these are to be documented. For instance, if the shipbuilder chooses to use or change manufacturers of machinery items, subcontractors for machinery items, supplier of machinery items, or to incorporate any modifications necessitated by changes in production, in inspection methods, in rules and regula-

tions, in structural modifications, or in the event where increased inspection requirements are deemed necessary as a result of a substantial non-conformance, or otherwise.

3.6.4 Fabrication quality standard (1/1/2013)

The quality standard of shipbuilding, manufacturers of machinery items, subcontractors for machinery items, supplier of machinery items, for the machinery installations during new constructions are to be reviewed and agreed during the kick-off meeting. Machinery items should be manufactured and installed according to applicable IACS Recommendations, or a recognized fabrication standard which has been accepted by the Society prior to the commencement of fabrication/construction. The work is to be carried out in accordance with the Rules and under survey of the Society.

3.6.5 Other attendees at the kick-off meeting (1/1/2013)

The kick-off meeting may be attended by other parties, such as the Owner or Administrations, subject to agreement by the shipbuilder.

3.6.6 Special cases of kick-off meeting (1/1/2013)

In the event of series ship production, consideration may be given to waiving the requirement for a kick-off meeting for the second and subsequent ships provided any changes are documented as required in [3.6.1] and in [3.6.3].

3.7 Examination and test plan for newbuilding activities

3.7.1 Plans to be provided (1/1/2013)

The shipbuilder is to provide plans of the items which are intended to be examined and tested. These plans need not be submitted for approval and examination at the time of the kick-off meeting. They are to include:

- a) list of machinery components to be fitted on board including the machinery arrangement plans, comprehensive of:
 - 1) proposals for the examination of piping steelwork, including booklets of typical arrangements, completed with the list of the materials and fittings;
 - 2) proposals for the examination of electric systems fittings, including booklets of typical arrangements, completed with the list of the materials and devices;
 - 3) proposal for the examination of propulsion system(s) arrangement and associated fittings ;
 - 4) proposal for the examination of steering system(s) arrangement and associated fittings;
 - 5) proposal for the examination of the machinery systems arrangement, as referred in Pt C, Ch 1, Sec 10, and associated fittings
 - 6) proposal for the examination of automation system(s) arrangement and associated fittings (if any);
 - 7) proposal for the examination of anchoring and mooring arrangements and associated fittings,
 - 8) proposal for the examination of cargo system(s) arrangement and associated fittings (if any);

- 9) proposal for the examination of Additional class Notation machinery systems arrangement and associated fittings (if any);
- b) proposal for non destructive examination of piping steelwork, and in general for all systems requiring welding for their manufacture or installation ;
- c) proposals for testing of machinery components after their manufacture or installation on board;
- d) any other proposals specific to the ship type or to the delegated statutory requirements.

3.7.2 Submittal of plans to the Surveyors (1/1/2013)

The plans and any modifications to them are to be submitted to the Surveyors in sufficient time to allow review before the relevant survey activity commences.

3.8 Proof of the consistency of surveys

3.8.1 Evidence for survey planning and activities (1/1/2013)

Inspection and test records, checklists etc are to be kept in order to provide evidence that the Society's Surveyors have complied with the requirements of the newbuilding survey planning and duly participated in the relevant activities shown in the shipbuilder's examination and test plans.

3.9 Inspection and tests of machinery components

3.9.1 Inspection and tests at workshop (1/1/2013)

Inspection and testing of machinery components, at the workshop, shall be carried out according to the provisions of the applicable classification Rules and delegated statutory regulations.

3.9.2 Inspection and tests at dock and sea trials (1/7/2015)

Inspection and testing of machinery components during sea trials are to be carried out according to the provisions of the

applicable classification Rules and delegated statutory regulations. The following Parts of the Rules are applicable:

- a) main propulsion systems, including but not limited to propeller shafting line: Pt C, Ch 1, Sec 16
- b) auxiliary systems for propulsion and other services systems: Pt C, Ch 1, Sec 16
- c) main and auxiliary systems for steering: Pt C, Ch 1, Sec 16
- d) main and auxiliary piping systems: Pt C, Ch 1, Sec 16 and Pt C, Ch 1, Sec 10
- e) main, emergency and auxiliary electrical system for primary, secondary and emergency systems: Pt C, Ch 2, Sec 15
- f) automation systems: Pt C, Ch 3, Sec 5 and Pt C, Ch 3, Sec 6
- g) machinery system for mooring and anchoring: Pt B, Ch 12, Sec 3
- h) machinery systems required for specific Service Notations: Part E
- i) machinery systems required for specific Additional Class Notations: Part F.

In addition, where batteries are used for essential and emergency services, it is to be verified that a schedule document, detailing:

- type and manufacturer's type designation
- voltage and ampere-hour rating
- location
- equipment and/or system(s) served
- maintenance/replacement cycle dates
- date(s) of last maintenance and/or replacement
- for replacement batteries in storage, the date of manufacture and shelf-life has been prepared. The document is to be reviewed for compliance with the on-board arrangements.

SECTION 2

SURVEY FOR ASSIGNMENT OF CLASS OF A SHIP IN SERVICE

1 Surveys required by IACS Procedural Requirement PR1A

1.1 Transfer to the Society's class of a ship in service classed by another QSCS Classification Society

1.1.1 General (1/7/2009)

Surveys for assignment of class may be credited as periodical surveys for maintenance of class, provided that the losing Society is a QSCS Classification Society as defined in Ch 2, Sec 1, [1.1.1]. In this case, all recommendations due for compliance at that periodical survey are to be complied with.

1.1.2 Surveys (1/7/2016)

Notwithstanding the records indicating that all surveys are up-to-date, a survey for assignment of class is held by the Society, the extent of which is based on the age of the ship and the losing Society's class status as follows:

a) Hull:

- 1) for ships less than 5 years of age the survey takes the form of an annual survey;
- 2) for ships between 5 and 10 years of age the survey includes an Annual Survey and inspection of a representative number of ballast spaces;
- 3) for ships of 10 years of age and above but less than 20 years of age, the survey includes an Annual Survey and inspection of a representative number of ballast spaces and cargo spaces. For gas carriers, in lieu of internal inspection of cargo spaces, the following applies:
 - inspection of representative spaces surrounding cargo tanks, including external inspection of the tank and its supporting systems as far as possible;
 - review of cargo log books and operational records to verify the correct functioning of the cargo containment system;
- 4) for ships provided with the Additional Service Feature "ESP" which are 15 years of age and above but less than 20 years of age, the survey has the scope of a class renewal survey or an intermediate survey, whichever is due next;
- 5) for all ships which are 20 years of age and above, the survey has the scope of a class renewal survey (this is also applicable to ships having their hull under continuous survey);
- 6) in the context of applying items 4) and 5) above, if dry-docking of the ship is not due at the time of

transfer, consideration can be given to carrying out an underwater examination in lieu of dry-docking;

- 7) in the context of applying items 4) and 5), as applicable, the anchors and anchor chain cables ranging and gauging for vessels over 15 years of age is not required to be carried out as part of the class entry survey unless the class entry survey is being credited as a periodical survey for maintenance of class.

If the class entry survey is to be credited as a periodical survey for maintenance of class, consideration may be given by the gaining society to the acceptance of the anchors and anchor chain cables ranging and gauging carried out by the losing society provided they were carried out within the applicable survey window of the periodical survey in question;

- 8) in the context of applying items 1) to 6) above, as applicable:
 - if the class entry survey is to be credited as a periodical survey for maintenance of class, consideration may be given by the Society to the acceptance of thickness measurements taken by the losing society provided they were carried out within the applicable survey window of the periodical survey in question;
 - if the class entry survey is not to be credited as a periodical survey for maintenance of class, consideration may be given by the Society to the acceptance of thickness measurements taken by the losing society provided they were carried out within 15 months prior to completion of the class entry survey when it is within the scope of a Class Renewal Survey, or within 18 months prior to completion of the class entry survey when it is within the scope of an Intermediate Survey.

In both cases, the thickness measurements are to be reviewed by the Society for compliance with the applicable survey requirements, and confirmatory gaugings are to be taken to the satisfaction of the Society.

- 9) in the context of applying 3) to 6) above, as applicable, tank testing for ships over 15 years of age is not required to be carried out unless the survey is credited as a periodical survey for maintenance of class. If the class entry survey is to be credited as a periodical survey for maintenance of class, consideration may be given by the Society to the acceptance of the tank testing carried out by the losing Society pro-

vided they were carried out within the applicable survey window of the periodical survey in question;

- 10) in the context of applying 1) to 6) above, as applicable, compliance with IACS Unified Requirements that demand fulfillment at the forthcoming due periodical surveys (such as S26 and S27) is not required unless the survey is credited as a periodical survey for maintenance of class.

b) Machinery:

A general examination of all essential machinery is held and includes the following:

- 1) examination under working conditions of fuel oil burning equipment of boilers, economisers and steam/steam generators. The adjustment of safety valves of this equipment is to be verified by checking the records on the ship;
- 2) all pressure vessels;
- 3) insulation resistance, generator circuit-breakers, preference tripping relays and generator prime mover governors are to be tested and paralleling and load sharing to be proved (Note 1);
- 4) in all cases, navigating lights and indicators are to be examined and their working and alternative sources of power verified;
- 5) bilge pumps, emergency fire pumps and remote control for oil valves, fuel oil pumps, lubricating oil pumps and forced draught fans are to be examined under working conditions;
- 6) recirculating and ice clearing arrangements, if any;
- 7) the main and all auxiliary machinery necessary for operation of the ship at sea together with essential controls and steering gear is to be tested under working conditions. Alternative means of steering are to be tested. A short sea trial is to be held at the Surveyor's discretion if the ship has been laid up for a long period;
- 8) initial start arrangements are to be verified;
- 9) in the case of oil tankers, the cargo oil system and electrical installation in way of hazardous spaces are to be checked for compliance with the Society's Rule requirements. Where intrinsically safe equipment is installed, the Surveyor is to satisfy himself that a recognised authority has approved such equipment. The safety devices, alarms and essential instruments of the inert gas system are to be verified and the plant generally examined to ensure that it does not constitute a hazard to the ship (Note 1).

Note 1: For the transfer of class or adding class at ship's delivery, items listed in 3) and 9) may be verified by reviewing the ship's records.

1.2 Transfer to the Society's class of a ship surveyed during construction by another QSCS Classification Society at ship's delivery

1.2.1 General (1/1/2008)

A survey for assignment of class at ship's delivery is to be held by the Society, the extent of which is that of an annual survey as minimum.

2 Surveys required by IACS Procedural Requirement PR1B

2.1 Addition of the Society's class to a ship in service classed by another QSCS Classification Society

2.1.1 General (1/7/2009)

Survey requirements for adding the Society's class to a ship in service are indicated in [2.1.2] and [2.1.3].

2.1.2 Surveys for double class ships (1/7/2007)

The requirements of [1.1] apply.

2.1.3 Surveys for dual class ships (1/7/2007)

Notwithstanding the records indicating that all surveys are up-to-date, a survey for assignment of class is held by the Society, the extent of which is that of an annual survey as a minimum.

2.2 Addition of the Society's class to a ship surveyed during construction by another QSCS Classification Society at ship's delivery

2.2.1 General (1/1/2008)

A survey for adding the Society's class at ship's delivery is to be held by the Society, the extent of which is that of an annual survey as minimum.

3 Surveys required by IACS Procedural Requirement PR1D

3.1 Ships in service not classed with a QSCS Classification Society or not classed at all

3.1.1 General (1/1/2015)

In this case, the class of the ship will be assigned upon a preliminary review of the documentation listed in Ch 2, Sec 1, [3.6.2] and subsequent satisfactory completion of the surveys, the extent and scope of which are given below.

Where the vessel has, during any portion of the five years prior to the request for classification being received, been previously classed by:

- a) the Society, or
- b) a Society subject to verification of compliance with QSCS at the time it classed the ship,

then survey requirements may be specially considered but are not to be less than those required by IACS Procedural Requirement PR1A as per [1.1.2].

3.1.2 Surveys (1/1/2015)

The minimum extent and scope of the class entry survey is to be based on the age and type of the ship as follows:

- a) class renewal survey of hull, including thickness measurements
- b) class renewal survey of machinery, inclusive of pressure vessel survey(s), as applicable
- c) bottom survey in dry condition
- d) tailshaft survey(s)
- e) main boiler survey(s) and auxiliary boiler survey(s), as applicable.
- f) in addition all other periodical surveys should be performed together with those inspections which are linked to specific service notations and/or additional class notations and/or special installations the ship is provided with.

The Society may request further examinations, tests and measurements, including but not limited to material testing, non-destructive testing, hydraulic and hydrostatic tests and sea trials.

4 Reassignment of class

4.1 Surveys

4.1.1 (1/1/2015)

The survey for reassignment of class consists of an admission to class survey, the consistency of which is determined by the Society on a case by case basis. Account may be taken of any periodical surveys held in the former period of class with the Society

5 Ships of less than 100 gross tonnage

5.1 Surveys and documentation

5.1.1 (1/7/2007)

For ships of less than 100 gross tonnage, special consideration will be given to the scope of surveys and documentation to be supplied.

SECTION 3

ANNUAL SURVEY

1 General

1.1

1.1.1 The requirements of this Section apply to annual surveys of all ships. The specific requirements for annual surveys related to service notations and additional class notations assigned to ships are addressed in Chapter 4 and Chapter 5, respectively.

1.1.2 At the time of annual surveys, the ship is to be generally examined. The survey is to include a visual inspection of the hull, equipment and machinery of the ship and some tests thereof, so far as necessary and practicable in order to verify that the ship is in a satisfactory and efficient general condition and is properly maintained.

1.1.3 Owners are reminded that, in compliance with the requirements in Ch 2, Sec 2, [11.4], any modification to the ship's hull, equipment and machinery affecting its classification is to be made known to the Society.

2 Hull

2.1 Scope

2.1.1 (1/7/2006)

The survey is to consist of an examination for the purpose of ensuring, as far as practicable, that the hull, hatch covers, hatch coamings, closing appliances, equipment and related piping are maintained in a satisfactory condition.

2.2 Hull and hull equipment

2.2.1 (1/7/2015)

The survey is to include a general external examination and testing, where appropriate, verifying the efficient condition of the following items, as applicable:

- scuppers and sanitary discharges, valves on discharge lines and their controls
 - the means provided to minimise water ingress through the spurling pipes and chain lockers
 - the arrangements for closing openings in the shell plating below the freeboard deck
 - ventilators, air pipes, overflow pipes and gas vent pipes, with their means of closure and flame screens, where required. In particular:
 - examination of the weld connection between air pipes and deck plating
 - examination of flame screens on vents to all bunker tanks
 - examination of ventilators, including closing devices, if any.
 - external examination of all air pipe heads installed on exposed decks including all automatic air pipe heads installed on exposed decks (see Note 2). This requirement is not applicable to passenger ships
 - the special requirements for ships permitted to sail with type "A" or type "B-minus" freeboards
 - fittings and appliances for timber deck cargoes, where applicable
 - freeboard marks on the ship's sides
 - deck equipment such as lifeboat davit foundations, bollards, fairleads, hawse pipes, etc., masts and associated rigging, including lightning conductors
 - equipment of chain cables for anchors, windlass, mooring lines and mooring winches, where required
 - confirmation that the towing and mooring equipment is properly marked with any restriction associated with its safe operation (for ships built after 1/1/2007)
 - deck fittings, their pedestals, if any, and the hull structures associated with towing and mooring
 - watertight bulkheads, their watertight doors and associated local and remote controls, and their watertight penetrations
 - main and auxiliary steering arrangements, including their associated equipment and control systems, and manoeuvring gear
 - accessible cargo holds, in particular in areas likely to be damaged by cargo handling
 - confirmation that the drainage from enclosed cargo spaces situated on the freeboard deck is satisfactory
 - engine room and other dry spaces
 - where fitted, helicopter deck and its supporting structure, safety net and arrangements for the prevention of sliding
- outer shell plating above the waterline, relevant shell doors and accessible parts of the rudder(s)
 - plating of freeboard deck and exposed decks, superstructures, with their openings and means of closure
 - openings on exposed decks, with their coamings and their means of closure and securing arrangements (for cargo hatchways see [2.3])
 - sidescuttles and deadlights, garbage chutes and other openings with their means of closure
 - bulwarks, guard rails, freeing ports, gangways and life-lines, ladders

- availability of loading manual or, where required, electronic loading instrument, including standard test
- availability of approved stability documentation
- accuracy of the shipboard computer for stability calculations (see Note 3)
- confirmation that no new materials containing asbestos have been installed on board.

Note 1: Due attention is also to be given to fuel oil piping passing through ballast tanks, which is to be pressure tested where doubts arise.

Note 2: Air pipe heads installed on exposed decks are those extending above the freeboard deck or superstructure decks.

Note 3: It is the responsibility of the ship's Master to check the accuracy of the shipboard computer for stability calculations at each annual survey by applying at least one approved test condition (see Pt B, Ch 11, Sec 2, [4.5]). If a Surveyor of the Society is not present for the computer check, a copy of the test condition results obtained by the computer check is to be retained on board as documentation of satisfactory testing for the Surveyor's verification. The testing procedure is to be carried out in accordance with Pt B, Ch 11, Sec 2, [4.5.9]

2.3 Cargo hatch covers and coamings, weather decks and ship side plating above the waterline

2.3.1 (1/7/2006)

The Owner or his representative is to declare to the attending Surveyor that no changes have been made to the hatch covers, hatch coamings and their securing and sealing devices without prior approval of the Society.

The survey of hatch covers and coamings is to include:

- a) when fitted with portable covers, or wooden or steel pontoons, checking of the satisfactory condition of:
 - wooden covers and portable beams, carriers or sockets for the portable beams, and their securing devices
 - steel pontoons
 - tarpaulins
 - cleats, battens and wedges
 - hatch securing bars and their securing devices
 - loading pads/bars and the side plate edge
 - guide plates and chocks
 - compression bars, drainage channels and drain pipes (if any)
- b) when fitted with mechanically operated steel covers, checking of the satisfactory condition of:
 - hatch covers
 - tightness devices of longitudinal, transverse and intermediate cross junctions (gaskets, gasket lips,

compression bars, drainage channels and, if any, drain pipes)

- clamping devices, retaining bars, cleating
 - chain or rope pulleys
 - guides
 - guide rails and track wheels
 - stoppers, etc.
 - wires, chains, gypsies, tensioning devices
 - hydraulic system essential to closing and securing
 - safety locks and retaining devices
- c) checking of the satisfactory condition of hatch coaming plating and its stiffeners
 - d) random checking of the satisfactory operation of mechanically operated hatch covers is to be made including:
 - stowage and securing in open condition;
 - proper fit and efficiency of sealing in closed condition;
 - operational testing of hydraulic and power components, wires, chains and link drives.

2.4 Suspect areas

2.4.1 (1/7/2006)

Suspect areas identified at previous surveys are to be examined. Thickness measurements are to be taken of the areas of substantial corrosion and the extent of thickness measurements is to be increased to determine the extension of areas of substantial corrosion. Sec 5, Tab 2 may be used as guidance for these additional thickness measurements. These extended thickness measurements are to be carried out before the annual survey is credited as completed.

Note 1: These requirements are not applicable to cargo tanks of oil tankers, chemical tankers and double hull oil tankers, surveyed in accordance with the requirements given in Ch 4, Sec 3, Ch 4, Sec 4 and Ch 4, Sec 5, respectively.

2.5 Ballast tanks

2.5.1 (1/7/2006)

Examination of ballast tanks when required as a consequence of the results of the class renewal survey and intermediate survey is to be carried out. When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurement is to be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, then the extent of thickness measurements is to be increased to determine the extension of areas of substantial corrosion. Sec 5, Tab 2 may be used as guidance for these additional measurements. These extended thickness measurements are to be carried out before the annual survey is credited as completed.

2.6 Additional requirements for single hold cargo ships (see Note 1 to [1.1.1] of Ch 4, Sec 8)

2.6.1 (1/1/2009)

For ships complying with the requirements of SOLAS II-1/23-3 (effective from 1 January 2007 to 31 December 2008) and II-1/25 (effective from 1 January 2009) for hold water level detectors (see Note 1), the annual survey is to include an examination and a test, at random, of the water ingress detection system and of their alarms.

Note 1: This survey requirement is to be fulfilled at annual surveys carried out after the ship has been made compliant with the requirements of SOLAS regulations II-1/23-3 or II-1/25, as applicable (see above) and commenced on or after 1 July 2007.

3 Machinery and systems

3.1 General machinery installations

3.1.1 (1/7/2015)

The survey of general machinery installations is to cover the following items:

- general examination of machinery and boiler spaces with particular attention to the fire and explosion hazards
- general examination of the machinery, steam, hydraulic, pneumatic and other systems and their associated fittings, for confirmation of their proper maintenance
- testing of the means of communication and order transmission between the navigating bridge and the machinery control positions and other control stations
- confirmation that the rudder angle indicator on the bridge is in working order
- examination, as far as practicable, of the bilge pumping systems and bilge wells, including operation of the pumps, remote reach rods and level alarms, where fitted
- visual examination of the condition of any expansion joints in sea water systems
- external examination of pressure vessels other than boilers and their appurtenances, including safety devices, foundations, controls, relieving gear, high pressure piping, insulation and gauges
- visual examination of mechanical components used for cooling and maintaining an ambient temperature lower than 45°C (see Pt C, Ch 2, Sec 2, [1.2.2])
- confirmation that no new materials containing asbestos have been installed on board.

3.1.2 (1/1/2007)

When the ship is equipped with a refrigerating plant (whether or not covered by an additional class notation), the annual survey is to include the external examination of:

- pressure vessels of the installation to the same extent as indicated in [3.1.1]
- refrigerant piping, as far as practicable

- for refrigerating machinery spaces using ammonia as refrigerant:
 - ventilation system including functional test
 - bilge system including functional test
 - electrical equipment, confirming its proper maintenance
 - gas detection system
 - breathing apparatus and protective clothing.

3.1.3 When the ship is equipped with thruster installations, the annual survey is to include:

- an external examination of the machinery installation
- an operating test of the complete installation.

3.2 Boilers

3.2.1 For main and auxiliary boilers, the annual survey consists of an external examination of boilers and their appurtenances, including safety devices, foundations, controls, relieving, high pressure and steam escape piping, insulation and gauges.

3.2.2 For thermal oil heaters, a functional test while in operation is to be carried out, during which the following items are checked:

- the heater for detection of leakages
- the condition of the insulation
- the operation of indication, control and safety devices
- the condition of remote controls for shut-off and discharge valves

A satisfactory analysis of the quality of oil is to be made available to the Surveyor.

3.2.3 For exhaust gas thermal oil heaters, in addition to the requirements of [3.2.2], a visual examination and a tightness testing to the working pressure of the heater tubes are to be carried out.

3.3 Electrical machinery and equipment

3.3.1 (1/7/2004)

The survey of electrical machinery and equipment is to cover the following items:

- general examination, visually and in operation, as feasible, of the electrical installations for power and lighting, in particular main and emergency generators, electric motors, batteries, switchboards, switchgears, cables and circuit protective devices, indicators of electrical insulation and automatic starting, where provided, of emergency sources of power
- checking, as far as practicable, the operation of emergency sources of power and, where they are automatic, also including the automatic mode.

3.3.2 (1/7/2007)

The survey is also to cover electrical components used for cooling and maintaining an ambient temperature lower than 45°C (see Pt C, Ch 2, Sec 2, [1.2.2]).

3.3.3 The survey is also to cover the bridge control of propulsion machinery, and related arrangements (alarms and safety devices), when fitted.

The survey of an automated installation covered by an additional class notation is detailed in Chapter 5.

3.3.4 (1/7/2017)

Additionally, on board ships where the electrical distribution system includes harmonic filters, harmonic distortion levels of main busbar are to be measured under seagoing conditions, as close to the periodical machinery survey as possible, so as to give a clear representation of the condition of the entire plant to the surveyor. Harmonic distortion readings are to be carried out when the greatest amount of distortion is indicated by the measuring equipment. An entry showing which equipment was running and/or filters

in service is to be recorded in the log so this can be replicated for the next periodical survey.

Records of all the above measurements are to be made available to the surveyor at each periodical survey.

Note 1: harmonic filters installed for single application frequency drives such as pump motors may be excluded from this requirement.

3.4 Fire protection, detection and extinction

3.4.1 (17/2015)

The survey of fire prevention includes the examination of arrangements for gaseous fuel for domestic purposes, such as movable cooking appliances, the so-called "flambé carte".

SECTION 4

INTERMEDIATE SURVEY

1 General

1.1

1.1.1 The requirements of this Section apply to intermediate surveys of all ships. The specific requirements for intermediate surveys related to service notations and additional class notations assigned to ships are addressed in Chapter 4 and Chapter 5, respectively.

1.1.2 The intermediate survey is to include examination and checks on a sufficiently extensive part of the structure to show that the structures of the ship are in satisfactory condition so that the ship is expected to operate until the end of the current period of class, provided that the ship is properly maintained and other surveys for maintenance of class are duly carried out during this period.

1.1.3 (1/7/2006)

A survey-planning meeting is to be held prior to the commencement of the survey.

2 Hull

2.1

2.1.1 (1/7/2010)

The scope of the intermediate survey includes the following requirements:

- a) for ships between 5 and 10 years of age, a general, internal examination of representative ballast tanks. If there is no hard protective coating, or soft or semi-hard

coating, or poor coating condition, the examination is to be extended to other ballast spaces of the same type;

- b) for ships over 10 years of age, a general, internal examination of all ballast tanks.

If considered necessary by the Surveyor, thickness measurements may be required.

2.1.2 (1/7/2006)

If such examinations reveal no visible structural defects, the examination may be limited to verification that the corrosion prevention system remains effective.

2.1.3 (1/7/2010)

For ballast tanks, excluding double bottom ballast tanks, if there is no hard protective coating, or soft or semi-hard coating, or poor coating condition and it is not renewed, the tanks in question are to be internally examined at annual surveys.

2.1.4 (1/7/2010)

When such conditions are found in double bottom ballast tanks, the tanks in question may be internally examined at annual surveys.

2.1.5 (1/1/2012)

In the case of ships over 10 years of age, other than ships engaged in the carriage of dry cargoes only or ships subject to the requirements of Ch 4, Sec 3, Ch 4, Sec 4, Ch 4, Sec 5 or Ch 4, Sec 6, an internal examination of selected cargo spaces is to be carried out.

2.1.6 (1/7/2006)

In the case of dry cargo ships over 15 years of age, other than bulk carriers subject to the requirements of Ch 4, Sec 2 or Ch 4, Sec 9 as applicable or general dry cargo ships subject to the requirements of Ch 4, Sec 8, an internal examination of selected cargo holds is to be carried out.

Table 1 : Intermediate survey of hull (all ships) (1/7/2006)

ITEM	Age of ship (in years at time of intermediate survey)		
	5 < age ≤ 10	10 < age ≤ 15	age > 15
SALT WATER BALLAST SPACES	Representative spaces internally examined Thickness measurements, if considered necessary by the Surveyor See (1) (2) (3)	All spaces internally examined Thickness measurements, if considered necessary by the Surveyor See (1) (3)	
CARGO HOLDS (dry cargo ships)			Selected cargo holds internally examined
CARGO TANKS (non-ESP tankers)			Selected cargo tanks internally examined
<p>(1) If such examinations reveal no visible structural defects, the examination may be limited to verification that the corrosion prevention system remains effective.</p> <p>(2) If there is no hard protective coating, or soft coating, or poor coating condition, the examination is to be extended to other ballast spaces of the same type.</p> <p>(3) For spaces used for water ballast, excluding double bottom tanks, if there is no hard protective coating, or soft coating, or poor coating condition and it is not renewed, the spaces in question are to be internally examined at annual surveys. When such conditions are found in water ballast double bottom tanks, the spaces in question may be internally examined at annual surveys.</p> <p>Note 1: Due attention is also to be given to fuel oil piping passing through ballast tanks, which is to be pressure tested should doubts arise.</p>			

SECTION 5

CLASS RENEWAL SURVEY

1 General

1.1

1.1.1 The requirements of this Section apply to class renewal surveys of all ships. The specific requirements for class renewal surveys related to service notations and additional class notations assigned to ships are addressed in Chapter 4 and Chapter 5, respectively.

1.1.2 (1/7/2015)

The class renewal survey is to include, in addition to the requirements of the annual survey, examination, tests and checks to show that the hull structures, main and auxiliary machinery, systems, equipment and related piping, as required in [2.2.8], are in satisfactory condition or restored to such condition as to allow the ship to operate for the new period of class to be assigned, provided that the ship is properly maintained and operated and other surveys for maintenance of class are duly carried out during this period.

The examinations of the hull are to be supplemented by thickness measurements and testing as required in [2.5.1] and [2.2.8], to ensure that the structural integrity remains effective. The aim of the examination is to discover substantial corrosion, significant deformation, fractures, damages or other structural deterioration.

1.1.3 The Owner is to provide the necessary facilities to enable this class renewal survey. The conditions for survey as detailed in Ch 2, Sec 2, [2.5] to Ch 2, Sec 2, [2.8] are to be met.

1.1.4 When the ship is under the continuous survey system for machinery and/or hull, the scope of the class renewal survey as described in this Section is carried out on a continuous basis over the period of class according to the procedure laid down in Ch 2, Sec 2, [4.3].

When the machinery installation is surveyed under the Planned Maintenance System, a specific program of survey replaces the scope of the class renewal survey of machinery and systems as laid down in [3] below, according to the procedure laid down in Ch 2, Sec 2, [4.4].

1.1.5 (1/7/2006)

A survey-planning meeting is to be held prior to the commencement of the survey.

2 Hull and hull equipment

2.1 Bottom survey

2.1.1 (1/7/2001)

The class renewal survey is to include a bottom survey as laid down in Sec 6, [2.2].

2.2 Decks, hatch covers and equipment

2.2.1 Decks are to be examined, particular attention being given to the areas where stress concentration or increased corrosion are likely to develop, such as hatch corners and other discontinuities of structure.

Deck erections such as hatch coamings, deckhouses and superstructures are to be examined.

The sheathing of wood-sheathed steel decks may be removed, at the Surveyor's discretion, in the case of doubt as to the condition of plating underneath.

Due attention is to be given to the examination in way of end and side openings and related shell and inner doors.

2.2.2 (1/7/2016)

The survey of hatch covers and coamings is to include:

- a thorough inspection of the items listed in Sec 3, [2.3], including close-up survey of hatch cover plating and hatch coaming plating. Subject to cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey shall be done of accessible parts of hatch covers structures.
- checking of the satisfactory operation of all mechanically operated hatch covers including stowage and securing in open condition, proper fit, locking and efficiency of sealing in closed position, operational testing of hydraulic and power components, wires, chains and link drives.
- checking of the effectiveness of sealing arrangements of all hatch covers by means of hose testing or equivalent.
- thickness measurements of coaming and attached stiffeners, hatch cover plating and stiffeners (see Tab 2).

2.2.3 (1/7/2007)

The survey of hull equipment is to cover the following points:

- windlass and chain stoppers, with disassembly as deemed necessary to verify the condition of the equipment and control and safety devices, hawse pipes
- steering arrangements, including steering gear, control and indication devices, operational tests and disassembly as deemed necessary; in the case of chain and rod gears, chains, rods, sheaves, pins and rollers are to be examined for wear
- connection of masts and standing rigging to the hull structure as well as condition of structure underneath
- deck fittings, their pedestals, if any, and the hull structures associated with towing and mooring, with disassembly where applicable and as deemed necessary.

2.2.4 (1/7/2007)

Piping systems outside tanks and compartments are to be visually examined and pressure tested as necessary, as per the requirements laid down for the class renewal survey of machinery and systems; see [3.5].

Ventilators, air pipes, overflow pipes and gas vent pipes, with their means of closure and flame screens, are to be opened up as necessary for the internal examination.

2.2.5 (1/7/2003)

For all ships except for passenger ships, automatic air pipe heads are to be completely examined (both internally and externally) as indicated in Tab 4.

For designs where the inner parts cannot be properly inspected from outside, this is to include removal of the head from the air pipe. Particular attention is to be paid to the condition of the zinc coating in heads constructed from galvanised steel.

2.2.6 (1/7/2003)

The anchors and chain cables are to be ranged and examined, and the required complement and condition verified. The chain locker, holdfasts, hawse pipes and chain stoppers are to be examined and pumping arrangements of the chain locker tested. At class renewal surveys of ships more than 5 years of age, chain cables are to be gauged and renewed in cases where their mean diameter is worn below the limits allowed.

2.2.7 (1/7/2005)

The accuracy of the shipboard computer for stability calculations is to be checked by applying all approved test loading conditions. The testing procedure is to be carried out in accordance with Pt B, Ch 11, Sec 2, [4.5.9].

2.2.8 (1/7/2006)

All bilge and ballast piping systems are to be examined and operationally tested to working pressure to the attending Surveyor's satisfaction to ensure that tightness and condition remain satisfactory.

2.3 Holds and other dry compartments

2.3.1 (1/1/2019)

All spaces including holds and their 'tweendecks where fitted, double bottom, deep, ballast, peak and cargo tanks, pump rooms, pipe tunnels, duct keels, machinery spaces, dry spaces, cofferdams and voids are to be internally examined, including the plating and framing, bilges and drain wells, sounding, venting, pumping and drainage arrangements. Internal examination of fuel oil, lube oil and fresh water tanks is to be carried out in accordance with Tab 5.

At renewal survey no. 3 and subsequent renewal surveys, the down flooding ducts integrated to the ship's structures and the ventilation ducts integrated to the ship's structures are to be internally examined.

2.3.2 (1/1/2003)

Machinery and boiler spaces, pump rooms and other spaces containing machinery are to be internally examined, ascertaining the condition of the structure. Particular attention is to be given to tank tops, shell plating in way of tank tops, brackets connecting side shell frames and tank tops,

and bulkheads in way of tank tops and bilge wells. Particular attention is also to be given to the sea suction, sea water cooling pipes and overboard discharge valves and their connections to the shell plating. Where wastage is evident or suspected, thickness measurements are to be carried out, and renewals or repairs effected when wastage exceeds allowable limits.

Piping systems inside these spaces are to be dealt with according to [3.5].

2.3.3 (1/7/2014)

Chain lockers are to be internally examined, while the anchor chains are ranged (see [2.2.6]). The pumping arrangement of the chain lockers is to be tested.

2.4 Tanks

2.4.1 (1/7/2006)

The type and number of tanks to be internally examined at each class renewal survey are detailed in Tab 1 for cargo and water ballast tanks and Tab 5 for fuel oil, lubricating oil and fresh water tanks, according to the age of the ship.

This internal examination is to ascertain the condition of the structure, bilges and drain wells, sounding, venting, pumping and drainage arrangements, including piping systems and their fittings. Due attention is to be given to plating or double plates below the lower end of sounding and suction pipes.

Where wastage is evident or suspected, thickness measurements are to be carried out, and renewals or repairs effected when wastage exceeds allowable limits.

Where the inner surface of the tanks is covered with cement or other compositions, the removal of coverings may be waived provided they are examined, found sound and adhering satisfactorily to the steel structures.

Note 1: For examination of independent (non-structural) tanks, refer to [3.5.9].

Note 2: Due attention is also to be given to fuel oil piping passing through ballast tanks, which is to be pressure tested when the ship is more than 10 years old.

2.4.2 (1/7/2010)

Where provided, the condition of corrosion prevention systems of ballast tanks is to be examined. For ballast tanks excluding double bottom tanks, where a hard protective coating is found in poor condition and it is not renewed, where soft or semi-hard coating has been applied, or where a hard protective coating has not been applied since the time of construction, the tanks in question are to be examined at annual surveys. Thickness measurements are to be carried out as deemed necessary by the Surveyor.

When such breakdown of hard protective coating is found in double bottom ballast tanks and it is not renewed, where a soft or semi-hard coating has been applied, or where a hard protective coating has not been applied since the time of construction, the tanks in question may be examined at annual surveys. When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurements are to be carried out.

Table 1 : Requirements for internal examination of cargo and ballast structural tanks at class renewal survey (1/7/2006)

Type and use of structural tanks	Age of ship (in years at time of class renewal survey)			
	age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	age > 15
Peaks (all uses)	all	all	all	all
Salt water ballast tanks (all types)	all	all	all	all
Cargo tanks	all	all	all	all
Note 1: Independent non-structural tanks are to be surveyed according to [3.5.9].				
Note 2: The extent of the survey of tanks dedicated to liquids other than those indicated in this table will be considered by the Society on a case by case basis according to the nature of the liquids.				

2.4.3 (1/7/2006)

Boundaries of double bottom, deep, ballast, peak and other tanks, including holds adapted for the carriage of salt water ballast, are to be tested with a head of liquid to the top of air pipes or to near the top of hatches for ballast/cargo holds.

2.4.4 (1/7/2006)

Boundaries of fuel oil, lube oil and fresh water tanks are to be tested with a head of liquid to the highest point that liquid will rise to under service conditions. Tank testing of fuel oil, lube oil and fresh water tanks may be specially considered based on a satisfactory external examination of the tank boundaries and confirmation from the Master that pressure testing has been carried out according to the requirements with satisfactory results. The Surveyor may extend the testing as deemed necessary.

2.4.5 Other testing procedures, in particular those specified in Pt B, Ch 12, Sec 3, [2] for the initial survey during construction, may be accepted.

For integral tanks which are intended to contain liquid cargoes such as edible oil, the Surveyor may waive the requirement specified in [2.4.4] subject to a satisfactory internal examination.

2.5 Thickness measurements**2.5.1 (1/7/2006)**

Thickness measurements are to be carried out according to the procedure detailed in Ch 2, Sec 2, [2.3].

The extent of thickness measurements is detailed in Tab 2, according to the age of the ship.

The Surveyor may extend the thickness measurements as deemed necessary. When thickness measurements indicate substantial corrosion, the extent of thickness measurements is to be increased to determine areas of substantial corrosion. Tab 3 may be used as guidance for these additional thickness measurements. These extended thickness measurements are to be carried out before the survey is credited as completed.

2.5.2 (1/7/2006)

When the structure is protected with hard coating and the coating is found to be in good condition, as defined in Ch 2, Sec 2, [2.2.13], the Surveyor may specially consider the extent of thickness measurements in the corresponding areas. Other effective protective arrangements may also be considered.

Table 2 : Requirements for thickness measurements at class renewal survey (1/7/2016)

Age of ship (in years at time of class renewal survey) (1) (2)			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15 (4)	age > 15
Suspect areas	Suspect areas	Suspect areas	Suspect areas
	One transverse section of deck plating in way of a cargo space within 0,5 L amidship	Two transverse sections within 0,5 L amidship in way of two different cargo spaces (3)	A minimum of three transverse sections in way of cargo spaces within 0,5 L amidship (3)
		Internals in forepeak and after peak tanks	Internals in forepeak and after peak tanks
		All cargo hold hatch covers and coamings (plating and stiffeners)	All cargo hold hatch covers and coamings (plating and stiffeners)
			All exposed main deck plating full length
			Representative exposed superstructure deck plating (poop, bridge, and fore-castle deck)
			Lowest strake and strakes in way of tween decks of all transverse bulkheads in cargo spaces together with internals in way
			All wind and water strakes, port and starboard, full length
			All keel plates full length. Also, additional bottom plates in way of cofferdams, machinery space, and aft end of tanks
			Plating of seachests. Shell plating in way of overboard discharges as considered necessary by the attending Surveyor
<p>(1) Thickness measurement locations are to be selected to provide the best representative sampling of areas likely to be most exposed to corrosion, considering cargo and ballast history and arrangement and condition of protective coatings.</p> <p>(2) Thickness measurements of internals may be specially considered by the Surveyor if the hard protective coating is in GOOD condition.</p> <p>(3) For ships less than 100 metres in length, the number of transverse sections required at the class renewal survey for ships 10 < age ≤ 15 may be reduced to one, and the number of transverse sections required at subsequent class renewal surveys may be reduced to two.</p> <p>(4) For ships more than 100 metres in length, at the class renewal surveys for ships 10 < age ≤ 15, thickness measurements of exposed deck plating within 0,5 L amidship may be required.</p> <p>(5) Subject to cargo hold hatch covers of approved design which structurally have no access to the internals, thickness measurement shall be done of accessible parts of hatch covers structures.</p>			

Table 3 : Guidance for additional thickness measurements in way of substantial corrosion areas

Structural member	Extent of measurements	Pattern of measurements
Plating	Suspect area and adjacent plates	5 point pattern over 1 square metre
Stiffeners	Suspect area	3 measurements each in line across web and flange

Table 4 : Survey requirements for automatic air pipe heads at class renewal surveys (1/7/2003)

Age of ship (in years at time of class renewal survey due date)		
age ≤ 5	5 < age ≤ 10	age >10
<ul style="list-style-type: none"> - Two air pipe heads, one port and one starboard, located on the exposed decks in the forward 0,25 L, preferably air pipes serving ballast tanks. - Two air pipe heads, one port and one starboard, on the exposed decks, serving spaces aft of 0,25 L, preferably air pipes serving ballast tanks. 	<ul style="list-style-type: none"> - All air pipe heads located on the exposed decks in the forward 0,25 L. - At least 20% of air pipe heads on the exposed decks serving spaces aft of 0,25 L, preferably air pipes serving ballast tanks. 	<ul style="list-style-type: none"> - All air pipe heads located on the exposed decks.
See (1) and (2)	See (1) and (2)	See (3)
<p>(1) The selection of air pipe heads to be inspected is left to the attending Surveyor.</p> <p>(2) According to the results of this inspection, the Surveyor may require the inspection of other heads located on the exposed decks.</p> <p>(3) Exemption may be considered for air pipe heads where there is substantiated evidence of replacement within the previous five years.</p>		

Table 5 : Requirements for internal examination of fuel oil, lubricating oil and fresh water tanks at class renewal survey (1/7/2017)

Type and use of structural tanks	Age of ship (in years at time of class renewal survey)			
	age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	age > 15
Fuel oil - diesel oil tanks (engine room)	none	none	one	one
Fuel oil - diesel oil tanks (cargo length area)	none	one	two	half, minimum two
If no tanks in cargo length area, additional fuel tank(s) outside of engine room (if fitted)	none	one	one	two
Lubricating oil tanks	none	none	none	one
Fresh water tanks	none	one	all	all
<p>Note 1: These requirements apply to tanks of integral (structural) type.</p> <p>Note 2: If a selection of tanks is accepted to be examined, then different tanks are to be examined at each class renewal survey, on a rotational basis.</p> <p>Note 3: Peak tanks (all uses) are subject to internal examination at each class renewal survey.</p> <p>Note 4: At class renewal survey no. 3 and subsequent (ships older than 10 years), one deep tank for fuel oil in the cargo length area is to be included, if fitted.</p>				

2.6 Additional requirements for single hold cargo ships (see Note 2 to [1.1.1] of Ch 4, Sec 8)

2.6.1 (1/1/2009)

For ships complying with the requirements of SOLAS II-1/23-3 (effective from 1 January 2007 to 31 December 2008) and II-1/25 (effective from 1 January 2009) for hold water level detectors (see Note 1), the class renewal survey is to include an examination and a test of the water ingress detection system and their alarms.

Note 1: This survey requirement is to be fulfilled at class renewal surveys carried out after the ship has been made compliant with the requirements of SOLAS regulations II-1/23-3 or II-1/25, as applicable (see above) and commenced on or after 1 July 2007.

3 Machinery and systems

3.1 General

3.1.1 The survey items listed below are to be covered to the satisfaction of the Surveyor. However, other survey alternatives deemed equivalent by the Surveyor in relation to the characteristics and general condition of the ship concerned may also be accepted.

Note 1: Attention is drawn to the requirement Ch 2, Sec 2, [2.5.1] regarding safe execution of surveys, in particular as regards health hazards related to asbestos.

3.1.2 Machinery verification runs (1/7/2018)

- a) As part of the renewal survey of machinery, a dock trial (or functional tests) is to be carried out to attending Surveyors' satisfaction to confirm satisfactory operation of main and auxiliary machinery. If significant repairs are carried out to main or auxiliary machinery or steering gear, consideration should be given to a sea trial to attending Surveyors' satisfaction.
- b) If the significant repairs as stated in a) is considered by the society to have any impact on response characteristics of the propulsion systems, then the scope of sea trial shall also include a test plan for astern response characteristics based on those required for such an equipment or systems when fitted to the new ship.
- c) The tests are to demonstrate the satisfactory operation and astern response characteristics of the equipment or system under realistic service conditions at least over the manoeuvring range of the propulsion plant, from all control positions and for both ahead and astern directions. A test plan is to be provided by the yard and accepted by the surveyor. If specific operational characteristics have been defined by the manufacturer these shall be included in the test plan.
- d) Depending on the actual extent of the repair, the Society may accept a reduction of the test plan.
- e) The reversing characteristics of the propulsion plant, including the blade pitch control system of controllable pitch propellers, are to be demonstrated and recorded during trials.

3.2 Main and auxiliary engines and turbines

3.2.1 General

Depending on the type of machinery, the following parts are to be opened up as necessary for inspection. Parts and components are to be pressure tested as appropriate or as deemed necessary by the Surveyor. A working test is also to be carried out, including testing of alarms and safety devices.

3.2.2 Internal combustion engines

- a) Columns and entablature.
- b) Cylinders with their liners, cylinder covers (together with valves and valve gear), pistons with their rods, crossheads, slippers and guides (or gudgeon pins), connecting rods (with their top and bottom end bearings), control gear, driven scavenge pumps, driven air compressors, driven fuel pumps, supercharging blowers, fuel injection pumps, turning gear, etc.
- c) Crankshafts (together with their main bearings).
- d) Reverse gear, reduction gear and clutches, if fitted.

3.2.3 Steam turbines

- a) Condensers and their cooling water and condensate extraction pumps
- b) Casings and rotors (including their blading), impulse wheels (including guide blading and diaphragms), noz-

zles and nozzle boxes, journals and bearings, dummy pistons, labyrinths, external glands, etc.

- c) Shafts, including their flexible couplings.

Where the propulsion steam turbines are of a well-known type, and fitted with rotor position indicators and vibration indicators of an approved type, as well as measuring equipment of steam pressure at proper locations along the steam flow, and the arrangements for change-over in the event of emergency operation of the plant are readily operable, the first class renewal survey may be limited to the examination of rotor bearings, thrust bearings and flexible couplings, provided the Surveyor is satisfied from operation service records and power trials subsequent to the survey, that the turbine plant is in good working condition.

3.2.4 Gas turbines

- a) Casings, rotors and disks, impellers and blading of all turbines and compressors, combustion chambers, burners, heat exchangers, gas piping, compressed air piping with fittings, starting and reverse arrangements
- b) Shafts and their flexible couplings.

3.2.5 Electric propulsion

Where the propulsion machinery consists of an electrical system, the propulsion motors, generators, cables and all ancillary electrical gear, exciters and ventilating plant (including coolers) associated therewith are to be examined and the insulation resistance to earth tested. Due attention is to be given to windings, commutations and sliprings. The operation of protective gear and alarm devices is to be checked, as far as practicable. Interlocks intended to prevent unsafe operations or unauthorised access are to be checked to verify that they are functioning correctly.

3.2.6 Thruster installations

When the ship is equipped with thruster installations, the class renewal survey is also to include:

- a thorough examination of the machinery and electrical installation, as applicable
- an external examination of the propulsive part of the installation to be carried out at the dry dock survey due as part of the class renewal survey. During this examination other checks such as clearance readings, tightness of hub and blade sealing for controllable pitch propellers are to be verified. Locking arrangements for bolts, if fitted, are to be checked. Results of lubricating oil analysis to detect possible deterioration of internal gears and bearings or the presence of water are to be confirmed as acceptable. The Manufacturer's requirements may be taken into account. Dismantling of the assembly for the examination of internal parts may be required if the foregoing checks are not satisfactory
- a running test of the system under operating conditions.

3.3 Reduction gears, main thrust and intermediate shaft(s)

3.3.1 Reduction gears complete with all wheels, pinions, shafts, couplings, bearings and gear teeth, including incorporated clutch arrangements, are to be opened up, as deemed necessary by the Surveyor, for visual inspection. For complicated assemblies, gears and roller bearings may be inspected without dismantling.

3.3.2 All shafts, thrust blocks and bearings are to be examined.

3.4 Pumps and other machinery items

3.4.1 General

The items listed in [3.4.2] are to be opened up, as deemed necessary by the Surveyor, for visual inspection. Their parts and components are to be pressure tested as appropriate and considered necessary by the Surveyor. A working test is also to be carried out, including testing of alarms and safety devices if deemed necessary by the Surveyor.

3.4.2 Items to be surveyed (1/7/2007)

- Air compressors with their intercoolers, filters and/or oil separators and safety devices
- Heat exchangers, ventilation fans for boilers and other equipment used for essential services
- Piston pumps and centrifugal pumps for sea water, bilge and salt water ballast
- Screw pumps, gear pumps and centrifugal pumps other than those listed in c) above (opening up is not required)
- Mechanical components used for cooling and maintaining an ambient temperature lower than 45°C (see Pt C, Ch 2, Sec 2, [1.2.2]).

3.5 Systems in machinery spaces

3.5.1 Valves, cocks and strainers of the bilge and ballast systems are to be opened up, thoroughly or partly as deemed necessary by the Surveyor, for visual inspection, and, together with the piping and safety devices, examined and tested under working conditions.

3.5.2 The fuel oil, lubricating oil, hydraulic oil, thermal oil, and feed and cooling water systems, together with pressure filters, heaters and coolers used for essential services, are to be opened up and examined or tested, as considered necessary by the Surveyor. Safety devices for the foregoing items are to be examined.

3.5.3 The compressed air system together with its valves, fittings and safety devices is to be examined, as considered necessary by the Surveyor.

3.5.4 (1/7/2006)

Compressed air receivers and other pressure vessels for essential services are to be cleaned internally and examined internally and externally. Where the above receivers or vessels cannot be examined internally, they are to be hydrostatically tested to 1,5 times the working pressure. Their fittings, valves and safety devices are to be opened up, as deemed

necessary by the Surveyor, for visual inspection and pressure tested as appropriate.

3.5.5 Steel pipes for superheated steam having a temperature of the steam at the superheater outlet exceeding 450°C are to be examined and tested in accordance with [3.5.7] to [3.5.8] at each class renewal survey.

3.5.6 Steel pipes for saturated steam or superheated steam having a temperature of the steam at the superheater outlet not exceeding 450°C are to be examined and tested in accordance with [3.5.7] and [3.5.8] at each class renewal survey for ships over 5 years of age. When the ship is 5 years of age or less, the inspection may be limited to a check of the satisfactory general condition of pipes.

3.5.7 The examination and hydrostatic test of steel pipes for main steam machinery, and steel pipes for auxiliary steam machinery having internal diameter 75 mm and over, are to be carried out on a number of pipes selected by the Surveyor after the lagging in way is removed.

3.5.8 Representative pipe lengths connected with bolted flanges are to be internally and externally examined, and hydrostatically tested to 1,1 times the working pressure at ambient temperature. Bolts and butt-welded joints between flanges and pipes are to be submitted to a non-destructive test for crack detection.

3.5.9 Non-structural tanks located in machinery spaces are to be externally examined; the relevant fittings, with particular regard to the remote control shut-off valves under hydrostatic head, are to be externally examined to check the efficiency of manoeuvres and the absence of cracks or leakage.

3.5.10 (1/1/2007)

When the ship is equipped with a refrigerating plant (whether or not covered by an additional class notation), the class renewal survey is to include:

- examination and test at the design pressure of the parts of the plant under pressure
- for refrigerating machinery spaces using ammonia as refrigerant:
 - examination of valves and pumps of the bilge system to the same extent as indicated in [3.4]
 - examination and test of the electrical equipment to the same extent as indicated in [3.6.10]
 - test of the gas detection system.

3.6 Electrical equipment and installations

3.6.1 An electrical insulation resistance test is to be performed on the electrical equipment and cables. If needed, for the purpose of this test, the installation may be subdivided or equipment which may be damaged disconnected.

3.6.2 The prime movers of generators are to be surveyed in accordance with [3.2] and their governors tested. All generators are to be presented for inspection, clean and with covers opened and examined under working conditions.

3.6.3 Main and emergency switchboards, section boards and distribution boards are to be cleaned and doors or cov-

ers opened for examination of their fittings. The condition of overcurrent protective devices and fuses is to be checked. Circuit-breakers of generators are to be tested, as far as practicable, to verify that protective devices including preference tripping relays, if fitted, operate satisfactorily. The tightening of busbar connections is to be checked.

3.6.4 Electrical cables and cable runs are to be examined at random, in particular in places where deterioration is likely to occur; terminal boxes of essential services are also to be subjected to a random check.

3.6.5 (1/7/2007)

The motors and starters concerning essential services together with associated control and switchgear, including electrical components used for cooling and maintaining an ambient temperature lower than 45°C (see Pt C, Ch 2, Sec 2, [1.2.2]), are to be examined and, if considered necessary by the Surveyor, checked, as far as practicable, under working conditions.

3.6.6 Navigation light indicators are to be tested under working conditions, and correct operation on the failure of supply or failure of navigation lights verified.

3.6.7 The emergency sources of electrical power, their automatic arrangements and associated circuits are to be tested.

3.6.8 Emergency lighting, transitional emergency lighting, supplementary emergency lighting, general emergency

alarm and public address systems are to be tested as far as practicable.

3.6.9 The visible condition of electrical equipment and installations is also to be checked as regards precautions against shock, fire and other hazards of electrical origin.

3.6.10 A general examination of the electrical equipment in areas where there may be flammable gas or vapour and/or combustible dust is to be carried out to ensure that the integrity of the electrical equipment of a safety type has not been impaired owing to corrosion, missing bolts, etc., and that there is not an excessive build-up of dust on or in dust-protected electrical equipment. Cable runs are to be examined for sheath and armouring defects, where practicable, and to ensure that the means of supporting the cables are in satisfactory condition.

The proper condition of bonding straps for the control of static electricity is to be checked. Alarms and interlocks associated with pressurised equipment or spaces are to be tested for correct operation.

Note 1: Owners are reminded that maintenance, repairs or renewal of certified electrical equipment of a safe type remains their responsibility or that of their representatives.

3.7 Controls

3.7.1 Where remote and/or automatic controls, not covered by an additional class notation related to automated installation, are fitted for essential machinery, they are to be tested to demonstrate that they are in satisfactory condition.

SECTION 6

BOTTOM SURVEY

1 General

1.1

1.1.1 (1/7/2001)

The bottom survey may be carried out in dry condition, such as in dry dock or on a slipway, or through an in-water survey.

The conditions for acceptance of a bottom in-water survey in lieu of a bottom survey in dry condition are laid down in Ch 2, Sec 2, [7.1.4] and [3].

2 Bottom survey in dry condition

2.1 General requirements

2.1.1 (1/7/2003)

When a ship is in dry condition, it is to be placed on blocks of sufficient height and with the necessary staging to permit the examination of elements such as shell plating including bottom and bow plating, stern frame and rudder, sea chests and valves, propeller, etc.

2.1.2 (1/1/2013)

The outer shell plating is to be visually examined for excessive corrosion, or deterioration due to chafing or contact with the ground or for any undue deformation or buckling. Due attention is to be given to the plating of end structures (stem and sternframe), and to the connection between the bilge strakes and the bilge keels. Significant plate unevenness or other deterioration which does not necessitate immediate repairs is to be recorded.

2.1.3 (1/7/2013)

Sea chests and their gratings, sea connections and overboard discharge valves and cocks and their fastenings to the hull or sea chests are to be examined. Valves and cocks need not be opened up more than once in a class renewal survey period unless considered necessary by the Surveyor.

2.1.4 (1/7/2014)

Visible parts of the propeller(s), stern bush(es), propeller shaft boss, brackets and tightness system(s) are to be examined. The clearances of the propeller shaft(s) (or wear down gauge) are to be checked and recorded. For controllable pitch propellers, the Surveyor is to be satisfied with the fastenings and tightness of hub and blade sealing.

Visible parts of side thrusters are to be examined. Other propulsion systems which also have manoeuvring characteristics (such as directional propellers, vertical axis propellers, water jet units) are to be examined externally with focus on the condition of gear housing, propeller blades, bolt locking and other fastening arrangements. Sealing

arrangement of propeller blades, propeller shaft and steering column are to be verified.

Dismantling is to be carried out, if considered necessary, notably where leakages are detected.

2.1.5 (1/7/2003)

Visible parts of the rudder(s), rudder pintles, rudder stock and couplings as well as the sternframe are to be examined. If considered necessary by the Surveyor, the rudder(s) is (are) to be lifted or the inspection plates removed for the examination of pintles.

The clearances in the rudder bearings and the rudder lowering are to be checked and recorded.

Where applicable, a pressure test of the rudder may be required as deemed necessary by the Surveyor.

2.2 Bottom survey held within the scope of class renewal survey

2.2.1 (1/7/2001)

The bottom survey held within the scope of the class renewal survey is to include the requirements in [2.1] for ships with **ESP** notation.

2.2.2 (1/7/2001)

The bottom survey held within the scope of the class renewal survey is to be carried out in compliance with [1.1] for ships without **ESP** notation

3 Bottom in-water survey

3.1 General

3.1.1 An in-water survey may normally be carried out if the ship has been granted the additional class notation **INWATERSURVEY** as defined in Ch 1, Sec 2, [6.14.3]. Upon application by the Owner and in special circumstances, the Society may also authorise such bottom in-water survey for ships not assigned with the additional class notation **INWATERSURVEY**.

3.1.2 (1/7/2005)

The bottom in-water survey is to provide the information normally obtained from a bottom survey carried out in dry condition. Special consideration is to be given to ascertaining rudder bearing clearances and stern bush clearances of oil stern bearings based on a review of the operating history, on board testing and stern oil sample reports. These considerations are to be included in the proposals for in-water survey, which are to be submitted in advance of the survey so that satisfactory arrangements can be agreed on with the Society.

3.1.3 (15/3/2018)

Sea chests and their gratings, sea connections and overboard discharge valves and cocks and their fastenings to the hull or sea chests are to be examined. Valves and cocks need not be opened up more than once in two class renewal survey periods unless considered necessary by the Surveyor.

3.1.4 (1/1/2019)

The in-water survey is to be carried out with the ship in sheltered water and preferably with weak tidal streams and currents. The in-water visibility and the cleanliness of the hull below the waterline are to be good enough to permit a meaningful examination which allows the Surveyor and the in-water survey firm to determine the condition of the plating, appendages and welding.

The Society is to be satisfied with the methods of orientation of the divers or Remotely Operated Vehicle (ROV) on the plating, which should make use where necessary of permanent markings on the plating at selected points.

The equipment and the procedure for observing and reporting the survey are to be discussed with the parties involved prior to the in-water survey, and suitable time is to be allowed to permit the in-water survey firm to test all equipment beforehand.

3.1.5 (1/1/2019)

The in-water survey is to be carried out under the surveillance of a Surveyor by an in-water survey firm approved by the Society in accordance with the "Rules for the Certification of Service Suppliers".

3.1.6 (1/7/2003)

The Surveyor is to be satisfied with the method of pictorial representation, and good two-way communication between the Surveyor and the divers is to be provided.

3.1.7 If the in-water survey reveals damage or deterioration that requires early attention, the Surveyor may require the ship to be drydocked in order for a detailed survey to be undertaken and the necessary repairs carried out.

4 Bottom in-water survey of ships enrolled into the extended dry docking (EDD) scheme

4.1 In-water survey

4.1.1 (1/2/2019)

The in-water survey is to be carried out in accordance with the requirements in [3]: the in-water survey shall provide the information normally obtained from a docking survey.

A plan for the in-water survey is to be submitted to the Society for review in advance of the survey, and is to include the following:

- the scheduled time and location for survey;
- the name of the approved diving company;
- the means for cleaning of the hull below waterline;
- the means of access for the examination of sea chests, sea valves and, when applicable, box coolers;
- the results of the inspections by the ship owner's personnel of double bottom tanks, double side ballast tanks, dry compartments and cofferdams adjacent to the outer hull (during the last 3 years) with reference to structural deterioration in general, leakages in tank boundaries and piping and condition of the protective coating;
- the conditions for the internal examination of double bottom tanks, double side ballast tanks, dry compartments and cofferdams adjacent to the outer hull, e.g. information regarding tank cleaning, gas freeing, ventilation, lighting, etc.

As a part of the in-water survey, dry compartments and cofferdams adjacent to the outer hull are to be inspected on a sample basis, to the satisfaction of the Surveyor; ballast tanks are to be inspected by the Surveyor as per the class periodicity.

The records relevant to the monitoring of the impressed cathodic corrosion protection system, if any, are to be submitted to the Surveyor for review.

Prior to commencement of the in-water survey, a survey planning meeting shall be held between the attending surveyor(s), the owner's representative, the diving company and the master of the ship for the purpose of ascertaining that all the arrangements envisaged in the survey plan are in place, so as to ensure the safe and efficient conduct of the survey work to be carried out.

SECTION 7

SHAFT SURVEY

1 Survey of shafts

1.1 General

1.1.1 (1/1/2016)

The different types of surveys to which shafts may be subjected

- Method 1, Method 2 or Method 3 for oil lubricated or Closed Loop System Fresh Water Lubricated Shafts
- Method 4 for shafts lubricated by water in an open loop system

and the intervals at which they are to be carried out are given in Ch 2, Sec 2, [8].

1.2 METHOD 1

1.2.1 (1/1/2016)

The survey is to consist of:

- a) Drawing the shaft and examining the entire shaft, seals system and bearings.
- b) For keyed and keyless connections:
 - removing the propeller to expose the forward end of the taper,
 - performing a non-destructive examination (NDE) by an approved surface crack-detection method all around the shaft in way of the forward portion of the taper section, including the keyway (if fitted). For shafts provided with liners, the NDE is to be extended to the after edge of the liner.
- c) For flanged connection:
 - whenever the coupling bolts of any type of flange-connected shaft are removed or the flange radius is made accessible in connection with overhaul, repairs or when deemed necessary by the surveyor, the coupling bolts and flange radius are to be examined by means of an approved surface crack detection method.
- d) Checking and recording the bearing clearances:
 - verification that the propeller is free of damage which may cause the propeller to be out of balance,
 - verification of the satisfactory conditions of inboard and outboard seals during the re-installation of the shaft and propeller,
 - recording the bearing wear down measurements (after re-installation).

1.3 METHOD 2

1.3.1 (1/1/2016)

The survey is to consist of:

- a) for keyed and keyless connections:

- removing the propeller to expose the forward end of the taper,
 - performing a non-destructive examination (NDE) by an approved surface crack-detection method all around the shaft in way of the forward portion of the taper section, including the keyway (if fitted);
- b) for flanged connection:
 - whenever the coupling bolts of any type of flange-connected shaft are removed or the flange radius is made accessible in connection with overhaul, repairs or when deemed necessary by the surveyor, the coupling bolts and flange radius are to be examined by means of an approved surface crack detection method;
 - c) checking and recording the bearing wear down measurements;
 - d) visual inspection of all accessible parts of the shafting system;
 - e) verification that the propeller is free of damage which may cause the propeller to be out of balance;
 - f) seal liner found to be or placed in a satisfactory condition;
 - g) verification of the satisfactory re-installation of the propeller including verification of satisfactory conditions of inboard and outboard seals.

Pre-requisites to satisfactorily verify in order to apply METHOD 2:

- review of service records;
- review of test records of:
 - Lubricating Oil analysis (for oil lubricated shafts), or
 - Fresh Water Sample test (for closed system fresh water lubricated shafts);
- oil sample examination (for oil lubricated shafts), or Fresh Water Sample test (for closed system fresh water lubricated);
- verification of no reported repairs by grinding or welding of shaft and/or propeller.

1.4 METHOD 3

1.4.1 (1/1/2016)

The survey is to consist of:

- a) checking and recording the bearing wear down measurements;
- b) visual inspection of all accessible parts of the shafting system;
- c) verification that the propeller is free of damage which may cause the propeller to be out of balance;
- d) seal liner found to be or placed in a satisfactory condition;

- e) verification of the satisfactory conditions of inboard and outboard seals.

Pre-requisites to satisfactorily verify in order to apply METHOD 3:

- review of service records;
- review of test records of:
 - Lubricating Oil analysis (for oil lubricated shafts), or
 - Fresh Water Sample test (for closed system fresh water lubricated shafts);
- oil sample examination (for oil lubricated shafts), or Fresh Water Sample test (for closed system fresh water lubricated);
- verification of no reported repairs by grinding or welding of shaft and/or propeller.

1.5 METHOD 4

1.5.1 (1/1/2016)

The survey is to consist of:

- a) drawing the shaft and examining the entire shaft (including liners, corrosion protection system and stress reducing features, where provided), inboard seal system and bearings;
- b) for keyed and keyless connections:
- removing the propeller to expose the forward end of the taper,
 - performing a non-destructive examination (NDE) by an approved surface crack- detection method all around the shaft in way of the forward portion of the taper section, including the keyway (if fitted). For shafts provided with liners, the NDE is to be extended to the after edge of the liner;
- c) for flanged connection:
- whenever the coupling bolts of any type of flange-connected shaft are removed or the flange radius is made accessible in connection with overhaul, repairs or when deemed necessary by the surveyor, the coupling bolts and flange radius are to be examined by means of an approved surface crack detection method;
- d) checking and recording the bearing clearances;
- e) verification that the propeller is free of damage which may cause the propeller to be out of balance;
- f) verification of the satisfactory conditions of inboard seal during re-installation of the shaft and propeller.

1.6 Extension surveys

1.6.1 Extension up to 2.5 years for oil lubricated shafts or closed loop system fresh water lubricated shafts (1/1/2016)

The survey is to consist of:

- a) checking and recording the bearing wear down measurements, as far as practicable;
- b) visual inspection of all accessible parts of the shafting system;
- c) verification that the propeller is free of damage which may cause the propeller to be out of balance;

- d) verification of the effectiveness of the inboard seal and outboard seals.

Pre-requisites to satisfactorily verify in order to apply EXTENSION UP TO 2.5 YEARS:

- review of service records;
- review of test records of:
 - Lubricating Oil analysis (for oil lubricated shafts), or
 - Fresh Water Sample test (for closed system fresh water lubricated shafts);
- oil sample examination (for oil lubricated shafts), or Fresh Water Sample test (for closed system fresh water lubricated);
- verification of no reported repairs by grinding or welding of shaft and/or propeller;
- confirmation from the Chief Engineer that the shafting arrangement is in good working condition.

1.6.2 Extension up to 1 year for oil lubricated shafts or closed loop system fresh water lubricated shafts (1/1/2016)

The survey is to consist of:

- a) visual inspection of all accessible parts of the shafting system;
- b) verification that the propeller is free of damage which may cause the propeller to be out of balance;
- c) verification of the effectiveness of the inboard seal and outboard seals.

Pre-requisites to satisfactorily verify in order to apply EXTENSION UP TO 1 YEARS:

- review of the previous wear down and/or clearance recordings;
- review of service records;
- review of test records of:
 - Lubricating Oil analysis (for oil lubricated shafts), or
 - Fresh Water Sample test (for closed system fresh water lubricated shafts);
- oil sample examination (for oil lubricated shafts), or Fresh Water Sample test (for closed system fresh water lubricated);
- verification of no reported repairs by grinding or welding of shaft and/or propeller;
- confirmation from the Chief Engineer that the shafting arrangement is in good working condition.

1.6.3 Extension up to 3 months for oil lubricated shafts or closed loop system fresh water lubricated shafts (1/1/2016)

The survey is to consist of:

- a) visual inspection of all accessible parts of the shafting system;
- b) verification of the effectiveness of the inboard seal.

Pre-requisites to satisfactorily verify in order to apply extension up to 3 months:

- review of the previous wear down and/or clearance recordings;
- review of service records;
- review of test records of:

- Lubricating Oil analysis (for oil lubricated shafts), or
- Fresh Water Sample test (for closed system fresh water lubricated shafts);
- oil sample examination (for oil lubricated shafts), or Fresh Water Sample test (for closed system fresh water lubricated);
- verification of no reported repairs by grinding or welding of shaft and/or propeller;
- confirmation from the Chief Engineer that the shafting arrangement is in good working condition.

1.6.4 Extension up to 1 year for water lubricated shafts (open loop systems) (1/1/2016)

The survey is to consist of:

- a) visual inspection of all accessible parts of the shafting system;
- b) verification that the propeller is free of damage which may cause the propeller to be out of balance;
- c) checking and recording the bearing clearances;
- d) verification of the effectiveness of the inboard seal.

Pre-requisites to satisfactorily verify in order to apply EXTENSION UP TO 1 YEAR:

- review of the previous clearance recordings;
- review of service records;
- verification of no reported repairs by grinding or welding of shaft and/or propeller;
- confirmation from the Chief Engineer that the shafting arrangement is in good working condition.

1.6.5 Extension up to 3 months for water lubricated shafts (open loop systems) (1/1/2016)

The survey is to consist of:

- a) visual inspection of all accessible parts of the shafting system;
- b) verification that the propeller is free of damage which may cause the propeller to be out of balance;
- c) verification of the effectiveness of the inboard seal.

Pre-requisites to satisfactorily verify in order to apply EXTENSION UP TO 3 MONTHS:

- review of the previous clearance recordings;
- review of service records;
- verification of no reported repairs by grinding or welding of shaft and/or propeller;
- confirmation from the Chief Engineer that the shafting arrangement is in good working condition.

1.6.6 (1/1/2016)

Where the notation **MON-SHAFT** has been assigned as specified in Ch 2, Sec 2, [8.3.1], the tailshaft need not be withdrawn provided that all condition monitoring data (bearing temperature, consumption and analysis of lubricating oil) is found to be within permissible limits and the remaining requirements for the complete survey are complied with.

Where the Surveyor considers that the data presented is not entirely to his satisfaction, the shaft is to be withdrawn.

2 Periodical survey of other propulsion systems

2.1 Rotating and azimuth thrusters

2.1.1 (1/7/2007)

The periodical survey of rotating and azimuth thrusters consists of:

- a) removing the propeller(s) in order to examine the following items, as applicable:
 - exposed parts
 - cone and keyway to be checked by an appropriate crack detection method
 - sealing glands
 - threaded end and nut.

For keyless or flange mounted propellers, alternative means to removal of the propeller for examination of the shaft cone, such as pressure testing of the hub and hub gland, may be adopted at alternate surveys;
- b) examining the results of a lubricating oil analysis (water content and presence of material particles) to detect possible deterioration of internal gears and bearings
- c) examining the orientation device.

If the foregoing checks are not satisfactory, dismantling of the internal parts may be required.

2.2 Vertical axis propellers

2.2.1 The periodical survey of vertical axis propeller systems consists of:

- checking the tightness of the oil glands and the backlash of the gears from outside by action on the blades
- checking the condition of gears and couplings from inside the ship
- examining the results of a lubricating oil analysis (water content and presence of material particles) to detect possible deterioration of internal gears and bearings.

If the foregoing checks are not satisfactory, dismantling of the internal parts may be required.

2.3 Pump jet systems

2.3.1 The periodical survey of pump jet systems consists of examining the following parts:

- impeller, shaft and clearances of bearings
- tightness of gland
- water duct
- steering nozzle
- reversing arrangements and control gear.

If the foregoing checks are not satisfactory, further dismantling may be required.

SECTION 8

BOILER SURVEY

1 Steam boilers

1.1

1.1.1 (1/7/2006)

Steam boilers, superheaters and economisers are to be examined internally and externally with the periodicity given in Ch 2, Sec 2, [9.1]. To this end, boilers are to be emptied and suitably prepared for the examination, and the water-steam side and fire side are to be cleaned and cleared of soot. Where necessary, the external surfaces are to be made accessible for inspection by removal of insulation and lining.

The internal examination is to be made on both the water-steam side and fire side.

Review of the following records since the last boiler survey is to be carried out as part of the survey:

- Operation
- Maintenance
- Repair history
- Feed water chemistry.

1.1.2 Subject to the results of this visual examination, the Surveyor may require:

- non-destructive tests for detection of possible defects in critical areas of plating and shells, pipes and stays
- thickness measurements of plating and shells, furnaces, pipes and stays.

If appropriate, a new working pressure may be fixed by the Society.

When situated inside boiler combustion chambers, steam pipes of cylindrical boilers are to be examined at their ends, and if deemed necessary by the Surveyor, a sample pipe is to be removed for examination.

1.1.3 If the internal examination is not carried out for practicable reasons, the parts subject to pressure are to be submitted to a hydraulic test.

1.1.4 Boiler supports and securing arrangements (fixed and sliding seating, chocks, rolling stays, if any, etc.) are to be examined.

Boiler accessories and mountings (such as valves and studs, water level indicators, safety valves) are to be externally and (as needed) internally examined.

Forced circulation pumps of fired steam generators are, wherever possible, to be opened up.

Fuel supply pipes between pumps and burners, fuel tank valves, pipes and deck control gear are to be examined.

1.1.5 (1/7/2006)

Upon completion of the internal survey, the boiler is to be examined under steam and fuel oil burners and safety devices checked under working conditions.

The boiler safety valves and their relieving gear are to be examined and tested to verify satisfactory operation. However, for exhaust gas heated economisers, if steam cannot be raised at port, the safety valves may be set by the Chief Engineer at sea, and the results recorded in the log-book for review by the Society.

1.1.6 (1/7/2006)

When an extension of the interval of the boiler survey is granted based on Ch 2, Sec 2, [9.1.4], the following is to be satisfactorily carried out:

- a) External examination of the boiler
- b) Boiler safety valve relieving gear (easing gear) is to be examined and operationally tested
- c) Boiler protective devices operationally tested
- d) Review of the following records since the last boiler survey:
 - Operation
 - Maintenance
 - Repair history
 - Feed water chemistry.

1.1.7 (1/7/2006)

In addition to the other requirements of [1.1.1] (internal examination), in exhaust gas heated economisers of the shell type all accessible welded joints are to be subjected to a visual examination for cracking. Non-destructive testing may be required for this purpose.

1.1.8 (1/7/2017)

When direct visual internal inspection is not feasible due to the limited size of the internal spaces, such as for small boilers and/or narrow internal spaces, this is to be replaced by a hydrostatic pressure test or by alternative verifications as determined by the Society.

2 Thermal oil heaters

2.1

2.1.1 (1/7/2014)

Thermal oil heaters are to be examined internally and externally with the periodicity given in Ch 2, Sec 2, [9.1]. The heater tubes are to be visually examined, and the tightness of the installation (including flange connections, valves and pumps) is to be checked through a test at the working pressure.

2.1.2 Thermal oil heater supports and securing arrangements are to be examined.

Heater accessories and mountings are to be externally and (as needed) internally examined.

Forced circulation pumps are, wherever possible, to be opened up.

Fuel supply pipes between pumps and burners, fuel tank valves, pipes and deck control gear are to be examined.

2.1.3 The following safety devices and instrumentation are to be examined and tested:

- thermal fluid temperature safety device and control
- thermal fluid flow meter
- device for low thermal fluid level in the expansion tank
- other regulation and safety systems.

2.1.4 Where repairs and/or renewal of components exposed to pressure are performed, a pressure test is to be carried out to 1,5 times the working pressure

2.1.5 Upon completion of the survey, the thermal oil heater is to be examined under working conditions, with particular attention to safety devices and controls of the plant.

SECTION 9

GAS FUELLED SHIPS

1 Ships other than liquefied gas carriers

1.1 Application

1.1.1 (1/1/2018)

These requirements have to apply to ships, other than those covered by Pt E, Ch 9, Sec 16, which utilize gas or other low flash point fuels as a fuel for propulsion prime mover/auxiliary power generation arrangements and associated systems.

These requirements are in addition to the requirements of Sec 3, Sec 4 and Sec 5.

These survey requirements do not cover fire protection, fire-fighting installation, and personnel protection equipment.

1.2 Annual Survey

1.2.1 Scope (1/1/2018)

The following is to be carried out during the survey of the Fuel Storage, Fuel Bunkering System, and Fuel Supply System:

a) Logbooks/Records

The logbooks and operating records are to be examined with regard to correct functioning of the gas detection systems, fuel supply/gas systems, etc. The hours per day of the re-liquefaction plant, gas combustion unit, as applicable, the boil-off rate, and nitrogen consumption (for membrane containment systems) are to be considered together with gas detection records.

b) Operating and Maintenance Instruction Manuals

The manufacturer/builder instructions and manuals covering the operations, safety and maintenance requirements and occupational health hazards relevant to fuel storage, fuel bunkering, and fuel supply and associated systems for the use of the fuel, are to be confirmed as being aboard the vessel.

c) Control, Monitoring and Safety Systems

1) Gas detection and other leakage detection equipment in compartments containing fuel storage, fuel bunkering, and fuel supply equipment or components or associated systems, including indicators and alarms, is to be confirmed in satisfactory operating condition. Recalibration of the gas detection systems should be verified in accordance with the manufacturers' recommendations.

2) Verification of the satisfactory operation of the control, monitoring and automatic shut-down systems

as far as practicable of the fuel supply and bunkering systems.

3) Operational test, as far as practicable, of the shut-down of ESD protected machinery spaces.

d) Fuel Handling Piping, Machinery and Equipment

Piping, hoses, emergency shut-down valves, remote operating valves, relief valves, machinery and equipment for fuel storage, fuel bunkering, and fuel supply such as venting, compressing, refrigerating, liquefying, heating, cooling or otherwise handling the fuel is to be examined, as far as practicable. Means for inerting is to be examined. Stopping of pumps and compressors upon emergency shut-down of the system is to be confirmed as far as practicable.

e) Ventilating System

Examination of the ventilation system, including portable ventilating equipment where fitted, is to be made for spaces containing fuel storage, fuel bunkering, and fuel supply units or components or associated systems, including air locks, pump rooms, compressor rooms, fuel preparation rooms, fuel valve rooms, control rooms and spaces containing gas burning equipment. Where alarms, such as differential pressure and loss of pressure alarms, are fitted, these should be operationally tested as far as practicable.

f) Drip Trays

Portable and fixed drip trays and insulation for the protection of the ship's structure in the event of leakage are to be examined.

g) Hazardous Areas

Electrical equipment and bulkhead/deck penetrations including access openings in hazardous areas are to be examined for continued suitability for their intended service and installation area.

h) Electrical Bonding

Electrical bonding arrangements in hazardous areas, including bonding straps where fitted, are to be examined.

1.2.2 Fuel Storage, Bunkering and Supply Systems (1/1/2018)

The following are to be examined, so far as applicable. Insulation need not be removed, but any deterioration or evidence of dampness is to be investigated:

- a) Fuel Storage
 - 1) External examination of the storage tanks including secondary barrier if fitted and accessible.
 - 2) General examination of the fuel storage hold place.
 - 3) Internal examination of tank connection space.
 - 4) External examination of tank and relief valves.
 - 5) Verification of satisfactory operation of tank monitoring system.
 - 6) Examination and testing of installed bilge alarms and means of drainage of the compartment.
 - 7) Testing of the remote and local closing of the installed main tank valve.
- b) Fuel Bunkering System
 - 1) Examination of bunkering stations and the fuel bunkering system.
 - 2) Verification of satisfactory operation of the fuel bunkering control, monitoring and shut-down systems.
- c) Fuel Supply System

Examination of the fuel supply system during working condition as far as practicable.

 - 1) Verification of satisfactory operation of the fuel supply system control, monitoring and shut-down systems.
 - 2) Testing of the remote and local closing of the master fuel valve for each engine compartment.

1.3 Intermediate Survey

1.3.1 Scope (1/1/2018)

In addition to the applicable requirements of the Annual Survey, the Intermediate Survey is also to include:

- a) Safety Systems

Gas detectors, temperature sensors, pressure sensors, level indicators, and other equipment providing input to the fuel safety system are to be randomly tested to confirm satisfactory operating condition. Proper response of the fuel safety system upon fault conditions is to be verified.

1.4 Renewal Survey

1.4.1 Scope (1/1/2018)

The Renewal Survey is to include, in addition to the requirements of the Annual Survey, examination, tests and checks of sufficient extent to ensure that the fuel installations are in a satisfactory condition and is fit for its intended purpose for the new period of class of 5 years to be assigned, subject to proper maintenance and operation and to periodical surveys being carried out at the due dates.

1.4.2 Fuel Handling and Piping (1/1/2018)

All piping for fuel storage, fuel bunkering, and fuel supply such as venting, compressing, refrigerating, liquefying, heating storing, burning or otherwise handling the fuel and liquid nitrogen installations are to be examined. Removal of insulation from the piping and opening for examination may be required. Where deemed suspect, a hydrostatic test to 1.25 times the Maximum Allowable Relief Valve Setting

(MARVS) for the pipeline is to be carried out. After reassembly, the complete piping is to be tested for leaks. Where water cannot be tolerated and the piping cannot be dried prior to putting the system into service, the Surveyor may accept alternative testing fluids or alternative means of testing.

1.4.3 Fuel Valves (1/1/2018)

All emergency shut-down valves, check valves, block and bleed valves, master gas valves, remote operating valves, isolating valves for pressure relief valves in the fuel storage, fuel bunkering, and fuel supply piping systems are to be examined and proven operable. A random selection of valves is to be opened for examination.

1.4.4 Pressure Relief Valves (1/1/2019)

- a) Fuel Storage Tank Pressure Relief Valves. The pressure relief valves for the fuel storage tanks are to be opened for examination, adjusted, and function tested. If the tanks are equipped with relief valves with non-metallic membranes in the main or pilot valves, such non-metallic membranes are to be replaced.
- b) Fuel Supply and Bunkering Piping Pressure Relief Valves. Pressure relief valves for the fuel supply and bunkering piping are to be opened for examination, adjusted, and function tested. Where a proper record of continuous overhaul and retesting of individually identifiable relief valves is maintained, consideration will be given to acceptance on the basis of opening, internal examination, and testing of a representative sampling of valves, including each size and type of liquefied gas or vapor relief valve in use, provided there is logbook evidence that the remaining valves have been overhauled and tested since crediting of the previous Special Survey.
- c) Pressure/Vacuum Relief Valves. The pressure/vacuum relief valves, rupture disc and other pressure relief devices for interbarrier spaces and hold spaces are to be opened, examined, tested and readjusted as necessary, depending on their design.

1.4.5 Fuel Handling Equipment (1/1/2018)

Fuel pumps, compressors, process pressure vessels, inert gas generators, heat exchangers and other components used in connection with fuel handling are to be examined as required in the Rules of each individual Society for periodical survey of machinery.

1.4.6 Electrical Equipment (1/1/2018)

- a) Examination of electrical equipment to include the physical condition of electrical cables and supports, intrinsically safe, explosion proof, or increased safety features of electrical equipment.
- b) Functional testing of pressurized equipment and associated alarms.
- c) Testing of systems for de-energizing electrical equipment which is not certified for use in hazardous areas.
- d) An electrical insulation resistance test of the circuits terminating in, or passing through, the hazardous zones and spaces is to be carried out.

1.4.7 Safety Systems (1/1/2018)

Gas detectors, temperature sensors, pressure sensors, level indicators, and other equipment providing input to the fuel safety system are to be tested to confirm satisfactory operating condition.

- a) Proper response of the fuel safety system upon fault conditions is to be verified.
- b) Pressure, temperature and level indicating equipment are to be calibrated in accordance with the manufacturer's requirements.

1.4.8 Fuel Storage Tanks (1/1/2018)

Fuel storage tanks are to be examined in accordance with an approved survey plan. Liquefied gas fuel storage tanks are to be examined based upon Recommendation No. 148.

2 Liquefied gas Carriers

2.1 Annual survey

2.1.1 (1/1/2018)

Examination, as far as possible, of arrangements for the use of cargo as fuel, and associated instrumentation and safety devices.

2.2 Intermediate survey

2.2.1 (1/1/2018)

Examination of instrumentation and safety systems for burning cargo as fuel:

- Confirmation that spares are provided for mechanical ventilation fans
- Examination of the installed pressure gauging systems on gas fuel lines and associated alarms
- Test of the instrumentation including alarm and safety functions by changing pressure, temperature as applicable and comparing with test instruments (simulated tests may be accepted for sensors which are not accessible)
- Examination, as far as practicable, of the piping of the gas detection system, when fitted, for corrosion and damage and verification, as far as possible, of the integrity of the suction lines between suction points and analysing units
- Calibration of gas detectors, when fitted, or verification thereof with sample gases
- Confirmation of the availability and suitability of the portable gas detection equipment and instruments for measuring oxygen levels.

2.3 Renewal survey

2.3.1 (1/1/2018)

Ships fitted with a reliquefaction or refrigeration plant and/or arrangements for the use of cargo as fuel: the corresponding machinery and equipment, such as cargo pumps, compressors, heat exchangers, condensers, liquid nitrogen tanks, process pressure vessels and other components have been internally inspected and working tested as far as practicable and applicable.

APPENDIX 1

CLASS REQUIREMENTS AND SURVEYS OF LAID-UP SHIPS

1 General

1.1

1.1.1 In order to maintain its class during a normal operation period, a ship is to be submitted to the surveys described in Ch 2, Sec 2 at their due dates and to the satisfaction of the Society, and is to be free of overdue surveys and conditions of class during the considered period.

1.1.2 When a ship stops trading and is put out of commission for a certain period, i.e. is laid-up, the normal survey requirements may no longer apply provided that the Owner notifies the Society of this fact. The Owner is also to submit a lay-up maintenance program to the Society for approval.

1.1.3 The lay-up maintenance program includes:

- the safety conditions to be kept throughout the lay-up period
- the measures taken to preserve the maintenance of the ship throughout the lay-up period
- the survey requirements to be complied with for lay-up, maintenance of class in lay-up and re-commissioning.

2 Safety conditions

2.1

2.1.1 Power supply

Adequate power supply is to be supplied, or readily available, all around the clock, either from independent means on board the ship or from shore.

The following safety conditions are to be kept throughout the lay-up period.

2.1.2 Manning

Watch personnel are to be provided. The number of the watch personnel will depend on the size of the ship, the lay-up site and mooring arrangements, the shore assistance available in case of fire, leakage or flooding, the maintenance required to provide adequate preservation. A permanent shore communication installation (radio, telephone) is also to be available.

2.1.3 Fire protection and fire fighting (1/7/2012)

Automatic fire alarm systems, where provided, are to be in working order and in operation.

2.1.4 Protection against explosion

Cargo spaces and piping systems are to be cleaned and ventilated to prevent gas from forming any pockets.

An inert gas system in operation is recommended for the cargo spaces of oil and chemical tankers.

All flammable materials, sludge, etc. are to be removed from the ship's bilge, tank tops, double bottom tanks, engine room, pump rooms and similar spaces.

Hot work is not to be carried out during lay-up, unless special precautionary measures are taken.

2.1.5 Safety equipment

All the equipment usually recommended for the safety of the watch personnel is to be provided, kept in working order and tested regularly.

The usual life-saving equipment such as liferafts, life-buoys, breathing apparatus, oxygen masks and distress signals is to be provided and made accessible.

The requirements of the flag Administration and of the local port authorities of the lay-up site are usually to be applied.

2.1.6 Emergency power

The emergency source of power, emergency generator and/or emergency air compressor are to be kept in working order and tested weekly.

3 Preservation measures for lay-up and maintenance

3.1 General

3.1.1 A lay-up log-book is to be kept on board, in which the maintenance work and tests carried out during the lay-up period are to be entered with the corresponding dates. The nature and frequency of the maintenance, inspections and tests are also to be defined in the lay-up log book.

3.1.2 The following measures for preservation and maintenance during the lay-up period are to be taken by Owners according to the type of ship, hull equipment, machinery installations and the specific cases of lay-up conditions.

3.2 Exposed parts of the hull

3.2.1 Underwater parts of the hull are to be protected against corrosion. It is advisable to provide an impressed current cathodic protection system where the quantity of corrosive waste discharge is particularly high. When such systems are provided they are to be serviced and checked at regular intervals. The condition of sacrificial anodes is to be evaluated at the annual lay-up condition surveys.

3.2.2 The coating of the hull above the waterline, exposed decks, access doors or covers on exposed decks, and hatch covers is to be maintained in satisfactory condition.

All accesses leading to internal spaces are to be kept closed.

All vent pipes and ventilation trunks are to be kept closed.

3.3 Internal spaces

3.3.1 Cargo tanks and cargo holds are to be emptied, cleaned and kept dry.

Ballast tanks are to be kept either full or empty. When ballast spaces are kept filled with sea water, special care is to be taken to keep such spaces topped up and protected against corrosion. When provided, sacrificial anodes are to be renewed when deemed necessary. The topping up is to be regularly verified.

3.3.2 Chain lockers are to be drained, cleaned and kept dry. Coating with bituminous paint is recommended.

3.3.3 Fuel oil and lubricating oil tanks are to be drained regularly.

Lubricating oil analysis is to be performed regularly and the oil renewed when the result is not satisfactory. Prior to being refilled, tanks are to be cleaned.

Empty lubricating oil tanks are to be cleaned and kept dry.

Fresh water or distilled water tanks are to be kept full or empty. Empty tanks are to be cleaned and kept dry. Where cement wash is used as a coating, this is to be examined and, if necessary, repaired prior to filling.

3.3.4 The bilge and tank top in engine rooms are to be cleaned and kept dry.

Hull sea inlet and outlet valves not in use are to be kept closed.

3.4 Deck fittings

3.4.1 The windlass, capstans and winches are to be regularly greased and turned once a week.

All wire cables are to be kept greased.

Visible parts of chains are to be coal-tarred and examined regularly.

Chocks and hawse pipes are to be coated with bituminous paint or equivalent if deemed necessary.

Cargo piping on deck is to be drained, blown through if deemed necessary and kept dry by opening up drains.

Electrical machinery and navigational equipment are to be protected by watertight covers.

3.5 Machinery

3.5.1 Machinery spaces

The air temperature inside the machinery spaces is normally to be kept above 0°C.

Humidity is to be kept as low as possible and within acceptable limits.

3.5.2 Machinery - General

Exposed mechanical parts of machinery are to be greased.

All rotating machinery such as diesel engines, reciprocating engines, pumps, turbines, electric motors and generators are to be turned at regular intervals with a limited number of revolutions (the lubricating oil system should be put in operation or proper priming applied). Units are not to be stopped in the same position as the previous one.

Bearing boxes are to be emptied, cleaned and refilled with new oil.

3.5.3 Main turbines

Turbines are to be kept dry.

All steam inlets are to be sealed.

Expansion arrangements (sliding feet) are to be suitably greased.

Electric heaters are to be put inside the turbines. Heat drying is to be made in open circuit, all valves shut and gland closing devices withdrawn.

Turbines are to be turned weekly, the lubricating oil system being put in service. The shaft line is to be stopped after turning an integer number of revolutions plus one quarter of a revolution.

3.5.4 Reduction gears

For large reduction gears, a fan activating the circulation of hot air in closed circuit with air hoses is to be fitted (intake at lower part of casing and discharge at upper part).

3.5.5 Auxiliary turbine-driven machinery

Stators are to be drained and kept dry.

Shaft sealing glands are to be lubricated.

Lubricating oil is to be analysed and renewed when deemed necessary. Prior to oil renewal, the oil casings are to be cleaned.

Exhaust steam pipes are to be kept dry.

Stuffing boxes are to be dismantled.

Turbines are to be turned weekly an integer number of revolutions plus one quarter of a revolution.

3.5.6 Condensers and heat exchangers

Condensers and heat exchangers are to be drained and kept dry.

Desiccant is to be placed in steam spaces.

Water sides are to be washed with fresh water.

The condition of the zinc anodes is to be periodically checked.

When tubes are fitted with plastic or fibre packing, water sides are to be filled with alkaline distilled water.

When tubes are expanded or fitted with metal packing, water sides are to be provided with desiccants and kept dry.

3.5.7 Auxiliary machinery

Air receivers are to be drained, opened up and cleaned. Pressure relief valves are to be cleaned and slightly lubricated.

Air compressor crankcases are to be drained, cleaned and refilled with clean oil. Cylinders and valves are to be lubricated. Coolers are to be drained and dried. Air drains are to be opened and the system dried.

Air start lines are to be drained and dried.

Hot-wells/return tanks are to be drained and dried.

De-aerators are to be drained and dried.

Feed pumps and extraction pumps are to be drained and dried.

Air ejectors are to be drained and dried.

Main circulation pumps are to be drained and dried.

Evaporators are to be drained, cleaned and dried.

3.5.8 Piping

Pipes not in use are to be drained and kept dry.

3.5.9 Diesel engines

Daily tank fuel oil outlet pipes and all injection equipment are to be filled with filtered gas oil.

Fresh water circuits are to be filled with water mixed with rust inhibitors. Fresh water pH is to be checked monthly.

Oil of hydraulic regulators is to be replaced.

Sea water cooling pipes are to be drained.

Crankcases are to be provided with desiccant.

Starting valves are to be lubricated (internally and externally).

Motor oil is to be sprayed in cylinders and on all external parts liable to corrosion.

Cams and cylinders are to be motor oil sprayed monthly.

Turbo-compressor/charger ball bearings are to be oil sprayed and rotated for an integer number of revolutions plus one quarter of a revolution.

Engine air inlets and exhaust gas pipes are to be sealed.

Scavenge spaces are to be cleaned

Engines are to be turned weekly.

3.5.10 Shaft lines

Shaft lines are to be coated with grease.

Shaft bearing cooling pipes are to be drained.

For sea water lubricated propeller shafts, the packing gland of the engine room stuffing box is to be tightened.

For oil lubricated stern tubes, lubricating oil is to be analysed and renewed if not satisfactory. The oil level in the tank is to be verified regularly.

Propeller shaft lines are to be rotated an integer number of revolutions plus one quarter of a revolution.

3.6 Electrical installations

3.6.1 Main and secondary switchboards, sub-feeder panels, fuse panels and starters are to be made tight. Desiccant is to be provided.

Contacts of relays, breakers and switch-breakers are to be coated with neutral vaseline.

Bearings of generators are to be cleaned of old grease and protected with new oil or grease.

Carbon brushes are to be lifted off their commutations.

3.6.2 Electrical insulation of each item is to be kept at a minimum 200000 Ω and general insulation is to be not less than 50000 Ω . Local electric heating may be necessary to improve the level of insulation, particularly in the generators/alternators and large motors.

A megger test is to be performed regularly.

3.7 Steering gear

3.7.1 Exposed mechanical parts are to be greased or oil sprayed.

For electrical parts the same preservation measures given in [3.6] are to be taken.

It is recommended that the steering gear should be operated monthly.

3.8 Boilers

3.8.1 Smoke sides of boilers are to be swept, washed clean with basic hot water and hot air dried.

3.8.2 Water and steam sides should preferably be preserved using the dry method, keeping the moisture at the lowest possible level, the ideal level being between 30% and 35%. It is advisable to ensure that no residual water remains to cause rapid corrosion. Drum doors are to be kept closed.

In other cases, it is advisable to keep the boilers, superheaters and economisers filled with water having a pH around 10,5. Hydrazine hydrate treatment of the water is preferable to reduce risks of corrosion caused by dissolved oxygen. The water is to be regularly analysed.

3.8.3 Air heaters are to be cleaned and kept dry.

Uptake, shell and fan outlets are to be cleaned and kept closed with watertight hoods.

Burners are to be dismantled, and atomisers greased.

Desiccant is to be provided in furnaces where deemed necessary.

Expansion arrangements (sliding feet) are to be suitably greased.

The internal condition of boilers is to be checked every three months.

3.8.4 Boilers may also be preserved sealed with inert gas (nitrogen), provided that cocks and valves are tight and the installation allows an internal pressure of at least 0,05 bar to be maintained to prevent air penetration. Regular checks of the overpressure are to be carried out and results recorded in the log-book.

3.9 Automation equipment

3.9.1 Recommendations for electronic components are the same as those given for electrical installations.

For pneumatic parts the manufacturers' recommendations are to be followed and the system is to be checked regularly.

Pressure, temperature or level sensors are generally not affected by damage when not used. However, when available, the manufacturers' recommendations are to be followed.

4 Lay-up site and mooring arrangements

4.1 General

4.1.1 The choice and suitability of the lay-up site, as well as the type of mooring conditions, the mooring arrangements and their efficiency during the lay-up period remain the responsibility of the Owner.

However, at the Owner's request, the mooring arrangement may be reviewed by the Society.

4.2 Recommendations for the lay-up site

4.2.1 The following recommendations are to be considered by Owners regarding the choice and suitability of the lay-up site.

The site should be:

- sheltered from open sea, strong currents and waves
- not exposed to whirling winds or turbulent tidal waves
- not exposed to moving ice
- clear of corrosive waste waters
- provided with adequate ship/shore communications.

4.3 Recommendations for the mooring arrangements

4.3.1 The following recommendations are to be considered by Owners with respect to the mooring arrangements:

- ground holding should be adequate
- vessels laid-up to buoys or anchored should be moored in such a way as to be prevented from swinging with normal wind and tidal changes
- chain cables should not be subject to cross-contact or twisting and stern anchorage should generally be provided
- laid-up ships should be in ballast condition in order to reduce the effects of wind. Due consideration should be given to the still water bending moment. For guidance, normal ballast draft should be roughly between 30% and 50% of the maximum draft.

4.3.2 Ships should normally be moored singly. However, when several ships are moored together, the following provisions are to be made:

- ships are to be moored bow to stern
- ships are to be of approximately the same size
- the number of ships moored together is, in principle, not to exceed six
- breast-lines are to be of similar elasticity
- fenders are to be provided.

4.4 Review of the mooring arrangements

4.4.1 As indicated in [4.1.1], at the Owners' request, the mooring arrangements may be reviewed by the Society.

4.4.2 The proposal for the mooring arrangements is in such case to be submitted by the Owner and is to include the following information.

a) Mooring site:

- geographical area (to be specified on a map)
- characteristics of the sea bottom
- water depth
- preferential angular sectors (effects of wind / tide / current) indicated according to statistical studies
- wave characteristics (amplitude, periods)

b) Geometry of mooring arrangements:

- ship's position and direction
- shore anchorage
- diagram showing mooring equipment (fore and aft)
- angle between chain cables and ship's centreline

c) Characteristics of mooring equipment:

- maximum holding strength of each anchor
- type of mooring lines (chains, cables, sinkers, etc.)
- length of each section
- weight of each section
- mechanical characteristics of each section (breaking load)
- weight of sinkers.

4.4.3 On completion of the installation, the mooring arrangements are to be inspected by the Society. When the ship is anchored, the underwater installation is to be inspected by a diver whose report is to be presented to the Society.

4.4.4 It is the responsibility of the Owners to ascertain the efficiency of the mooring arrangements during the lay-up period. The mooring arrangements are to be re-examined at regular intervals (at least each year when the ship is anchored) and when abnormal weather conditions occur at the lay-up site.

5 Surveys

5.1 Laying-up survey

5.1.1 At the beginning of the lay-up period a laying-up survey is to be carried out whose scope is to verify that the safety conditions, preservation measures, lay-up site and mooring arrangements are in accordance with the program agreed by the Society.

5.1.2 Upon satisfactory completion of this survey, an endorsement to confirm that the ship has been placed in lay-up is entered on the Certificate of Classification, which is subsequently to be kept on board.

5.2 Annual lay-up condition survey

5.2.1 As described in Ch 2, Sec 2, [13], an annual lay-up condition survey is to be performed in lieu of the normal annual class surveys. The purpose of this survey is to ascertain that the lay-up maintenance program implemented is continuously complied with.

5.2.2 It is to be checked that the arrangements made for the lay-up are unchanged and that the maintenance work and tests are carried out in accordance with the maintenance manual and recorded in the lay-up log-book.

5.2.3 Upon satisfactory completion of the survey, the Certificate of Classification is endorsed.

5.3 Re-commissioning survey

5.3.1 Owners are to make the necessary arrangements to remove the temporary lay-up installations provided for preservation measures and the protective materials and coatings (oil, grease, inhibitors, desiccants), before the survey is commenced.

It is the Owners' responsibility to verify that the ship parts that are not covered by class are reactivated in satisfactory operational condition.

5.3.2 (1/1/2015)

The scope of the re-commissioning survey is to include:

- a general examination of the hull, deck fittings, safety systems, machinery installations (including boilers whose survey is not due) and steering gear
- all periodical surveys due at the date of re-commissioning or which became overdue during the lay-up period

- dealing with the recommendations due at the date of re-commissioning or which became due during the lay-up period.

In all cases where the Owner elects to carry out the "next due" renewal survey, the due periodical hull and machinery surveys, due or which become overdue during the lay-up period, will be replaced by this one.

5.3.3 For the hull the following is to be carried out:

- examination of shell plating above the waterline, deck plating, hatch covers and coamings
- examination of load line items
- overall survey of all cargo tanks/holds
- overall survey of representative ballast tanks when the lay-up period does not exceed two years
- overall survey of all ballast tanks when the lay-up period is two years and over
- function tests of bilge and ballast systems.

5.3.4 (1/7/2007)

For the deck fittings the following is to be carried out:

- where possible, examination of deck piping under working pressure
- function tests of class items
- checking inert gas installation under working condition after inspection of water seal and function test of deck non-return valve and pressure/vacuum valves.

5.3.5 For machinery installations the following is to be checked:

- the analysis of lubricating oil of main engines, auxiliary engines, reduction gears, main thrust bearings and sterntube
- the general condition of crankcase, crankshaft, piston rods and connecting rods of diesel engines
- the crankshaft deflections of diesel engines. In addition when engines have been laid-up for more than two years, one piston is to be disconnected and one liner is to be removed for examination. Dismantling is to be extended if deemed necessary
- the condition of blades of turbines through the inspection doors
- the condition of the water side of condensers and heat exchangers
- the condition of expansion arrangements
- the condition of reduction gears through the inspection doors
- the condition after overhauling of pressure relief devices
- the test of bilge level alarms, when fitted.

5.3.6 The main and emergency electrical installations are to be tested. The parallel shedding of main generators and main switchboard safety devices are to be checked. A megger test of the electrical installation is to be performed.

5.3.7 (1/7/2012)

For the fire prevention, detection and fire-fighting systems, the following is to be examined and/or tested:

- fire detectors and alarms.

5.3.8 The automated installation is to be checked for proper operation.

5.3.9 When classed, the installations for refrigerated cargo are to be examined under working conditions. Where the lay-up period exceeds two years, representative components of the installation are to be dismantled.

5.3.10 For cargo installations on liquefied gas carriers, the following is to be carried out:

- inspection of the primary barrier in tanks
- for membrane tanks, a global gas test of tanks whose results are to be compared with those obtained at ship's delivery
- testing of gas piping at working pressure using inert gas.

A Surveyor of the Society is to attend the first cooling down and loading of the ship.

5.3.11 For other specific classed installations, the Owners are to submit a survey program to the Society.

5.3.12 On completion of the above surveys and tests, sea trials are to be performed in the presence of a Surveyor of the Society.

The sea trials are to include :

- verification of the satisfactory performance of the deck installations, main propulsion system and essential auxiliaries, including a test of the safety devices
- an anchoring test
- complete tests of steering gear
- full head and full astern tests
- tests of automated machinery systems, where applicable

5.3.13 Upon satisfactory completion of the surveys, an endorsement to confirm the carrying out of all relevant surveys and the re-commissioning of the ship is entered on the Certificate of Classification.

**SCOPE OF SURVEYS IN RESPECT OF THE
DIFFERENT SERVICES OF SHIPS**

SECTION 1	GENERAL
SECTION 2	BULK CARRIERS, COMBINATION CARRIERS AND SELF-UNLOADING BULK CARRIERS OF SINGLE SIDE SKIN CONSTRUCTION
SECTION 3	OIL TANKERS AND COMBINATION CARRIERS
SECTION 4	DOUBLE HULL OIL TANKERS
SECTION 5	CHEMICAL TANKERS
SECTION 6	LIQUEFIED GAS CARRIERS
SECTION 7	RO-RO CARGO SHIPS, CAR CARRIER PASSENGER SHIPS, RO-RO PASSENGER SHIPS
SECTION 8	GENERAL DRY CARGO SHIPS
SECTION 9	DOUBLE SKIN BULK CARRIERS AND SELF-UNLOADIGN BULK CARRIERS OF DOUBLE SKIN CONSTRUCTION
SECTION 10	OTHER SERVICE NOTATIONS
APPENDIX 1	SURVEY REPORTING PRINCIPLES FOR SHIPS SUBJECT TO ENHANCED SURVEY PROGRAM

SECTION 1

GENERAL

1 General

1.1

1.1.1 The purpose of this Chapter is to give details on the scope of surveys of certain ships which, due to the service notation assigned and related equipment, need specific requirements to be verified for the maintenance of their class.

1.1.2 These specific requirements either are additional to or supersede those stipulated in Chapter 3, which gives general requirements for surveys applicable to all types of ships: this is indicated in each Section of this Chapter. These surveys are to be carried out at intervals as described in Ch 2, Sec 2, concurrently with the surveys of the same type, i.e. annual, intermediate or class renewal surveys, detailed in Chapter 3.

1.1.3 (1/7/2002)

Where specific requirements are given in this Chapter for the class renewal survey, they are additional to the applicable requirements for the annual survey.

2 Service notations subject to additional surveys

2.1

2.1.1 The specific requirements detailed in this Chapter are linked to the service notation(s) assigned to the ship at the request of the Owner. Where a ship has more than one service notation, the specific requirements linked to each one are applicable, insofar as they are not contradictory (in such case, the most stringent requirement will be applied).

2.1.2 Tab 1 indicates which service notations are subject to specific requirements, and in which Section or Article they are specified.

Table 1 : Service notations for which specific requirements are applicable (1/7/2011)

Service notation assigned	Section or Article applicable in this Chapter	Type of surveys affected by these specific requirements	Remarks
asphalt tanker	Sec 10, [15]	annual survey intermediate survey class renewal survey	Not subject to enhanced survey program
bulk carrier ESP ore carrier ESP bulk carrier ESP CSR	Sec 2 or Sec 9 (as applicable)	annual survey intermediate survey class renewal survey	Subject to enhanced survey program
asphalt tanker ESP oil tanker ESP combination carrier/OBO ESP combination carrier/OOC ESP oil tanker ESP CSR	Sec 3, Sec 4 or Sec 9 (as applicable)	annual survey intermediate survey class renewal survey	Subject to enhanced survey program
chemical tanker	Sec 5	annual survey intermediate survey class renewal survey	Not subject to enhanced survey program
chemical tanker ESP	Sec 5	annual survey intermediate survey class renewal survey	Subject to enhanced survey program
oil tanker	Sec 3	annual survey intermediate survey class renewal survey	Not subject to enhanced survey program
liquefied gas carrier	Sec 6	annual survey intermediate survey class renewal survey	
ro-ro cargo ship passenger ship ro-ro passenger ship	Sec 7	annual survey class renewal survey	Survey of shell and inner doors is included

Service notation assigned	Section or Article applicable in this Chapter	Type of surveys affected by these specific requirements	Remarks
general dry cargo ship	Sec 8	annual survey intermediate survey class renewal survey	
container ship or ship equipped for carriage of containers	Sec 10, [2]	annual survey class renewal survey	
livestock carrier	Sec 10, [3]	annual survey class renewal survey	
FLS tanker	Sec 10, [4]	annual survey intermediate survey class renewal survey	
dredger hopper dredger hopper unit split hopper unit split hopper dredger	Sec 10, [5]	annual survey class renewal survey	
tug salvage tug escort tug	Sec 10, [6]	annual survey class renewal survey	
supply vessel	Sec 10, [7]	annual survey intermediate survey class renewal survey	
fire-fighting ship	Sec 10, [8]	annual survey class renewal survey	
oil recovery ship	Sec 10, [9]	annual survey class renewal survey	
cable laying ship	Sec 10, [10]	annual survey class renewal survey	
fishing vessel	Sec 10, [11]	annual survey class renewal survey	
pipe laying ship	Sec 10, [12]	annual survey class renewal survey	
research ship	Sec 10, [13]	annual survey class renewal survey	
cement carrier	Sec 10, [14]	annual survey class renewal survey	

SECTION 2

BULK CARRIERS, COMBINATION CARRIERS AND SELF-UNLOADING BULK CARRIERS OF SINGLE SIDE SKIN CONSTRUCTION

1 General

1.1 Application

1.1.1 (1/1/2017)

The requirements of this Section apply to all self-propelled bulk carriers other than double skin bulk carriers as defined in Sec 9. These ships are assigned with one of the following service notations:

- **bulk carrier ESP**
- **bulk carrier ESP CSR**
- **combination carrier/OBO ESP** (see Note 1)
- **combination carrier/OOC ESP** (see Note 1)
- **Self-unloading bulk carriers ESP**

Note 1: For single skin combination carriers additional requirements are specified in Sec 3.

1.1.2 (1/7/2006)

The requirements apply to the surveys of the hull structure and piping systems in way of cargo holds, cofferdams, pipe tunnels, fuel oil tanks and void spaces within the cargo length area and all salt water ballast tanks. They are additional to the requirements applicable to the remainder of the ship, given in Chapter 3 according to the relevant surveys.

1.1.3 The requirements contain the minimum extent of examination, thickness measurements and tank testing. When substantial corrosion, as defined in Ch 2, Sec 2, [2.2.9], and/or structural defects are found, the survey is to be extended and is to include additional close-up surveys when necessary.

1.1.4 (1/7/2004)

Ships required to comply with the provisions in Ch 6, App 1 are subject to the additional thickness measurement guidance in Ch 6, Sec 2, [1.3] for the vertically corrugated transverse watertight bulkhead between cargo holds Nos. 1 and 2 for purposes of determining compliance with Ch 6, App 1 prior to the relevant compliance deadline stipulated in Ch 6, Sec 2, [1.2] and at subsequent intermediate surveys (for ships over 10 years of age) and renewal surveys for purposes of verifying continuing compliance with Ch 6, App 1.

1.1.5 (1/7/2004)

Ships required to comply with the provisions in Ch 6, Sec 2, [7] are subject to the additional thickness measurement guidance in Ch 6, App 2 for side shell frames and brackets for the purposes of determining compliance with Ch 6, Sec 2, [7] prior to the relevant compliance deadline stipulated in Ch 6, Sec 2, [7] and at subsequent intermediate and

renewal surveys for purposes of verifying continuing compliance with Ch 6, Sec 2, [7].

1.1.6 (1/1/2019)

When, in any survey, thickness measurements are required :

- the procedure detailed in Ch 2, Sec 2, [2.3] is to be applied
- the thickness measurement firm is to be part of the survey planning meeting held prior to commencing the survey.

1.1.7 (1/7/2006)

Special consideration may be given to the extent of close-up surveys and/or thickness measurements in cargo holds as required below for class renewal, intermediate or annual surveys, when all internal and external surfaces of hatch coamings and hatch covers, and all internal surfaces of the cargo holds, excluding the flat tank top areas and the hopper tank sloped plating approximately 300 mm below the side shell frame end brackets, have protective coating in good condition.

The above special consideration may also be given to existing bulk carriers, where Owners elect to coat or re-coat cargo holds, in accordance with the Manufacturers' recommendations. However, prior to re-coating the cargo holds, scantlings are to be assessed in the presence of a Surveyor of the Society.

1.1.8 (1/7/2006)

For bulk carriers with hybrid cargo hold arrangements, e.g. with some cargo holds of single side skin and others of double side skin, the requirements of Sec 9 are to apply to cargo holds of double side skin and associated wing spaces.

1.2 Documentation on board

1.2.1 (1/7/2016)

The Owner is to supply and maintain documentation on board as specified in [1.2.2] and [1.2.3], which is to be readily available for examination by the Surveyor.

The documentation is to be kept on board for the lifetime of the ship.

For bulk carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10, the Owner is to arrange the updating of the Ship Construction File (SCF) throughout the ship's life whenever a modification of the documentation included in the SCF has taken place.

Documented procedures for updating the SCF are to be included within the Safety Management System.

1.2.2 A survey report file is to be a part of the documentation on board consisting of:

- reports of structural surveys
- hull condition evaluation report (summarising the results of class renewal surveys)
- thickness measurement reports.

The survey report file is also to be available in the Owner's management office.

1.2.3 (1/7/2016)

The following additional supporting documentation is to be available on board:

- survey program, as required in [4.1], until such time as the class renewal survey or the intermediate survey, as applicable, has been completed
- main structural plans of cargo holds and ballast tanks (for CSR ships these plans are to include for each structural element both the as-built and renewal thickness. Any thickness for voluntary addition is also to be clearly indicated on the plans. The midship section plan to be supplied on board the ship is to include the minimum allowable hull girder sectional properties for hold transverse section in all cargo holds)
- previous repair history
- cargo and ballast history
- ship's personnel reports on:
 - structural deterioration/defects in general
 - leakage in bulkheads and piping systems
 - condition of coatings or corrosion prevention systems, if any
- any other information that may help to identify critical structural areas and/or suspect areas requiring inspection.

For bulk carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10, the Ship Construction File (SCF), limited to the items to be retained on board, is to be available on board.

1.2.4 (1/1/2018)

Prior to survey, the Surveyor examines the documentation on board and its contents, which are used as a basis for the survey.

For bulk carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10, on completion of the survey, the surveyor is to verify that the update of the Ship Construction File (SCF) has been done whenever a modification of the documentation included in the SCF has taken place.

For the SCF stored on board ship, the surveyor is to examine the information on board ship.

In cases where any major event, including, but not limited to, substantial repair and conversion, or any modification to the ship structures, the surveyor is to also verify that the updated information is kept on board the ship.

If the updating of the SCF onboard is not completed at the time of survey, the Surveyor records it and requires confirmation at the next periodical survey.

For the SCF stored on shore archive, the surveyor is to examine the list of information included on shore archive.

In cases where any major event, including, but not limited to, substantial repair and conversion, or any modification to the ship structures, the surveyor is to also verify that the updated information is stored on shore archive by examining the list of information included on shore archive or kept on board the ship.

In addition, the surveyor is to confirm that the service contract with of the Archive Center is valid.

If the updating of the SCF Supplement ashore is not completed at the time of survey, the Surveyor records it and requires confirmation at the next periodical survey.

For bulk carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10, on completion of the survey, the surveyor is to verify any addition and/or renewal of materials used for the construction of the hull structure are documented within the Ship Construction File list of materials.

1.3 Reporting and evaluation of surveys

1.3.1 The data and information on the structural condition of the ship collected during survey are evaluated for acceptability and structural integrity of the ship's cargo area.

1.3.2 (1/7/2006)

For ships subject to the requirements of this Section, the surveys of hull structure and piping systems are reported in conformance to the Survey Reporting Principles laid down in App 1.

1.3.3 A hull condition evaluation report (summarising the results of class renewal surveys) is issued by the Society to the Owner, who is to place it on board the ship for reference at future surveys. The hull condition evaluation report is endorsed by the Society.

1.4 Access to structures

1.4.1 (1/1/2007)

For overall surveys, means are to be provided to enable the Surveyor to examine the hull structure in a safe and practical way.

1.4.2 (1/1/2007)

For close-up surveys of the hull structure, other than cargo hold shell frames, one or more of the following means for access, acceptable to the Surveyor, are to be provided:

- permanent staging and passages through structures;
- temporary staging and passages through structures;
- lifts and movable platforms;
- boats or rafts;
- portable ladders;
- other equivalent means.

1.4.3 (1/7/2008)

For close-up surveys of the cargo hold shell frames of bulk carriers less than 100000 dwt, one or more of the following

means for access, acceptable to the Surveyor, are to be provided:

- permanent staging and passages through structures;
- temporary staging and passages through structures;
- portable ladder restricted to not more than 5 m in length may be accepted for surveys of lower section of a shell frame including bracket;
- hydraulic arm vehicles such as conventional cherry pickers, lifts and movable platforms;
- boats or rafts provided the structural capacity of the hold is sufficient to withstand static loads at all levels of water;
- other equivalent means.

1.4.4 (1/1/2019)

For close-up surveys of the cargo hold shell frames of bulk carriers of 100000 dwt and above, the use of portable ladders is not accepted, and one or more of the following means for access, acceptable to the Surveyor, are to be provided:

- a) Annual surveys, intermediate survey under 10 years of age and class renewal survey no. 1:
 - permanent staging and passages through structures;
 - temporary staging and passages through structures;
 - hydraulic arm vehicles such as conventional cherry pickers, lifts and movable platforms;
 - boats or rafts provided the structural capacity of the hold is sufficient to withstand static loads at all levels of water;
 - other equivalent means.
- b) Subsequent intermediate surveys and class renewal surveys:
 - either permanent or temporary staging and passage through structures for close-up survey of at least the upper part of hold frames;
 - hydraulic arm vehicles such as conventional cherry pickers for surveys of lower and middle parts of shell frames as an alternative to staging;
 - lifts and movable platforms;
 - boats or rafts provided the structural capacity of the hold is sufficient to withstand static loads at all levels of water;
 - other equivalent means.

Notwithstanding the above requirements:

- the use of a portable ladder fitted with a mechanical device to secure the upper end of the ladder is acceptable for the "close-up examination of sufficient extent, minimum 25% of frames, to establish the condition of the lower region of the shell frames including approx. lower one third length of side frame at side shell and side frame end attachment and the adjacent shell plating" as required in the forward cargo hold at annual surveys of ships between 10 and 15 years of age (see [2.4.1] b)) and as required in the forward cargo hold and one other selected cargo hold at annual surveys of ships over 15 years of age (see [2.4.2] b));
- the use of hydraulic arm vehicles or aerial lifts (i.e. "cherry picker") may be accepted by Surveyor for the

close-up survey of the upper part of side shell frames or other structures in all cases where the maximum working height is not more than 17 m.

2 Annual survey

2.1 General

2.1.1 (1/1/2019)

The survey is to consist of an examination for the purpose of ensuring, as far as practicable, that the hull, weather decks, hatch covers, coamings and piping are maintained in a satisfactory condition and is to take into account the service history, condition and extent of the corrosion prevention system of ballast tanks and areas identified in the survey report file.

2.2 Hull and equipment

2.2.1 (1/7/2006)

Examination of:

- the hull plating and its closing appliances as far as can be seen
- the watertight penetrations as far as practicable.

2.3 Weather decks, hatch covers and coamings

2.3.1 (1/7/2006)

Confirmation is to be obtained that no unapproved changes have been made to the hatch covers, hatch coamings and their securing and sealing devices since the last survey.

2.3.2 (1/1/2008)

A thorough survey of cargo hatch covers and coamings is only possible by examination in the open as well as closed positions and is to include verification of proper opening and closing operation. As a result, the hatch cover sets within the forward 25% of the ship's length and at least one additional set, such that all sets on the ship are assessed at least once in every 5-year period, are to be surveyed open, closed and in operation to the full extent in each direction at each annual survey, including:

- a) stowage and securing in open condition;
- b) proper fit and efficiency of sealing in closed condition; and
- c) operational testing of hydraulic and power components, wires, chains, and link drives.

The closing of the covers is to include the fastening of all peripheral and cross-joint cleats or other securing devices. Particular attention is to be paid to the condition of the hatch covers in the forward 25% of the ship's length, where sea loads are normally greatest.

2.3.3 (1/1/2008)

If there are indications of difficulty in operating and securing hatch covers, additional sets above those required by [2.3.2], at the discretion of the Surveyor, are to be tested in operation.

2.3.4 (1/1/2019)

Where the cargo hatch securing system does not function properly, repairs are to be carried out under the supervision of the Society.

Where hatch covers or coamings undergo substantial repairs, the strength of securing devices is to be upgraded to comply with Pt B, Ch 9, Sec 7.

2.3.5 (1/1/2008)

For each cargo hatch cover set, at each annual survey, the following items are to be surveyed:

- a) cover panels, including side plates, and stiffener attachments that may be accessible in the open position by close-up survey (for corrosion, cracks, and deformation);
- b) sealing arrangements of perimeter and cross-joints (gaskets for condition and permanent deformation, flexible seals on combination carriers, gasket lips, compression bars, drainage channels and non-return valves);
- c) clamping devices, retaining bars, cleating (for wastage, adjustment and condition of rubber components);
- d) closed cover locating devices (for distortion and attachment);
- e) chain or rope pulleys;
- f) guides;
- g) guide rails and track wheels;
- h) stoppers;
- i) wires, chains, tensioners, and gypsies;
- j) hydraulic system, electrical safety devices and interlocks;
- k) end and interpanel hinges, pins and stools where fitted.

2.3.6 (1/1/2019)

At each hatchway, at each annual survey, the coamings, with plating stiffeners and brackets are to be checked for corrosion, cracks and deformation, especially of the coaming tops, including close-up survey.

2.3.7 (1/1/2008)

Where considered necessary, the effectiveness of sealing arrangements may be proved by hose or chalk testing supplemented by dimensional measurements of seal compressing components.

2.3.8 (1/1/2008)

Where portable covers or wooden or steel pontoons are fitted, they are to be examined to confirm the satisfactory condition, where applicable, of:

- a) wooden covers and portable beams, carriers or sockets for the portable beams, and their securing devices;
- b) steel pontoons, including close-up survey of hatch cover plating;
- c) tarpaulins;
- d) cleats, battens and wedges;
- e) hatch securing bars and their securing devices;
- f) loading pads/bars and the side plate edge;
- g) guide plates and chocks;
- h) compression bars, drainage channels and drain pipes (if any).

2.3.9 (1/7/2006)

Examination of flame screens on vents to all bunker tanks.

2.3.10 (1/7/2006)

Examination of bunker and vent piping systems, including ventilators.

2.4 Cargo holds

2.4.1 Ships between 10 and 15 years of age (1/7/2012)

The requirements of the survey, which are also given in Tab 1 and Tab 2, are the following:

- a) Overall survey of all cargo holds.
- b) Close-up survey of sufficient extent, minimum 25% of frames, to establish the condition of the lower region of the shell frames including approx. lower one third length of side frame at side shell and side frame end attachment and the adjacent shell plating in the forward cargo hold. Where this level of survey reveals the need for remedial measures, the survey is to be extended to include a close-up survey of all of the shell frames and adjacent shell plating of that cargo hold as well as a close-up survey of sufficient extent of all remaining cargo holds.
- c) When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurement is to be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with Tab 7 to Tab 11. These extended thickness measurements are to be carried out before the annual survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.
For ships built under the Common Structural Rules, the annual thickness gauging may be omitted where a protective coating has been applied in accordance with the coating manufacturer's requirements and is maintained in good condition.
- d) Where a hard protective coating is fitted in cargo holds as provided in [1.1.7] and is found to be in good condition, the extent of close-up surveys and thickness measurements may be specially considered.
- e) All piping and penetrations in cargo holds, including overboard piping, are to be examined.

2.4.2 Ships over 15 years of age (1/7/2012)

The requirements of the survey, which are also given in Tab 1 and Tab 2, are the following:

- a) Overall survey of all cargo holds.
- b) Close-up survey of sufficient extent, minimum 25% of frames, to establish the condition of the lower region of the shell frames including approx. lower one third length of side frame at side shell and side frame end attachment and the adjacent shell plating in the forward cargo hold and one other selected cargo hold. Where this level of survey reveals the need for remedial measures, the survey is to be extended to include a close-up survey of all of the shell frames and adjacent shell plat-

ing of that cargo hold as well as a close-up survey of sufficient extent of all remaining cargo holds.

- c) When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurement is to be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with Tab 7 to Tab 11. These thickness measurements are to be carried out before the annual survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.

For ships built under the Common Structural Rules, the annual thickness gauging may be omitted where a protective coating has been applied in accordance with the coating manufacturer's requirements and is maintained in good condition.

- d) Where a hard protective coating is fitted in cargo holds as provided in [1.1.7] and is found to be in good condition, the extent of close-up surveys and thickness measurements may be specially considered.
- e) All piping and penetrations in cargo holds, including overboard piping, are to be examined.

2.4.3 Ships subject to SOLAS regulation XII/9.1 (1/7/2006)

This item contains additional requirements for the foremost cargo hold of ships subject to Reg. 9.1 of Ch. XII of SOLAS 74 as amended, which are those meeting all the following conditions:

- bulk carriers of 150 m in length and upwards of single side skin construction,
- carrying solid bulk cargoes having a density of 1,780 t/m³ and above,
- contracted for construction (see Note 1) before 1 July 1999, and
- constructed with an insufficient number of transverse watertight bulkheads to enable them to withstand flooding of the foremost cargo hold in all loading conditions and remain afloat in a satisfactory condition of equilibrium as specified in Reg. 4.3 of Ch. XII of SOLAS 74 as amended.

In accordance with Reg. 9.1 of Ch. XII of SOLAS 74 as amended, for the foremost cargo hold of the above ships, the additional survey requirements given in Tab 2 are to be included in the scope of the annual survey.

Note 1: "The "contracted for construction" date means the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. For further details regarding the date of "contract for construction", refer to IACS Procedural Requirement (PR) No.29."

2.5 Ballast tanks

2.5.1 Ballast tanks are to be internally examined when required as a consequence of the results of the class renewal survey and intermediate survey.

2.5.2 (1/1/2004)

When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurements are to be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with Tab 7 to Tab 11. These extended thickness measurements are to be carried out before the survey is credited as completed.

2.5.3 (1/7/2001)

Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.

2.5.4 (1/7/2012)

For ships built under the Common Structural Rules, the annual thickness gauging may be omitted where a protective coating has been applied in accordance with the coating manufacturer's requirements and is maintained in good condition.

2.5.5 (1/7/2011)

Confirmation is to be given that the corrosion prevention system fitted to dedicated ballast water tanks when appropriate is maintained.

2.6 Additional requirements after determining compliance with SOLAS regulation XII/12 (water level detectors) and XII/13 (availability of pumping systems)

2.6.1 (1/1/2007)

For ships complying with the requirements of SOLAS XII/12 for hold, ballast and dry space water level detectors, the annual survey is to include an examination and a test, at random, of the water ingress detection systems and of their alarms.

2.6.2 (1/1/2007)

For ships complying with the requirements of SOLAS XII/13 for the availability of pumping systems, the annual survey is to include an examination and a test of the means for draining and pumping ballast tanks forward of the collision bulkhead and bilges of dry spaces, any part of which extends forward of the foremost cargo hold, and of their controls.

2.7 Means of access

2.7.1 (1/7/2011)

Confirmation is to be given, when appropriate and as far as is practicable when internal spaces are examined, that the means of access to cargo and other spaces remain in good condition.

2.8 Self unloading bulk carrier - cargo handling system(s)

2.8.1 (1/1/2017)

Cargo handling systems not covered by the additional class notation **CARGO HANDLING** such as, but not limited to:

- belt conveyors,
- spiral conveyors,
- crew conveyors
- pneumatic conveyors
- chain conveyors (buckets, pockets, etc...)
- wire conveyors
- cable conveyors (wagons, buckets, pockets, ...)
- chain elevators (buckets, pockets, etc..)
- cable elevators (buckets, pockets, etc..)
- loading and discharging boom(s)

and combinations of these, have to be annually inspected.

The survey is to include:

- verification that no modification of the cargo handling system(s) layout has been made. Particular attention is to be paid to cargo handling arrangements passing in close proximity to accommodation and/or control stations
- verification that, when expected and fitted, special arrangements to avoid unintentional release of lifted cargo are maintained and unmodified
- general examination, as far as applicable, of cargo handling system(s) with particular attention to the connection of their foundations to the hull structure
- an examination of the instruction/installation manual to verify the layout of the complete system(s) and confirm correspondence to the actual system(s) fitted on board
- verification that maintenance of the system(s) has been carried out according to the Manufacturer's instructions and schedules.
- a general examination of components of the system in order to verify their satisfactory condition of maintenance
- verification and test of the cargo handling system alarm and safety devices
- a running test of the system in order to verify the satisfactory working and operation conditions.

3 Intermediate survey - Hull items

3.1 General

3.1.1 (1/7/2006)

The survey extent is dependent on the age of the ship as specified in [3.2], [3.3] and [3.4] and shown in Tab 3 and Tab 4.

3.2 Ships between 5 and 10 years of age

3.2.1 Ballast tanks (1/7/2010)

- a) For tanks used for water ballast, an overall survey of representative tanks selected by the Surveyor is to be carried out. The selection is to include fore and aft peak tanks and a number of other tanks, taking into account

the total number and type of ballast tanks. If such overall survey reveals no visible structural defects, the examination may be limited to verification that the corrosion prevention system remains efficient.

- b) Where poor coating condition, corrosion or other defects are found in water ballast tanks or where a hard protective coating has not been applied since the time of construction, the examination is to be extended to other ballast tanks of the same type.
- c) In ballast tanks other than double bottom tanks, where a hard protective coating is found in poor condition, and it is not renewed, or where a soft or semi-hard coating has been applied, or where a hard protective coating has not been applied since the time of construction, the tanks in question are to be examined and thickness measurements carried out as considered necessary at annual surveys. When such breakdown of hard protective coating is found in ballast double bottom tanks, or where a soft or semi-hard coating has been applied, or where a hard protective coating has not been applied, the tanks in question may be examined at annual surveys. When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurements are to be carried out.
- d) In addition to the requirements above, suspect areas identified at previous surveys are to be examined.

3.2.2 Cargo holds (1/7/2006)

- a) An overall survey of all cargo holds, including close-up survey of sufficient extent, minimum 25% of frames, is to be carried out to establish the condition of:
- Shell frames including their upper and lower end attachments, adjacent shell plating, and transverse bulkheads in the forward cargo hold and one other selected cargo hold;
 - Areas found suspect at previous surveys.
- b) Where considered necessary by the Surveyor as a result of the overall and close-up survey as described in a), the survey is to be extended to include a close-up survey of all of the shell frames and adjacent shell plating of that cargo hold as well as a close-up survey of sufficient extent of all remaining cargo holds.

3.2.3 Extent of Thickness Measurements (1/7/2012)

- a) Thickness measurements are to be carried out to an extent sufficient to determine both general and local corrosion levels in areas subject to close-up survey as described in [3.2.2] a). The minimum requirements for thickness measurements at the intermediate survey are areas found to be suspect areas at previous surveys.
- b) The extent of thickness measurement may be specially considered, provided the Surveyor is satisfied by the close-up survey that there is no structural diminution and the hard protective coatings are found to be in a good condition.
- c) Where substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with the requirements of Tab 7 to Tab 11. These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect

areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.

For ships built under Common Structural Rules, the identified substantial corrosion areas may be:

- 1) protected by coating applied in accordance with the coating manufacturer's requirements and examined

at annual intervals to confirm the coating in way is still in good condition, or alternatively

- 2) required to be measured at annual intervals.
- d) Where the hard protective coating in cargo holds, as defined in [1.1.7], is found in good condition, the extent of close-up surveys and thickness measurements may be specially considered.

Table 1 : Annual survey of cargo holds for bulk carriers, combination carriers and self-unloading bulk carriers of single side skin construction (1/7/2006)

Age of ship (in years at time of annual survey)	
10 < age ≤ 15	age > 15
Overall survey of all cargo holds Close-up survey of sufficient extent, minimum 25% of frames, to establish the condition of the lower region of the shell frames including approximately the lower one third length of side frame at side shell and side frame end attachment and the adjacent shell plating in the forward cargo hold See (1), (2) and (3)	Overall survey of all cargo holds Close-up survey of sufficient extent, minimum 25% of frames, to establish the condition of the lower region of the shell frames including approximately the lower one third length of side frame at side shell and side frame end attachment and the adjacent shell plating in the forward cargo hold and one other selected cargo hold Examination of all piping and penetrations, including overboard piping, in all cargo holds See (1), (2) and (3)
<ol style="list-style-type: none"> (1) Where this level of survey reveals the need for remedial measures, the survey is to be extended to include a close-up survey of all the shell frames and adjacent shell plating of that cargo hold as well as a close-up survey of sufficient extent of all remaining cargo holds. (2) When considered necessary by the Surveyor or where extensive corrosion exists, thickness measurements are to be carried out. If the results of these thickness measurements indicate that substantial corrosion is present, the extent of thickness measurements is to be increased in accordance with Tab 7 to Tab 11. These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements. (3) Where a hard protective coating is fitted in cargo holds as provided in [1.1.7] and is found to be in good condition, the extent of close-up surveys and thickness measurements may be specially considered. 	

Table 2 : Additional survey requirements for the foremost cargo hold for ships subject to Reg. 9.1 of Ch. XII of SOLAS 74 as amended, only for ships referred to in [2.4.3] (1/7/2006)

Age of ship (in years at time of annual survey)	
5 < age ≤ 15	age > 15
Overall survey of the foremost cargo hold, including close-up survey of sufficient extent to establish the condition of: <ul style="list-style-type: none"> • minimum 25% of shell frames including their upper and lower end attachments, adjacent shell plating, and transverse bulkheads • suspect areas identified at previous surveys (see Ch 2, Sec 2, [2.2.10]) See (1) and (2)	Overall survey of the foremost cargo hold, including close-up survey of sufficient extent to establish the condition of: <ul style="list-style-type: none"> • all shell frames including their upper and lower end attachments, adjacent shell plating, and transverse bulkheads • suspect areas identified at previous surveys (see Ch 2, Sec 2, [2.2.10]) See (2)
Thickness measurement to an extent sufficient to determine both general and local corrosion levels at areas subject to close-up survey. See (3), (4) and (5)	Thickness measurement to an extent sufficient to determine both general and local corrosion levels at areas subject to close-up survey. See (3), (4) and (5)
<p>(1) Where considered necessary by the Surveyor as a result of the overall and close-up survey as described above, the survey is to be extended to include a close-up survey of all of the shell frames and adjacent shell plating of the foremost cargo hold.</p> <p>(2) Where the protective coating in the foremost cargo hold as provided in [1.1.7] is found to be in good condition, the extent of close-up surveys and thickness measurements may be specially considered.</p> <p>(3) The minimum requirements for thickness measurements are suspect areas identified at previous surveys (see Ch 2, Sec 2, [2.2.10]).</p> <p>(4) Where substantial corrosion as defined in Ch 2, Sec 2, [2.2.9] is found, the extent of thickness measurements is to be increased in accordance with Tab 7 to Tab 11. These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect Areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.</p> <p>(5) The thickness measurements may be dispensed with provided the Surveyor is satisfied by the close-up survey, that there is no structural diminution and the protective coating where fitted remains effective</p>	

Table 3 : Intermediate survey of cargo holds for bulk carriers, combination carriers and self-unloading bulk carriers of single side skin construction (1/7/2006)

Age of ship (in years at time of intermediate survey)		
5 < age ≤ 10	10 < age ≤ 15	age > 15
Overall survey of all cargo holds	See [3.3]	See [3.4]
Close-up survey in the forward cargo hold and one other selected cargo hold, to establish the condition of: <ul style="list-style-type: none"> • at least 25% of the side shell frames including their upper and lower end attachments, and adjacent shell plating • the transverse bulkheads • areas found suspect at previous surveys (see Ch 2, Sec 2, [2.2.10]) See (1) and (2)	See [3.3]	See [3.4]
Thickness measurements to an extent sufficient to determine both general and local corrosion levels in areas subject to close-up survey. The minimum requirement for thickness measurements are areas found to be suspect areas at previous surveys (see Ch 2, Sec 2, [2.2.10]). See (2), (3) and (4)	See [3.3]	See [3.4]
<p>(1) Where considered necessary by the Surveyor as a result of the overall and close-up surveys, the survey is to be extended to include a close-up survey of all the shell frames and adjacent shell plating of that cargo hold as well as a close-up survey of sufficient extent of all remaining cargo holds.</p> <p>(2) Where the hard protective coating in cargo holds as defined in [1.1.7] is found in good condition, the extent of close-up survey and thickness measurements may be specially considered.</p> <p>(3) Where substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with Tab 7 to Tab 11. These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.</p> <p>(4) The extent of thickness measurement may be specially considered provided the Surveyor is satisfied by the close-up survey, that there is no structural diminution and the hard protective coating is found to be in good condition.</p>		

3.3 Ships between 10 and 15 years of age

3.3.1 (1/7/2006)

The requirements of the intermediate survey are to the same extent as the previous class renewal survey as required in [4]. However, internal examination of fuel oil tanks and pressure testing of all tanks are not required unless deemed necessary by the attending Surveyor.

3.3.2 (1/1/2003)

In application of [3.3.1], the intermediate survey may be commenced at the second annual survey and be progressed during the succeeding year with a view to completion at the third annual survey in lieu of application of Ch 2, Sec 2, [4.2.2].

3.3.3 (1/1/2003)

In application of [3.3.1], an underwater survey may be considered in lieu of a bottom survey in dry condition (see Ch 3, Sec 5, [2]).

3.4 Ships over 15 years of age

3.4.1 (1/7/2006)

The requirements of the intermediate survey are to the same extent as the previous class renewal survey as required in [4]. However, internal examination of fuel oil tanks and pressure testing of all tanks are not required unless deemed necessary by the attending Surveyor.

3.4.2 (1/1/2003)

In application of [3.4.1], the intermediate survey may be commenced at the second annual survey and be progressed during the succeeding year with a view to completion at the third annual survey in lieu of application of Ch 2, Sec 2, [4.2.2].

3.4.3 (1/7/2002)

In application of [3.4.1], a bottom survey in dry condition is to be part of the intermediate survey. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo holds and ballast tanks (see Note 1) are to be carried out in accordance with the applicable requirements for intermediate surveys, if not already performed.

Note 1: Lower portions of the cargo holds and ballast tanks are considered to be the parts below the light ballast waterline.

4 Class renewal survey

4.1 Survey program and preparation for survey

4.1.1 (1/1/2008)

The Owner, in cooperation with the Society, is to work out a specific survey program prior to the commencement of any part of:

- the class renewal survey
- the intermediate survey for bulk carriers over 10 years of age.

Prior to the development of the survey program, the Survey Planning Questionnaire is to be completed by the Owner based on the information set out in [4.10], and forwarded to the Society.

The survey program is to be in a written format, based on the information in [4.9]. The survey is not to commence until the survey program has been agreed. The survey program at intermediate survey may consist of the survey program at the previous class renewal survey supplemented by the condition evaluation report of that class renewal survey and later relevant survey reports.

The survey program is to be worked out taking into account any amendments to the survey requirements after the last class renewal survey carried out.

4.1.2 (1/7/2006)

In developing the survey program, the following documentation is to be collected and consulted with a view to selecting tanks, holds, areas and structural elements to be examined:

- survey status and basic ship information
- the documentation on board, as described in [1.2.2] and [1.2.3]
- main structural plans (scantling drawings), including information on use of high tensile steels (HTS)
- relevant previous survey and inspection reports from both the Society and the Owner
- information on the use of ship holds and tanks, with regard to the nature of the typical cargoes transported and other useful data
- information on the corrosion prevention level on the new building
- information on the relevant maintenance level during operation.

4.1.3 The survey program is to comply, at least, with the requirements for close-up surveys, thickness measurements and tank testing given in [4.4], [4.5] and [4.6], respectively. In addition, the survey program is to include at least:

- basic ship information and particulars
- main structural plans (scantling drawings), including information on the use of high tensile steels (HTS)
- plan of holds and tanks
- list of holds and tanks including information on their use, protective coating, if any, and its condition
- conditions for survey, with regard to holds, tanks and spaces which are to be safe for access, i.e. cleaned, gas freed, ventilated, illuminated
- provisions and methods for access to structures
- equipment for surveys
- nomination of holds, spaces and areas for close-up surveys according to Tab 5
- nomination of sections and areas for thickness measurements according to Tab 6
- nomination of holds, if any, and tanks for tank testing according to [4.6]
- damage experience and repair history related to the ship in question.

4.1.4 The survey program is also to include the maximum acceptable structural corrosion diminution levels applicable to the ship. The Society will advise the Owner of this information.

4.1.5 In addition, the survey program is to include proposals on how to conduct surveys and tests in a safe and practical way, including the means of providing access to structures for close-up survey, thickness measurements and tank testing. All other provisions described in Ch 2, Sec 2, [2.3], Ch 2, Sec 2, [2.5], Ch 2, Sec 2, [2.7], Ch 2, Sec 2, [2.8] and Ch 2, Sec 2, [2.10] regarding procedures for thickness measurements, conditions for survey, access to structures, equipment for survey and survey at sea or at anchorage, respectively, are also to be complied with.

4.1.6 Survey Planning Meeting (1/1/2019)

The establishment of proper preparation and close co-operation between the attending Surveyor(s) and the Owner's representatives on board prior to and during the survey are an essential part in the safe and efficient conduct of the survey. During the survey on board safety meetings are to be held regularly.

Prior to commencement of any part of the renewal and intermediate survey, a survey planning meeting is to be held between the attending Surveyor(s), the Owner's representative in attendance, the thickness measurement firm representative, where involved, and the Master of the ship or an appropriately qualified representative appointed by the Master or Company for the purpose of ascertaining that all the arrangements envisaged in the survey program are in place, so as to ensure the safe and efficient conduct of the

survey work to be carried out. Refer also to Ch 2, Sec 2, [2.3.1].

The following is an indicative list of items that are to be addressed in the meeting:

- a) schedule of the ship (i.e. the voyage, docking and undocking manoeuvres, periods alongside, cargo and ballast operations etc);
- b) provisions and arrangements for thickness measurements (i.e. access, cleaning/de-scaling, illumination, ventilation, personal safety);
- c) extent of the thickness measurements;
- d) acceptance criteria (refer to the list of minimum thicknesses);
- e) extent of close-up survey and thickness measurement considering the coating condition and suspect areas/areas of substantial corrosion;
- f) execution of thickness measurements;
- g) taking representative readings in general and where uneven corrosion/pitting is found;
- h) mapping of areas of substantial corrosion;
- i) communication between the attending Surveyor(s), the thickness measurement firm operator(s) and the Owner's representative(s) concerning findings.

Table 4 : Intermediate survey of water ballast tanks for bulk carriers, combination carriers and self-unloading bulk carriers of single side skin construction (1/7/2006)

Age of ship (in years at time of intermediate survey)		
5 < age ≤ 10	10 < age ≤ 15	age > 15
Overall survey of representative water ballast tanks selected by the Surveyor (the selection is to include fore and aft peak tanks and a number of other tanks, taking into account the total number and type of ballast tanks).	See [3.3]	See [3.4]
Examination of suspect areas identified at previous surveys.		
<p>(1) When such overall survey reveals no visible structural defects, the examination may be limited to verification that the corrosion prevention system remains efficient.</p> <p>(2) Where poor coating condition, corrosion or other defects are found in water ballast tanks or where a hard protective coating has not been applied since the time of construction, the examination is to be extended to other ballast tanks of the same type.</p> <p>(3) For ballast tanks other than double bottom tanks, where a hard protective coating is found in poor condition and is not renewed, or where soft coating has been applied or where a hard protective coating has not been applied since the time of construction, the tanks in question are to be internally examined and thickness measurement carried out as considered necessary at annual surveys. When such breakdown of hard protective coating is found in ballast double bottom tanks and is not renewed, or where soft coating has been applied or where a hard protective coating has not been applied, the tanks in question may be internally examined at annual surveys. When considered necessary by the surveyor or where extensive corrosion exists, thickness measurements are to be carried out.</p> <p>(4) Where substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with Tab 7 to Tab 11. These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.</p> <p>(5) The extent of thickness measurements may be specially considered provided the Surveyor is satisfied by the close-up surveys that there is no structural diminution and the hard protective coating is found to be in good condition.</p>		

Age of ship (in years at time of intermediate survey)		
5 < age ≤ 10	10 < age ≤ 15	age > 15
See (1), (2) and (3)		
The minimum requirements are areas found to be suspect areas at previous survey (see Ch 2, Sec 2, [2.2.10]). See (4) and (5)	See [3.3]	See [3.4]
<p>(1) When such overall survey reveals no visible structural defects, the examination may be limited to verification that the corrosion prevention system remains efficient.</p> <p>(2) Where poor coating condition, corrosion or other defects are found in water ballast tanks or where a hard protective coating has not been applied since the time of construction, the examination is to be extended to other ballast tanks of the same type.</p> <p>(3) For ballast tanks other than double bottom tanks, where a hard protective coating is found in poor condition and is not renewed, or where soft coating has been applied or where a hard protective coating has not been applied since the time of construction, the tanks in question are to be internally examined and thickness measurement carried out as considered necessary at annual surveys. When such breakdown of hard protective coating is found in ballast double bottom tanks and is not renewed, or where soft coating has been applied or where a hard protective coating has not been applied, the tanks in question may be internally examined at annual surveys. When considered necessary by the surveyor or where extensive corrosion exists, thickness measurements are to be carried out.</p> <p>(4) Where substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with Tab 7 to Tab 11. These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.</p> <p>(5) The extent of thickness measurements may be specially considered provided the Surveyor is satisfied by the close-up surveys that there is no structural diminution and the hard protective coating is found to be in good condition.</p>		

4.2 Scope of survey

4.2.1 (1/7/2007)

In addition to the requirements of annual surveys, the class renewal survey is to include examination, tests and checks of sufficient extent to ensure that the hull and related piping, as required in [4.2.3], are in a satisfactory condition and are fit for their intended purpose for the new period of class to be assigned, subject to proper maintenance and operation and to periodical surveys being carried out at the due dates.

4.2.2 (1/7/2007)

All cargo holds, ballast tanks, including double bottom tanks, pipe tunnels, cofferdams and void spaces bounding cargo holds, decks and outer hull are to be examined, and this examination is to be supplemented by thickness measurement and testing as required in [4.5] and [4.6] respectively, to ensure that the structural integrity remains effective. The aim of the examination is to discover substantial corrosion, significant deformation, fractures, damage or other structural deterioration that may be present.

4.2.3 (1/7/2006)

All piping systems within the above spaces are to be examined and operationally tested to working pressure to the

attending Surveyor's satisfaction to ensure that tightness and condition remain satisfactory.

4.2.4 The survey extent of ballast tanks converted to void spaces will be specially considered by the Society in relation to the requirements for ballast tanks.

4.2.5 (1/7/2010)

Where provided, the condition of the corrosion prevention system of ballast tanks is to be examined.

For ballast tanks, excluding double bottom tanks, where a hard protective coating is found in poor condition, and it is not renewed, where a soft or semi-hard coating has been applied, or where a hard protective coating has not been applied since the time of construction, the tanks in question are to be examined at annual surveys. Thickness measurements are to be carried out as deemed necessary by the Surveyor.

When such a breakdown of hard protective coating is found in water ballast double bottom tanks and is not renewed, where a soft or semi-hard coating has been applied, or where a hard protective coating has not been applied since the time of construction, the tanks in question may be examined at annual surveys. When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurements are to be carried out.

Table 5 : Requirements for close-up survey at class renewal survey of bulk carriers, combination carriers and self-unloading bulk carriers of single side skin construction (1/1/2017)

Age of ship (in years at time of class renewal survey)			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	age > 15
25% of shell frames in the forward cargo hold at representative positions (1) (see Note 1) Selected shell frames in all remaining cargo holds (1) (see Note 1)	All shell frames in the forward cargo hold and 25% of shell frames in each of the remaining cargo holds including upper and lower end attachments and adjacent shell plating (1) (see Note 1) For cape size bulk carriers, all shell frames in the forward cargo hold and 50% of shell frames in each of the remaining cargo holds, including upper and lower end attachments and adjacent shell plating (1) (see Note 1)	All shell frames in the forward and one other selected cargo hold and 50 % of shell frames in each of the remaining cargo holds including upper and lower end attachments and adjacent shell plating (1) (see Note 1)	All shell frames in all cargo holds including upper and lower end attachments and adjacent shell plating (1) (see Note 1)
One transverse web with associated plating and longitudinals in two representative water ballast tanks of each type (i.e. top-side or hopper side tank) (2) (see Note 1)	One transverse web with associated plating and longitudinals in each water ballast tank (2) (see Note 1)	All transverse webs with associated plating and longitudinals in each water ballast tank (2) (see Note 1)	Areas (2) to (5) (see Note 1) as for class renewal survey for ships between 10 and 15 years of age
	Forward and aft transverse bulkheads in one ballast tank, including stiffening system (2) (see Note 1)	All transverse bulkheads in ballast tanks, including stiffening system (2) (see Note 1)	
Two selected cargo hold transverse bulkheads (3) (see Note 1)	All cargo hold transverse bulkheads (3) (see Note 1)	All cargo hold transverse bulkheads (3) (see Note 1)	
<p>Note 1:(1), (2), (3), (4) and (5), are areas to be subjected to close-up surveys and thickness measurements according to Tab 6 (see Fig 1)</p> <p>(1) : Cargo hold transverse frames</p> <p>(2) : Transverse web frame or transverse watertight bulkhead in water ballast tanks</p> <p>(3) : Cargo hold transverse bulkhead plating, stiffeners and girders, including internal structure of upper and lower stools, where fitted</p> <p>(4) : Cargo hold hatch covers and coamings (plating and stiffeners). Subject to cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers structures.</p> <p>(5) : Deck plating and under deck structure inside line of hatch openings between cargo hold hatches</p> <p>Note 2: Close-up survey of transverse bulkheads to be carried out at four levels (see Fig 2):</p> <ul style="list-style-type: none"> • immediately above the inner bottom and immediately above the line of gussets (if fitted) and shedders for bulkheads without lower stool • immediately above and below the lower stool shelf plate (for bulkheads fitted with lower stools), and immediately above the line of the shedder plates • about mid-height of the bulkhead • immediately below the upper deck plating and immediately adjacent to the upper wing tank, and immediately below the upper stool shelf plate for bulkheads fitted with upper stools, or immediately below the top side tanks. <p>Note 3: See also Figures in Ch 6, App 2 for zones of side shell frames for ships subject to compliance with the requirements of Ch 6, Sec 2, [7].</p>			

Age of ship (in years at time of class renewal survey)			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	age > 15
All cargo hold hatch covers and coamings (4) (see Note 1)	All cargo hold hatch covers and coamings (4) (see Note 1)	All cargo hold hatch covers and coamings (4) (see Note 1)	
	All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches (5) (see Note 1)	All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches (5) (see Note 1)	

Note 1:(1), (2), (3), (4) and (5), are areas to be subjected to close-up surveys and thickness measurements according to Tab 6 (see Fig 1)

(1) : Cargo hold transverse frames

(2) : Transverse web frame or transverse watertight bulkhead in water ballast tanks

(3) : Cargo hold transverse bulkhead plating, stiffeners and girders, including internal structure of upper and lower stools, where fitted

(4) : Cargo hold hatch covers and coamings (plating and stiffeners). Subject to cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers structures.

(5) : Deck plating and under deck structure inside line of hatch openings between cargo hold hatches

Note 2: Close-up survey of transverse bulkheads to be carried out at four levels (see Fig 2):

- immediately above the inner bottom and immediately above the line of gussets (if fitted) and shedders for bulkheads without lower stool
- immediately above and below the lower stool shelf plate (for bulkheads fitted with lower stools), and immediately above the line of the shedder plates
- about mid-height of the bulkhead
- immediately below the upper deck plating and immediately adjacent to the upper wing tank, and immediately below the upper stool shelf plate for bulkheads fitted with upper stools, or immediately below the top side tanks.

Note 3: See also Figures in Ch 6, App 2 for zones of side shell frames for ships subject to compliance with the requirements of Ch 6, Sec 2, [7].

4.2.6 (1/7/2006)

Where a hard protective coating is provided in cargo holds, as provided in [1.1.7], and is found to be in good condition, the extent of close-up surveys and thickness measurements may be specially considered.

4.2.7 (1/1/2003)

The proper operation of the water detection system in cargo holds is to be verified (only for ships subject to Reg. XII/9.1 of SOLAS 1974 as amended).

4.2.8 (1/7/2006)

The class renewal survey is to include a bottom survey in dry condition as laid down in Ch 3, Sec 6, [2.2.1].

The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo holds and ballast tanks (see Note 1) are to be carried out in accordance with the applicable requirements for class renewal surveys, if not already performed.

Note 1: Lower portions of the cargo holds and ballast tanks are considered to be the parts below the light ballast waterline.

4.3 Hatch covers and coamings

4.3.1 (1/1/2008)

A thorough inspection of the items listed in [2.3] is to be carried out, in addition to all hatch covers and coamings.

4.3.2 (1/1/2008)

A check of the satisfactory operation of all mechanically operated hatch covers is to be made, including:

- stowage and securing in open condition;
- proper fit and efficiency of sealing in closed condition;
- operational testing of hydraulic and power components, wires, chains and link drives.

4.3.3 (1/1/2008)

A check of the effectiveness of sealing arrangements of all hatch covers by hose testing or equivalent is to be made.

4.3.4 (1/7/2016)

Close-up survey and thickness measurement (see Note 1) of the hatch cover and coaming plating and stiffeners is to be carried out as given in Tab 5 and Tab 6, respectively.

Note 1: Subject to cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers structures.

4.4 Overall and close-up surveys

4.4.1 (1/7/2006)

An overall survey of all cargo holds, tanks and spaces is to be carried out at each class renewal survey. For fuel oil tanks in the cargo length area, the requirements given in Ch 3, Sec 5, Tab 5 are to be complied with.

4.4.2 (1/7/2006)

The minimum requirements for close-up surveys at class renewal survey are given in Tab 5.

4.4.3 (1/7/2006)

The Surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of the spaces under survey, the condition of the corrosion prevention system and where spaces have structural arrangements or details which have suffered defects in similar spaces or on similar ships according to available information.

4.4.4 (1/1/2008)

For areas in spaces where hard protective coatings are found to be in a good condition, the extent of close-up surveys according to Tab 5 may be specially considered. Refer also to [4.2.6].

4.5 Thickness measurements

4.5.1 (1/1/2004)

The minimum requirements for thickness measurements at class renewal survey are given in Tab 6.

Note 1: Attention is drawn to specific additional thickness measurements to be carried out on the vertical corrugated transverse watertight bulkhead between the two foremost cargo holds for ships which are to comply with retroactive requirements as detailed in Ch 6, Sec 2, [1.3].

Note 2: Attention is drawn to specific additional thickness measurements to be carried out on the side shell frames and brackets in cargo holds for ships which are to comply with retroactive requirements as detailed in Ch 6, Sec 2, [7].

4.5.2 (1/7/2012)

Provisions for extended measurements for areas with substantial corrosion as defined in Ch 2, Sec 2, [2.2.9] are given in Tab 7 to Tab 11 and as may be additionally specified in the survey program as required in [4.1]. These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.

For ships built under Common Structural Rules, the identified substantial corrosion areas may be:

- a) protected by coating applied in accordance with the coating manufacturer's requirements and examined at annual intervals to confirm the coating in way is still in good condition, or alternatively
- b) required to be measured at annual intervals.

4.5.3 (1/7/2006)

The Surveyor may further extend the thickness measurements as deemed necessary.

4.5.4 (1/7/2006)

For areas in tanks where hard protective coatings are found to be in a good condition, the extent of thickness measure-

ments according to Tab 6 may be specially considered. Refer also to [4.2.6].

4.5.5 (1/1/2016)

For ships not built under the Common Structural Rules, when pitting is found on bottom plating and its intensity is 20% or more, thickness measurements are to be extended in order to determine the actual plate thickness out of the pits and the depth of the pits. Where the wastage is in the substantial corrosion range or the average depth of pitting is 1/3 or more of the actual plate thickness, the pitted plate is to be considered as a substantially corroded area.

For ships built under the Common Structural Rules, the acceptance criteria for pitting is:

- according to Chapter 13 of the Common Structural Rules for Bulk Carriers and as specified in Ch 2, App 3, [4.2.2] for ships contracted for construction on or after 1 April 2006 but before 1 July 2015, or
- according to Ch 2, App 3, [4.2.2] for ships contracted for construction on or after 1 July 2015.

4.5.6 (1/7/2012)

Transverse sections are to be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements, one of which is to be in the amidships area.

4.5.7 (1/7/2006)

Representative thickness measurement to determine both general and local levels of corrosion in the shell frames and their end attachments in all cargo holds and water ballast tanks is to be carried out. Thickness measurement is also to be carried out to determine the corrosion levels on the transverse bulkhead plating. The extent of thickness measurements may be specially considered, provided the Surveyor is satisfied by the close-up survey that there is no structural diminution and the hard protective coating where applied remains efficient.

4.6 Tank testing

4.6.1 (1/7/2006)

All boundaries of water ballast tanks, deep tanks and cargo holds used for water ballast within the cargo length area are to be pressure tested. For fuel oil tanks, only representative tanks are to be pressure tested.

4.6.2 The Surveyor may extend the tank testing as deemed necessary.

4.6.3 (1/7/2006)

Boundaries of ballast tanks are to be tested with a head of liquid to the top of air pipes.

4.6.4 (1/7/2006)

Boundaries of ballast holds are to be tested with a head of liquid to near to the top of hatches.

Table 6 : Requirements for thickness measurements at class renewal survey of bulk , combination carriers and self-unloading bulk carriers of single side skin construction (1/7/2006)

Age of ship (in years at time of class renewal survey)			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	age > 15
Suspect areas	Suspect areas	Suspect areas	Suspect areas
	Within the cargo length: <ul style="list-style-type: none"> two transverse sections of deck plating outside line of cargo hatch openings (1) 	Within the cargo length: <ul style="list-style-type: none"> each deck plate outside line of cargo hatch openings two transverse sections, one in the amidships area, outside line of cargo hatch openings, (1) 	Within the cargo length: <ul style="list-style-type: none"> each deck plate outside line of cargo hatch openings three transverse sections, one in the amidships area, outside line of cargo hatch openings, (1) each bottom plate
	Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Tab 5	Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Tab 5	Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Tab 5
	Wind and water strakes in way of the transverse sections considered above	All wind and water strakes within the cargo length area	All wind and water strakes, full length
	Selected wind and water strakes outside the cargo length area	Selected wind and water strakes outside the cargo length area	
		Additional thickness measurements given in Ch 6, Sec 2, [1.3] are to be taken on the transverse watertight bulkhead between the two foremost cargo holds on ships to which the requirements given in Ch 6, Sec 2, [1.1.1] apply.	Additional thickness measurements given in Ch 6, Sec 2, [1.3] are to be taken on the transverse watertight bulkhead between the two foremost cargo holds on ships to which the requirements given in Ch 6, Sec 2, [1.1.1] apply.
	Additional thickness measurements are to be taken in accordance with the guidelines given in Ch 6, App 2 applicable to side shell frames and brackets on ships subject to compliance with the requirements of Ch 6, Sec 2, [7]	Additional thickness measurements are to be taken in accordance with the guidelines given in Ch 6, App 2 applicable to side shell frames and brackets on ships subject to compliance with the requirements of Ch 6, Sec 2, [7]	Additional thickness measurements are to be taken in accordance with the guidelines given in Ch 6, App 2 applicable to side shell frames and brackets on ships subject to compliance with the requirements of Ch 6, Sec 2, [7]
(1) Transverse sections are to be chosen where largest reductions are suspected to occur or are revealed from deck plating measurements.			

4.6.5 (1/7/2006)

Boundaries of fuel oil tanks are to be tested with a head of liquid to the highest point that liquid will rise to under service conditions. Tank testing of fuel oil tanks may be specially considered based on a satisfactory external examination of the tank boundaries and confirmation from the Master stating that pressure testing has been carried out according to the requirements with satisfactory results.

4.6.6 (1/7/2006)

The testing of double bottom tanks and other spaces not designed for the carriage of liquid may be omitted, provided a satisfactory internal examination is carried out together with an examination of the tank top.

4.7 Additional requirements after determining compliance with SOLAS regulation XII/12 (water level detectors) and XII/13 (availability of pumping systems)**4.7.1 (1/1/2007)**

For ships complying with the requirements of SOLAS XII/12 for hold, ballast and dry space water level detectors, the class renewal survey is to include an examination and a test of the water ingress detection systems and of their alarms.

4.7.2 (1/1/2007)

For ships complying with the requirements of SOLAS XII/13 for the availability of pumping systems, the class renewal survey is to include an examination and a test of the means for draining and pumping ballast tanks forward of the collision bulkhead and bilges of dry spaces, any part of which extends forward of the foremost cargo hold, and of their controls.

**Table 7 : Requirements for extent of thickness measurements at those areas of substantial corrosion
Class renewal survey of bulk carriers, combination carriers and self-unloading bulk carriers of single side skin construction within the cargo area**

BOTTOM AND SIDE SHELL STRUCTURES		
Structural member	Extent of measurement	Pattern of measurement
Bottom and side shell plating	Suspect plate, plus 4 adjacent plates See other tables for particulars on gauging in way of tanks and cargo holds	5-point pattern for each panel between longitudinals
Bottom and side shell longitudinals	Minimum of 3 longitudinals in way of suspect areas	3 measurements in line across web 3 measurements on flange

**Table 8 : Requirements for extent of thickness measurements at those areas of substantial corrosion
Class renewal survey of bulk carriers, combination carriers and self-unloading bulk carriers of single side skin construction within the cargo area**

TRANSVERSE BULKHEADS IN CARGO HOLDS		
Structural member	Extent of measurement	Pattern of measurement
Lower stool	Transverse band within 25mm of welded connection to inner bottom Transverse band within 25mm of welded connection to shelf plate	5-point pattern between stiffeners over one metre length 5-point pattern between stiffeners over one metre length
Transverse bulkhead	Transverse band at approximately mid-height Transverse band at part of bulkhead adjacent to upper deck or below upper stool shelf plate (for bulkheads fitted with upper stool)	5-point pattern over 1 m ² of plating 5-point pattern over 1 m ² of plating

Figure 1 : Areas subject to close-up surveys and thickness measurements

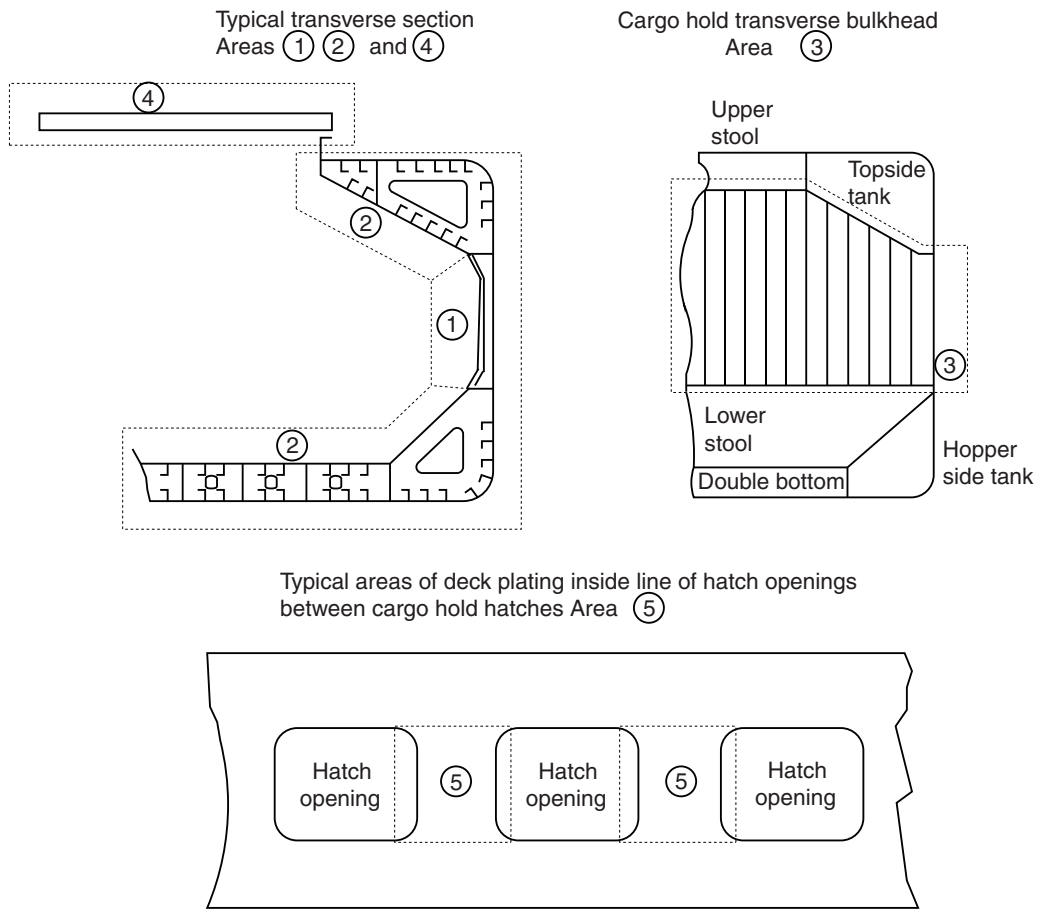
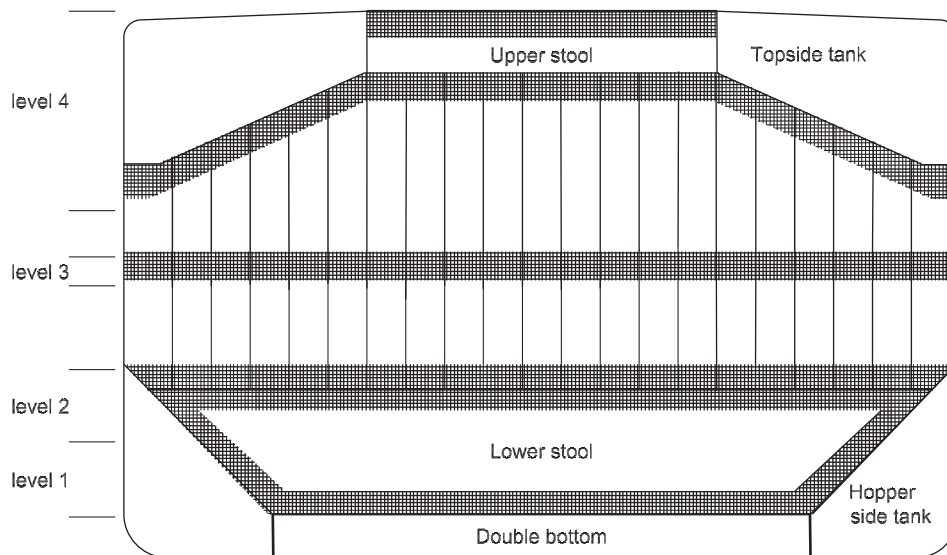


Figure 2 : Transverse bulkhead: close-up survey areas



**Table 9 : Requirements for extent of thickness measurements at those areas of substantial corrosion
Class renewal survey of bulk carriers, combination carriers and self-unloading bulk carriers of single side skin construction within the cargo area**

DECK STRUCTURE AND HATCH COAMINGS AND COAMINGS		
Structural member	Extent of measurement	Pattern of measurement
Cross deck strip plating	Suspect cross deck strip plating	5-point pattern between underdeck stiffeners over one metre length
Underdeck stiffeners	Transverse members Longitudinal members	5-point pattern at each end and mid-span 5-point pattern on both web and flange
Hatch covers	Skirt: 3 locations on each side and each end 3 longitudinal bands, outboard strakes (2) and centreline strake (1)	5-point pattern at each location 5-point measurement each band
Hatch coamings	Both sides and ends of coaming: one band lower 1/3 and one band upper 2/3 of coaming	5-point measurement each band
Topside water ballast tanks	Transverse watertight bulkhead: (a) lower 1/3 of bulkhead (b) upper 2/3 of bulkhead (c) stiffeners	(a) 5-point pattern over 1 m ² of plating (b) 5-point pattern over 1 m ² of plating (c) 5-point pattern over 1 m length
	Two representative transverse wash bulkheads: (a) lower 1/3 of bulkhead (b) upper 2/3 of bulkhead (c) stiffeners	(a) 5-point pattern over 1 m ² of plating (b) 5-point pattern over 1 m ² of plating (c) 5-point pattern over 1 m length
	Three representative bays of sloped plating: (a) lower 1/3 of tank (b) upper 2/3 of tank	(a) 5-point pattern over 1 m ² of plating (b) 5-point pattern over 1 m ² of plating
	Longitudinals: suspect and adjacent	5-point pattern both web and flange over 1 m length
Main deck plating	Suspect plates and adjacent	5-point pattern over 1 m ² of plating
Main deck longitudinals	Minimum of 3 longitudinals where plating measured	5-point pattern both web and flange over 1 m length
Web frames/transverses	Suspect plates	5-point pattern over 1 m ² of plating

**Table 10 : Requirements for extent of thickness measurements at those areas of substantial corrosion
Class renewal survey of bulk carriers, combination carriers and self-unloading bulk carriers of single side skin construction within the cargo area**

DOUBLE BOTTOM AND HOPPER STRUCTURE		
Structural member	Extent of measurement	Pattern of measurement
Inner bottom plating	Suspect plate plus all adjacent plates	5-point pattern for each panel between longitudinals over one metre length
Inner bottom longitudinals	Three longitudinals where plates measured	3 measurements in line across web and 3 measurements on flange
Longitudinal girders and transverse floors	Suspect plates	5-point pattern over approximately 1 m ² of plating
Watertight bulkheads (floors and girders)	(a) lower 1/3 of tank	(a) 5-point pattern over 1 m ² of plating
	(b) upper 2/3 of tank	(b) 5-point pattern alternate plates over 1 m ² of plating
Transverse web frames	Suspect plate	5-point pattern over 1 m ² of plating

**Table 11 : Requirements for extent of thickness measurements at those areas of substantial corrosion
Class renewal survey of bulk carriers, combination carriers and self-unloading bulk carriers of single side skin
construction within the cargo area**

CARGO HOLDS		
Structural member	Extent of measurement	Pattern of measurement
Side shell frames	Suspect frame and each adjacent	(a) At each end and mid-span: 5-point pattern of both web and flange (b) 5-point pattern within 25 mm of welded attachment to both shell and lower sloped plate

4.8 Self unloading bulk carrier - cargo handling system(s)

4.8.1 (1/1/2017)

The class renewal survey for Cargo handling systems, not covered by the additional class notation **CARGO HANDLING** is to include, in addition to the requirements of the annual survey [2.8]:

- an examination of the instruction/installation manual to verify the layout of the complete system(s) and confirm the correspondence to the actual system(s) fitted on board
- verification that maintenance of the system(s) has been carried out according to the Manufacturer's instructions and schedules
- a general examination of components of the system in order to verify their satisfactory condition of maintenance
- verification and test of the cargo handling system alarm and safety devices
- a running test of the system in order to verify the satisfactory working and operation conditions.

4.8.2 (1/7/2006)

The requirements apply to the surveys of the hull structure and piping systems in way of cargo holds, cofferdams, pipe tunnels, fuel oil tanks and void spaces within the cargo length area and all salt water ballast tanks. They are additional to the requirements applicable to the remainder of the ship, given in Chapter 3 according to the relevant surveys.

4.8.3 The requirements contain the minimum extent of examination, thickness measurements and tank testing. When substantial corrosion, as defined in Ch 2, Sec 2, [2.2.9], and/or structural defects are found, the survey is to be extended and is to include additional close-up surveys when necessary.

4.8.4 (1/7/2004)

Ships required to comply with the provisions in Ch 6, App 1 are subject to the additional thickness measurement guidance in Ch 6, Sec 2, [1.3] for the vertically corrugated transverse watertight bulkhead between cargo holds Nos. 1 and 2 for purposes of determining compliance with Ch 6, App 1 prior to the relevant compliance deadline stipulated in Ch 6, Sec 2, [1.2] and at subsequent intermediate surveys (for ships over 10 years of age) and renewal surveys for purposes of verifying continuing compliance with Ch 6, App 1.

4.8.5 (1/7/2004)

Ships required to comply with the provisions in Ch 6, Sec 2, [7] are subject to the additional thickness measurement guidance in Ch 6, App 2 for side shell frames and brackets for the purposes of determining compliance with Ch 6, Sec 2, [7] prior to the relevant compliance deadline stipulated in Ch 6, Sec 2, [7] and at subsequent intermediate and renewal surveys for purposes of verifying continuing compliance with Ch 6, Sec 2, [7].

4.8.6 (1/1/2019)

When, in any survey, thickness measurements are required :

- the procedure detailed in Ch 2, Sec 2, [2.3] is to be applied
- the thickness measurement firm is to be part of the survey planning meeting held prior to commencing the survey.

4.8.7 (1/7/2006)

Special consideration may be given to the extent of close-up surveys and/or thickness measurements in cargo holds as required below for class renewal, intermediate or annual surveys, when all internal and external surfaces of hatch coamings and hatch covers, and all internal surfaces of the cargo holds, excluding the flat tank top areas and the hopper tank sloped plating approximately 300 mm below the side shell frame end brackets, have protective coating in good condition.

The above special consideration may also be given to existing bulk carriers, where Owners elect to coat or re-coat cargo holds, in accordance with the Manufacturers' recommendations. However, prior to re-coating the cargo holds, scantlings are to be assessed in the presence of a Surveyor of the Society.

4.8.8 (1/7/2006)

For bulk carriers with hybrid cargo hold arrangements, e.g. with some cargo holds of single side skin and others of double side skin, the requirements of Sec 9 are to apply to cargo holds of double side skin and associated wing spaces.

4.9 Survey Program

4.9.1 Basic information and particulars (1/1/2008)

Basic information and particulars of the ship are indicated in Tab 12.

4.9.2 Scope (1/1/2008)

The present survey program covers the minimum extent of overall surveys, close-up surveys, thickness measurements and pressure testing within the cargo length area, of cargo

holds and ballast tanks, including fore and aft peak tanks, required by the Rules.

The arrangements and safety aspects of the survey are to be acceptable to the attending Surveyor(s).

4.9.3 Documentation (1/1/2008)

All documents used in the development of the survey program are to be available on board during the survey as required in [1.2].

4.9.4 Arrangement of cargo holds, tanks and spaces (1/1/2008)

This section of the survey program is to provide information (either in the form of plans or text) on the arrangement of cargo holds, tanks and spaces that fall within the scope of the survey.

4.9.5 List of cargo holds, tanks and spaces with information on their use, extent of coatings and corrosion protection system (1/1/2008)

This section of the survey program is to indicate any changes relating to (and is to update) the information on the use of the holds and tanks of the ship, the extent of coatings and the corrosion protective system provided in the Survey Planning Questionnaire referred to in [4.10].

4.9.6 Conditions for survey (1/1/2008)

This section of the survey program is to provide information on the conditions for survey, e.g. information regarding cargo hold and tank cleaning, gas freeing, ventilation, lighting, etc.

Table 12 : Basic information and particulars (1/1/2019)

Name of ship:	
IMO number:	
Flag State:	
Port of registry:	
Gross tonnage:	
Deadweight (metric tonnes):	
Length between perpendiculars (m):	
Shipbuilder:	
Hull number:	
Classification Society:	
Register Number:	
Date of build of the ship:	
Owner:	
Thickness measurement firm:	
Any other information which may be useful	

4.9.7 Provisions and methods of access to structures (1/1/2008)

This section of the survey program is to indicate any changes relating to (and is to update) the information on the provisions and methods of access to structures provided in the Survey Planning Questionnaire referred to in [4.10].

4.9.8 List of equipment for survey (1/1/2008)

This section of the survey program is to identify and list the equipment that will be made available for carrying out the survey and the required thickness measurements.

4.9.9 Survey requirements (1/1/2008)

- a) Overall survey
This section of the survey program is to identify and list the spaces that are to undergo an overall survey for the ship in accordance with [4.3] and [4.4.1].
- b) Close-up survey
This section of the survey program is to identify and list the hull structures that are to undergo a close-up survey for the ship in accordance with [4.4.2].

4.9.10 Identification of tanks for tank testing (1/1/2008)

This section of the survey program is to identify and list the cargo holds and tanks that are to undergo tank testing for the ship in accordance with [4.6].

4.9.11 Identification of areas and sections for thickness measurements (1/1/2008)

This section of the survey program is to identify and list the areas and sections where thickness measurements are to be taken in accordance with [4.3.4] and [4.5].

4.9.12 Minimum thickness of hull structures (1/1/2008)

This section of the survey program is to specify the minimum thickness for hull structures of the ship that are subject to survey, according to (a) or (b):

- a) determined from the attached wastage allowance table and the original thickness according to the hull structure plans of the ship (see Note 1);
- b) given in the following Tab 13.

Note 1: The wastage allowance tables are to be attached to the survey program.

Table 13 : As-built and minimum thickness for hull structures (1/1/2008)

Area or location	Original as-built thickness (mm)	Minimum thickness (mm)	Substantial corrosion thickness (mm)
Deck			
Plating			
Longitudinals			
Longitudinal girders			
Cross deck plating			
Cross deck stiffeners			
Bottom			
Plating			
Longitudinals			
Longitudinal girders			
Inner bottom			
Plating			
Longitudinals			
Longitudinal girders			
Floors			
Ship side in way of topside tanks			
Plating			
Longitudinals			
Ship side in way of hopper side tanks			
Plating			
Longitudinals			
Ship side in way of tanks, if applicable			
Plating			
Longitudinals			
Longitudinal girders			
Ship side in way of cargo holds			
Plating			
Side frame webs			
Side frame flanges			
Upper bracket webs			

Area or location	Original as-built thickness (mm)	Minimum thickness (mm)	Substantial corrosion thickness (mm)
Upper bracket flanges			
Lower bracket webs			
Lower bracket flanges			
Longitudinal bulkhead, if applicable			
Plating			
Longitudinals, if applicable			
Longitudinal girders, if applicable			
Transverse bulkheads			
Plating			
Stiffeners, if applicable			
Upper stool plating			
Upper stool stiffeners			
Lower stool plating			
Lower stool stiffeners			
Transverse web frames in topside tanks			
Plating			
Flanges			
Stiffeners			
Transverse web frames in hopper tanks			
Plating			
Flanges			
Stiffeners			
Hatch covers			
Plating			
Stiffeners			
Hatch coamings			
Plating			
Stiffeners			

4.9.13 Thickness measurement firm (1/1/2019)

This section of the survey program is to identify changes, if any, relating to the information on the thickness measurement firm provided in the Survey Planning Questionnaire referred to in [4.10].

4.9.14 Damage experience related to the ship (1/1/2008)

This section of the survey program, using Tab 14, is to provide details of the hull damage for at least the last three years in way of the cargo holds, ballast tanks and void spaces within the cargo length area. This damage is subject to survey.

4.9.15 Areas identified with substantial corrosion from previous surveys (1/1/2008)

This section of the survey program is to identify and list the areas of substantial corrosion from previous surveys.

4.9.16 Critical structural areas and suspect areas (1/1/2008)

This section of the survey program is to identify and list the critical structural areas and the suspect areas, if such information is available.

4.9.17 Other relevant comments and information (1/1/2008)

This section of the survey program is to provide any other comments and information relevant to the survey.

4.9.18 Appendices to be provided (1/1/2008)

The following appendices are to be attached to the survey program:

a) Appendix 1 - List of plans

This appendix is to identify and list the main structural plans of cargo holds and ballast tanks (scantling drawings), including information regarding use of high tensile steel (HTS), as required by the second item of the list in [4.1.3].

b) Appendix 2 - Survey Planning Questionnaire

The Survey Planning Questionnaire (refer to [4.10]), which has been submitted by the Owner.

c) Appendix 3 - Other documentation

This part of the survey program is to identify and list any other documentation that forms part of the plan.

4.9.19 Date and signature (1/1/2008)

The survey program is to be completed with the following wording:

Prepared by the owner in co-operation with the Society for compliance with [4.1.3] of Pt A, Ch 4, Sec 2 of the Rules.

Date:..... (name and signature of authorised Owner's representative)

Date:..... (name and signature of authorised representative of the Society)

4.10 Survey Planning Questionnaire**4.10.1 General (1/1/2008)**

The following information will enable the Owner in co-operation with the Society to develop a survey program complying with the requirements given in [4.9]. It is essential that, when completing the present questionnaire, the Owner provides up-to-date information. The present questionnaire, when completed, is to provide all information and material required in [4.9].

4.10.2 Particulars (1/1/2008)

The particulars of the ship are indicated in Tab 15.

4.10.3 Information on access provision for close-up surveys and thickness measurement (1/1/2008)

The Owner is to indicate in Tab 16 the means of access to the structures subject to close-up survey and thickness measurement. A close-up survey is an examination where the details of structural components are within the close visual inspection range of the attending Surveyor, i.e. normally within reach of hand.

4.10.4 History of cargo (1/1/2008)

The Owner is to provide history of bulk cargoes of corrosive nature, e.g. with high sulphur content.

Table 14 : Hull damage sorted by location for the ship concerned and for sister or similar ships (if available) in the case of design related damage (1/1/2008)

Cargo hold, tank or space number or area	Possible cause, if known	Description of the damage	Location	Repair	Date of repair

4.10.5 Owner's inspections (1/1/2008)

Using a format similar to that of Tab 17 (which is given as an example), the Owner is to provide details of the results of their inspections for the last three years on all cargo holds and ballast tanks and void spaces within the cargo area, including peak tanks.

4.10.6 Reports of Port State Control inspections (1/1/2008)

The Owner is to provide a list of any reports of Port State Control inspections containing hull structural related deficiencies and relevant information on rectification of the deficiencies.

4.10.7 Safety Management System (1/1/2008)

The Owner is to provide a list of any non-conformities related to hull maintenance, including the associated corrective actions.

4.10.8 Approved thickness measurement firm (1/1/2019)

The Owner is to provide the name and address of the approved thickness measurement firm.

4.10.9 Date and signature (1/1/2008)

The Survey Planning Questionnaire is to be completed with the date, the name of the Owner's representative responsible for filling in the document and his signature.

4.10.10 Availability of the form (1/1/2008)

An example of the "Survey Planning Questionnaire" form to be filled in by the Owner is available on the Society website or may be supplied upon request; application may be made to dry.cargoships@rina.org.

Table 15 : Particulars of the ship (1/1/2008)

Name of ship:	
IMO number:	
Flag State:	
Port of registry:	
Gross tonnage:	
Deadweight (metric tonnes):	
Classification Society:	
Register Number:	
Date of build:	
Owner:	

Table 16 : Means of access to hull structures (1/1/2008)

Hold/Tank No. Other spaces	Structure	Temporary staging	Rafts/Boats	Ladders	Direct access	Other means (please specify)
Peaks	Fore Peak					
	Aft Peak					
Cargo Holds	Hatch side coamings					
	Topside sloping plate					
	Upper stool plating					
	Cross deck					
	Side shell plating, frames and brackets					
	Transverse bulkhead					
	Hopper tank plating					
	Lower stool plating					
Topside Tanks	Tank top					
	Underdeck structure					
	Side shell and structure					
	Sloping plate and structure					
Hopper Tanks	Webs and bulkheads					
	Sloping plate and structure					
	Side shell and structure					
	Bottom structure					
Other space structures	Webs and bulkheads					
	Double bottom structure					
	Upper stool internal structure					
	Lower stool internal structure					

Table 17 : Owner's inspection report (1/1/2008)

Tank/Hold No.	Corrosion protection (1)	Coating extent (2)	Coating condition (3)	Structural deterioration (4)	Hold and tank history (5)
Cargo holds					
Topside tanks					
Hopper tanks					
Double bottom tanks					
Upper stools					
Lower stools					
Fore peak					
Aft peak					
Miscellaneous other spaces:					

Note 1: Indicate tanks which are used for oil/ballast.
 (1) HC=hard coating; SC=soft coating; SH=semi-hard coating; NP=no protection
 (2) U=upper part; M=middle part; L=lower part; C=complete
 (3) G=good; F=fair; P=poor; RC=recoated (during the last three years)
 (4) N=no findings recorded; Y=findings recorded, description of findings is to be attached to the questionnaire
 (5) DR=damage and repair; L=leakages; CV= conversion (description is to be attached to this questionnaire)

SECTION 3

OIL TANKERS AND COMBINATION CARRIERS

1 General

1.1 Application

1.1.1 (1/7/2011)

The requirements of this Section apply to all self-propelled ships, other than double hull oil tankers, which have been assigned one of the following service notations:

- **asphalt tanker ESP**
- **oil tanker ESP**
- **combination carrier/OBO ESP**
- **combination carrier/OOC ESP**

Self-propelled ships which have been assigned the service notation **oil tanker**, without integral cargo tanks and having independent cargo tanks within the hull, are to be surveyed, as far as applicable, according to the provisions given for ships having the service notation **liquefied gas carrier**, as far as hull surveys are concerned, as laid down in Sec 6.

1.1.2 The requirements for hull surveys apply to the surveys of the hull structure and piping systems in way of cargo tanks, pump rooms, cofferdams, pipe tunnels and void spaces within the cargo area and all salt water ballast tanks. They are additional to the requirements applicable to the remainder of the ship, given in Chapter 3 according to the relevant surveys.

1.1.3 The requirements contain the minimum extent of examination, thickness measurements and tank testing. When substantial corrosion, as defined in Ch 2, Sec 2, [2.2.9], and/or structural defects are found, the survey is to be extended and is to include additional close-up surveys when necessary.

1.1.4 (1/1/2019)

When, in any survey, thickness measurements are required :

- the procedure detailed in Ch 2, Sec 2, [2.3] is to be applied
- the thickness measurement firm is to be part of the survey planning meeting held prior to commencing the survey.

1.1.5 The requirements for machinery surveys apply to surveys of the machinery and equipment in the cargo area or dedicated to cargo service systems and are additional to those given in Chapter 3 for all ships.

1.2 Documentation on board

1.2.1 The Owner is to supply and maintain documentation on board as specified in [1.2.2] and [1.2.3], which is to be readily available for examination by the Surveyor. The documentation is to be kept on board for the lifetime of the ship.

1.2.2 A survey report file is to be a part of the documentation on board consisting of:

- reports of structural surveys
- hull condition evaluation report (summarising the results of class renewal surveys)
- thickness measurement reports.

The survey report file is also to be available in the Owner's management office.

1.2.3 (1/1/2008)

The following additional supporting documentation is to be available on board:

- survey program, as required in [6.1], until such time as the class renewal survey or the intermediate survey, as applicable, has been completed
- main structural plans of cargo tanks/holds and ballast tanks
- previous repair history
- cargo and ballast history
- extent of use of inert gas system and tank cleaning procedures
- ship's personnel reports on:
 - structural deterioration/defects in general
 - leakage in bulkheads and piping systems
 - condition of coatings or corrosion prevention systems, if any
- any other information that may help to identify critical structural areas and/or suspect areas requiring inspection.

1.2.4 Prior to survey, the Surveyor examines the documentation on board and its contents, which are used as a basis for the survey.

1.3 Reporting and evaluation of surveys

1.3.1 The data and information on the structural condition of the ship collected during survey are evaluated for acceptability and structural integrity of the ship's cargo area.

1.3.2 (1/7/2005)

In the case of oil tankers of 130 m in length and upwards (as defined in the International Convention on Load Lines in force), the ship's longitudinal strength is to be evaluated by using the thickness of structural members measured, renewed and reinforced, as appropriate, during the class renewal survey carried out after the ship reached 10 years of age in accordance with the criteria for longitudinal strength of the ship's hull girder for oil tankers specified in Ch 2, App 4.

The final result of evaluation of the ship's longitudinal strength required above, after renewal or reinforcement

work of structural members, if carried out as a result of initial evaluation, is to be reported as a part of the condition evaluation report.

1.3.3 (1/7/2006)

For ships subject to the requirements of this Section, the surveys of hull structure and piping systems are reported in conformance with the Survey Reporting Principles laid down in App 1.

1.3.4 A hull condition evaluation report (summarising the results of class renewal surveys) is issued by the Society to the Owner, who is to place it on board the ship for reference at future surveys. The hull condition evaluation report is endorsed by the Society.

2 Annual survey - Hull items

2.1

2.1.1 (1/1/2019)

The survey is to consist of an examination for the purpose of ensuring, as far as practicable, that the hull and piping are maintained in a satisfactory condition and is to take into account the service history, condition and extent of the corrosion prevention system of ballast tanks and areas identified in the survey report file.

2.2 Hull and weather decks

2.2.1 (1/1/2019)

The survey is to include:

- examination of the hull plating and its closing appliances as far as can be seen
- examination of watertight penetrations as far as practicable
- examination of cargo tank openings, including gaskets, covers, coamings and flame screens
- examination of cargo tank pressure/vacuum valves and flame screens
- examination of flame screens on vents to all bunker tanks
- examination of cargo, crude oil washing, bunker and vent piping systems, including vent masts and headers
- confirmation that wheelhouse doors and windows, sidescuttles and windows in superstructure and deckhouse ends facing the cargo area are in satisfactory condition.

2.3 Cargo pump rooms and pipe tunnels

2.3.1 The survey is to include:

- examination of all pump room bulkheads and pipe tunnels (if any) for signs of oil leakage or fractures and, in particular, the sealing arrangements of penetrations in these bulkheads
- examination of the condition of all piping systems, in cargo pump rooms and pipe tunnels (if any)
- examination of the bilge and ballast arrangements.

2.4 Ballast tanks

2.4.1 (1/7/2010)

Ballast tanks are to be internally examined when required as a consequence of the results of the class renewal survey or the intermediate survey (see Note 1), in cases where:

- a) a hard protective coating has not been applied since the time of construction, or
- b) a soft or semi-hard coating has been applied, or
- c) substantial corrosion is found within the tank, or
- d) the hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the Surveyor.

Note 1: The requirements related to the protective coating condition are to apply to ballast tanks whose coating condition will be assessed at the forthcoming class renewal survey and intermediate survey on or after 1 July 2006. For the assessment of the coating condition, reference is to be made to IACS Recommendation No.87 "Guidelines for Coating Maintenance & Repairs for Ballast Tanks and Combined Cargo / Ballast Tanks on Oil Tankers".

2.4.2 (1/7/2006)

When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurements are to be carried out and if the results indicate that substantial corrosion is present, the extent of the measurements is to be increased in accordance with Tab 5 to Tab 8.

These extended thickness measurements are to be carried out before the survey is credited as completed.

Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.

2.4.3 (1/7/2011)

Confirmation is to be given that the corrosion prevention system fitted to dedicated ballast water tanks when appropriate is maintained.

2.5 Emergency towing arrangement

2.5.1 The Owner or his representative is to declare to the attending Surveyor that no significant alterations have been made, without prior approval from the Society, to the equipment and arrangements fitted on board in accordance with the provisions given in Pt B, Ch 10, Sec 4, [4].

2.5.2 The survey is to include:

- an examination, as far as practicable, of the emergency towing arrangement
- confirmation that the aft towing arrangement is pre-rigged and forward chafing gear is secured to the strong-point
- confirmation of the proper functioning of the light, where it is provided, on the pick-up gear marker buoy.

2.6 Means of access

2.6.1 (1/7/2011)

Confirmation is to be given, when appropriate and as far as is practicable when internal spaces are examined, that the means of access to cargo and other spaces remain in good condition.

2.7 Safe access to bow

2.7.1 (1/7/2011)

The access to bow arrangement is to be examined, as applicable.

3 Annual survey - Cargo machinery items

3.1 Cargo area and cargo pump rooms

3.1.1 (1/1/2007)

The Owner or his representative is to declare to the attending Surveyor that no modifications or alterations which might impair safety have been made to the various installations in dangerous zones without prior approval from the Society.

The survey is to include:

- confirmation that potential sources of ignition in or near the cargo pump rooms, such as loose gear, excessive product in bilge, excessive vapours, combustible materials, etc., are eliminated and that access ladders are in satisfactory condition
- examination, as far as practicable, of cargo, bilge, ballast and stripping pumps for excessive gland seal leakage, verification of proper operation of electrical and mechanical remote operating and shutdown devices and operation of the pump room bilge system, and checking that pump foundations are intact
- confirmation that the ventilation system, including portable equipment, if any, of all spaces in the cargo area (including cargo pump rooms) is operational, ducting is intact and screens are clean
- confirmation that electrical equipment in dangerous zones, cargo pump rooms and other spaces is in satisfactory condition and has been properly maintained
- confirmation that the remote operation of the cargo pump room bilge system is satisfactory
- examination of the cargo heating system
- examination of the cargo-transfer arrangement and confirmation that the ship's cargo hoses are suitable for their intended purpose and in satisfactory condition
- confirmation that any special arrangement made for bow or stern loading/unloading is in satisfactory condition and test of the means of communication and remote shutdown of the cargo pumps
- examination of the emergency lighting in all cargo pump rooms (for oil tankers constructed after 1 July 2002).

3.2 Instrumentation and safety devices

3.2.1 (1/1/2007)

The survey is to include:

- a) examination of cargo tank gauging devices, high level alarms and valves associated with overflow control
- b) verification that installed pressure gauges on cargo discharge lines are properly operational
- c) confirmation that the required gas detection instruments are on board and satisfactory arrangements have been made for the supply of any required vapour detection tubes
- d) confirmation that devices provided for measuring the temperature of the cargo, if any, operate satisfactorily
- e) check of protection of the cargo pump room, and in particular of:
 - 1) temperature sensing devices for bulkhead glands and alarms;
 - 2) interlock between lighting and ventilation;
 - 3) gas detection system;
 - 4) bilge level monitoring devices and alarms.

3.3 Inert gas system

3.3.1 The survey is to include:

- a) external examination of the whole system, to check the condition of all piping, including vent piping above the upper deck in the cargo tank area and overboard discharges through the shell so far as practicable, and associated components to verify, in particular, the absence of signs of corrosion and leakage of gas, water or other liquid from inert gas and water piping systems or from the pressure/vacuum breaking device
- b) check of proper operation of both inert gas blowers
- c) check of proper operation of ventilation system required for scrubber room (if any)
- d) check of deck water seal for automatic water filling and draining
- e) check of absence of water carry over in the inert gas from the deck water seal and check of the condition of the non-return valve
- f) check of proper operation of all remotely operated or automatically controlled valves and, in particular, of the flue gas isolating valve located on the inert gas supply main after the blowers
- g) check of proper operation of the interlocking feature fitted to prevent soot blowers from operating when the inert gas system is working
- h) check that the gas pressure regulating valve automatically closes when gas blowers are stopped

- i) check, as far as practicable and using simulated conditions where necessary, of the following alarms and safety devices of the inert gas system:
- 1) high oxygen content of gas in the inert gas main
 - 2) low gas pressure in the inert gas main
 - 3) low pressure in the supply to the deck water seal
 - 4) high temperature of gas in the inert gas main, including automatic shutdown devices
 - 5) low water pressure to the scrubber, including automatic shutdown devices
 - 6) accuracy of portable and fixed oxygen measuring equipment by means of calibration gases
 - 7) high water level in the scrubber, including automatic shutdown devices
 - 8) failure of the inert gas blowers
 - 9) failure of the power supply to the automatic control system for the gas regulating valve and to the instrumentation for continuous indication and permanent recording of pressure and oxygen content in the inert gas main
 - 10) high pressure of gas in the inert gas main
- j) check, when practicable, of the proper operation of the inert gas system on completion of the checks listed above.

3.4 Steering capability

3.4.1 (1/7/2011)

Confirmation is to be given, when appropriate, that the requisite arrangements to regain steering capability in the event of the prescribed single failure are being maintained.

4 Intermediate survey - Hull items

4.1 Weather decks

4.1.1 (1/7/2013)

The survey is to include:

- examination, as far as applicable, of cargo, crude oil washing, bunker, ballast, steam and vent piping systems as well as vent masts and headers. If upon examination there is any doubt as to the condition of the piping, pressure testing, thickness measurement or both may be required.
- confirmation that pipelines are electrically bonded to the hull or alternatively, verification of electrical resistance to the hull
- examination of vent line drainage arrangements.

4.2 General

4.2.1 (1/7/2006)

The survey extent is dependent on the age of the ship as specified in [4.3] to [4.5].

4.3 Ships between 5 and 10 years of age

4.3.1 (1/7/2006)

All ballast tanks are to be examined. When considered necessary by the Surveyor, thickness measurement and testing

are to be carried out to ensure that the structural integrity remains effective.

4.3.2 (1/7/2010)

A ballast tank is to be examined at subsequent annual surveys (see Note 1) where:

- a) a hard protective coating has not been applied since the time of construction, or
- b) a soft or semi-hard coating has been applied, or
- c) substantial corrosion is found within the tank, or
- d) the hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the Surveyor.

Note 1: The requirements related to the protective coating condition are to apply to ballast tanks whose coating condition will be assessed at the forthcoming class renewal survey and intermediate survey on or after 1 July 2006. For the assessment of the coating condition, reference is to be made to IACS Recommendation No.87 "Guidelines for Coating Maintenance & Repairs for Ballast Tanks and Combined Cargo / Ballast Tanks on Oil Tankers".

4.3.3 (1/7/2006)

In addition to the requirements above, suspect areas identified at previous surveys are to be examined.

4.4 Ships between 10 and 15 years of age

4.4.1 (1/7/2006)

The requirements of the intermediate survey are to be to the same extent as the previous class renewal survey as required in [6]. However, pressure testing of cargo and ballast tanks and the provisions for longitudinal strength evaluation of the hull girder as given in Ch 2, App 4, [6] are not required unless deemed necessary by the attending Surveyor.

4.4.2 (1/7/2006)

In application of [4.4.1], the intermediate survey may be commenced at the second annual survey and be progressed during the succeeding year with a view to completion at the third annual survey in lieu of application of Ch 2, Sec 2, [4.2.1].

4.4.3 (1/7/2006)

In application of [4.4.1], an underwater survey may be considered in lieu of the requirements of [6.2.5].

4.5 Ships over 15 years of age

4.5.1 (1/7/2006)

The requirements of the intermediate survey are to be to the same extent as the previous class renewal survey as required in [6]. However, pressure testing of cargo and ballast tanks and the provisions for longitudinal strength evaluation of the hull girder as given in Ch 2, App 4, [6] are not required unless deemed necessary by the attending Surveyor.

4.5.2 (1/7/2006)

In application of [4.5.1], the intermediate survey may be commenced at the second annual survey and be progressed during the succeeding year with a view to completion at the third annual survey in lieu of application of Ch 2, Sec 2, [4.2.1].

4.5.3 (1/7/2006)

In application of [4.5.1], a bottom survey in dry condition is to be part of the intermediate survey. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo tanks and ballast tanks (see Note 1) are to be carried out in accordance with the applicable requirements for intermediate surveys, if not already performed.

Note 1: Lower portions of the cargo and ballast tanks are considered to be the parts below the light ballast waterline.

5 Intermediate survey - Cargo machinery items**5.1 Cargo area and cargo pump rooms**

5.1.1 A general examination of the electrical equipment and cables in dangerous zones such as cargo pump rooms and areas adjacent to cargo tanks is to be carried out for defective and non-certified safe type electrical equipment and fixtures, non-approved lighting and fixtures, and improperly installed or defective or dead-end wiring.

5.1.2 The electrical insulation resistance of the electrical equipment and circuits terminating in or passing through the dangerous zones is to be tested; however, in cases where a proper record of testing is maintained, consideration may be given to accepting recent test readings effected by the ship's personnel.

5.1.3 The satisfactory condition of the cargo heating system is to be verified.

5.2 Inert gas system

5.2.1 For ships over 10 years old at the time of the intermediate survey due date, the following is to be carried out:

- main parts such as the scrubber, washing machines, blowers, deck water seal and non-return valve are to be opened out as considered necessary and examined
- gas distribution lines and shut-off valves, including soot blower interlocking devices, are to be examined as deemed necessary
- all automatic shutdown devices and alarms are to be examined and tested.

6 Class renewal survey - Hull items**6.1 Survey program and preparation for hull survey****6.1.1 (1/1/2008)**

The Owner, in co-operation with the Society, is to work out a specific survey program prior to the commencement of any part of:

- the class renewal survey
- the intermediate survey for oil tankers over 10 years of age.

Prior to the development of the survey program, the Survey Planning Questionnaire is to be completed by the Owner based on the information set out in [6.9], and forwarded to the Society.

The survey program is to be in a written format, based on the information in [6.8]. The survey is not to commence until the survey program has been agreed. The survey program at intermediate surveys may consist of the survey program at the previous class renewal survey supplemented by the condition evaluation report of that class renewal survey and later relevant survey reports.

The survey program is to be worked out taking into account any amendments to the survey requirements implemented after the last class renewal survey carried out.

6.1.2 (1/1/2019)

In developing the survey program, the following documentation is to be collected and consulted with a view to selecting tanks, areas and structural elements to be examined:

- a) survey status and basic ship information
- b) documentation on board, as described in [1.2.2] and [1.2.3]
- c) main structural plans of cargo and ballast tanks (scantling drawings), including information regarding use of high tensile steels (HTS);
- d) Executive Hull Summary (or Condition Evaluation Report);
- e) relevant previous damage and repair history;
- f) relevant previous survey and inspection reports from both the recognised organisation and the Owner;
- g) cargo and ballast history for the last 3 years, including carriage of cargo under heated conditions;
- h) details of the inert gas plant and tank cleaning procedures;
- i) information and other relevant data regarding conversion or modification of the ship's cargo and ballast tanks since the time of construction;
- j) description and history of the coating and corrosion protection system (including previous class notations), if any;
- k) inspections by the Owner's personnel during the last 3 years with reference to structural deterioration in general, leakages in tank boundaries and piping, and condition of the coating and corrosion protection system, if any (guidance for reporting is shown in Tab 2);
- l) information regarding the relevant maintenance level during operation including Port State Control reports of inspection containing hull related deficiencies, Safety Management System non-conformities relating to hull maintenance, including the associated corrective action(s); and
- m) any other information that will help identify suspect areas and critical structural areas.

6.1.3 (1/1/2019)

The submitted survey program is to account of and comply with at least the requirements for close-up surveys, thickness measurements and tank testing given in Tab 3, Tab 4

and [6.5], respectively. In addition, the survey program is to include at least:

- a) basic ship information and particulars;
- b) main structural plans of cargo and ballast tanks (scantling drawings), including information regarding use of high tensile steels (HTS);
- c) arrangement of tanks;
- d) list of tanks with information on their use, extent of coatings and corrosion protection systems;
- e) conditions for survey (e.g. information regarding tank cleaning, gas freeing, ventilation, lighting etc);
- f) provisions and methods for access to structures;
- g) equipment for surveys;
- h) identification of tanks and areas for close-up survey (see [6.3]);
- i) identification of areas and sections for thickness measurement (see [6.4]);
- j) identification of tanks for tank testing (see [6.5]);
- k) identification of the thickness measurement firm;
- l) damage experience related to the ship in question; and
- m) critical structural areas and suspect areas, where relevant.

6.1.4 The survey program is also to include the maximum acceptable structural corrosion diminution levels applicable to the ship. The Society will advise the Owner of this information.

6.1.5 In addition, the survey program is to include proposals on how to conduct surveys and tests in a safe and practical way, including the means of providing access to structures for close-up survey, thickness measurements and tank testing. All other provisions described in Ch 2, Sec 2, [2.3], Ch 2, Sec 2, [2.5], Ch 2, Sec 2, [2.7], Ch 2, Sec 2, [2.8] and Ch 2, Sec 2, [2.10] regarding procedures for thickness measurements, conditions for survey, access to structures, equipment for survey and survey at sea or at anchorage, respectively, are also to be complied with.

6.1.6 Survey Planning Meeting (1/1/2019)

Proper preparation and close co-operation between the attending Surveyor(s) and the Owner's representatives on board prior to and during the survey are an essential part in the safe and efficient conduct of the survey. During the survey on board safety meetings are to be held regularly.

Prior to commencement of any part of the renewal and intermediate survey, a survey planning meeting is to be held between the attending Surveyor(s), the Owner's representative in attendance, the thickness measurement firm representative, where involved, and the Master of the ship or an appropriately qualified representative appointed by the Master or Company for the purpose of ascertaining that all the arrangements envisaged in the survey program are in place, so as to ensure the safe and efficient conduct of the survey work to be carried out. Refer also to Ch 2, Sec 2, [2.3.1].

The following is an indicative list of items that are to be addressed in the meeting:

- a) schedule of the ship (i.e. the voyage, docking and undocking manoeuvres, periods alongside, cargo and ballast operations etc.);
- b) provisions and arrangements for thickness measurements (i.e. access, cleaning/de-scaling, illumination, ventilation, personal safety);
- c) extent of the thickness measurements;
- d) acceptance criteria (refer to the list of minimum thicknesses);
- e) extent of close-up survey and thickness measurement considering the coating condition and suspect areas/areas of substantial corrosion;
- f) execution of thickness measurements;
- g) taking representative readings in general and where uneven corrosion/pitting is found;
- h) mapping of areas of substantial corrosion;
- i) communication between the attending Surveyor(s), the thickness measurement firm operator(s) and the Owner's representative(s) concerning findings.

Table 1 : Intermediate survey of cargo and water ballast tanks for oil tankers and combination carriers (1/1/2008)

Age of ship (in years at time of intermediate survey)		
5 < age ≤ 10	10 < age ≤ 15	age > 15
Examination of all ballast tanks See (1) and (2)	See [4.4]	See [4.5]
Examination of suspect areas identified at previous surveys	See [4.4]	See [4.5]
<p>(1) When considered necessary by the Surveyor, thickness measurement and testing are to be carried out to ensure that the structural integrity remains effective.</p> <p>(2) A ballast tank is to be examined at subsequent annual surveys (see Note 1) where:</p> <ul style="list-style-type: none"> • a hard protective coating has not been applied since the time of construction, or • a soft coating has been applied, or • substantial corrosion is found within the tank, or • the hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the Surveyor. <p>Note 1: The requirements related to the protective coating condition are to apply to the ballast tanks whose coating condition will be assessed at the forthcoming class renewal survey and intermediate survey on or after 1 July 2006. For the assessment of the coating condition, reference is to be made to IACS Recommendation No.87 "Guidelines for Coating Maintenance & Repairs for Ballast Tanks and Combined Cargo / Ballast Tanks on Oil Tankers".</p>		

Table 2 (1/1/2019)

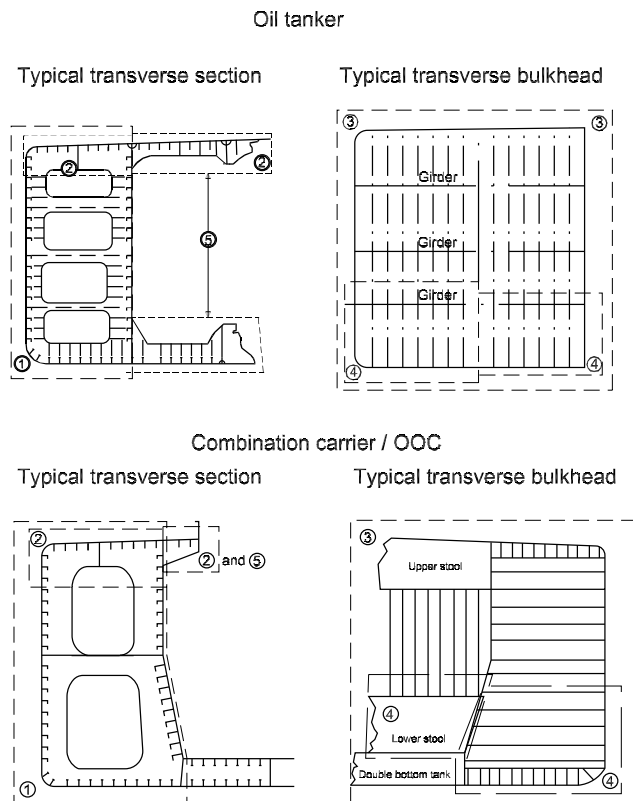
Ship Name:						
OWNERS INSPECTION REPORT - Structural Condition For Tank No:						
Grade of steel:	Deck:		Side:			
	Bottom:		Long. Bhd:			
Elements Other	Cracks:	Buckles:	Corrosion:	Coating cond.	Pitting	Mod./Rep.
Deck: Bottom: Side: Long: Bulkheads:						
Repairs carried out due to: Thickness measurements carried out, dates: Results in General: Overdue Surveys: Outstanding Conditions of class: Comments:						
Date of Inspection: Inspected by: Signature:						

Table 3 : Requirements for close-up survey at class renewal survey of oil tankers and combination carriers (1/7/2004)

Age of ship (in years at time of class renewal survey)			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	age > 15
One web frame ring, in a wing ballast tank, if any, or a wing cargo tank used primarily for water ballast (1) (see Note 1)	All web frame rings, in a wing ballast tank, if any, or a wing cargo tank used primarily for water ballast (1) (see Note 1)	All web frame rings in all ballast tanks (1) (see Note 1) All web frame rings in a cargo wing tank (1) (see Note 1) A minimum of 30% (see Note 3) of all web frame rings in each remaining cargo wing tank (1) (see Note 1)	As class renewal survey for ships between 10 and 15 years of age
<p>Note 1:(1), (2), (3), (4) and (5) are areas to be subjected to close-up surveys and thickness measurements according to Tab 4 (see Fig 1).</p> <p>(1) : Complete transverse web frame ring including adjacent structural member (2) : Deck transverse including adjacent deck structural members (3) : Transverse bulkhead complete, including girder system and adjacent structural members (4) : Transverse bulkhead lower part, including girder system and adjacent structural members (5) : Deck and bottom transverse, including adjacent structural members</p> <p>Note 2: Ballast tanks include peak tanks. Note 3: The 30% is to be rounded up to the next whole integer.</p>			

Age of ship (in years at time of class renewal survey)			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	age > 15
One deck transverse, in a cargo tank (2) (see Note 1)	One deck transverse (2) (see Note 1):	All transverse bulkheads, in all cargo and ballast tanks (3) (see Note 1)	Additional transverse areas as deemed necessary by the Society
	<ul style="list-style-type: none"> • in each remaining ballast tank • in a cargo wing tank • in two cargo centre tanks 		
	Both transverse bulkheads, in a wing ballast tank, if any, or a cargo wing tank used primarily for water ballast (3) (see Note 1)		
One transverse bulkhead in a ballast tank (4) (see Note 1) One transverse bulkhead in a cargo wing tank (4) (see Note 1) One transverse bulkhead in a cargo centre tank (4) (see Note 1)	One transverse bulkhead in each remaining ballast tank (4) (see Note 1) One transverse bulkhead in a cargo wing tank (4) (see Note 1) One transverse bulkhead in two cargo centre tanks (4) (see Note 1)	A minimum of 30% (see Note 3) of deck and bottom transverses including adjacent structural members, in each cargo centre tank (5) (see Note 1) Additional web frame ring(s) (1) (see Note 1), as considered necessary by the Surveyor	
<p>Note 1: (1), (2), (3), (4) and (5) are areas to be subjected to close-up surveys and thickness measurements according to Tab 4 (see Fig 1).</p> <p>(1) : Complete transverse web frame ring including adjacent structural member</p> <p>(2) : Deck transverse including adjacent deck structural members</p> <p>(3) : Transverse bulkhead complete, including girder system and adjacent structural members</p> <p>(4) : Transverse bulkhead lower part, including girder system and adjacent structural members</p> <p>(5) : Deck and bottom transverse, including adjacent structural members</p> <p>Note 2: Ballast tanks include peak tanks.</p> <p>Note 3: The 30% is to be rounded up to the next whole integer.</p>			

Figure 1 : Areas subject to close-up surveys and thickness measurements



6.2 Scope of survey

6.2.1 (1/1/2003)

In addition to the requirements of annual surveys, the class renewal survey is to include examination, tests and checks of sufficient extent to ensure that the hull and related piping, as required in [6.6.1] are in satisfactory condition and fit for their intended purpose for the new period of class to be assigned, subject to proper maintenance and operation and to periodical surveys being carried out at the due dates.

6.2.2 (1/7/2006)

All cargo tanks/holds, ballast tanks, including double bottom tanks, pump rooms, pipe tunnels, cofferdams and void spaces bounding cargo tanks/holds, decks and outer hull are to be examined, and this examination is to be supplemented by thickness measurement and testing required in [6.4] and [6.5], respectively, to ensure that the structural integrity remains effective. The aim of the examination is to discover substantial corrosion, significant deformation, fractures, damages or other structural deterioration that may be present.

6.2.3 The survey extent of ballast tanks converted to void spaces will be specially considered by the Society in relation to the requirements for ballast tanks.

6.2.4 (1/7/2010)

Where provided, the condition of the corrosion prevention system of cargo tanks is to be examined.

A ballast tank is to be examined at subsequent annual surveys (see Note 1) where:

- a hard protective coating has not been applied since the time of construction, or
- a soft or semi-hard coating has been applied, or
- substantial corrosion is found within the tank, or
- the hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the Surveyor.

Thickness measurements are to be carried out as deemed necessary by the Surveyor.

Note 1: The requirements related to the protective coating condition are to apply to ballast tanks whose coating condition will be assessed at the forthcoming class renewal survey and intermediate survey on or after 1 July 2006. For the assessment of the coating condition, reference is to be made to IACS Recommendation No.87 "Guidelines for Coating Maintenance & Repairs for Ballast Tanks and Combined Cargo / Ballast Tanks on Oil Tankers".

6.2.5 (1/7/2006)

The class renewal survey is to include a bottom survey in dry condition as laid down in Ch 3, Sec 6, [2.2.1].

The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo tanks and ballast tanks (see Note 1) are to be carried out in

accordance with the applicable requirements for class renewal surveys, if not already performed.

Note 1: Lower portions of the cargo and ballast tanks are considered to be the parts below the light ballast waterline.

6.3 Overall and close-up surveys

6.3.1 (1/7/2006)

Each class renewal survey is to include an overall survey of all tanks/holds and all spaces.

6.3.2 (1/7/2006)

The minimum requirements for close-up surveys at class renewal surveys are given in Tab 3.

6.3.3 (1/7/2006)

The Surveyor may extend the close-up survey as deemed necessary, taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and also in the following cases:

- where tanks have structural arrangements or details which have suffered defects in similar spaces or on similar ships according to available information
- where tanks have structures approved with reduced scantlings due to an approved corrosion control system.

6.3.4 (1/7/2006)

For areas in tanks where hard protective coatings are found to be in good condition, as defined in Ch 2, Sec 2, [2.2.13], the extent of close-up surveys required according to Tab 3 may be specially considered.

6.4 Thickness measurements

6.4.1 The minimum requirements for thickness measurements at class renewal survey are given in Tab 4.

6.4.2 (1/7/2006)

Provisions for extended measurements for areas with substantial corrosion are given in Tab 5 to Tab 8 and as may be additionally specified in the survey program as required in [6.1].

These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.

6.4.3 (1/7/2006)

The Surveyor may further extend the thickness measurements as deemed necessary.

6.4.4 When pitting is found on bottom plating and its intensity is 20% or more, thickness measurements are to be extended in order to determine the actual plate thickness out of the pits and the depth of the pits. Where the wastage is in the substantial corrosion range or the average depth of pitting is 1/3 or more of the actual plate thickness, the pitted plate is to be considered as a substantially corroded area.

Table 4 : Requirements for thickness measurements at class renewal survey of oil tankers and combination carriers (1/7/2006)

Age of ship (in years at time of class renewal survey)			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	age > 15
Suspect areas	Suspect areas	Suspect areas	Suspect areas
One section of deck plating for the full beam of the ship within the cargo area (in way of a ballast tank, if any, or a cargo tank used primarily for water ballast)	Within the cargo area: <ul style="list-style-type: none"> • each deck plate (1) • 1 transverse section (2) 	Within the cargo area: <ul style="list-style-type: none"> • each deck plate (1) • 2 transverse sections (2) (3) • all wind and water strakes 	Within the cargo area: <ul style="list-style-type: none"> • each deck plate (1) • 3 transverse sections (2) (3) • each bottom plate
Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Tab 3	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Tab 3	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Tab 3	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Tab 3
	Selected wind and water strakes outside the cargo area	Selected wind and water strakes outside the cargo area	All wind and water strakes, full length
<p>(1) For combination carriers only the deck plating outside line of cargo hold hatch openings is to be measured .</p> <p>(2) Transverse sections are to be chosen where the largest reductions are likely to occur or as revealed by deck plating measurements.</p> <p>(3) At least one section is to be within 0,5L amidships and, where applicable, in way of a ballast tank.</p>			

Table 5 : Requirements for extent of thickness measurements at those areas of substantial corrosion Class renewal survey of oil tankers and combination carriers within the cargo area

BOTTOM STRUCTURE		
Structural member	Extent of measurement	Pattern of measurement
Bottom plating	Minimum of 3 bays across tank, including aft bay Measurements around and under all suction bell mouths	5-point pattern for each panel between longitudinals and webs
Bottom longitudinals	Minimum of 3 longitudinals in each bay where bottom plating measured	3 measurements in line across flange and 3 measurements on vertical web
Bottom girders and brackets	At fore and aft transverse bulkhead, bracket toes and in centre of tanks	Vertical line of single measurements on web plating with one measurement between each panel stiffener, or a minimum of three measurements. Two measurements across face flat. 5-point pattern on girder/bulkhead brackets
Bottom transverse webs	3 webs in bays where bottom plating measured, with measurements at both ends and middle	5-point pattern over 2 square metre area. Single measurements on face flat
Panel stiffening	Where provided	Single measurements

Table 6 : Requirements for extent of thickness measurements at those areas of substantial corrosion Class renewal survey of oil tankers and combination carriers within the cargo area

DECK STRUCTURE		
Structural member	Extent of measurement	Pattern of measurement
Deck plating	Two bands across tank	Minimum of three measurements per plate per band
Deck longitudinals	Minimum of 3 longitudinals in each of two bays	3 measurements in line vertically on webs and 2 measurements on flange (if fitted)

DECK STRUCTURE		
Structural member	Extent of measurement	Pattern of measurement
Deck girders and brackets	At fore and aft transverse bulkhead, bracket toes and in centre of tanks	Vertical line of single measurements on web plating with one measurement between each panel stiffener, or a minimum of three measurements. Two measurements across face flat. 5-point pattern on girder/bulkhead brackets
Deck transverse webs	Minimum of 2 webs, with measurements at both ends and middle of span	5-point pattern over 2 square metre area. Single measurements on face flat
Panel stiffening	Where provided	Single measurements

**Table 7 : Requirements for extent of thickness measurements at those areas of substantial corrosion
Class renewal survey of oil tankers and combination carriers within the cargo area**

SIDE SHELL AND LONGITUDINAL BULKHEADS		
Structural member	Extent of measurement	Pattern of measurement
Deckhead and bottom strakes and strakes in way of stringer platforms	Plating between each pair of longitudinals in a minimum of 3 bays	Single measurement
All other strakes	Plating between every third pair of longitudinals in same 3 bays	Single measurement
Longitudinals on deckhead and bottom strakes	Each longitudinal in same 3 bays	3 measurements across web and 1 measurement on flange
All other longitudinals	Every third longitudinal in same 3 bays	3 measurements across web and 1 measurement on flange
Longitudinal brackets	Minimum of 3 at top, middle and bottom of tank in same 3 bays	5-point pattern over area of bracket
Web frames and cross ties	3 webs with minimum of three locations on each web, including in way of cross tie connections	5-point pattern over approximately 2 square metre area, plus single measurements on web frame and cross tie face flats

**Table 8 : Requirements for extent of thickness measurements at those areas of substantial corrosion
Class renewal survey of oil tankers and combination carriers within the cargo area**

TRANSVERSE BULKHEADS AND SWASH BULKHEADS		
Structural member	Extent of measurement	Pattern of measurement
Deckhead and bottom strakes, and strakes in way of stringer platforms	Plating between pair of stiffeners at three locations : approximately 1/4, 1/2 and 3/4 width of tank	5-point pattern between stiffeners over 1 metre length
All other strakes	Plating between pair of stiffeners at middle location	Single measurement
Strakes in corrugated bulkheads	Plating for each change of scantling at centre of panel and at flange of fabricated connection	5-point pattern over about 1 square metre of plating
Stiffeners	Minimum of three typical stiffeners	For web, 5-point pattern over span between bracket connections (2 measurements across web at each bracket connection and one at centre of span). For flange, single measurements at each bracket toe and at centre of span
Brackets	Minimum of three at top, middle and bottom of tank	5-point pattern over area of bracket

TRANSVERSE BULKHEADS AND SWASH BULKHEADS		
Structural member	Extent of measurement	Pattern of measurement
Deep webs and girders	Measurements at toe of bracket and at centre of span	For web, 5-point pattern over about 1 square metre. Three measurements across face flat
Stringer platforms	All stringers with measurements at both ends and middle	5-point pattern over 1 square metre of area plus single measurements near bracket toes and on face flats

6.4.5 (1/7/2006)

For areas in tanks where hard protective coatings are found to be in good condition as defined in Ch 2, Sec 2, [2.2.13], the extent of thickness measurements according to Tab 4 may be specially considered.

6.4.6 (1/7/2005)

Transverse sections are to be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements.

6.4.7 (1/7/2005)

In cases where two or three sections are to be measured, at least one is to include a ballast tank within 0,5L amidships.

In the case of oil tankers of 130 m in length and upwards (as defined in the International Convention on Load Lines in force) and more than 10 years of age, for the evaluation of the ship's longitudinal strength as required in [1.3.2], the sampling method of thickness measurements is given in Ch 2, App 4, [6].

6.5 Tank testing

6.5.1 (1/7/2016)

The minimum requirements for ballast tank testing at renewal survey are given in [6.5.3] and Tab 9.

The minimum requirements for cargo tank testing at renewal survey are given in [6.5.4] and Tab 8.

Cargo tank testing carried out by the vessel's crew under the direction of the Master may be accepted by the surveyor provided the following conditions are complied with:

- a) a tank testing procedure, specifying fill heights, tanks being filled and bulkheads being tested, has been submitted by the owner and reviewed by the Society prior to the testing being carried out;
- b) there is no record of leakage, distortion or substantial corrosion that would affect the structural integrity of the tank;
- c) the tank testing has been satisfactorily carried out within special survey window not more than 3 months prior to the date of the survey on which the overall or close up survey is completed;
- d) the satisfactory results of the testing are recorded in the vessel's logbook;
- e) the internal and external condition of the tanks and associated structure are found satisfactory by the surveyor at the time of the overall and close up survey.

6.5.2 The Surveyor may extend the tank testing as deemed necessary.

6.5.3 (1/7/2006)

Boundaries of ballast tanks are to be tested with a head of liquid to the top of air pipes.

6.5.4 (1/7/2006)

Boundaries of cargo tanks are to be tested to the highest point that liquid will rise to under service conditions.

Table 9 : Requirements for tank testing at class renewal survey of oil tankers and combination carriers (1/7/2006)

Age of ship (in years at time of class renewal survey)	
age ≤ 5	age > 5
All ballast tank boundaries	All ballast tank boundaries
Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, pump rooms or cofferdams	All cargo tank bulkheads

6.6 Cargo area and cargo pump rooms

6.6.1 (1/7/2013)

Cargo piping on deck, including crude oil washing (cow) piping, and cargo and ballast piping within the cargo area are to be examined and operationally tested to working pressure to the attending Surveyor's satisfaction to ensure that their tightness and condition remain satisfactory. Special attention is to be given to any ballast piping in cargo tanks and cargo piping in ballast tanks and void spaces. Surveyors are to be advised on all occasions when this piping,

including valves and fittings, is opened during repair periods and can be examined internally.

The Surveyor may require dismantling and/or thickness measurements of piping. A hydraulic test is to be carried out in the event of repair or dismantling or cargo, crude oil washing, or ballast piping, or where doubts arise.

It is to be confirmed that pipelines are electrically bonded to the hull or, alternatively, electrical resistance to the hull is to be verified.

6.6.2 All safety valves on cargo piping and of cargo tanks are to be dismantled for examination, adjusted and, as applicable, resealed.

6.6.3 All cargo pump room boundaries are to be generally examined. All gas-tight shaft sealing devices are to be examined. The bottom of cargo pump rooms is to be presented clean for the examination of stripping devices and gutters.

6.7 Emergency towing arrangement

6.7.1 The survey is to include:

- an examination of the emergency towing arrangement
- confirmation that the arrangement is readily available with aft towing arrangement pre-rigged and forward chafing gear secured to the strong-point
- an examination of the pick-up gear, towing pennant and chafing gear over the full length for possible deterioration. Where the pennant line is stored in a watertight condition and can be confirmed as being maintained, consideration may be given to waiving the requirement to examine the pennant line over the full length.
- an examination of the strong-points, fairleads and pedestal roller together with their attachments to the hull structure.

6.8 Survey Program

6.8.1 Basic information and particulars (1/1/2008)

Basic information and particulars of the ship are indicated in Tab 10.

6.8.2 Scope (1/1/2008)

The present survey program covers the minimum extent of overall surveys, close-up surveys, thickness measurements and pressure testing within the cargo area, of cargo tanks and ballast tanks, including fore and aft peak tanks, required by the Rules.

The arrangements and safety aspects of the survey are to be acceptable to the attending Surveyor(s).

6.8.3 Documentation (1/1/2008)

All documents used in the development of the survey program are to be available on board during the survey as required in [1.2].

6.8.4 Arrangement of tanks and spaces (1/1/2008)

This section of the survey program is to provide information (either in the form of plans or text) on the arrangement of tanks and spaces that fall within the scope of the survey.

6.8.5 List of tanks and spaces with information on their use, extent of coatings and corrosion protection system (1/1/2008)

This section of the survey program is to indicate any changes relating to (and is to update) the information on the

use of the tanks of the ship, the extent of coatings and the corrosion protective system provided in the Survey Planning Questionnaire referred to in [6.9].

6.8.6 Conditions for survey (1/1/2008)

This section of the survey program is to provide information on the conditions for survey, e.g. information regarding cargo tank cleaning, gas freeing, ventilation, lighting etc.

6.8.7 Provisions and methods of access to structures (1/1/2008)

This section of the survey program is to indicate any changes relating to (and is to update) the information on the provisions and methods of access to structures provided in the Survey Planning Questionnaire referred to in [6.9].

6.8.8 List of equipment for survey (1/1/2008)

This section of the survey program is to identify and list the equipment that will be made available for carrying out the survey and the required thickness measurements.

6.8.9 Survey requirements (1/1/2008)

a) Overall survey

This section of the survey program is to identify and list the spaces that are to undergo an overall survey for the ship in accordance with [6.3.1].

b) Close-up survey

This section of the survey program is to identify and list the hull structures that are to undergo a close-up survey for the ship in accordance with [6.3.2].

6.8.10 Identification of tanks for tank testing (1/1/2008)

This section of the survey program is to identify and list the tanks that are to undergo tank testing for the ship in accordance with [6.5].

6.8.11 Identification of areas and sections for thickness measurements (1/1/2008)

This section of the survey program is to identify and list the areas and sections where thickness measurements are to be taken in accordance with [6.4.1].

6.8.12 Minimum thickness of hull structures (1/1/2008)

This section of the survey program is to specify the minimum thickness for hull structures of the ship that are subject to the Rule requirements (indicate either (a) or preferably (b), if such information is available):

- a) determined from the attached wastage allowance table and the original thickness according to the hull structure plans of the ship (see Note 1);
- b) given in the following Tab 11.

Note 1: The wastage allowance tables are to be attached to the survey program.

Table 10 : Basic information and particulars (1/1/2019)

Name of ship:	
IMO number:	
Flag State:	
Port of registry:	
Gross tonnage:	
Deadweight (metric tonnes):	
Length between perpendiculars (m):	
Shipbuilder:	
Hull number:	
Classification Society:	
Register Number:	
Date of build of the ship:	
Owner:	
Thickness measurement firm:	
Any other information which may be useful	

Table 11 : As-built and minimum thickness for hull structures (1/1/2008)

Area or location	Original as-built thickness (mm)	Minimum thickness (mm)	Substantial corrosion thickness (mm)
Deck			
Plating			
Longitudinals			
Longitudinal girders			
Bottom			
Plating			
Longitudinals			
Longitudinal girders			
Ship side			
Plating			
Longitudinals			
Longitudinal girders			
Longitudinal bulkhead			
Plating			
Longitudinals			
Longitudinal girders			
Inner bottom			
Plating			
Longitudinals			

Area or location	Original as-built thickness (mm)	Minimum thickness (mm)	Substantial corrosion thickness (mm)
Longitudinal girders			
Transverse bulkheads			
Plating			
Stiffeners			
Transverse web frames, floors and stringers			
Plating			
Flanges			
Stiffeners			
Cross-ties			
Flanges			
Webs			

6.8.13 Thickness measurement firm (1/1/2019)

This section of the survey program is to identify changes, if any, relating to the information on the thickness measurement firm provided in the Survey Planning Questionnaire referred to [6.9].

6.8.14 Damage experience related to the ship (1/1/2008)

This section of the survey program, using Tab 12, shown below, is to provide details of the hull damage for at least the last three years in way of the cargo and ballast tanks and void spaces within the cargo area. This damage is subject to survey.

6.8.15 Areas identified with substantial corrosion from previous surveys (1/1/2008)

This section of the survey program is to identify and list the areas of substantial corrosion from previous surveys.

6.8.16 Critical structural areas and suspect areas (1/1/2008)

This section of the survey program is to identify and list the critical structural areas and the suspect areas, if such information is available.

6.8.17 Other relevant comments and information (1/1/2008)

This section of the survey program is to provide any other comments and information relevant to the survey.

Table 12 : Hull damage sorted by location for the ship concerned and for sister or similar ships (if available) in the case of design related damage (1/1/2008)

Tank or space number or area	Possible cause, if known	Description of the damage	Location	Repair	Date of repair

6.8.18 Appendices to be provided (1/1/2008)

The following appendices are to be attached to the survey program:

- a) Appendix 1 - List of plans
This appendix is to identify and list the main structural plans of cargo and ballast tanks (scantling drawings), including information regarding use of high tensile steel (HTS), as required in item 2 of the list in [6.1.3].
- b) Appendix 2 - Survey Planning Questionnaire
The Survey Planning Questionnaire (refer to [6.9]), which has been submitted by the Owner.
- c) Appendix 3 - Other documentation
This part of the survey program is to identify and list any other documentation that forms part of the plan.

6.8.19 Date and signature (1/1/2008)

The survey program is to be completed with the following wording:

Prepared by the owner in co-operation with the Society for compliance with [6.1.3] of Pt A, Ch 4, Sec 3 of the Rules.

Date:..... (name and signature of authorised Owner's representative)

Date:..... (name and signature of authorised representative of the Society)

6.9 Survey Planning Questionnaire

6.9.1 General (1/1/2008)

The following information will enable the Owner in co-operation with the Society to develop a survey program complying with the requirements given in [6.8]. It is essential that, when completing the present questionnaire, the Owner provides up-to-date information. The present questionnaire, when completed, is to provide all information and material required in [6.8].

6.9.2 Particulars (1/1/2008)

The particulars of the ship are indicated in Tab 13.

6.9.3 Information on access provision for close-up surveys and thickness measurement (1/1/2008)

The Owner is to indicate, in Tab 14, the means of access to the structures subject to close-up survey and thickness measurement. A close-up survey is an examination where the details of structural components are within the close visual inspection range of the attending Surveyor, i.e. normally within reach of hand.

6.9.4 History of cargo (1/1/2008)

The Owner is to provide history of cargo with H₂S content or heated cargo for the last three years together with indication as to whether cargo was heated and, where available, Material Safety Data Sheets (MSDS) (see Note 1)

Note 1: Refer to IMO Resolution MSC 150(77) on Recommendation for material safety data sheets for MARPOL Annex I cargoes and marine fuel oils.

6.9.5 Owner's inspections (1/1/2008)

Using a format similar to that of Tab 15 (which is given as an example), the Owner is to provide details of the results

of their inspections for the last 3 years on all cargo and ballast tanks and void spaces within the cargo area, including peak tanks.

6.9.6 Reports of Port State Control inspections (1/1/2008)

The Owner is to provide a list of any reports of Port State Control inspections containing hull structural related deficiencies and relevant information on rectification of the deficiencies.

6.9.7 Safety Management System (1/1/2008)

The Owner is to provide a list of any non-conformities related to hull maintenance, including the associated corrective actions.

6.9.8 Approved thickness measurement firm (1/1/2019)

The Owner is to provide the name and address of the approved thickness measurement firm.

6.9.9 Date and signature (1/1/2008)

The Survey Planning Questionnaire is to be completed with the date, the name of the Owner's representative responsible for filling in the document and his signature.

6.9.10 Availability of the form (1/1/2019)

An example of the "Survey Planning Questionnaire" form to be filled in by the Owner is available on the Society website.

7 Class renewal survey - Cargo machinery items

7.1 Cargo area and cargo pump rooms

7.1.1 Ballast and stripping pumps are to be internally examined and prime movers checked. A working test is to be carried out, as far as practicable.

Maintenance records of cargo pumps are to be made available to the Surveyor.

7.1.2 Where a crude oil washing system is fitted, piping, pumps, valves and deck-mounted washing machines are to be examined and tested for signs of leakage, and anchoring devices of deck-mounted washing machines are to be checked to the Surveyor's satisfaction.

7.1.3 The satisfactory condition of the cargo heating system is to be verified and, if deemed necessary by the Surveyor, the system is to be pressure tested.

7.1.4 An operating test of the remote control of pumps and valves and of automatic closing valves is to be carried out.

7.1.5 A general examination of the electrical equipment and cables in dangerous zones such as cargo pump rooms and areas adjacent to cargo tanks is to be carried out for defective and non-certified safe type electrical equipment and fixtures, non-approved lighting and fixtures, and improperly installed or defective or dead-end wiring.

The electrical insulation resistance of the electrical equipment and circuits terminating in or passing through the dangerous zones is to be tested; however, in cases where a proper record of testing is maintained, consideration may

be given to accepting recent test readings effected by the ship's personnel.

7.2 Inert gas system

7.2.1 In addition to the inspections required at the intermediate survey, the following is to be carried out:

a) an internal examination of:

- the inert gas generator, where fitted

- the scrubber
- the deck water seal including the non-return valve
- the pressure/vacuum breaking device
- the cooling water systems including overboard discharge from the scrubber
- all valves

b) a test to verify the proper operation of the system upon completion of all survey checks.

Table 13 : Particulars of the ship (1/1/2008)

Name of ship:	
IMO number:	
Flag State:	
Port of registry:	
Gross tonnage:	
Deadweight (metric tonnes):	
Classification Society:	
Register Number:	
Date of build:	
Owner:	

Table 14 : Means of access to hull structures (1/1/2008)

Tank No.	Structure	C (Cargo)/B (Ballast)	Temporary staging	Rafts	Ladders	Direct access	Other means (please specify)
Peaks	Fore Peak						
	Aft Peak						
Wing Tanks	Under deck						
	Side shell						
	Bottom transverse						
	Longitudinal						
	Transverse						
Centre Tanks	Under deck						
	Bottom transverse						
	Transverse						

Table 15 : Owner's inspection report (1/1/2008)

Tank No. / Other spaces	Corrosion protection (1)	Coating extent (2)	Coating condition (3)	Structural deterioration (4)	Tank damage his- tory (5)
Cargo centre tanks					
Cargo wing tanks					
Slop tanks					
Ballast tanks					
Aft peak					
Fore peak					
Miscellaneous spaces:					
<p>Note 1: Indicate tanks which are used for oil/ballast.</p> <p>(1) HC=hard coating; SC=soft coating; SH=semi-hard coating; NP=no protection</p> <p>(2) U=upper part; M=middle part; L=lower part; C=complete</p> <p>(3) G=good; F=fair; P=poor; RC=recoated (during the last three years)</p> <p>(4) N=no findings recorded; Y=findings recorded, description of findings is to be attached to the questionnaire</p> <p>(5) DR=damage and repair; L=leakages; CV= conversion (description is to be attached to this questionnaire)</p>					

SECTION 4

DOUBLE HULL OIL TANKERS

1 General

1.1 Application

1.1.1 (1/7/2011)

The requirements of this Section apply to all self-propelled ships which have been assigned one of the following service notations .

- **oil tanker ESP - double hull**
- **oil tanker ESP CSR.**

Self-propelled ships which have been assigned the service notation **oil tanker-double hull**, without integral cargo tanks and having independent cargo tanks within the hull, are to be surveyed, as far as applicable, according to the provisions given for ships having the service notation **liquefied gas carrier**, as far as hull surveys are concerned, as laid down in Sec 6.

1.1.2 (1/1/2003)

The requirements for hull surveys apply to the surveys of the hull structure and piping systems in way of cargo tanks, pump rooms, cofferdams, pipe tunnels and void spaces within the cargo area and all salt water ballast tanks. They are additional to the requirements applicable to the remainder of the ship, given in Chapter 3 according to the relevant surveys.

1.1.3 (1/1/2003)

The requirements contain the minimum extent of examination, thickness measurements and tank testing. When substantial corrosion, as defined in Ch 2, Sec 2, [2.2.9], and/or structural defects are found, the survey is to be extended and is to include additional close-up surveys when necessary.

1.1.4 (1/1/2019)

When, in any survey, thickness measurements are required:

- the procedure detailed in Ch 2, Sec 2, [2.3] is to be applied
- the thickness measurement firm is to be part of the survey planning meeting held prior to commencing the survey.

1.1.5 (1/1/2003)

For machinery surveys, the requirements given in Sec 3 apply.

1.2 Documentation on board

1.2.1 (1/7/2016)

The Owner is to supply and maintain documentation on board as specified in [1.2.2] and [1.2.3], which is to be readily available for examination by the Surveyor. The doc-

umentation is to be kept on board for the lifetime of the ship.

For tankers and bulk carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10, the Owner is to arrange the updating of the Ship Construction File (SCF) throughout the ship's life whenever a modification of the documentation included in the SCF has taken place. Documented procedures for updating the SCF are to be included within the Safety Management System.

1.2.2 (1/1/2003)

A survey report file is to be a part of the documentation on board consisting of:

- reports of structural surveys
- hull condition evaluation report (summarising the results of class renewal surveys)
- thickness measurement reports.

The survey report file is also to be available in the Owner's management office.

1.2.3 (1/7/2016)

The following additional supporting documentation is to be available on board:

- survey program, as required in [4.1], until such time as the class renewal survey or the intermediate survey, as applicable, has been completed
- main structural plans of cargo and ballast tanks (for CSR ships these plans are to include for each structural element both the as-built and renewal thickness. Any thickness for voluntary addition is also to be clearly indicated on the plans. The Midship Section plan to be supplied on board the ship is to include the minimum allowable hull girder sectional properties for the tank transverse section in all cargo tanks)
- previous repair history
- cargo and ballast history
- extent of use of inert gas system and tank cleaning procedures
- ship's personnel reports on:
 - structural deterioration/defects in general
 - leakage in bulkheads and piping systems
 - condition of coatings or corrosion prevention systems, if any
- any other information that may help to identify critical structural areas and/or suspect areas requiring inspection.

For double hull tankers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10, the Ship Construction File (SCF), limited to the items to be retained on board, is to be available on board.

1.2.4 (1/1/2018)

Prior to survey, the Surveyor examines the documentation on board and its contents, which are used as a basis for the survey.

For double hull tankers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10, on completion of the survey, the surveyor is to verify that the update of the Ship Construction File (SCF) has been done whenever a modification of the documentation included in the SCF has taken place.

For the SCF stored on board ship, the surveyor is to examine the information on board ship.

In cases where any major event, including, but not limited to, substantial repair and conversion, or any modification to the ship structures, the surveyor is to also verify that the updated information is kept on board the ship.

If the updating of the SCF onboard is not completed at the time of survey, the Surveyor records it and requires confirmation at the next periodical survey.

For the SCF stored on shore archive, the surveyor is to examine the list of information included on shore archive.

In cases where any major event, including, but not limited to, substantial repair and conversion, or any modification to the ship structures, the surveyor is to also verify that the updated information is stored on shore archive by examining the list of information included on shore archive or kept on board the ship.

In addition, the surveyor is to confirm that the service contract with of the Archive Center is valid.

If the updating of the SCF Supplement ashore is not completed at the time of survey, the Surveyor records it and requires confirmation at the next periodical survey.

For double hull tankers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10, on completion of the survey, the surveyor is to verify any addition and/or renewal of materials used for the construction of the hull structure are documented within the Ship Construction File list of materials.

1.3 Reporting and evaluation of surveys

1.3.1 (1/1/2003)

The data and information on the structural condition of the ship collected during survey are evaluated for acceptability and structural integrity of the ship's cargo area.

1.3.2 (1/7/2005)

In the case of oil tankers of 130 m in length and upwards (as defined in the International Convention on Load Lines in force), the ship's longitudinal strength is to be evaluated by using the thickness of structural members measured, renewed and reinforced, as appropriate, during the class renewal survey carried out after the ship reached 10 years of age in accordance with the criteria for longitudinal strength of the ship's hull girder for oil tankers specified in Ch 2, App 4.

The final result of evaluation of the ship's longitudinal strength required above, after renewal or reinforcement work of structural members, if carried out as a result of ini-

tial evaluation, is to be reported as a part of the condition evaluation report.

1.3.3 (1/7/2006)

For ships subject to the requirements of this Section, the surveys of hull structure and piping systems are reported in conformance to the Survey Reporting Principles laid down in App 1.

1.3.4 (1/1/2003)

A hull condition evaluation report (summarising the results of class renewal surveys) is issued by the Society to the Owner, who is to place it on board the ship for reference at future surveys. The hull condition evaluation report is endorsed by the Society.

2 Annual survey - Hull items

2.1

2.1.1 (1/1/2019)

The survey is to consist of an examination for the purpose of ensuring, as far as practicable, that the hull and piping are maintained in a satisfactory condition and is to take into account the service history, condition and extent of the corrosion prevention system of ballast tanks and areas identified in the survey report file.

2.2 Hull and weather decks

2.2.1 (1/1/2019)

The survey is to include:

- examination of the hull plating and its closing appliances as far as can be seen
- examination of watertight penetrations as far as practicable
- examination of cargo tank openings, including gaskets, covers, coamings and flame screens
- examination of cargo tank pressure/vacuum valves and flame screens
- examination of flame screens on vents to all bunker tanks
- examination of cargo, crude oil washing, bunker and vent piping systems, including vent masts and headers
- confirmation that wheelhouse doors and windows, side scuttles and windows in superstructure and deckhouse ends facing the cargo area are in satisfactory condition.

2.3 Cargo pump rooms and pipe tunnels

2.3.1 (1/1/2003)

The survey is to include:

- examination of all pump room bulkheads and pipe tunnels (if any) for signs of oil leakage or fractures and, in particular, the sealing arrangements of penetrations in these bulkheads
- examination of the condition of all piping systems in cargo pump rooms and pipe tunnels (if any)
- examination of the bilge and ballast arrangements.

2.4 Ballast tanks

2.4.1 (1/7/2010)

Ballast tanks are to be internally examined when required as a consequence of the results of the class renewal survey or the intermediate survey (see Note 1), in cases where:

- a) a hard protective coating has not been applied since the time of construction, or
- b) a soft or semi-hard coating has been applied, or
- c) substantial corrosion is found within the tank, or
- d) the hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the Surveyor.

Note 1: The requirements related to the protective coating condition are to apply to ballast tanks whose coating condition will be assessed at the forthcoming class renewal survey and intermediate survey on or after 1 July 2006. For the assessment of the coating condition, reference is to be made to IACS Recommendation No.87 "Guidelines for Coating Maintenance & Repairs for Ballast Tanks and Combined Cargo / Ballast Tanks on Oil Tankers".

2.4.2 (1/7/2012)

When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurements are to be carried out and if the results indicate that substantial corrosion is present, the extent of the measurements is to be increased in accordance with Tab 4 to Tab 8.

These extended thickness measurements are to be carried out before the survey is credited as completed.

Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.

For ships built under the Common Structural Rules, the identified substantial corrosion areas are required to be examined and additional thickness measurements are to be carried out.

2.4.3 (1/7/2011)

Confirmation is to be given that the corrosion prevention system fitted to dedicated ballast water tanks when appropriate is maintained.

2.5 Emergency towing arrangement

2.5.1 (1/1/2003)

The Owner or his representative is to declare to the attending Surveyor that no significant alterations have been made, without prior approval from the Society, to the equipment and arrangements fitted on board in accordance with the provisions given in Pt B, Ch 10, Sec 4, [4].

2.5.2 (1/1/2003)

The survey is to include:

- an examination, as far as practicable, of the emergency towing arrangement
- confirmation that the aft towing arrangement is pre-rigged and forward chafing gear is secured to the strong-point
- confirmation of the proper functioning of the light, where it is provided, on the pick-up gear marker buoy.

2.6 Means of access

2.6.1 (1/7/2011)

Confirmation is to be given, when appropriate and as far as is practicable when internal spaces are examined, that the means of access to cargo and other spaces remain in good condition.

2.7 Safe access to bow

2.7.1 (1/7/2011)

The access to bow arrangement is to be examined, as applicable.

3 Intermediate survey - Hull items

3.1 Weather decks

3.1.1 (1/7/2013)

The survey is to include:

- examination, as far as applicable, of cargo, crude oil washing, bunker, ballast, steam and vent piping systems as well as vent masts and headers. If upon examination there is any doubt as to the condition of the piping, pressure testing, thickness measurement or both may be required
- confirmation that pipelines are electrically bonded to the hull or, alternatively, verification of the electrical resistance to the hull
- examination of vent line drainage arrangements.

3.2 General

3.2.1 (1/7/2006)

The survey extent is dependent on the age of the ship as specified in [3.3] to [3.5] and shown in Tab 1.

3.2.2 (1/7/2012)

For ships built under the Common Structural Rules, the identified substantial corrosion areas are required to be examined and additional thickness measurements are to be carried out.

3.3 Ships between 5 and 10 years of age

3.3.1 (1/7/2006)

For tanks used for water ballast, an overall survey of representative tanks selected by the Surveyor is to be carried out. If such inspections reveal no visible structural defects, the examination may be limited to verification that the hard protective coating remains in good condition.

3.3.2 (1/7/2010)

A ballast tank is to be examined at subsequent annual surveys (see Note 1) where:

- a) a hard protective coating has not been applied since the time of construction, or
- b) a soft or semi-hard coating has been applied, or
- c) substantial corrosion is found within the tank, or
- d) the hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the Surveyor.

Note 1: The requirements related to the protective coating condition are to apply to ballast tanks whose coating condition will be assessed at the forthcoming class renewal survey and intermediate survey on or after 1 July 2006. For the assessment of the coating condition, reference is to be made to IACS Recommendation No.87 "Guidelines for Coating Maintenance & Repairs for Ballast Tanks and Combined Cargo / Ballast Tanks on Oil Tankers".

3.3.3 (1/7/2006)

In addition to the requirements above, suspect areas identified at previous surveys are to be examined.

3.4 Ships between 10 and 15 years of age

3.4.1 (1/7/2006)

The requirements of the intermediate survey are to be to the same extent as the previous class renewal survey as required in [4]. However, pressure testing of cargo and ballast tanks and the provisions for longitudinal strength of the hull girder as given in Ch 2, App 4, [6] are not required unless deemed necessary by the attending Surveyor.

3.4.2 (1/7/2006)

In application of [3.4.1], the intermediate survey may be commenced at the second annual survey and be progressed during the succeeding year with a view to completion at the third annual survey in lieu of application of Ch 2, Sec 2, [4.2.1].

3.4.3 (1/7/2006)

In application of [3.4.1], an underwater survey may be considered in lieu of the requirements of [4.2.5].

Table 1 : Minimum requirements for overall and close-up survey and thickness measurements at intermediate survey of double hull oil tankers (1/7/2016)

Age of ship (in years at time of intermediate survey due date)		
5 < age ≤ 10	10 < age ≤ 15	age > 15
Examination of representative ballast tanks selected by the Surveyor. See (1) and (2)	The requirements of the previous Renewal Survey. [3.4].	The requirements of the previous Renewal Survey. See [3.5].
Examination of suspect areas identified at previous surveys	The requirements of the previous Renewal Survey. See [3.4].	The requirements of the previous Renewal Survey. See [3.5].
<p>(1) When considered necessary by the Surveyor, thickness measurement and testing are to be carried out to ensure that the structural integrity remains effective</p> <p>(2) A ballast tank is to be examined at subsequent annual surveys (see Note 1) where:</p> <ul style="list-style-type: none"> • a hard protective coating has not been applied since the time of construction, or • a soft coating has been applied, or • substantial corrosion is found within the tank, or • the hard protective coating is found to be in less than good condition and the protective coating is not repaired to the satisfaction of the Surveyor. <p>Note 1: The requirements related to the protective coating condition are to apply to the ballast tanks whose coating condition will be assessed at the forthcoming class renewal survey and intermediate survey on or after 1 July 2006. For the assessment of the coating condition, reference is to be made to IACS Recommendation No.87 "Guidelines for Coating Maintenance & Repairs for Ballast Tanks and Combined Cargo / Ballast Tanks on Oil Tankers".</p>		

3.5 Ships exceeding 15 years of age

3.5.1 (1/7/2006)

The requirements of the intermediate survey are to be to the same extent as the previous class renewal survey as required in [4]. However, pressure testing of cargo and ballast tanks and the provisions for longitudinal strength of the hull girder as given in Ch 2, App 4, [6] are not required unless deemed necessary by the attending Surveyor.

3.5.2 (1/7/2006)

In application of [3.5.1], the intermediate survey may be commenced at the second annual survey and be progressed during the succeeding year with a view to completion at the

third annual survey in lieu of application of Ch 2, Sec 2, [4.2.1].

3.5.3 (1/7/2006)

In application of [3.5.1], a bottom survey in dry condition is to be part of the intermediate survey. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo tanks and ballast tanks (see Note 1) are to be carried out in accordance with the applicable requirements for intermediate surveys, if not already performed.

Note 1: Lower portions of the cargo and ballast tanks are considered to be the parts below the light ballast waterline.

4 Class renewal survey - Hull items

4.1 Survey program and preparation for hull survey

4.1.1 (1/1/2008)

The Owner, in co-operation with the Society, is to work out a specific survey program prior to the commencement of any part of:

- the class renewal survey
- the intermediate survey for double hull oil tankers over 10 years of age.

Prior to the development of the survey program, the Survey Planning Questionnaire is to be completed by the Owner based on the information set out in [4.9], and forwarded to the Society.

The survey program is to be in a written format, based on the information in [4.8]. The survey is not to commence until the survey program has been agreed. The survey program at intermediate surveys may consist of the survey program at the previous class renewal survey supplemented by the condition evaluation report of that class renewal survey and later relevant survey reports.

The survey program is to be worked out taking into account any amendments to the survey requirements implemented after the last class renewal survey carried out.

4.1.2 (1/1/2019)

In developing the survey program, the following documentation is to be collected and consulted with a view to selecting tanks, areas and structural elements to be examined:

- a) survey status and basic ship information;
- b) documentation on board, as described in [1.2.2] and [1.2.3]
- c) main structural plans of cargo and ballast tanks (scantling drawings), including information regarding use of high tensile steels (HTS);
- d) Executive Hull Summary (or Conditional Evaluation Report);
- e) relevant previous damage and repair history;
- f) relevant previous survey and inspection reports from both the recognised organisation and the Owner;
- g) cargo and ballast history for the last 3 years, including carriage of cargo under heated conditions;
- h) details of the inert gas plant and tank cleaning procedures;
- i) information and other relevant data regarding conversion or modification of the ship's cargo and ballast tanks since the time of construction;
- j) description and history of the coating and corrosion protection system (including previous class notations), if any;
- k) inspections by the Owner's personnel during the last 3 years with reference to structural deterioration in general, leakages in tank boundaries and piping, and condition of the coating and corrosion protection system, if any (guidance for reporting is shown in Tab 15);

- l) information regarding the relevant maintenance level during operation including Port State Control reports of inspection containing hull related deficiencies, Safety Management System non-conformities relating to hull maintenance, including the associated corrective action(s); and

- m) any other information that will help identify suspect areas and critical structural areas.

4.1.3 (1/1/2019)

The submitted survey program is to take account of and comply with at least the requirements for close-up surveys, thickness measurements and tank testing given in Tab 2, Tab 3 and [4.5], respectively. In addition, the survey program is to include at least:

- a) basic ship information and particulars;
- b) main structural plans (scantling drawings), including information regarding use of high tensile steels (HTS);
- c) plan of tanks
- d) list of tanks with information on use, corrosion prevention and condition of coating;
- e) conditions for survey (e.g. information regarding tank cleaning, gas freeing, ventilation, lighting etc);
- f) provisions and methods for access to structures;
- g) equipment for surveys;
- h) nomination of tanks and areas for close-up survey (see [4.3]);
- i) nomination of sections for thickness measurement (see [4.4]);
- j) nomination of tanks for tank testing (see [4.5]);
- k) identification of the thickness measurement firm;
- l) damage experience related to the ship in question;
- m) critical structural areas and suspect areas, where relevant.

4.1.4 (1/1/2003)

The survey program is also to include the maximum acceptable structural corrosion diminution levels applicable to the ship. The Society will advise the Owner of this information.

4.1.5 (1/1/2003)

In addition, the survey program is to include proposals on how to conduct surveys and tests in a safe and practical way, including the means of providing access to structures for close-up survey, thickness measurements and tank testing. All other provisions described in Ch 2, Sec 2, [2.3], Ch 2, Sec 2, [2.5], Ch 2, Sec 2, [2.7], Ch 2, Sec 2, [2.8] and Ch 2, Sec 2, [2.10] regarding procedures for thickness measurements, conditions for survey, access to structures, equipment for survey and survey at sea or at anchorage, respectively, are also to be complied with.

4.1.6 Survey Planning Meeting (1/1/2019)

Proper preparation and close co-operation between the attending Surveyor(s) and the Owner's representatives on board prior to and during the survey are an essential part in the safe and efficient conduct of the survey. During the survey on board safety meetings are to be held regularly.

Prior to the commencement of any part of the renewal and intermediate survey, a survey planning meeting is to be held between the attending Surveyor(s), the Owner's representative in attendance, the thickness measurement firm representative, where involved, and the Master of the ship or an appropriately qualified representative appointed by the Master or Company for the purpose of ascertaining that all the arrangements envisaged in the survey program are in place, so as to ensure the safe and efficient conduct of the survey work to be carried out. Refer also to Ch 2, Sec 2, [2.3.1].

The following is an indicative list of items that are to be addressed in the meeting:

- a) schedule of the ship (i.e. the voyage, docking and undocking manoeuvres, periods alongside, cargo and ballast operations etc);
- b) provisions and arrangements for thickness measurements (i.e. access, cleaning/de-scaling, illumination, ventilation, personal safety);
- c) extent of the thickness measurements;
- d) acceptance criteria (refer to the list of minimum thicknesses);
- e) extent of close-up survey and thickness measurement considering the coating condition and suspect areas/areas of substantial corrosion;
- f) execution of thickness measurements;
- g) taking representative readings in general and where uneven corrosion/pitting is found;
- h) mapping of areas of substantial corrosion; and
- i) communication between the attending Surveyor(s), the thickness measurement firm operator(s) and the Owner's Representative(s) concerning findings.

4.2 Scope of survey

4.2.1 (1/1/2003)

In addition to the requirements of annual surveys, the class renewal survey is to include examination, tests and checks of sufficient extent to ensure that the hull and related piping, as required in [4.6.1], are in satisfactory condition and are fit for their intended purpose for the new period of class to be assigned, subject to proper maintenance and operation and to periodical surveys being carried out at the due dates.

4.2.2 (1/1/2008)

All cargo tanks, ballast tanks, including double bottom tanks, pump rooms, pipe tunnels, cofferdams and void spaces bounding cargo tanks, decks and outer hull are to be examined, and this examination is to be supplemented by thickness measurement and testing required in [4.4] and [4.5], respectively, to ensure that the structural integrity remains effective. The aim of the examination is to discover substantial corrosion, significant deformation, fractures, damage or other structural deterioration that may be present.

4.2.3 (1/1/2003)

The survey extent of ballast tanks converted to void spaces will be specially considered by the Society in relation to the requirements for ballast tanks.

4.2.4 (1/7/2010)

Where provided, the condition of the corrosion prevention system of cargo tanks is to be examined.

A ballast tank is to be examined at subsequent annual surveys (see Note 1) where:

- a) a hard protective coating has not been applied since the time of construction, or
- b) a soft or semi-hard coating has been applied, or
- c) substantial corrosion is found within the tank, or
- d) the hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the Surveyor.

Thickness measurements are to be carried out as deemed necessary by the Surveyor.

Note 1: The requirements related to the protective coating condition are to apply to the ballast tanks whose coating condition will be assessed at the forthcoming class renewal survey and intermediate survey on or after 1 July 2006. For the assessment of the coating condition, reference is to be made to IACS Recommendation No.87 "Guidelines for Coating Maintenance & Repairs for Ballast Tanks and Combined Cargo / Ballast Tanks on Oil Tankers".

4.2.5 (1/7/2006)

The class renewal survey is to include a bottom survey in dry condition as laid down in Ch 3, Sec 6, [2.2.1].

The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo tanks and ballast tanks (see Note 1) are to be carried out in accordance with the applicable requirements for class renewal surveys, if not already performed.

Note 1: Lower portions of the cargo and ballast tanks are considered to be the parts below the light ballast waterline.

4.3 Overall and close-up surveys

4.3.1 (1/7/2006)

Each class renewal survey is to include an overall survey of all tanks and spaces.

4.3.2 (1/7/2006)

The minimum requirements for close-up surveys at class renewal surveys are given in Tab 2.

4.3.3 (1/1/2003)

The Surveyor may extend the close-up survey as deemed necessary, taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and also in the following cases:

- where tanks have structural arrangements or details which have suffered defects in similar spaces or on similar ships according to available information
- where tanks have structures approved with reduced scantlings due to an approved corrosion control system.

4.3.4 (1/7/2006)

For areas in tanks where hard protective coatings are found to be in good condition, as defined in Ch 2, Sec 2, [2.2.13], the extent of close-up surveys required according to Tab 2 may be specially considered.

4.4 Thickness measurements

4.4.1 (1/1/2003)

The minimum requirements for thickness measurements at class renewal survey are given in Tab 3.

4.4.2 (1/7/2012)

Provisions for extended measurements for areas with substantial corrosion are given in Tab 4 to Tab 8 and as may be additionally specified in the survey program as required in [4.1].

These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect Areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.

For ships built under the Common Structural Rules, the identified substantial corrosion areas are required to be examined and additional thickness measurements are to be carried out at annual and intermediate surveys.

Table 2 : Requirements for close-up survey at class renewal survey of double hull oil tankers (1/1/2019)

Age of ship (in years at time of class renewal survey)			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	age > 15
One web frame (1) (see Note 1), in a ballast tank (see Note 2)	All web frames (1) (see Note 1), in a ballast tank (see Note 2) The knuckle area and the upper part (approximately 5 metres) of one web frame in each remaining ballast tank (6) (see Note 1)	All web frames (1) (see Note 1), in all ballast tanks	As for class renewal survey for age from 10 to 15 years Additional transverse areas as deemed necessary by the Society
One deck transverse, in a cargo oil tank (2) (see Note 1)	One deck transverse, in two cargo oil tanks (2) (see Note 1)	All web frames (7 (see Note 1)), including deck transverse and cross ties, if fitted, in a cargo oil tank One web frame (7) (see Note 1), including deck transverse and cross ties, if fitted, in each remaining cargo oil tank	

Note 1: (1), (2), (3), (4), (5), (6) and (7) are areas to be subjected to close-up surveys and thickness measurements according to Tab 3 (see Fig 1 and Fig 2)

(1) : "Web frame" in a ballast tank means vertical web in side tank, hopper web in hopper tank, floor in double bottom tank and deck transverse in double deck tank (where fitted), including adjacent structural members. In fore and aft peak tanks, "web frame" means a complete transverse web frame ring including adjacent structural members

(2) : Deck transverse, including adjacent deck structural members (or external structure on deck in way of the tank, where applicable)

(3) : Transverse bulkhead complete in cargo tanks, including girder system, adjacent structural members (such as longitudinal bulkheads) and internal structure of lower and upper stools, where fitted

(4) : Transverse bulkhead complete in ballast tanks, including girder system and adjacent structural members, such as longitudinal bulkheads, girders in double bottom tanks, inner bottom plating, hopper side, connecting brackets

(5) : Transverse bulkhead lower part in cargo tank, including girder system, adjacent structural members (such as longitudinal bulkheads) and internal structure of lower stool, where fitted

(6) : The knuckle area and the upper part (approximately 5 metres), including adjacent structural members. Knuckle area is the area of the web frame around the connections of the slope hopper plating to the inner hull bulkhead and the inner bottom plating, up to 2 metres from the corners both on the bulkhead and the double bottom

(7) : Web frame in a cargo oil tank means deck transverse, longitudinal bulkhead structural elements and cross ties, where fitted, including adjacent structural members

Note 2: Ballast tank: apart from the fore and aft peak tanks, the term "ballast tank" has the following meaning:

- all ballast compartments (hopper tank, side tank and double-deck tank, if separate from double-bottom tank) located on one side, i.e. portside or starboard side, and additionally double-bottom tank on portside plus starboard side, when the longitudinal central girder is not watertight and, therefore, the double-bottom tank is a unique compartment from portside to starboard side; or
- all ballast compartments (double-bottom tank, hopper tank, side tank and double-deck tank) located on one side, i.e. portside or starboard side, when the longitudinal central girder is watertight and, therefore, the portside double-bottom tank separate from the starboard-side double-bottom tank.

Note 3: Where no centre cargo tanks are fitted (as in the case of centre longitudinal bulkhead), transverse bulkheads in wing tanks are to be surveyed.

Age of ship (in years at time of class renewal survey)			
One transverse bulkhead (4) (see Note 1), in a ballast tank (see Note 2)	One transverse bulkhead (4) (see Note 1), in each ballast tank (see Note 2)	All transverse bulkheads, in all cargo oil (3) (see Note 1) and ballast (4) (see Note 1) tanks	
One transverse bulkhead (5) (see Note 1) in a cargo oil centre tank One transverse bulkhead (5) (see Note 1), in a cargo oil wing tank (see Note 3)	One transverse bulkhead (5) (see Note 1), in two cargo oil centre tanks One transverse bulkhead (5) (see Note 1), in a cargo oil wing tank (see Note 3)		
<p>Note 1: (1), (2), (3), (4), (5), (6) and (7) are areas to be subjected to close-up surveys and thickness measurements according to Tab 3 (see Fig 1 and Fig 2)</p> <p>(1) : "Web frame" in a ballast tank means vertical web in side tank, hopper web in hopper tank, floor in double bottom tank and deck transverse in double deck tank (where fitted), including adjacent structural members. In fore and aft peak tanks, "web frame" means a complete transverse web frame ring including adjacent structural members</p> <p>(2) : Deck transverse, including adjacent deck structural members (or external structure on deck in way of the tank, where applicable)</p> <p>(3) : Transverse bulkhead complete in cargo tanks, including girder system, adjacent structural members (such as longitudinal bulkheads) and internal structure of lower and upper stools, where fitted</p> <p>(4) : Transverse bulkhead complete in ballast tanks, including girder system and adjacent structural members, such as longitudinal bulkheads, girders in double bottom tanks, inner bottom plating, hopper side, connecting brackets</p> <p>(5) : Transverse bulkhead lower part in cargo tank, including girder system, adjacent structural members (such as longitudinal bulkheads) and internal structure of lower stool, where fitted</p> <p>(6) : The knuckle area and the upper part (approximately 5 metres), including adjacent structural members. Knuckle area is the area of the web frame around the connections of the slope hopper plating to the inner hull bulkhead and the inner bottom plating, up to 2 metres from the corners both on the bulkhead and the double bottom</p> <p>(7) : Web frame in a cargo oil tank means deck transverse, longitudinal bulkhead structural elements and cross ties, where fitted, including adjacent structural members</p> <p>Note 2: Ballast tank: apart from the fore and aft peak tanks, the term "ballast tank" has the following meaning:</p> <ul style="list-style-type: none"> • all ballast compartments (hopper tank, side tank and double-deck tank, if separate from double-bottom tank) located on one side, i.e. portside or starboard side, and additionally double-bottom tank on portside plus starboard side, when the longitudinal central girder is not watertight and, therefore, the double-bottom tank is a unique compartment from portside to starboard side; or • all ballast compartments (double-bottom tank, hopper tank, side tank and double-deck tank) located on one side, i.e. portside or starboard side, when the longitudinal central girder is watertight and, therefore, the portside double-bottom tank separate from the starboard-side double-bottom tank. <p>Note 3: Where no centre cargo tanks are fitted (as in the case of centre longitudinal bulkhead), transverse bulkheads in wing tanks are to be surveyed.</p>			

Table 3 : Requirements for thickness measurements at class renewal survey of double hull oil tankers (1/7/2006)

Age of ship (in years at time of class renewal survey)			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	age > 15
One section of deck plating for the full beam of the ship within the cargo area	Within the cargo area: <ul style="list-style-type: none"> • each deck plate • one transverse section (1) 	Within the cargo area: <ul style="list-style-type: none"> • each deck plate • two transverse sections (1) (2) • all wind and water strakes 	Within the cargo area: <ul style="list-style-type: none"> • each deck plate • three transverse sections (1) (2) • each bottom plate
	Selected wind and water strakes outside the cargo area	Selected wind and water strakes outside the cargo area	All wind and water strakes, full length
Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up Survey according to Tab 2	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up Survey according to Tab 2	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up Survey according to Tab 2	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up Survey according to Tab 2
Suspect areas	Suspect areas	Suspect areas	Suspect areas
(1) transverse sections are to be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements			
(2) at least one section should be within 0,5L amidships			

Table 4 : Requirements for extent of thickness measurements at those areas of substantial corrosion on double hull oil tankers within the cargo area length (1/1/2003)

BOTTOM, INNER BOTTOM AND HOPPER STRUCTURE		
Structural member	Extent of measurement	Pattern of measurement
Bottom, inner bottom and hopper structure plating	Minimum of three bays across double bottom tank, including aft bay Measurements around and under all suction bell mouths	5-point pattern for each panel between longitudinals and floors
Bottom, inner bottom and hopper structure longitudinals	Minimum of three longitudinals in each bay where bottom plating measured	Three measurements in line across flange and three measurements on vertical web
Bottom girders, including the watertight ones	At fore and aft watertight floors and in centre of tanks	Vertical line of single measurements on girder plating with one measurement between each panel stiffener, or a minimum of three measurements
Bottom floors, including the watertight ones	Three floors in bays where bottom plating measured, with measurements at both ends and middle	5-point pattern over two square metre area
Hopper structure web frame ring	Three floors in bays where bottom plating measured	5-point pattern over one square metre of plating. Single measurements on flange
Hopper structure transverse watertight bulkhead or swash bulkhead	• lower 1/3 of bulkhead	• 5-point pattern over one square metre of plating
	• upper 2/3 of bulkhead	• 5-point pattern over two square metre of plating
	• stiffeners (minimum of three)	• For web, 5-point pattern over span (two measurements across web at each end and one at centre of span). For flange, single measurements at each end and centre of span
Panel stiffening	Where applicable	Single measurements

Table 5 : Requirements for extent of thickness measurements at those areas of substantial corrosion on double hull oil tankers within the cargo area length (1/1/2003)

DECK STRUCTURE		
Structural member	Extent of measurement	Pattern of measurement
Deck plating	Two transverse bands across tank	Minimum of three measurements per plate per band
Deck longitudinals	Every third longitudinal in each of two bands with a minimum of one longitudinal	Three measurements in line vertically on webs and two measurements on flange (if fitted)
Deck girders and brackets (usually in cargo tanks only)	At fore and aft transverse bulkhead, bracket toes and in centre of tanks	Vertical line of single measurements on web plating with one measurement between each panel stiffener, or a minimum of three measurements. Two measurements across flange. 5-point pattern on girder/bulkhead brackets
Deck transverse webs	Minimum of two webs, with measurements at both ends and middle of span	5-point pattern over one square metre area. Single measurements on flange
Vertical web and transverse bulkhead in wing ballast tank (two metres from deck)	Minimum of two webs, and both transverse bulkheads	5-point pattern over one square metre area
Panel stiffening	Where applicable	Single measurements

Table 6 : Requirements for extent of thickness measurements at those areas of substantial corrosion on double hull oil tankers within the cargo area length (1/1/2003)

STRUCTURE IN WING BALLAST TANKS		
Structural member	Extent of measurement	Pattern of measurement
Side shell and longitudinal bulkhead plating: <ul style="list-style-type: none"> • upper strake and strakes in way of horizontal girders • all other strakes 	<ul style="list-style-type: none"> • Plating between each pair of longitudinals in a minimum of three bays (along the tank) • Plating between every third pair of longitudinals in same three bays 	<ul style="list-style-type: none"> • Single measurement • Single measurement
Side shell and longitudinal bulkhead longitudinals on: <ul style="list-style-type: none"> • upper strake • all other strakes 	<ul style="list-style-type: none"> • Each longitudinal in same three bays • Every third longitudinal in same three bays 	<ul style="list-style-type: none"> • 3 measurements across web and 1 measurement on flange
Longitudinals - brackets	Minimum of three at top, middle and bottom of tank in same three bays	5-point pattern over area of bracket
Vertical web and transverse bulkheads (excluding deckhead area): <ul style="list-style-type: none"> • strakes in way of horizontal girders • other strakes 	<ul style="list-style-type: none"> • Minimum of two webs and both transverse bulkheads • Minimum of two webs and both transverse bulkheads 	<ul style="list-style-type: none"> • 5-point pattern over approx. two square metre area • two measurements between each pair of vertical stiffeners
Horizontal girders	Plating on each girder in a minimum of three bays	Two measurements between each pair of longitudinal girder stiffeners
Panel stiffening	Where applicable	Single measurements

Table 7 : Requirements for extent of thickness measurements at those areas of substantial corrosion on double hull oil tankers within the cargo area length (1/1/2003)

LONGITUDINAL BULKHEADS IN CARGO TANKS		
Structural member	Extent of measurement	Pattern of measurement
Deckhead and bottom strakes, and strakes in way of the horizontal stringers of transverse bulkheads	Plating between each pair of longitudinals in a minimum of three bays	Single measurement
All other strakes	Plating between every third pair of longitudinals in same three bays	Single measurement
Longitudinals on deckhead and bottom strakes	Each longitudinal in same three bays	Three measurements across web and one measurement on flange
All other longitudinals	Every third longitudinal in same three bays	Three measurements across web and one measurement on flange
Longitudinals - brackets	Minimum of three at top, middle and bottom of tank in same three bays	5-point pattern over area of bracket
Web frames and cross ties	Three webs with minimum of three locations on each web, including in way of cross tie connections	5-point pattern over approximately two square metre area of webs, plus single measurements on flanges of web frame and cross ties
Lower end brackets (opposite side of web frame)	Minimum of three brackets	5-point pattern over approximately two square metre area of brackets, plus single measurements on bracket flanges

Table 8 : Requirements for extent of thickness measurements at those areas of substantial corrosion on double hull oil tankers within the cargo area length (1/1/2003)

TRANSVERSE WATERTIGHT AND SWASH BULKHEADS IN CARGO TANKS		
Structural member	Extent of measurement	Pattern of measurement
Upper and lower stool, where fitted	<ul style="list-style-type: none"> • Transverse band within 25mm of welded connection to inner bottom/deck plating • Transverse band within 25mm of welded connection to shelf plate 	5-point pattern between stiffeners over one metre length
Deckhead and bottom strakes, and strakes in way of horizontal stringers	Plating between pair of stiffeners at three locations : approximately 1/4, 1/2 and 3/4 width of tank	5-point pattern between stiffeners over one metre length
All other strakes	Plating between pair of stiffeners at middle location	Single measurement
Strakes in corrugated bulkheads	Plating for each change of scantling at centre of panel and at flange of fabricated connection	5-point pattern over about one square metre of plating
Stiffeners	Minimum of three typical stiffeners	For web, 5-point pattern over span between bracket connections (two measurements across web at each bracket connection and one at centre of span). For flange, single measurements at each bracket toe and at centre of span
Brackets	Minimum of three at top, middle and bottom of tank	5-point pattern over area of bracket
Horizontal stringers	All stringers with measurements at both ends and middle	5-point pattern over one square metre area, plus single measurements near bracket toes and on flanges

4.4.3 (1/7/2006)

The Surveyor may further extend the thickness measurements as deemed necessary.

4.4.4 (1/1/2016)

For ships not built under the Common Structural Rules, when pitting is found on bottom plating and its intensity is 20% or more, thickness measurements are to be extended in order to determine the actual plate thickness out of the pits and the depth of the pits. Where the wastage is in the substantial corrosion range or the average depth of pitting is 1/3 or more of the actual plate thickness, the pitted plate is to be considered as a substantially corroded area.

For ships built under the Common Structural Rules, the acceptance criteria for pitting is:

- according to Section 12 of the Common Structural Rules for Oil Tankers and as specified in Ch 2, App 3, [4.2.2] for ships contracted for construction on or after 1 April 2006 but before 1 July 2015, or
- according to Ch 2, App 3, [4.2.2] for ships contracted for construction on or after 1 July 2015.

4.4.5 (1/7/2006)

For areas in tanks where hard protective coatings are found to be in good condition as defined in Ch 2, Sec 2, [2.2.13], the extent of thickness measurements according to Tab 3 may be specially considered.

4.4.6 (1/7/2005)

Transverse sections are to be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements.

4.4.7 (1/7/2005)

In cases where two or three sections are to be measured, at least one is to include a ballast tank within 0,5L amidships.

In the case of oil tankers of 130 m in length and upwards (as defined in the International Convention on Load Lines in force) and more than 10 years of age, for the evaluation of the ship's longitudinal strength as required in [1.3.2], the sampling method of thickness measurements is given in Ch 2, App 4, [6].

4.5 Tank testing

4.5.1 (1/7/2016)

The minimum requirements for ballast tank testing at Special Survey are given in [4.5.3] and Tab 9.

The minimum requirements for cargo tank testing at Special Survey are given in [4.5.4] and Tab 9.

Cargo tank testing carried out by the vessel's crew under the direction of the Master may be accepted by the surveyor provided the following conditions are complied with:

- a) a tank testing procedure, specifying fill heights, tanks being filled and bulkheads being tested, has been submitted by the owner and reviewed by the Society prior to the testing being carried out;
- b) there is no record of leakage, distortion or substantial corrosion that would affect the structural integrity of the tank;
- c) the tank testing has been satisfactorily carried out within special survey window not more than 3 months prior to

the date of the survey on which the overall or close up survey is completed;

- d) the satisfactory results of the testing are recorded in the vessel's logbook; surveyor at the time of the overall and close up survey's logbook;

- e) the internal and external condition of the tanks and associated structure are found satisfactory by the surveyor at the time of the overall and close up survey.

4.5.2 (1/1/2003)

The Surveyor may extend the tank testing as deemed necessary.

4.5.3 (1/7/2006)

Boundaries of ballast tanks are to be tested with a head of liquid to the top of air pipes.

4.5.4 (1/7/2006)

Boundaries of cargo tanks are to be tested to the highest point that liquid will rise to under service conditions.

4.5.5 (1/7/2006)

The testing of double bottom tanks and other spaces not designed for the carriage of liquid may be omitted, provided a satisfactory internal examination is carried out together with an examination of the tank top.

4.6 Cargo area and cargo pump rooms

4.6.1 (1/7/2013)

Cargo piping on deck, including crude oil washing (COW) piping, and cargo and ballast piping within the cargo area are to be examined and operationally tested to working pressure to the attending Surveyor's satisfaction to ensure that their tightness and condition remain satisfactory. Where provided, special attention is to be given to any ballast piping in cargo tanks and any cargo piping in ballast tanks and void spaces.

Surveyors are to be advised on all occasions when this piping, including valves and fittings, is opened during repair periods and can be examined internally.

The Surveyor may require dismantling and/or thickness measurements of piping. A hydraulic test is to be carried out in the event of repair or dismantling of cargo, crude oil washing, or ballast piping, or where doubts arise.

It is to be confirmed that pipelines are electrically bonded to the hull or, alternatively, electrical resistance to the hull is to be verified.

4.6.2 (1/1/2003)

All safety valves on cargo piping and of cargo tanks are to be dismantled for examination, adjusted and, as applicable, resealed.

4.6.3 (1/1/2003)

All cargo pump room boundaries are to be generally examined. All gas-tight shaft sealing devices are to be examined. The bottom of cargo pump rooms is to be presented clean for the examination of stripping devices and gutters.

4.7 Emergency towing arrangement

4.7.1 (1/1/2003)

The survey is to include:

- an examination of the emergency towing arrangement
- confirmation that the arrangement is readily available with aft towing arrangement pre-rigged and forward chafing gear secured to the strong-point
- an examination of the pick-up gear, towing pennant and chafing gear over the full length for possible deteriora-

tion. Where the pennant line is stored in a watertight condition and can be confirmed as being maintained, consideration may be given to waiving the requirement to examine the pennant line over the full length

- an examination of the strong-points, fairleads and pedestal roller together with their attachments to the hull structure.

Table 9 : Requirements for tank testing at class renewal survey of double hull oil tankers (1/7/2006)

Age of ship (in years at time of class renewal survey)	
age ≤ 5	age > 5
All ballast tank boundaries	All ballast tank boundaries
Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, pump rooms or cofferdams	All cargo tank bulkheads

Figure 1 : Close-up survey requirements for double hull tankers, areas (1) to (5) (1/1/2003)

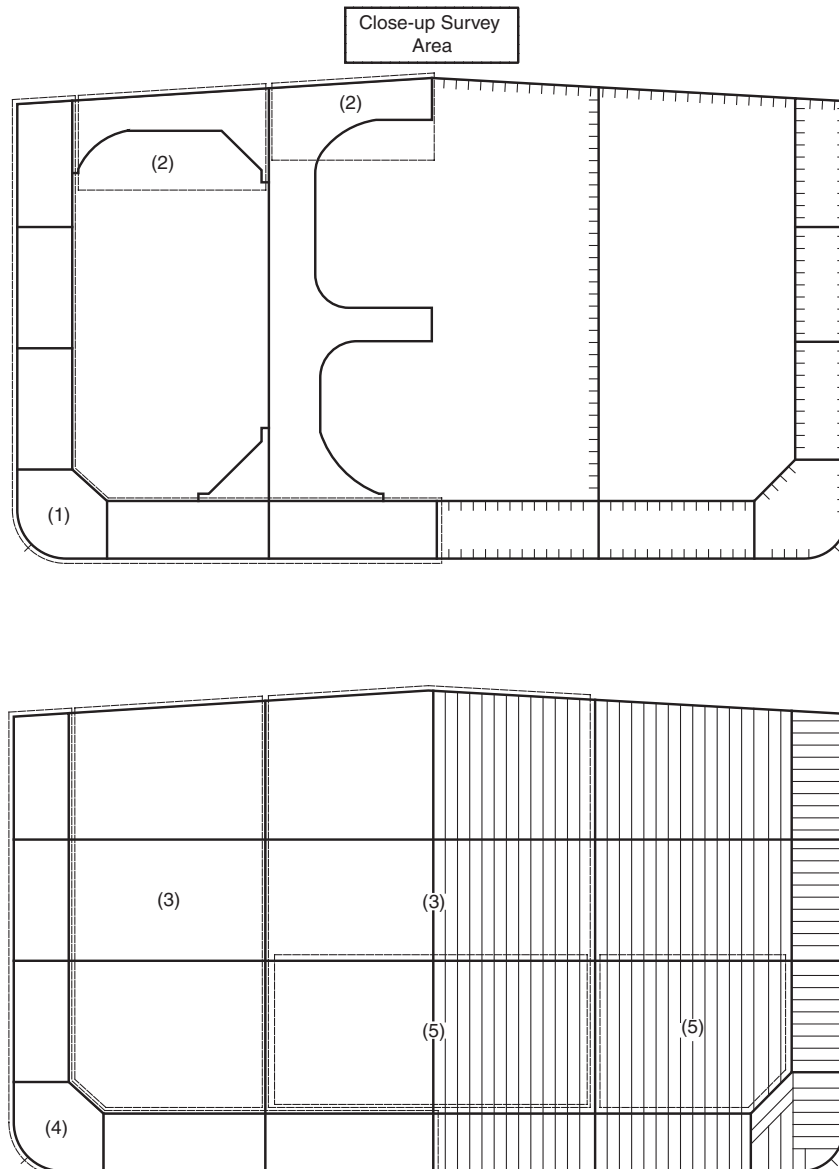
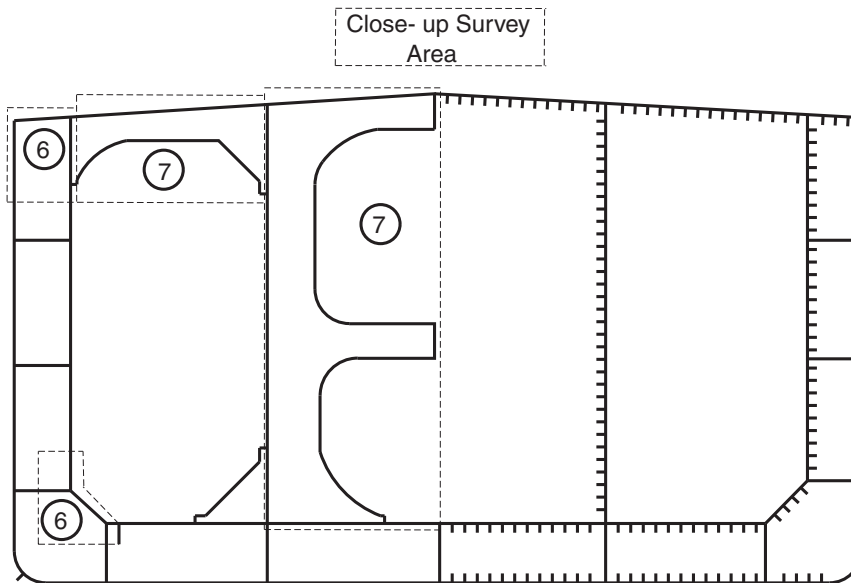


Figure 2 : Close-up survey requirements for double hull tankers, areas (6) and (7) (1/1/2003)



4.8 Survey Program

4.8.1 Basic information and particulars (1/1/2008)

Basic information and particulars of the ship are indicated in Tab 10.

Table 10 : Basic information and particulars (1/1/2019)

Name of ship:	
IMO number:	
Flag State:	
Port of registry:	
Gross tonnage:	
Deadweight (metric tonnes):	
Length between perpendiculars (m):	
Shipbuilder:	
Hull number:	
Classification Society:	
Register Number:	
Date of build:	
Owner:	
Thickness measurement firm:	
Any other information which may be useful	

4.8.2 Scope (1/1/2008)

The present survey program covers the minimum extent of overall surveys, close-up surveys, thickness measurements and pressure testing within the cargo area, of cargo tanks and ballast tanks, including fore and aft peak tanks, required by the Rules.

The arrangements and safety aspects of the survey are to be acceptable to the attending Surveyor(s).

4.8.3 Documentation (1/1/2008)

All documents used in the development of the survey program are to be available on board during the survey as required in [1.2].

4.8.4 Arrangement of tanks and spaces (1/1/2008)

This section of the survey program is to provide information (either in the form of plans or text) on the arrangement of tanks and spaces that fall within the scope of the survey.

4.8.5 List of tanks and spaces with information on their use, extent of coatings and corrosion protection system (1/1/2008)

This section of the survey program is to indicate any changes relating to (and is to update) the information on the use of the tanks of the ship, the extent of coatings and the corrosion protective system provided in the Survey Planning Questionnaire referred to in [4.9].

4.8.6 Conditions for survey (1/1/2008)

This section of the survey program is to provide information on the conditions for survey, e.g. information regarding cargo tank cleaning, gas freeing, ventilation, lighting, etc.

4.8.7 Provisions and methods of access to structures (1/1/2008)

This section of the survey program is to indicate any changes relating to (and is to update) the information on the provisions and methods of access to structures provided in the Survey Planning Questionnaire referred to in [4.9].

4.8.8 List of equipment for survey (1/1/2008)

This section of the survey program is to identify and list the equipment that will be made available for carrying out the survey and the required thickness measurements.

4.8.9 Survey requirements (1/1/2008)

- a) Overall survey
This section of the survey program is to identify and list the spaces that are to undergo an overall survey for the ship in accordance with [4.3.1].
- b) Close-up survey
This section of the survey program is to identify and list the hull structures that are to undergo a close-up survey for the ship in accordance with [4.3.2].

4.8.10 Identification of tanks for tank testing (1/1/2008)

This section of the survey program is to identify and list the tanks that are to undergo tank testing for the ship in accordance with [4.5].

4.8.11 Identification of areas and sections for thickness measurements (1/1/2008)

This section of the survey program is to identify and list the areas and sections where thickness measurements are to be taken in accordance with [4.4.1].

4.8.12 Minimum thickness of hull structures (1/1/2008)

This section of the survey program is to specify the minimum thickness for hull structures of the ship that are subject to the Rule requirements (indicate either (a) or preferably (b), if such information is available):

- a) determined from the attached wastage allowance table and the original thickness according to the hull structure plans of the ship (see Note 1);
- b) given in the Tab 11.

Note 1: The wastage allowance tables are to be attached to the survey program.

Table 11 : As-built and minimum thickness for hull structures (1/1/2008)

Area or location	Original as-built thickness (mm)	Minimum thickness (mm)	Substantial corrosion thickness (mm)
Deck			
Plating			
Longitudinals			
Longitudinal girders			
Bottom			
Plating			
Longitudinals			
Longitudinal girders			
Ship side			
Plating			
Longitudinals			

Area or location	Original as-built thickness (mm)	Minimum thickness (mm)	Substantial corrosion thickness (mm)
Longitudinal girders			
Longitudinal bulkhead			
Plating			
Longitudinals			
Longitudinal girders			
Inner bottom			
Plating			
Longitudinals			
Longitudinal girders			
Transverse bulkheads			
Plating			
Stiffeners			
Transverse web frames, floors and stringers			
Plating			
Flanges			
Stiffeners			
Cross-ties			
Flanges			
Webs			

4.8.13 Thickness measurement firm (1/1/2019)

This section of the survey program is to identify changes, if any, relating to the information on the thickness measurement firm provided in the Survey Planning Questionnaire referred to in [4.9].

4.8.14 Damage experience related to the ship (1/1/2008)

This section of the survey program, using Tab 12, is to provide details of the hull damage for at least the last three years in way of the cargo and ballast tanks and void spaces within the cargo area. This damage is subject to survey.

Table 12 : Hull damage sorted by location for the ship concerned and for sister or similar ships (if available) in the case of design related damage (1/1/2008)

Tank or space number or area	Possible cause, if known	Description of the damage	Location	Repair	Date of repair

4.8.15 Areas identified with substantial corrosion from previous surveys (1/1/2008)

This section of the survey program is to identify and list the areas of substantial corrosion from previous surveys.

4.8.16 Critical structural areas and suspect areas (1/1/2008)

This section of the survey program is to identify and list the critical structural areas and the suspect areas, if such information is available.

4.8.17 Other relevant comments and information (1/1/2008)

This section of the survey program is to provide any other comments and information relevant to the survey.

4.8.18 Appendices to be provided (1/1/2008)

The following appendices are to be attached to the survey program:

a) Appendix 1 - List of plans

This appendix is to identify and list the main structural plans of cargo and ballast tanks (scantling drawings), including information regarding use of high tensile steel (HTS), as required in item 2 of the list in [4.1.3].

b) Appendix 2 - Survey Planning Questionnaire

The Survey Planning Questionnaire (refer to [4.9]), which has been submitted by the Owner.

c) Appendix 3 - Other documentation

This part of the survey program is to identify and list any other documentation that forms part of the plan.

4.8.19 Date and signature (1/1/2008)

The survey program is to be completed with the following wording:

Prepared by the owner in co-operation with the Society for compliance with [4.1.3] of Pt A, Ch 4, Sec 4 of the Rules.

Date:..... (name and signature of authorised Owner's representative)

Date:..... (name and signature of authorised representative of the Society)

4.9 Survey Planning Questionnaire**4.9.1 General (1/1/2008)**

The following information will enable the Owner in co-operation with the Society to develop a survey program complying with the requirements given in [4.8]. It is essential that, when completing the present questionnaire, the Owner provides up-to-date information. The present questionnaire, when completed, is to provide all information and material required in [4.8].

4.9.2 Particulars (1/1/2008)

The particulars of the ship are indicated in Tab 13.

4.9.3 Information on access provision for close-up surveys and thickness measurement (1/1/2008)

The Owner is to indicate, in Tab 14, the means of access to the structures subject to close-up survey and thickness measurement. A close-up survey is an examination where the details of structural components are within the close visual inspection range of the attending Surveyor, i.e. normally within reach of hand.

4.9.4 History of cargo (1/1/2008)

The Owner is to provide history of cargo with H₂S content or heated cargo for the last three years together with indication as to whether cargo was heated and, where available, Material Safety Data Sheets (MSDS) (see Note 1)

Note 1: Refer to IMO Resolution MSC 150(77) on Recommendation for material safety data sheets for MARPOL Annex I cargoes and marine fuel oils.

4.9.5 Owner's inspections (1/1/2008)

Using a format similar to that of Tab 15 (which is given as an example), the Owner is to provide details of the results of their inspections for the last 3 years on all cargo and ballast tanks and void spaces within the cargo area, including peak tanks.

4.9.6 Reports of Port State Control inspections (1/1/2008)

The Owner is to provide a list of any reports of Port State Control inspections containing hull structural related deficiencies and relevant information on rectification of the deficiencies.

4.9.7 Safety Management System (1/1/2008)

The Owner is to provide a list of any non-conformities related to hull maintenance, including the associated corrective actions.

4.9.8 Approved thickness measurement firm (1/1/2019)

The Owner is to provide the name and address of the approved thickness measurement firm.

4.9.9 Date and signature (1/1/2008)

The Survey Planning Questionnaire is to be completed with the date, the name of the Owner's representative responsible for filling in the document and his signature.

4.9.10 Availability of the form (1/1/2008)

An example of the "Survey Planning Questionnaire" form to be filled in by the Owner is available on the Society website or may be supplied upon request; application may be made to: tankers@rina.org.

Table 13 : Particulars of the ship (1/1/2008)

Name of ship:	
IMO number:	
Flag State:	
Port of registry:	
Gross tonnage:	
Deadweight (metric tonnes):	
Classification Society:	
Register Number:	
Date of build:	
Owner:	

Table 14 : Means of access to hull structures (1/1/2008)

Tank No.	Structure	C (Cargo)/B (Ballast)	Temporary staging	Rafts	Ladders	Direct access	Other means (please specify)
Peaks	Fore Peak						
	Aft Peak						
Wing Tanks	Under deck						
	Side shell						
	Bottom transverse						
	Longitudinal						
	Transverse						
Centre Tanks	Under deck						
	Bottom transverse						
	Transverse						

Table 15 : Owner's inspection report (1/1/2008)

Tank No. / Other spaces	Corrosion protection (1)	Coating extent (2)	Coating condition (3)	Structural deterioration (4)	Tank damage his- tory (5)
Cargo centre tanks					
Cargo wing tanks					
Slop tanks					
Ballast tanks					
Aft peak					
Fore peak					
Miscellaneous spaces:					
<p>Note 1: Indicate tanks which are used for oil/ballast.</p> <p>(1) HC=hard coating; SC=soft coating; SH=semi-hard coating; NP=no protection</p> <p>(2) U=upper part; M=middle part; L=lower part; C=complete</p> <p>(3) G=good; F=fair; P=poor; RC=recoated (during the last three years)</p> <p>(4) N=no findings recorded; Y=findings recorded, description of findings is to be attached to the questionnaire</p> <p>(5) DR=damage and repair; L=leakages; CV= conversion (description is to be attached to this questionnaire)</p>					

SECTION 5

CHEMICAL TANKERS

1 General

1.1 Application

1.1.1 (1/7/2011)

The requirements of this Section apply to all self-propelled ships which have been assigned the service notation **chemical tanker ESP**.

Self-propelled ships which have been assigned the service notation **chemical tanker**, without integral cargo tanks and having independent cargo tanks within the hull, are to be surveyed, as far as applicable, according to the provisions given for ships having the service notation **liquefied gas carrier**, as far as hull surveys are concerned, as laid down in Sec 6.

1.1.2 The requirements for hull surveys apply to the surveys of the hull structure and piping systems in way of cargo tanks, pump rooms, cofferdams, pipe tunnels and void spaces within the cargo area and all salt water ballast tanks. These requirements, however, do not apply to independent tanks on deck. They are additional to the requirements applicable to the remainder of the ship, given in Chapter 3 according to the relevant surveys.

1.1.3 The requirements contain the minimum extent of examination, thickness measurements and tank testing. When substantial corrosion, as defined in Ch 2, Sec 2, [2.2.9], and/or structural defects are found, the survey is to be extended and is to include additional close-up surveys when necessary.

1.1.4 (1/1/2019)

When, in any survey, thickness measurements are required :

- the procedure detailed in Ch 2, Sec 2, [2.3] is to be applied
- the thickness measurement firm is to be part of the survey planning meeting held prior to commencing the survey.

1.1.5 (1/1/2019)

When close-up surveys are required, consideration may be given by the Surveyor to allow the use of Remote Inspection Techniques (RIT), according to the provisions of Ch 2, Sec 2, [2.3.3] and Ch 2, Sec 2, [2.6].

1.1.6 The requirements for machinery surveys apply to surveys of the machinery and equipment in the cargo area or dedicated to cargo service systems and are additional to those given in Chapter 3 for all ships.

1.2 Documentation on board

1.2.1 General (1/1/2010)

The Owner is to obtain, supply and maintain documentation on board as specified in [1.2.2] and [1.2.3], which is to be readily available for examination by the Surveyor. The

documentation is to be kept on board for the lifetime of the ship.

1.2.2 Survey Report File

A survey report file is to be a part of the documentation on board consisting of:

- reports of structural surveys
- hull condition evaluation report (summarising the results of class renewal surveys)
- thickness measurement reports.

The survey report file is also to be available in the Owner's management office.

1.2.3 Supporting documents (1/1/2010)

The following additional supporting documentation is to be available on board:

- survey program, as required in [6.1], until such time as the class renewal survey or the intermediate survey, as applicable, has been completed
- main structural plans of cargo and ballast tanks
- previous repair history
- cargo and ballast history
- extent of use of inert gas system and tank cleaning procedures
- ship's personnel reports on:
 - structural deterioration/defects in general
 - leakage in bulkheads and piping systems
 - condition of coatings or corrosion prevention systems, if any
- any other information that may help to identify critical structural areas and/or suspect areas requiring inspection.

1.2.4 Prior to survey, the Surveyor examines the documentation on board and its contents, which are used as a basis for the survey.

1.3 Reporting and evaluation of surveys

1.3.1 The data and information on the structural condition of the ship collected during survey are evaluated for acceptability and structural integrity of the ship's cargo area.

1.3.2 (1/7/2006)

For ships subject to the requirements of this Section, the surveys of hull structure and piping systems are reported in conformance to the Survey Reporting Principles laid down in App 1.

1.3.3 A hull condition evaluation report (summarising the results of class renewal surveys) is issued by the Society to the Owner, who is to place it on board the ship for refer-

ence at future surveys. The hull condition evaluation report is endorsed by the Society.

2 Annual survey - Hull items

2.1

2.1.1 (1/1/2019)

The survey is to consist of an examination for ensuring, as far as practicable, that the hull and piping are maintained in a satisfactory condition and is to take into account the service history, condition and extent of the corrosion prevention system of ballast tanks and areas identified in the survey report file.

2.2 Hull and weather decks

2.2.1 (1/1/2019)

The survey is to include:

- examination of the hull plating and its closing appliances as far as can be seen
- examination of watertight penetrations as far as practicable.
- examination of cargo tank openings, including gaskets, covers, coamings and flame screens
- examination, as far as practicable, of the cargo tank vent system, including the pressure/vacuum valves and secondary means to prevent overpressure or underpressure as well as devices to prevent the passage of flame
- examination of flame screens on vents to all bunker tanks
- examination of cargo, bunker, vent piping systems, including vent masts and headers
- confirmation that wheelhouse doors and windows, sidescuttles and windows in superstructure and deckhouse ends facing the cargo area are in satisfactory condition
- confirmation that pumps, valves and pipelines are identified and distinctively marked.

2.3 Cargo pump rooms and pipe tunnels

2.3.1 The survey is to include:

- examination of all pump room bulkheads and pipe tunnels (if any) for signs of chemical cargo leakage or fractures and, in particular, the sealing arrangements of penetrations in pump room bulkheads
- examination of the condition of all piping systems, in cargo pump rooms and pipe tunnels (if any)
- examination of the bilge and ballast arrangements and confirmation that pumps and pipelines are identified.

2.4 Ballast tanks

2.4.1 (1/7/2010)

Ballast tanks are to be internally examined when required as a consequence of the results of the class renewal survey or the intermediate survey (see Note 1), in cases where:

- a) a hard protective coating has not been applied since the time of construction, or
- b) a soft or semi-hard coating has been applied, or
- c) substantial corrosion is found within the tank, or
- d) the hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the Surveyor.

Note 1: The requirements related to the protective coating condition are to apply to ballast tanks whose coating condition will be assessed at the forthcoming class renewal survey and intermediate survey on or after 1 July 2006. For the assessment of the coating condition, reference is to be made to IACS Recommendation No.87 "Guidelines for Coating Maintenance & Repairs for Ballast Tanks and Combined Cargo / Ballast Tanks on Oil Tankers".

2.4.2 (1/7/2006)

When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurements are to be carried out and if the results indicate that substantial corrosion is present, the extent of the measurements is to be increased in accordance with Tab 5 to Tab 8.

These extended thickness measurements are to be carried out before the survey is credited as completed.

Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to have thickness measurements taken.

2.5 Emergency towing arrangement

2.5.1 The Owner or his representative is to declare to the attending Surveyor that no significant alterations have been made, without prior approval from the Society, to the equipment and arrangements fitted on board in accordance with the provisions given in Pt B, Ch 10, Sec 4, [4].

2.5.2 The survey is to include:

- an examination, as far as practicable, of the emergency towing arrangement
- confirmation that the aft towing arrangement is pre-rigged and forward chafing gear is secured to the strong-point
- confirmation of the proper functioning of the light, where it is provided, on the pick-up gear marker buoy.

2.6 Safe access to bow

2.6.1 (1/7/2011)

The access to bow arrangement is to be examined, as applicable.

3 Annual survey - Cargo machinery items

3.1 Cargo area and cargo pump rooms

3.1.1 (1/7/2011)

The Owner or his representative is to declare to the attending Surveyor that no modifications or alterations which might impair safety have been made to the various installations in dangerous zones without prior approval from the Society.

The survey is to include:

- confirmation that potential sources of ignition in or near the cargo pump rooms, such as loose gear, excessive product in bilge, excessive vapours, combustible materials, etc., are eliminated and that access ladders are in satisfactory condition
- examination, as far as practicable, of cargo, bilge, ballast and stripping pumps for excessive gland seal leakage, verification of proper operation of electrical and mechanical remote operating and shutdown devices and operation of the pump room bilge system, and checking that pump foundations are intact
- confirmation that the ventilation system, including portable equipment, if any, of all spaces in the cargo area (including cargo pump rooms) is operational, ducting is intact and screens are clean
- confirmation that electrical equipment in dangerous zones, cargo pump rooms and other spaces is in satisfactory condition and has been properly maintained
- confirmation that the remote operation of the cargo pump room bilge system is satisfactory
- confirmation that cargo pump room rescue arrangements are in order
- examination, as far as practicable, and confirmation of the satisfactory operation of the arrangements for the ventilation of spaces normally entered during cargo handling operations and other spaces in the cargo area
- confirmation that removable pipe lengths or other approved equipment necessary for cargo separation are available and in satisfactory condition
- examination, when applicable, of the cargo heating or cooling systems, including any sampling arrangements, and confirmation that the means for measuring the temperature and associated alarms are operating satisfactorily
- examination of the cargo transfer arrangements and confirmation that any hoses are suitable for their intended purpose and, where appropriate, type approved or marked with the date of testing
- confirmation that any special arrangement made for bow or stern loading/unloading is in satisfactory condition and test of the means of communications and the remote shutdown for the cargo pumps
- confirmation that, if applicable, the provisions made for chemical products which have special requirements as per Pt E, Ch 8, Sec 15 are satisfactory.

3.2 Instrumentation and safety devices

3.2.1 (1/7/2011)

The survey is to include the following items, as far as required or fitted:

- confirmation that installed pressure gauges on cargo discharge lines are properly operational
- examination of gauging devices, high level alarms and valves associated with overflow control
- confirmation that devices provided for measuring the temperature of the cargo and associated alarms operate satisfactorily
- confirmation that the required gas detection instruments are on board and satisfactory arrangements have been made for the supply of any required vapour detection tubes
- confirmation that the cargo sample stowage arrangements are in satisfactory condition
- confirmation that the system for continuous monitoring of the concentration of flammable vapours is in satisfactory condition
- confirmation that the system for continuous monitoring of the concentration of flammable vapours is in satisfactory condition
- confirmation, as far as practicable, that the intrinsically safe systems and circuits used for measurement, monitoring, control and communication purposes in all hazardous locations are being properly maintained
- confirmation that sampling points or detector heads are located in suitable positions in order that potentially dangerous leakages are readily detected.

3.3 Inert gas system and inert/padding/drying gas

3.3.1 If an inert gas system such as that installed on board oil tankers is fitted, the requirements given in Sec 3, [3.3] are to be complied with.

3.3.2 If an inert gas system consisting of a gas container package is fitted, arrangements are to be made for sufficient inert or padding gas to be carried to compensate for normal losses and means are to be provided for monitoring of ullage spaces.

3.3.3 If drying gas is necessary to supply the cargo spaces, arrangements are to be made for sufficient drying gas to be carried to compensate for normal losses and means are to be provided for monitoring of ullage spaces.

3.3.4 When drying agents are used on air inlets to cargo tanks, it is to be verified that arrangements are made for sufficient medium to be carried.

3.4 Steering capability

3.4.1 (1/7/2011)

Confirmation is to be given, when appropriate, that the requisite arrangements to regain steering capability in the event of the prescribed single failure are being maintained.

4 Intermediate survey - Hull items

4.1 Weather decks

4.1.1 The survey is to include:

- examination, as far as applicable, of cargo, stripping, cargo washing, bunker, ballast, steam and vent piping systems as well as vent masts and headers. If upon examination there is any doubt as to the condition of the piping, pressure testing, thickness measurement or both may be required
- confirmation that the pipelines and independent cargo tanks, where applicable, are electrically bonded to the hull
- examination of vent line drainage arrangements.

4.2 General

4.2.1 (1/7/2006)

The survey extent is dependent on the age of the ship as specified in [4.3] to [4.5].

4.3 Ships between 5 and 10 years of age

4.3.1 (1/7/2006)

For tanks used for water ballast, an overall survey of representative tanks selected by the Surveyor is to be carried out. If such inspections reveal no visible structural defects, the examination may be limited to verification that the hard protective coating remains in good condition.

4.3.2 (1/7/2010)

A ballast tank is to be examined at subsequent annual surveys (see Note 1) where:

- a hard protective coating has not been applied since the time of construction, or
- a soft or semi-hard coating has been applied, or
- substantial corrosion is found within the tank, or
- the hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the Surveyor.

Note 1: The requirements related to the protective coating condition are to apply to the ballast tanks whose coating condition will be assessed at the forthcoming class renewal survey and intermediate survey on or after 1 July 2006.

For the assessment of the coating condition, reference is to be made to IACS Recommendation No.87 "Guidelines for Coating Maintenance & Repairs for Ballast Tanks and Combined Cargo / Ballast Tanks on Oil Tankers".

4.3.3 (1/7/2006)

In addition to the requirements above, suspect areas identified at previous surveys are to be examined.

4.4 Ships between 10 and 15 years of age

4.4.1 (1/7/2006)

The requirements of the intermediate survey are to be to the same extent as the previous class renewal survey as required in [6]. However, pressure testing of cargo and ballast tanks is not required unless deemed necessary by the attending Surveyor.

4.4.2 (1/7/2006)

In application of [4.4.1], the intermediate survey may be commenced at the second annual survey and be progressed during the succeeding year with a view to completion at the third annual survey in lieu of application of Ch 2, Sec 2, [4.2.1].

4.4.3 (1/7/2006)

In application of [4.4.1], an underwater survey may be considered in lieu of the requirements of [6.2.7].

4.5 Ships over 15 years of age

4.5.1 (1/7/2006)

The requirements of the intermediate survey are to be to the same extent as the previous class renewal survey as required in [6]. However, pressure testing of cargo and ballast tanks is not required unless deemed necessary by the attending Surveyor.

4.5.2 (1/7/2006)

In application of [4.5.1], the intermediate survey may be commenced at the second annual survey and be progressed during the succeeding year with a view to completion at the third annual survey in lieu of application of Ch 2, Sec 2, [4.2.1].

4.5.3 (1/7/2006)

In application of [4.5.1], a bottom survey in dry condition is to be part of the intermediate survey. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo tanks and ballast tanks (see Note 1) are to be carried out in accordance with the applicable requirements for intermediate surveys, if not already performed.

Note 1: Lower portions of the cargo and ballast tanks are considered to be the parts below the light ballast waterline.

5 Intermediate survey - Cargo machinery items

5.1 Cargo area and cargo pump rooms

5.1.1 A general examination of the electrical equipment and cables in dangerous zones such as cargo pump rooms and areas adjacent to cargo tanks is to be carried out for defective and non-certified safe type electrical equipment, non-approved lighting and fixtures, and improperly installed or defective or dead-end wiring.

5.1.2 The electrical insulation resistance of the electrical equipment and circuits terminating in or passing through the dangerous zones is to be tested; however, in cases where a proper record of testing is maintained, consideration may be given to accepting recent test readings effected by the ship's personnel.

5.1.3 The satisfactory condition of the cargo heating/cooling system is to be verified.

5.2 Inert gas system

5.2.1 For ships over 10 years old at the time of the intermediate survey due date, if an inert gas system such as that

installed on board oil tankers is fitted, the requirements given in Sec 3, [5.2] for intermediate survey of oil tankers are to be complied with.

5.2.2 For ships over 10 years old at the time of the intermediate survey due date and fitted with another type of inert gas producing system, the main parts such as the inert gas generator, deck water seal or equivalent back flow arrangement, segregation devices, as fitted are to be overhauled for examination and alarms are to be tested.

Inert gas producer isolating valves, when fitted, are to be dismantled for examination.

6 Class renewal survey - Hull items

6.1 Survey program and preparation for hull survey

6.1.1 (1/1/2010)

The Owner, in co-operation with the Society, is to work out a specific survey program prior to the commencement of any part of:

- the class renewal survey
- the intermediate survey for chemical tanker over 10 years of age.

The survey program at intermediate surveys may consist of the survey program at the previous class renewal survey supplemented by the condition evaluation report of that class renewal survey and later relevant survey reports.

The survey program is to be worked out taking into account any amendments to the survey requirements implemented after the last class renewal survey carried out.

The survey program is to be in a written format based on the information in [6.8].

Prior to the development of the survey program, the Survey Planning Questionnaire is to be completed by the Owner based on the information set out in [6.9], and forwarded to the Society.

6.1.2 (1/1/2019)

In developing the survey program, the following documentation is to be collected and consulted with a view to selecting tanks, areas and structural elements to be examined:

- a) survey status and basic ship information
- b) information included in the documentation on board, as described in [1.2.2] and [1.2.3]
- c) main structural plans of cargo and ballast tanks (scantling drawings), including information on use of high tensile steels (HTS) and stainless steels
- d) Condition Evaluation Report or Executive Hull Summary
- e) relevant previous damage and repair history
- f) relevant previous survey and inspection reports from both the Society and the Owner
- g) information on the use of ship tanks, typical cargoes and other relevant data

- h) details of the inert gas plant and tank cleaning procedures
- i) information and other relevant data regarding conversion or modification of the ship's cargo and ballast tanks since the time of construction
- j) description and history of the coating and corrosion protection system (previous class notations), if any
- k) inspections by the Owner's personnel during the last 3 years with reference to structural deterioration in general, leakages in tank boundaries and piping, and condition of the coating and corrosion protection system, if any (guidance for reporting is shown in Tab 1)
- l) information regarding the relevant maintenance level during operation, including Port State Control reports of inspection containing hull related deficiencies, Safety Management System non-conformities relating to hull maintenance, including the associated corrective action(s); and
- m) any other information that will help identify suspect areas and critical structural areas.

6.1.3 (1/1/2019)

The survey program is to take account of and comply, at least, with the requirements for close-up surveys, thickness measurements, tank testing and pipe testing given in Tab 3, Tab 4, [6.5] and [6.6.3], respectively. In addition, the survey program is to include at least:

- a) basic ship information and particulars
- b) main structural plans (scantling drawings), including information on the use of high tensile steels (HTS), clad steels and stainless steels
- c) plan of tanks
- d) list of tanks including information on their use, corrosion prevention and condition of coating
- e) conditions for survey, with regard to tanks and spaces which are to be safe for access, i.e. cleaned, gas freed, ventilated and illuminated
- f) provisions and methods for access to structures
- g) equipment for surveys
- h) nomination of tanks, spaces and areas for close-up surveys according to [6.3]
- i) nomination of sections and areas for thickness measurements according to [6.4]
- j) nomination of tanks for tank testing according to [6.5]; and the pipes that are to undergo pipe testing according to [6.6.3]
- k) identification of the thickness measurement firm
- l) damage experience related to the ship in question
- m) critical structural areas and suspect areas, where relevant.

6.1.4 The survey program is also to include the maximum acceptable structural corrosion diminution levels applicable to the ship. The Society will advise the Owner of this information.

Table 1 (1/1/2019)

Ship Name:							
OWNERS INSPECTION REPORT - Structural Condition For Tank No:							
Grade of steel:	Deck:		Side:				
	Bottom:		Long. Bhd:				
Elements Other	Cracks:	Buckles:	Corrosion:	Coating cond.	Pitting	Mod./Rep.	Other
Deck:							
Bottom:							
Side:							
Longitudinal bulk- head:							
Transverse bulk- heads:							
Repairs carried out due to: Thickness measurements carried out (dates): Results in General: Overdue Surveys: Outstanding Conditions of class: Comments:							
Date of Inspection: Inspected by: Signature:							

Table 2 : Intermediate survey of cargo and water ballast tanks for chemical tankers (1/7/2006)

Age of ship (in years at time of intermediate survey)		
5 < age ≤ 10	10 < age ≤ 15	age > 15
Examination of representative tanks selected by the Surveyor See (1) and (2)	See [4.4]	See [4.5]
Examination of suspect areas identified at previous surveys	See [4.4]	See [4.5]
<p>(1) When considered necessary by the Surveyor, thickness measurement and testing are to be carried out to ensure that the structural integrity remains effective</p> <p>(2) A ballast tank is to be examined at subsequent annual surveys (see Note 1) where:</p> <ul style="list-style-type: none"> a) a hard protective coating has not been applied since the time of construction, or b) a soft coating has been applied, or c) substantial corrosion is found within the tank, or d) the hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the Surveyor. <p>Note 1: The requirements related to the protective coating condition are to apply to the ballast tanks whose coating condition will be assessed at the forthcoming class renewal survey and intermediate survey on or after 1 July 2006. For the assessment of the coating condition, reference is to be made to IACS Recommendation No.87 "Guidelines for Coating Maintenance & Repairs for Ballast Tanks and Combined Cargo / Ballast Tanks on Oil Tankers".</p>		

6.1.5 In addition, the survey program is to include proposals on how to conduct survey and tests in a safe and practical way, including the means of providing access to structures for close-up survey, thickness measurements and tank testing. All other provisions described in Ch 2, Sec 2, [2.3], Ch 2, Sec 2, [2.5], Ch 2, Sec 2, [2.7], Ch 2, Sec 2, [2.8] and Ch 2, Sec 2, [2.10] regarding procedures for thickness measurements, conditions for survey, access to structures, equipment for survey and survey at sea or at anchorage, respectively, are also to be complied with.

6.1.6 Survey Planning Meeting (1/1/2019)

Proper preparation and close co-operation between the attending Surveyor(s) and the Owner's representatives on board prior to and during the survey are an essential part of the safe and efficient conduct of the survey. During the survey on board safety meetings are to be held regularly.

Prior to the commencement of any part of the class renewal and intermediate survey, a survey planning meeting is to be held between the attending Surveyor(s), the Owner's representative in attendance and the thickness measurement firm representative, where involved, and the Master of the ship or an appropriately qualified representative appointed by the Master or Company for the purpose of ascertaining that all the arrangements envisaged in the survey program are in place, so as to ensure the safe and efficient conduct of the survey work to be carried out. Refer also to Ch 2, Sec 2, [2.3.1].

The following is an indicative list of items that are to be addressed in the meeting:

- a) schedule of the vessel (i.e. the voyage, docking and undocking manoeuvres, periods alongside, cargo and ballast operations etc.);
- b) provisions and arrangements for thickness measurements (i.e. access, cleaning/descaling, illumination, ventilation, personal safety);
- c) extent of the thickness measurements;
- d) acceptance criteria (refer to the list of minimum thicknesses);
- e) extent of close-up survey and thickness measurement considering the coating condition and suspect areas/areas of substantial corrosion;
- f) execution of thickness measurements;
- g) taking representative readings in general and where uneven corrosion/pitting is found;
- h) mapping of areas of substantial corrosion; and
- i) communication between attending Surveyor(s), the thickness measurement firm operator(s) and Owner's Representative(s) concerning findings.

6.2 Scope of survey

6.2.1 (1/1/2003)

In addition to the requirements of annual surveys, the class renewal survey is to include examination, tests and checks of sufficient extent to ensure that the hull and related piping, as required in [6.6.1], is in satisfactory condition and is fit for its intended purpose for the new period of class to be

assigned, subject to proper maintenance and operation and to periodical surveys being carried out at the due dates.

6.2.2 (1/7/2006)

All cargo tanks, ballast tanks, including double bottom tanks, pump rooms, pipe tunnels, cofferdams and void spaces bounding cargo tanks, decks and outer hull are to be examined, and this examination is to be supplemented by thickness measurement and testing as required in [6.4] and [6.5], respectively, to ensure that the structural integrity remains effective. The aim of the examination is to discover substantial corrosion, significant deformation, fractures, damages or other structural deterioration, that may be present.

6.2.3 The survey extent of ballast tanks converted to void spaces will be specially considered by the Society in relation to the requirements for ballast tanks.

6.2.4 (1/1/2010)

Where provided, the condition of the corrosion prevention system of cargo tanks is to be examined.

A ballast tank is to be examined at subsequent annual surveys (see Note 1) where:

- a) a hard protective coating has not been applied since the time of construction, or
- b) a soft or semi-hard coating has been applied, or
- c) substantial corrosion is found within the tank, or
- d) the hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the Surveyor.

Thickness measurements are to be carried out as deemed necessary by the Surveyor.

Note 1: The requirements related to the protective coating condition are to apply to the ballast tanks whose coating condition will be assessed at the forthcoming class renewal survey and intermediate survey on or after 1 July 2006. For the assessment of the coating condition, reference is to be made to IACS Recommendation No.87 "Guidelines for Coating Maintenance & Repairs for Ballast Tanks and Combined Cargo / Ballast Tanks on Oil Tankers".

6.2.5 In the case of independent cargo tanks, the survey consists of:

- an external examination of cargo tanks
- an examination of cargo tank supports, chocks, keys and the adjacent hull structure with non-destructive testing if deemed necessary.

6.2.6 The Owner or his representative is to declare to the attending Surveyor that the arrangements in cargo tanks (including coating) related to the transported products are suitable for the purpose.

6.2.7 (1/7/2006)

The class renewal survey is to include a bottom survey in dry condition as laid down in Ch 3, Sec 6, [2.2.1].

The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo tanks and ballast tanks (see Note 1) are to be carried out in accordance with the applicable requirements for class renewal surveys, if not already performed.

Note 1: Lower portions of the cargo and ballast tanks are considered to be the parts below the light ballast waterline.

6.3 Overall and close-up surveys

6.3.1 (1/1/2002)

Each class renewal survey is to include an overall survey of all tanks and all spaces. For fuel oil, lube oil and fresh water tanks, however, the requirements given in Ch 3, Sec 5, Tab 1 are to be complied with.

6.3.2 The survey of stainless steel tanks may be carried out as an overall survey supplemented by close-up survey as deemed necessary by the Surveyor.

6.3.3 Each class renewal survey is to include a close-up examination of sufficient extent to establish the condition of cargo tanks and salt water ballast tanks. The minimum requirements for close-up surveys are given in Tab 3.

6.3.4 (1/7/2006)

The Surveyor may extend the close-up survey as deemed necessary, taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and also in the following cases:

- where tanks have structural arrangements or details which have suffered defects in similar spaces or on similar ships according to available information
- where tanks have structures approved with reduced scantlings due to an approved corrosion control system.

6.3.5 (1/7/2006)

For areas in tanks where hard protective coatings are found to be in good condition, as defined in Ch 2, Sec 2, [2.2.13], the extent of close-up surveys required according to Tab 3 may be specially considered.

Table 3 : Requirements for close-up survey at class renewal survey of chemical tankers (1/7/2013)

Age of ship (in years at time of class renewal survey)						
age ≤ 5 (see Note 1 and Note 2)		5 < age ≤ 10 (see Note 1 and Note 2)		10 < age ≤ 15 (see Note 1 and Note 2)		age > 15
A/ (1)	ONE WEB FRAME RING - in a ballast wing tank (for single hull) or ballast double hull tank (for double hull) (see Note 3)	A/ (1)	ALL WEB FRAME RINGS - in a ballast wing tank or ballast dou- ble hull tank (see Note 3)	A/ (1)	ALL WEB FRAME RINGS - in all ballast tanks	As class renewal survey for ships between 10 and 15 years of age Additional transverse areas as deemed necessary by the Society
B/ (2)	ONE DECK TRANS- VERSE - in a cargo tank or on deck	B	ONE DECK TRANS- VERSE - in each remaining ballast tank or on deck (for S.H.)	A/ (7)	ALL WEB FRAME RINGS - in a cargo wing tank	
B	ONE DECK TRANS- VERSE - in a cargo wing tank or on deck (for single hull)	(6)	THE KNUCKLE AREA AND THE UPPER PART (5 metres approx) of one web frame in each remaining bal- last tank (for double hull)			
D/C/ (4)	ONE TRANSVERSE BULKHEAD (lower part for single hull - complete for double hull) - in a ballast tank	B/ (2)	ONE DECK TRANS- VERSE - in two cargo centre tanks or on deck (for single hull) and one deck transverse in two cargo tanks (for double hull)	A/ (7)	ONE WEB FRAME RING - in each remaining cargo tank	

Note 1: (1), (2), (3), (4), (5), (6) and (7) are areas to be subjected to close-up surveys and thickness measurements for double hull chemical tankers (see Fig 1, Fig 2 and Fig 3).

- (1) Web frame in a ballast tank means vertical web in side tank, hopper web in hopper tank, floor in double bottom tank and deck transverse in double deck tank (where fitted), including adjacent structural members. In fore and aft peak tanks web frame means a complete transverse web frame ring including adjacent structural members.
- (2) Deck transverse, including adjacent deck structural members (or external structure on deck in way of the tank, where applicable).
- (3) Transverse bulkhead complete in cargo tanks, including girder system, adjacent structural members (such as longitudinal bulkheads) and internal structure of lower and upper stools, where fitted.
- (4) Transverse bulkhead complete in ballast tanks, including girder system and adjacent structural members, such as longitudinal bulkheads, girders in double bottom tanks, inner bottom plating, hopper side, connecting brackets.
- (5) Transverse bulkhead lower part in cargo tank, including girder system, adjacent structural members (such as longitudinal bulkheads) and internal structure of lower stool, where fitted.
- (6) The knuckle area and the upper part (5 metres approximately), including adjacent structural members. Knuckle area is the area of the web frame around the connections of the slope hopper plating to the inner hull bulkhead and the inner bottom plating, up to 2 metres from the corners both on the bulkhead and the double bottom.
- (7) Web frame in a cargo oil tank means deck transverse, longitudinal bulkhead vertical girder and cross ties, where fitted, including adjacent structural members.

Note 2: A-B-C-D: are areas to be subjected to close-up surveys and thickness measurements for single hull chemical tankers (see Fig 1 and Fig 2).

A : Complete transverse web frame ring including adjacent structural members.

B: Deck transverse including adjacent deck structural members.

C: Transverse bulkhead complete - including girder system and adjacent structural members.

D: Transverse bulkhead lower part - including girder system and adjacent structural members.

Note 3: Ballast double hull tank: means double bottom tank plus double side tank plus double deck tank, as applicable, even if these tanks are separate.

Note 4: Where no centre cargo tanks are fitted (as in case of centre longitudinal bulkhead), transverse bulkheads in wing tanks are to be surveyed.

Age of ship (in years at time of class renewal survey)						
age ≤ 5 (see Note 1 and Note 2)		5 < age ≤ 10 (see Note 1 and Note 2)		10 < age ≤ 15 (see Note 1 and Note 2)		age > 15
D/ (5)	ONE TRANSVERSE BULKHEAD - in a cargo wing tank	C	BOTH TRANSVERSE BULKHEADS - in a ballast wing tank (for single hull)	C/ (3)	ALL TRANSVERSE BULKHEADS - in all cargo tanks	
		(4)	ONE TRANSVERSE BULKHEAD in each ballast tank (for double hull) (see Note 3)			
D/ (5)	ONE TRANSVERSE BULKHEAD - in a cargo centre tank (see Note 4)	D	ONE TRANSVERSE BULKHEAD - in each remaining ballast tank (for single hull)	C/ (4)	ALL TRANSVERSE BULKHEADS - in all ballast tanks	
		D/ (5)	ONE TRANSVERSE BULKHEAD - in two cargo centre tanks (see Note 4)			
		D/ (5)	ONE TRANSVERSE BULKHEAD - in a cargo wing tank			

Note 1: (1), (2), (3), (4), (5), (6) and (7) are areas to be subjected to close-up surveys and thickness measurements for double hull chemical tankers (see Fig 1, Fig 2 and Fig 3).

(1) Web frame in a ballast tank means vertical web in side tank, hopper web in hopper tank, floor in double bottom tank and deck transverse in double deck tank (where fitted), including adjacent structural members. In fore and aft peak tanks web frame means a complete transverse web frame ring including adjacent structural members.

(2) Deck transverse, including adjacent deck structural members (or external structure on deck in way of the tank, where applicable).

(3) Transverse bulkhead complete in cargo tanks, including girder system, adjacent structural members (such as longitudinal bulkheads) and internal structure of lower and upper stools, where fitted.

(4) Transverse bulkhead complete in ballast tanks, including girder system and adjacent structural members, such as longitudinal bulkheads, girders in double bottom tanks, inner bottom plating, hopper side, connecting brackets.

(5) Transverse bulkhead lower part in cargo tank, including girder system, adjacent structural members (such as longitudinal bulkheads) and internal structure of lower stool, where fitted.

(6) The knuckle area and the upper part (5 metres approximately), including adjacent structural members. Knuckle area is the area of the web frame around the connections of the slope hopper plating to the inner hull bulkhead and the inner bottom plating, up to 2 metres from the corners both on the bulkhead and the double bottom.

(7) Web frame in a cargo oil tank means deck transverse, longitudinal bulkhead vertical girder and cross ties, where fitted, including adjacent structural members.

Note 2: A-B-C-D: are areas to be subjected to close-up surveys and thickness measurements for single hull chemical tankers (see Fig 1 and Fig 2).

A : Complete transverse web frame ring including adjacent structural members.

B: Deck transverse including adjacent deck structural members.

C: Transverse bulkhead complete - including girder system and adjacent structural members.

D: Transverse bulkhead lower part - including girder system and adjacent structural members.

Note 3: Ballast double hull tank: means double bottom tank plus double side tank plus double deck tank, as applicable, even if these tanks are separate.

Note 4: Where no centre cargo tanks are fitted (as in case of centre longitudinal bulkhead), transverse bulkheads in wing tanks are to be surveyed.

Figure 1 : Representative transverse section of chemical tanker. Areas A & B and 1 and 2 (1/7/2013)

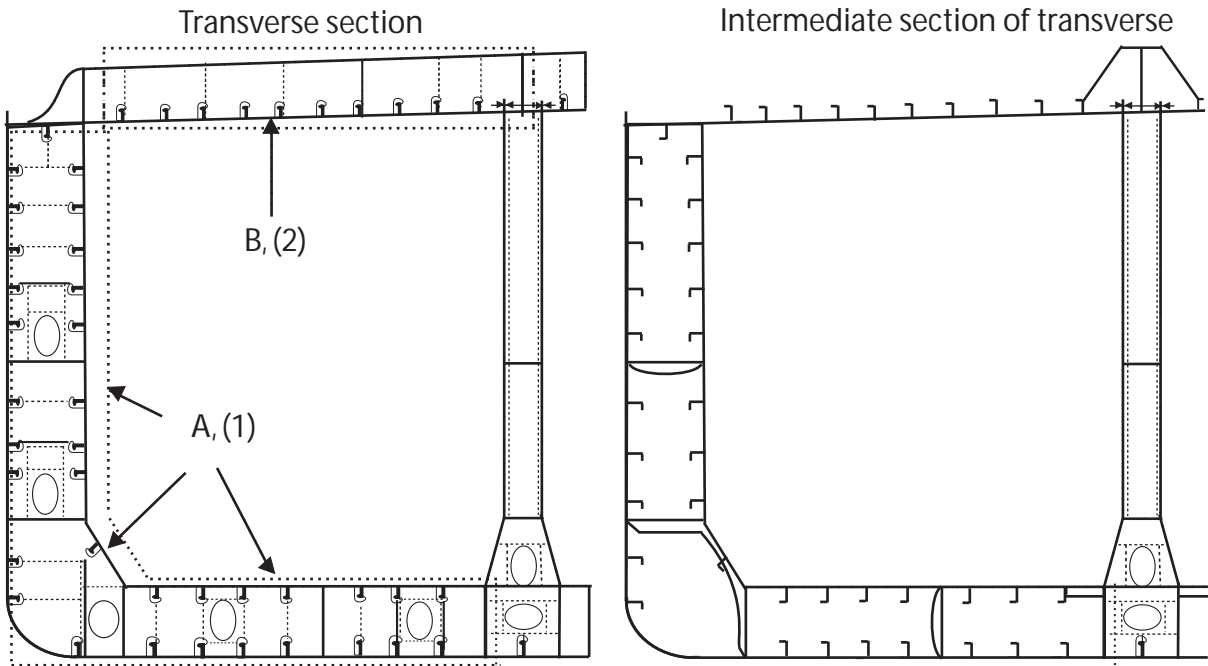


Figure 2 : Representative transverse section of chemical tanker. Areas C & D and 3, 4 and 5 (1/7/2013)

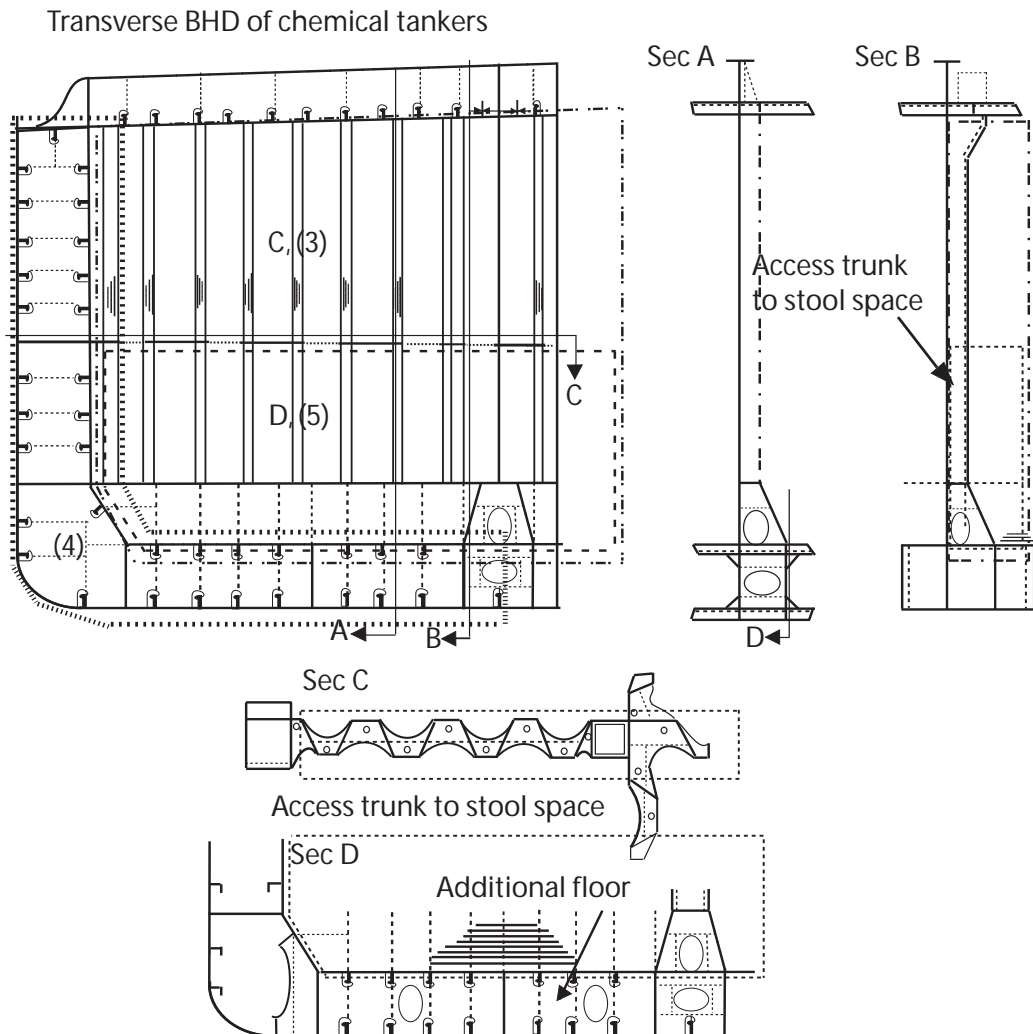
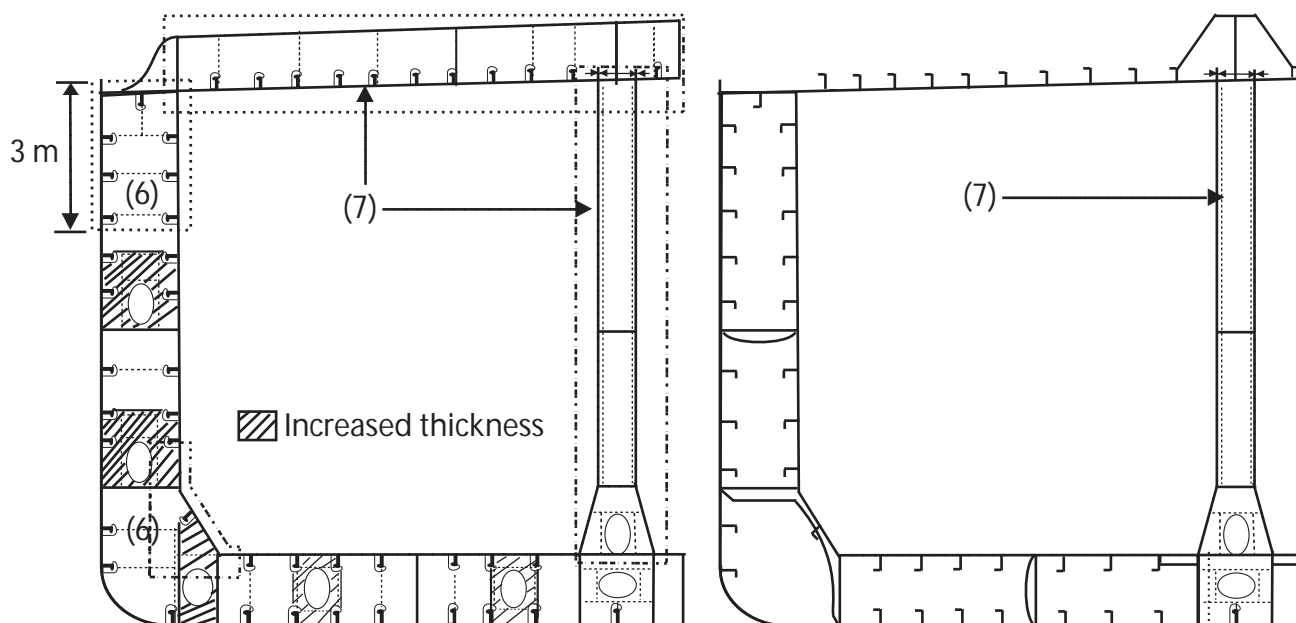


Figure 3 : Representative transverse section of chemical tanker. Areas 6 and 7 (1/7/2013)



6.4 Thickness measurements

6.4.1 The minimum requirements for thickness measurements at class renewal survey are given in Tab 4. Thickness measurement of stainless steel hull structure and piping may be waived by the Society, except for clad steel plating.

6.4.2 (1/7/2006)

Provisions for extended measurements for areas with substantial corrosion are given in Tab 5 to Tab 8 and as may be additionally specified in the survey program as required in [6.1].

These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.

6.4.3 (1/7/2006)

The Surveyor may further extend the thickness measurements as deemed necessary.

6.4.4 When pitting is found on bottom plating and its intensity is 20% or more, thickness measurements are to be extended in order to determine the actual plate thickness out of the pits and the depth of the pits. Where the wastage is in the substantial corrosion range or the average depth of pitting is 1/3 or more of the actual plate thickness, the pitted plate is to be considered as a substantially corroded area.

6.4.5 (1/7/2006)

For areas in tanks where hard protective coatings are found to be in good condition as defined in Ch 2, Sec 2, [2.2.13], the extent of thickness measurements according to Tab 4 may be specially considered.

6.4.6 (1/7/2006)

Transverse sections are to be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements.

6.4.7 (1/7/2006)

In cases where two or three sections are to be measured, at least one is to include a ballast tank within 0,5L amidships.

6.5 Tank testing

6.5.1 (1/7/2016)

The minimum requirements for ballast tank testing at Special Survey are given in [6.5.3] and Tab 9.

The minimum requirements for cargo tank testing at Special Survey are given in [6.5.4] and Tab 8.

Cargo tank testing carried out by the vessel's crew under the direction of the Master may be accepted by the surveyor provided the following conditions are complied with:

- a) a tank testing procedure, specifying fill heights, tanks being filled and bulkheads being tested, has been submitted by the owner and reviewed by the Society prior to the testing being carried out;
- b) there is no record of leakage, distortion or substantial corrosion that would affect the structural integrity of the tank;
- c) the tank testing has been satisfactorily carried out within special survey window not more than 3 months prior to the date of the survey on which the overall or close up survey is completed;
- d) the satisfactory results of the testing are recorded in the vessel's logbook;
- e) the internal and external condition of the tanks and associated structure are found satisfactory by the surveyor at the time of the overall and close up survey.

6.5.2 The Surveyor may extend the tank testing as deemed necessary.

6.5.3 (1/7/2006)

Boundaries of ballast tanks are to be tested with a head of liquid to the top of air pipes.

Table 4 : Requirements for thickness measurements at class renewal survey of chemical tankers (1/7/2006)

Age of ship (in years at time of class renewal survey)			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	age > 15
Suspect areas	Suspect areas	Suspect areas	Suspect areas
One section of deck plating for the full beam of the ship within the cargo area (in way of a ballast tank, if any, or a cargo tank used primarily for water ballast)	Within the cargo area: <ul style="list-style-type: none"> • each deck plate • one transverse section (1) 	Within the cargo area: <ul style="list-style-type: none"> • each deck plate • two transverse sections (1) (2) • all wind and water strakes 	Within the cargo area: <ul style="list-style-type: none"> • each deck plate • three transverse sections (1) (2) • each bottom plate
Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Tab 3	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Tab 3	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Tab 3	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Tab 3
	Selected wind and water strakes outside the cargo area	Selected wind and water strakes outside the cargo area	All wind and water strakes, full length
(1) Transverse sections are to be chosen where the largest reductions are likely to occur or as revealed by deck plating measurements.			
(2) At least one section is to be within 0,5 L amidships and, where applicable, in way of a ballast tank.			

Table 5 : Requirements for extent of thickness measurements at those areas of substantial corrosion Class renewal survey of chemical tankers within the cargo area length (1/1/2010)

BOTTOM, INNER BOTTOM AND HOPPER STRUCTURE		
Structural member	Extent of measurement	Pattern of measurement
Bottom, inner bottom and hopper structure plating	Minimum of three bays across tank, including aft bay Measurements around and under all suction bell mouths	5-point pattern for each panel between longitudinals and floors
Bottom, inner bottom and hopper structure longitudinals	Minimum of three longitudinals in each bay where bottom plating measured	Three measurements in line across the flange and three measurements on vertical web
Bottom girders, including watertight ones	At fore and aft watertight floors and in centre of tanks	Vertical line of single measurements on girder plating with one measurement between each panel stiffener, or a minimum of three measurements. Two measurements across face flat where fitted
Bottom floors, including watertight ones	Three floors in bays where bottom plating measured, with measurements at both ends and middle	5-point pattern over two square metre area
Hopper structure web frame ring	Three floors in bays where bottom plating measured	5-point pattern over one square metre of plating. Single measurements on flange
Hopper structure transverse watertight bulkhead or swash bulkhead	lower 1/3 of bulkhead	5-point pattern over one square metre of plating
	upper 2/3 of bulkhead	5-point pattern over two square metre of plating
	stiffeners (minimum of three)	For web, 5-point pattern over span (two measurements across web at each end and one at centre of span). For flange, single measurements at each end and centre of span
Panel stiffening	Where applicable	Single measurements

**Table 6 : Requirements for extent of thickness measurements at those areas of substantial corrosion
Class renewal survey of chemical tankers within the cargo area length (1/1/2010)**

DECK STRUCTURE		
Structural member	Extent of measurement	Pattern of measurement
Deck plating	Two transverse bands across tank	Minimum of three measurements per plate per band
Deck longitudinals	Every third longitudinal in each of two bands with a minimum of one longitudinal	Three measurements in line vertically on webs and two measurements on flange (if fitted)
Deck girders and brackets	At fore and aft transverse bulkhead, bracket toes and in centre of tanks	Vertical line of single measurements on web plating with one measurement between each panel stiffener, or a minimum of three measurements. Two measurements across flange. 5-point pattern on girder/bulkhead brackets
Deck transverse webs	Minimum of 2 webs, with measurements at both ends and middle of span	5-point pattern over 1 square metre area. Single measurements on flange
Vertical web and transverse bulkhead in wing ballast tank for double hull design (two metres from deck)	Minimum of two webs, and both transverse bulkheads	5-point pattern over one square metre area
Panel stiffening	Where applicable	Single measurements

**Table 7 : Requirements for extent of thickness measurements at those areas of substantial corrosion
Class renewal survey of chemical tankers within the cargo area length (1/1/2010)**

SIDE SHELL AND LONGITUDINAL BULKHEADS		
Structural member	Extent of measurement	Pattern of measurement
Side shell and longitudinal bulkhead plating: <ul style="list-style-type: none"> Deckhead and bottom strakes, and strakes in way of horizontal girders All other strakes 	<ul style="list-style-type: none"> Plating between each pair of longitudinals in a minimum of three bays (along the tank) Plating between every third pair of longitudinals in same three bays 	Single measurement
Side shell and longitudinal bulkhead longitudinals on: <ul style="list-style-type: none"> Deckhead and bottom strakes All other strakes 	<ul style="list-style-type: none"> Each longitudinal in same three bays Every third longitudinal in same three bays 	3 measurements across web and 1 measurement on flange
Longitudinal brackets	Minimum of three at top, middle and bottom of tank in same three bays	5-point pattern over area of bracket
Vertical web and transverse bulkheads of double side tanks (excluding deck area): <ul style="list-style-type: none"> Strakes in way of horizontal girders Other strakes 	<ul style="list-style-type: none"> Minimum of two webs and both transverse bulkheads Minimum of two webs and both transverse bulkheads 	<ul style="list-style-type: none"> 5-point pattern over approximately two square metre area Two measurements between each pair of vertical stiffeners
Web frames and cross-ties for other tanks than double side tanks	Three webs with minimum of three locations on each web, including in way of cross-tie connections and lower end bracket	5-point pattern over approximately two square metre area of webs, plus single measurements on flanges of web frame and cross-ties
Horizontal girders	Plating on each girder in a minimum of three bays	Two measurements between each pair of longitudinal girder stiffeners
Panel stiffening	Where applicable	Single measurements

**Table 8 : Requirements for extent of thickness measurements at those areas of substantial corrosion
Class renewal survey of chemical tankers within the cargo area length (1/1/2010)**

TRANSVERSE WATERTIGHT AND SWASH BULKHEADS		
Structural member	Extent of measurement	Pattern of measurement
Upper and lower stool, where fitted	Transverse band within 25 mm of welded connection to inner bottom/deck plating Transverse band within 25 mm of welded connection to shelf plate	5-point pattern between stiffeners over one metre length
Deckhead and bottom strakes, and strakes in way of horizontal stringers	Plating between pair of stiffeners at three locations: approximately 1/4, 1/2 and 3/4 width of tank	5-point pattern between stiffeners over 1 metre length
All other strakes	Plating between pair of stiffeners at middle location	Single measurement
Strakes in corrugated bulkheads	Plating for each change of scantling at centre of panel and at flange of fabricated connection	5-point pattern over about 1 square metre of plating
Stiffeners	Minimum of three typical stiffeners	For web, 5-point pattern over span between bracket connections (2 measurements across web at each bracket connection and one at centre of span). For flange, single measurements at each bracket toe and at centre of span
Brackets	Minimum of three at top, middle and bottom of tank	5-point pattern over area of bracket
Horizontal stringers	All stringers with measurements at both ends and middle	5-point pattern over one square metre area, plus single measurements near bracket toes and on flanges
Deep webs and girders	Measurements at toe of bracket and at centre of span	For web, 5-point pattern over about 1 square metre. Three measurements across face flat

Table 9 : Requirements for tank testing at class renewal survey of chemical tankers (1/7/2006)

Age of ship (in years at time of class renewal survey)	
age ≤ 5	age > 5
All ballast tank boundaries	All ballast tank boundaries
Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, pump rooms or cofferdams	All cargo tank bulkheads

6.5.4 (1/7/2006)

Boundaries of cargo tanks are to be tested to the highest point that liquid will rise to under service conditions.

6.5.5 (1/7/2006)

The testing of double bottom tanks and other spaces not designed for the carriage of liquid may be omitted, provided a satisfactory internal examination is carried out together with an examination of the tank top.

6.6 Cargo area and cargo pump rooms

6.6.1 Cargo piping on deck and cargo and ballast piping within the cargo area are to be examined and operationally tested to working pressure to the attending Surveyor's satisfaction to ensure that their tightness and condition remain satisfactory. Special attention is to be given to any ballast piping in cargo tanks and cargo piping in ballast tanks and void spaces. Surveyors are to be advised on all occasions when this piping, including valves and fittings, is opened during repair periods and can be examined internally.

The surveyor may require dismantling and/or thickness measurements of piping. A hydraulic test is to be carried out

in the event of repair or dismantling of cargo or ballast piping, or where doubts arise.

Vent line drainage arrangements are to be examined.

6.6.2 It is to be verified that cargo piping and independent cargo tanks, where applicable, are electrically bonded to the hull.

6.6.3 (1/7/2006)

For ships over 10 years of age, selected steel cargo pipes outside cargo tanks, cargo/slop discharge pipes passing through ballast tanks and void spaces and ballast pipes passing through cargo tanks are to be:

- subjected to thickness measurement at random, or selected pipe lengths are to be opened for internal inspection
- pressure tested to the maximum working pressure.

Special attention is to be given to cargo/slop discharge piping through ballast tanks and void spaces.

6.6.4 All safety valves on cargo piping and of cargo tanks are to be dismantled for examination, adjusted and, as applicable, resealed.

6.6.5 All cargo pump room boundaries are to be generally examined. All gas-tight shaft sealing devices are to be examined. The bottom of cargo pump rooms is to be presented clean for the examination of stripping devices and gutters.

6.7 Emergency towing arrangement

6.7.1 The survey is to include:

- an examination of the emergency towing arrangement
- confirmation that the arrangement is readily available with aft towing arrangement pre-rigged and forward chafing gear secured to the strong-point
- an examination of the pick-up gear, towing pennant and chafing gear over the full length for possible deterioration. Where the pennant line is stored in a watertight condition and can be confirmed as being maintained, consideration may be given to waiving the requirement to examine the pennant line over the full length.
- an examination of the strong-points, fairleads and pedestal roller together with their attachments to the hull structure.

6.8 Survey Program

6.8.1 Basic information and particulars (1/1/2010)

Basic information and particulars of the ship are indicated in Tab 10.

6.8.2 Scope (1/1/2010)

This survey program covers the minimum extent of overall surveys, close-up surveys, thickness measurements and pressure testing within the cargo area, of cargo tanks and ballast tanks, including fore and aft peak tanks, required by the Rules.

The arrangements and safety aspects of the survey are to be acceptable to the attending Surveyor(s).

6.8.3 Documentation (1/1/2010)

All documents used in the development of the survey program are to be available on board during the survey as required in [1.2].

6.8.4 Arrangement of tanks and spaces (1/1/2010)

This section of the survey program is to provide information (either in the form of plans or text) on the arrangement of tanks and spaces that fall within the scope of the survey.

6.8.5 List of tanks and spaces with information on their use, extent of coatings and corrosion protection system (1/1/2010)

This section of the survey program is to indicate any changes relating to (and is to update) the information on the use of the tanks of the ship, the extent of coatings and the corrosion protective system provided in the Survey Planning Questionnaire referred to in [6.9].

6.8.6 Conditions for survey (1/1/2010)

This section of the survey program is to provide information on the conditions for survey, e.g. information regarding cargo tank cleaning, gas freeing, ventilation, lighting, etc..

6.8.7 Provisions and methods of access to structures (1/1/2010)

This section of the survey program is to indicate any changes relating to (and is to update) the information on the provisions and methods of access to structures provided in the Survey Planning Questionnaire referred to in [6.9].

6.8.8 List of equipment for survey (1/1/2010)

This section of the survey program is to identify and list the equipment that will be made available for carrying out the survey and the required thickness measurements.

Table 10 : Basic information and particulars (1/1/2019)

Name of ship:	
IMO number:	
Flag State:	
Port of registry:	
Gross tonnage:	
Deadweight (metric tonnes):	
Length between perpendiculars (m):	
Shipbuilder:	
Hull number:	
Classification Society:	
Class ID:	
Date of build of the ship:	
Owner:	
Thickness measurement firm:	
Any other information which may be useful	

6.8.9 Survey requirements (1/1/2010)

a) Overall survey

This section of the survey program is to identify and list the spaces that are to undergo an overall survey for the ship in accordance with [6.3.1] and [6.3.2].

b) Close-up survey

This section of the survey program is to identify and list the hull structures that are to undergo a close-up survey for the ship in accordance with [6.3.2] and [6.3.3].

6.8.10 Identification of tanks for tank testing and pipes for pipe testing (1/1/2010)

This section of the survey program is to identify and list the tanks that are to undergo tank testing for the ship in accordance with [6.5] and the pipes that are to undergo pipe testing in accordance with [6.6.3].

6.8.11 Identification of areas and sections for thickness measurements (1/1/2010)

This section of the survey program is to identify and list the areas and sections where thickness measurements are to be taken in accordance with [6.4.1].

6.8.12 Minimum thickness of hull structures (1/1/2010)

This section of the survey program is to specify the minimum thickness for hull structures of the ship that are subject to the Rule requirements (indicate either (a) or preferably (b), if such information is available):

- a) Determined from the attached wastage allowance table (see Note 1) and the original thickness in the hull structure plans of the ship;
- b) Given in Tab 11.

Note 1: The wastage allowance tables are to be attached to the survey program.

Table 11 : As-built and minimum thickness for hull structures (1/1/2010)

Area or location	Original as-built thickness (mm)	Minimum thickness (mm)	Substantial corrosion thickness (mm)
DECK:			
Plating			
Longitudinals			
Longitudinal girders			
BOTTOM			
Plating			
Longitudinals			
Longitudinal girders			
SHIP SIDE			
Plating			
Longitudinals			
Longitudinal girders			
LONGITUDINAL BULKHEAD			
Plating			
Longitudinals			
Longitudinal girders			
INNER BOTTOM			
Plating			
Longitudinals			
Longitudinal girders			
TRANSVERSE BULKHEADS			
Plating			
Stiffeners			
TRANSVERSE WEB FRAMES, FLOORS AND STRINGERS AND DIAPHRAGMS			
Plating			
Flanges			
Stiffeners			

6.8.13 Thickness measurement firm (1/1/2019)

This section of the survey program is to identify changes, if any, relating to the information on the thickness measurement firm provided in the Survey Planning Questionnaire referred to in [6.9].

6.8.14 Damage experience related to the ship (1/1/2010)

This section of the survey program is, using Tab 12 and Tab 13 below, to provide details of the hull damage for at least the last three years in way of the cargo and ballast tanks and void spaces within the cargo area. This damage is subject to survey.

6.8.15 Areas identified with substantial corrosion from previous surveys (1/1/2010)

This section of the survey program is to identify and list the areas of substantial corrosion from previous surveys.

6.8.16 Critical structural areas and suspect areas (1/1/2010)

This section of the survey program is to identify and list the critical structural areas and suspect areas, if such information is available.

6.8.17 Other relevant comments and information (1/1/2010)

This section of the survey program is to provide any other comments and information relevant to the survey.

6.8.18 Appendices to be provided (1/1/2010)

The following appendices are to be attached to the survey program:

- a) Appendix 1 - List of plans

This appendix is to identify and list the main structural plans of cargo and ballast tanks (scantling drawings), including information regarding use of high tensile steel (HTS), clad steel and stainless steel to be available as required in item b) of the list in [6.1.3].

- b) Appendix 2 - Survey Planning Questionnaire

The Survey Planning Questionnaire (refer to [6.9]), which has been submitted by the Owner, is to be appended to the survey programme.

- c) Appendix 3 - Other documentation

This part of the survey program is to identify and list any other documentation that forms part of the plan.

Table 12 : Hull damage sorted by location for the ship (1/1/2010)

Tank or space number or area	Possible cause, if known	Description of the damage	Location	Repair	Date of repair

Table 13 : Hull damage for sister or similar ships (if available) in the case of design related damage (1/1/2010)

Tank or space number or area	Possible cause, if known	Description of the damage	Location	Repair	Date of repair

6.8.19 Date and signature (1/1/2010)

The survey program is to be completed with the following wording:

Prepared by the Owner in co-operation with the Society for compliance with [6.1.3].

Date:..... (name and signature of authorised Owner's representative)

Date:..... (name and signature of authorised representative of the Society)

6.9 Survey Planning Questionnaire

6.9.1 General (1/1/2010)

The following information will enable the Owner in co-operation with the Society to develop a survey program complying with the requirements given in [6.8]. It is essential that the Owner provides up-to-date information when completing this questionnaire,. When completed, the questionnaire, is to provide all information and material required in [6.8].

6.9.2 Particulars (1/1/2010)

The particulars of the ship are indicated in Tab 14.

6.9.3 Information on access provision for close-up surveys and thickness measurement (1/1/2010)

In Tab 15 the Owner is to indicate the means of access to the structures subject to close-up survey and thickness measurement. A close-up survey is an examination where the details of structural components are within the close visual inspection range of the attending Surveyor, i.e. normally within reach.

6.9.4 History of cargo (1/1/2010)

The Owner is to provide a history of heated cargo for the last three years.

6.9.5 Owner's inspections (1/1/2010)

Using a format similar to that of Tab 16 (which is given as an example), the Owner is to provide details of the results of the inspections for the last 3 years on all cargo and ballast tanks and void spaces within the cargo area, including peak tanks.

6.9.6 Reports of Port State Control inspections (1/1/2010)

The Owner is to provide a list of any reports of Port State Control inspections containing hull structural related deficiencies and relevant information on rectification of the deficiencies.

6.9.7 Safety Management System (1/1/2010)

The Owner is to provide a list of any non-conformities related to hull maintenance, including the associated corrective actions.

6.9.8 Approved thickness measurement firm (1/1/2019)

The Owner is to provide the name and address of the approved thickness measurement firm.

6.9.9 Date and signature (1/1/2010)

The Survey Planning Questionnaire is to be completed with the date, the name of the Owner's representative responsible for the completion of the document and his signature.

6.9.10 Availability of the form (1/1/2010)

An example of the form "Survey Planning Questionnaire" to be filled in by the Owner is available on the Society website or may be supplied by sending a request to TANKERS@RINA.ORG.

Table 14 : Particulars of the ship (1/1/2010)

Name of ship:	
IMO number:	
Flag State:	
Port of registry:	
Gross tonnage:	
Deadweight (metric tonnes):	
Classification Society:	
Class ID:	
Date of build of the ship:	
Owner:	

Table 15 : Means of access to hull structures (1/1/2010)

Tank No.	Structure	C (Cargo)/ B (Ballast)	Temporary staging	Rafts	Ladders	Direct access	Other means (please specify)
F.P.	Fore peak						
A.P.	Aft peak						
Wing Tanks	Under deck						
	Side shell						
	Bottom transverse						
	Longitudinal						
	Transverse						
Centre Tanks	Under deck						
	Bottom transverse						
	Transverse						

Table 16 : Owner's inspection report (1/1/2010)

Tank no.	Corrosion protection (1)	Coating extent (2)	Coating condition (3)	Structural deterioration (4)	Tank damage history (5)
Cargo centre tanks					
Cargo wing tanks					
Ballast tanks					
Aft peak					
Fore peak					
<p>Note 1: Indicate tanks which are used for oil/ballast.</p> <p>(1) HC=hard coating; SC=soft coating; SH=semihard coating; NP=no protection</p> <p>(2) U=upper part; M=middle part; L=lower part; C=complete</p> <p>(3) G=good; F=fair; P=poor; RC=recoated (during the last three years)</p> <p>(4) N=no findings recorded; Y=findings recorded, description of findings is to be attached to the questionnaire</p> <p>(5) DR=damage & repair; L=leakages; CV= conversion (description is to be attached to this questionnaire)</p>					
Name of Owner's representative:					
Signature:					
Date:					

Tank no.	Corrosion protection (1)	Coating extent (2)	Coating condition (3)	Structural deterioration (4)	Tank damage history (5)
Miscellaneous spaces					
<p>Note 1: Indicate tanks which are used for oil/ballast.</p> <p>(1) HC=hard coating; SC=soft coating; SH=semihard coating; NP=no protection</p> <p>(2) U=upper part; M=middle part; L=lower part; C=complete</p> <p>(3) G=good; F=fair; P=poor; RC=recoated (during the last three years)</p> <p>(4) N=no findings recorded; Y=findings recorded, description of findings is to be attached to the questionnaire</p> <p>(5) DR=damage & repair; L=leakages; CV= conversion (description is to be attached to this questionnaire)</p>					
<p>Name of Owner's representative:</p> <p>Signature:</p> <p>Date:</p>					

7 Class renewal survey - Cargo machinery items

7.1 Cargo area and cargo pump rooms

7.1.1 Ballast and stripping pumps are to be internally examined and prime movers checked. A working test is to be carried out.

Maintenance records of cargo pumps are to be made available to the Surveyor.

7.1.2 Where a washing system is fitted, piping, pumps, valves and deck-mounted washing machines are to be examined and tested for signs of leakage, and anchoring devices of deck-mounted washing machines are to be checked to the Surveyor's satisfaction.

7.1.3 The satisfactory condition of the cargo heating/cooling system is to be verified and, if deemed necessary by the Surveyor, the system is to be pressure tested.

7.1.4 Heat exchangers and anti-sparking fans are to be examined.

7.1.5 An operating test of the remote control of pumps and valves and of automatic closing valves is to be carried out.

7.1.6 A general examination of the electrical equipment and cables in dangerous zones such as cargo pump rooms and areas adjacent to cargo tanks is to be carried out for defective and non-certified safe type electrical equipment, non-approved lighting and fixtures, and improperly installed or defective or dead-end wiring.

The electrical insulation resistance of the electrical equipment and circuits terminating in or passing through the dangerous zones is to be tested; however, in cases where a proper record of testing is maintained, consideration may be given to accepting recent test readings effected by the ship's personnel.

7.2 Inert gas system

7.2.1 The requirements given in [5.2] for intermediate survey are to be complied with.

7.2.2 If an inert gas system such as that installed on board oil tankers is fitted, the requirements given in Sec 3, [7.2] for class renewal survey of oil tankers are to be complied with.

SECTION 6

LIQUEFIED GAS CARRIERS

1 General

1.1 Application

1.1.1 (1/7/2008)

The requirements of this Section apply to all self-propelled ships which have been assigned the service notation **liquefied gas carrier**.

1.1.2 (1/7/2008)

The requirements apply to the surveys of the hull structure and piping systems in way of pump rooms, compressor rooms, cofferdams, pipe tunnels, void spaces and fuel oil tanks within the cargo area and all ballast tanks. These provisions are additional to the classification requirements applicable to the remainder of the ship, given in Chapter 3 according to the relevant surveys.

1.1.3 (1/7/2008)

The requirements contain the minimum extent of examination, thickness measurements and tank testing. The survey is to be extended when substantial corrosion and/or structural defects are found and is to include additional close-up surveys when necessary.

1.1.4 (1/7/2008)

This Section is to be uniformly applied to surveys commenced on or after 1 July 2008. However, semi-hard coatings, if already applied, will not be accepted from the next class renewal survey or intermediate survey commenced on or after 1 January 2010, whichever comes first, with respect to waiving the annual internal examination of the ballast tanks.

1.1.5 (1/1/2019)

When close-up surveys are required, consideration may be given by the Surveyor to allow the use of Remote Inspection Techniques (RIT), according to the provisions of Ch 2, Sec 2, [2.3.3] and Ch 2, Sec 2, [2.6].

2 Annual survey - Hull items

2.1 Scope

2.1.1 General (1/7/2008)

The survey is to consist of an examination for the purpose of ensuring, as far as practicable, that the hull and piping are maintained in a satisfactory condition.

2.1.2 Examination of the hull (1/7/2008)

- Examination of the hull plating and its closing appliances as far as can be seen.
- Examination of watertight penetrations as far as practicable.

2.1.3 Examination of weather decks (1/7/2008)

- Examination of flame screens on vents to all bunker tanks.
- Examination of bunker and vent piping systems.

2.1.4 Examination of cargo pump rooms and compressor rooms and, as far as practicable, pipe tunnels if fitted (1/7/2008)

- Examination of all pump room and compressor room bulkheads for signs of leakage or fractures and, in particular, the sealing arrangements of all penetrations of pump room and compressor room bulkheads.
- Examination of the condition of all piping systems, except those related to cargo installations, for which reference is to be made to [3.2] and [3.3].

Note 1: For survey of air pipes, flame screens on vents and ventilators, refer to the requirements given in Ch 3, Sec 3, [2.2.1].

2.1.5 Suspect areas (1/7/2008)

Suspect areas identified at previous surveys are to be examined. Thickness measurements are to be taken of the areas of substantial corrosion and the extent of thickness measurements is to be increased to determine the extent of areas of substantial corrosion. Tab 4 may be used as guidance for these additional thickness measurements. These extended thickness measurements are to be carried out before the annual survey is credited as completed.

2.1.6 Examination of ballast tanks (1/7/2008)

Examination of ballast tanks is to be carried out when required as a consequence of the results of the class renewal survey and intermediate survey. When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurement is to be carried out. If the results of these thickness measurements indicate that there is substantial corrosion, then the extent of measurements is to be increased to determine the extent of areas of substantial corrosion. Tab 4 may be used as guidance for these additional measurements. These extended thickness measurements are to be carried out before the annual survey is credited as completed.

2.1.7 Emergency towing arrangement (1/7/2008)

- The Owner or his representative is to declare to the attending Surveyor that no significant alterations have been made, without prior approval from the Society, to the equipment and arrangements fitted on board in accordance with the provisions given in Pt B, Ch 10, Sec 4, [4].

- b) The survey is to include:
- 1) an examination, as far as practicable, of the emergency towing arrangement
 - 2) confirmation that the aft towing arrangement is pre-rigged and forward chafing gear is secured to the strong-point
 - 3) confirmation of the proper functioning of the light, where it is provided, on the pick-up gear marker buoy.

2.1.8 Safe access to bow (1/7/2011)

The access to bow arrangement is to be examined, as applicable.

3 Annual survey - Cargo installations items

3.1 General

3.1.1 Method of survey (1/7/2008)

The annual survey of cargo installations is preferably to be carried out during a loading or discharging operation. Access to cargo tanks or inerted hold spaces, necessitating gas-freeing/aerating will normally not be necessary.

3.1.2 Check of cargo log book (1/7/2008)

Gas plant operational record (log) entries since the last survey are to be examined in order to check the past performance of the system and to establish whether certain parts have shown any irregularities in operation. The evaporation rate and the inert gas consumption are also to be considered.

3.2 Weather decks and cargo handling rooms

3.2.1 (1/7/2008)

The survey is to include:

- a) examination of all accessible gas-tight bulkhead penetrations including gas-tight shaft sealings
- b) examination of the sealing arrangements for tanks or tank domes penetrating decks or tank covers
- c) examination of vapour and gas tightness devices of the wheelhouse windows and doors, sidescuttles and windows in way of ends of superstructures and deckhouses facing the cargo area or bow or stern loading/unloading arrangements, and closing devices of air intakes and openings into accommodation, service and machinery spaces and control stations
- d) examination of cargo and process piping, including the expansion arrangements, insulation from the hull structure, pressure relief and drainage arrangements
- e) examination of venting systems, including vent masts and protective screens, for cargo tanks, interbarrier spaces, hold spaces, fuel tanks and ballast tanks
- f) examination of cargo tank and interbarrier space relief valves and associated safety systems and alarms
- g) confirmation that the certificate for the relief valve opening/closing pressures is on board

- h) examination of drip trays or insulation for deck protection against cargo leakage
- i) examination of the cargo pump room, cargo compressor room and cargo control room
- j) confirmation of proper maintenance of arrangements for the airlocks
- k) confirmation that all accessible cargo piping systems are electrically bonded to the hull.

3.3 Other arrangements or devices

3.3.1 (1/7/2011)

The survey is to include:

- a) confirmation that any liquid and vapour hoses are suitable for their intended purpose and, where appropriate, type approved or marked with the date of testing and in satisfactory condition
- b) confirmation that any special arrangement made for bow or stern loading/unloading is satisfactory
- c) confirmation that relevant instruction and information material such as cargo handling plans, filling limit information, cooling down procedures, etc. is on board
- d) confirmation that, if applicable, the provisions made for products which have special arrangements as per Pt E, Ch 9, Sec 17 are satisfactory
- e) confirmation that any special arrangements to survive conditions of damage are in order.

3.4 Cargo area, cargo compressor rooms, cargo pump rooms

3.4.1 (1/7/2011)

The survey is to include:

- a) examination of mechanical ventilation fans in gas-dangerous spaces and zones
- b) examination and confirmation of the satisfactory operation of mechanical ventilation of spaces normally entered during operation
- c) examination, as far as possible during operation, of cargo heat exchangers, vaporisers, pumps, compressors and hoses
- d) confirmation that fixed and/or portable ventilation arrangements provided for spaces not normally entered are satisfactory
- e) examination of the gas detection safety arrangements for cargo control rooms and of the measures taken to exclude ignition sources when such spaces are not gas-safe
- f) examination of cargo (if accessible), bilge, ballast and stripping pumps for excessive gland seal leakage
- g) confirmation that electrical equipment in gas-dangerous spaces and zones is in satisfactory condition and has been properly maintained
- h) examination, as far as possible, of arrangements for the use of cargo as fuel, and associated instrumentation and safety devices

- i) confirmation that, if fitted, cargo reliquefaction or refrigeration equipment is in satisfactory condition.
- j) confirmation that the manually operated emergency shutdown system together with the automatic shutdown of the cargo pumps and compressors are satisfactory
- k) confirmation that the arrangements for the air locks are being properly maintained.

3.5 Instrumentation and safety devices

3.5.1 (1/7/2008)

The survey is to include:

- a) confirmation that installed pressure gauges on cargo discharge lines are operational (see Note 1)
- b) confirmation that cargo tank liquid level gauges are operational and that high level alarms as well as automatic shut-off systems are satisfactory (see Note 1)
- c) confirmation that the temperature indicating equipment of the cargo containment system and associated alarms are satisfactory (see Note 1)
- d) examination of the log-books for confirmation that the emergency shutdown system has been tested
- e) confirmation that cargo tank, hold and insulation space pressure gauging systems and associated alarms are satisfactory
- f) examination, and testing as appropriate, of fixed gas detection equipment
- g) confirmation of the availability and suitability of the portable gas detection equipment and instruments for measuring oxygen levels.

Note 1: Verification of these devices is to be carried out by one or more of the following methods:

- visual external examination
- comparing of read-outs from different indicators
- consideration of read-outs with regard to the actual cargo and/or actual conditions
- examination of maintenance records with reference to the cargo plant instrumentation maintenance manual
- verification of calibration status of the measuring instruments.

3.6 Inert gas/air drying systems

3.6.1 (1/7/2010)

The survey is to include:

- a) the examinations and tests as provided for the annual survey of inert gas systems of oil tankers, given in Sec 3, [3.3]
- b) confirmation that arrangements are made for sufficient inert gas to be carried to compensate for normal losses and that means are provided for monitoring the spaces
- c) confirmation that the use of inert gas has not increased beyond that needed to compensate for normal losses by examining records of inert gas usage

- d) confirmation that the means for prevention of backflow of cargo vapour to gas-safe spaces are in satisfactory operating condition
- e) confirmation that any air drying system and any inter-barrier and hold space purging inert gas system are satisfactory
- f) for membrane containment systems, confirmation by the Master to the Surveyor of the normal operation of the nitrogen control system for insulation and inter-barrier spaces.

3.7 Steering capability

3.7.1 (1/7/2011)

Confirmation is to be given, when appropriate, that the requisite arrangements to regain steering capability in the event of the prescribed single failure are being maintained.

4 Intermediate survey - Hull items

4.1 Schedule

4.1.1 Survey planning meeting (1/7/2008)

A survey planning meeting is to be held prior to the commencement of the survey.

4.2 Scope

4.2.1 Extent of the survey (1/7/2008)

The extent of the survey is dependent on the age of the vessel as specified in [4.2.2].

4.2.2 Ballast tanks (1/7/2008)

- a) For ships between 5 and 10 years of age, an overall survey of representative ballast tanks is to be carried out. If there is no hard protective coating, or if there is soft or semi-hard coating or poor coating condition, the examination is to be extended to other ballast tanks of the same type.
- b) For ships over 10 years of age, an overall survey of all ballast tanks is to be carried out.
- c) If such examinations reveal no visible structural defects, the examination may be limited to verification that the corrosion prevention system remains efficient.
- d) For ballast tanks, excluding double bottom tanks, if there is no hard protective coating, or if there is soft or semi-hard coating, or poor coating condition and it is not renewed, the tanks in question are to be internally examined at annual intervals.
- e) When such conditions are found in double bottom ballast tanks, the tanks in question may be internally examined at annual intervals.
- f) The minimum requirements for close-up surveys at intermediate survey are given in Tab 1.

Table 1 : Minimum requirements for close-up survey at hull intermediate surveys of liquefied gas carriers (1/7/2008)

Age of ship (in years at time of intermediate survey)	
10 < age ≤ 15	age > 15
Close-up survey of: a) all web frames and both transverse bulkheads in a representative ballast tank (1) and (2) b) the upper part of one web frame in another representative ballast tank c) one transverse bulkhead in another representative ballast tank (2)	Close-up survey of: a) all web frames and both transverse bulkheads in two representative ballast tanks (1) and (2)
(1) Complete transverse web frame including adjacent structural members (2) Transverse bulkhead complete, including girder system and adjacent members, and adjacent longitudinal bulkhead structure Note 1: Ballast tanks include topside, double hull side, double bottom, hopper side, or any combined arrangement of the aforementioned, and peak tanks where fitted. Note 2: For areas in tanks where protective coating is found to be in good condition, the extent of close-up survey may be specially considered by the Society. Note 3: For ships having independent tanks of type C, with a midship section similar to that of a general cargo ship, the extent of close-up surveys may be specially considered by the Society. Note 4: The extent of close-up surveys may be extended by the Surveyor as deemed necessary, taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and also in the following cases: a) in particular, in tanks having structural arrangements or details which have suffered defects in similar tanks, or on similar ships according to available information; b) in tanks having structures approved with reduced scantlings.	

5 Intermediate survey - Cargo installation items

5.1 General

5.1.1 Aim of survey (1/7/2008)

The aim of the intermediate survey is to supplement the annual survey by testing cargo handling installations with related automatic control, alarm and safety systems for correct functioning.

5.1.2 Method of survey (1/7/2008)

The intermediate survey is preferably to be carried out with the ship in a gas-free condition. In fact, the extent of the testing required for the intermediate survey will normally be such that the survey cannot be carried out during a loading or discharging operation.

5.2 Weather decks and cargo handling rooms

5.2.1 (1/7/2008)

The survey is to include:

- examination, as far as applicable, of cargo and process, liquid nitrogen (if any), ballast, bunker, stripping and vent piping systems as well as vent masts and headers. If upon examination there is any doubt as to the condition of the piping, pressure testing, thickness measurement or both may be required
- examination of vent line drainage arrangements
- confirmation that cargo pipes and independent cargo tanks, where applicable, are electrically bonded to the hull.

5.3 Cargo area, cargo pump rooms, cargo compressor rooms

5.3.1 (1/7/2008)

Electrical equipment and cables in dangerous zones such as cargo pump rooms, cargo compressor rooms and spaces adjacent to and areas above cargo tanks are to be examined as far as practicable and tested with particular regard to:

- protective earthing (spot check)
- integrity of enclosures
- damage of outer sheath of cables
- function test of pressurised equipment and associated alarms
- test of systems for de-energising non-certified safe electrical equipment located in spaces protected by airlocks, such as electric motor rooms, cargo control rooms, etc.

5.3.2 (1/7/2008)

The electrical insulation resistance of the electrical equipment and circuits in dangerous zones is to be measured. These measurements are only to be effected when the ship is in a gas-free or inerted condition. Where a proper record of testing is maintained, consideration may be given to accepting recent readings by the ship's personnel.

Reference is also to be made to IACS Recommendation No. 35 - Inspection and maintenance of electrical equipment installed in hazardous areas.

5.3.3 (1/7/2015)

In addition to the requirements of [5.3.1] and [5.3.2], the survey also consists of:

- a) confirmation that the cargo heating/cooling system is in satisfactory condition
- b) confirmation that the heating system of the hull structure is in satisfactory working condition
- c) general examination and test of leakage detection systems in interbarrier and hold spaces.

5.4 Instrumentation and safety devices**5.4.1 (1/7/2008)**

The survey is to include:

- a) examination of the installed pressure gauging systems on cargo discharge lines, cargo tanks, holds and insulation spaces and associated alarms
- b) examination of the cargo tank liquid level gauges and high level alarms as well as automatic shut-off systems
- c) examination of the temperature indicating equipment of the cargo containment system and associated alarms
- d) test of the above-mentioned instrumentation by changing pressure, level and temperature as applicable and comparing with test instruments. Simulated tests may be accepted for sensors which are not accessible or located within cargo tanks or inerted hold spaces. The test is to include alarm and safety functions
- e) examination, as far as practicable, of the piping of the gas detection system for corrosion and damage. The integrity of the suction lines between suction points and analysing units is to be verified as far as possible
- f) calibration of gas detectors or verification thereof with sample gases
- g) confirmation of the availability and suitability of the portable gas detection equipment and instruments for measuring oxygen levels
- h) test of the manually operated emergency shutdown system (without flow in the pipelines) to verify that the system will cause the cargo pumps and compressors to stop.

5.4.2 (1/7/2008)

The instrumentation and safety systems for burning cargo as fuel are to be examined in accordance with the requirements indicated in [5.4.1].

5.5 Inert gas system**5.5.1 (1/7/2008)**

For ships over 10 years old at the time of the intermediate survey due date, if an inert gas system such as that installed on board oil tankers is fitted, the requirements given in Sec 3, [5.2] for intermediate survey of oil tankers are to be complied with.

5.5.2 (1/7/2008)

In the case of low temperature liquid nitrogen storage, the plant and its associated arrangements for protecting the hull structure against liquid nitrogen leakage are to be examined.

6 Class renewal survey - Hull items**6.1 Schedule****6.1.1 Survey planning meeting (1/7/2008)**

A survey planning meeting is to be held prior to the commencement of the survey.

6.2 Scope of survey**6.2.1 General (1/7/2008)**

In addition to the requirements of annual surveys, the class renewal survey is to include examination, tests and checks of sufficient extent to ensure that the hull and related piping, as required in [6.2.3], are in satisfactory condition and fit for the intended purpose for the new period of class of 5 years to be assigned, subject to proper maintenance and operation and to periodical surveys being carried out at the due dates.

6.2.2 Tanks, spaces and areas (1/7/2008)

Ballast tanks, including double bottom tanks, pump rooms, compressor rooms, pipe tunnels, cofferdams and void spaces bounding cargo tanks, decks and outer hull are to be examined, and this examination is to be supplemented by thickness measurement and testing, as required in [6.4] and [6.5], to ensure that the structural integrity remains effective.

The aim of the examination is to discover substantial corrosion, significant deformation, fractures, damage or other structural deterioration that may be present.

6.2.3 Piping (1/7/2008)

All piping systems within the above spaces, except those related to cargo installations, for which reference is to be made to [7.3], are to be examined and operationally tested to working pressure to the attending Surveyor's satisfaction to ensure that tightness and condition remain satisfactory.

6.2.4 Ballast tanks converted to void spaces (1/7/2008)

The extent of the survey of ballast tanks converted to void spaces is to be specially considered in relation to the requirements for ballast tanks.

Note 1: For survey of automatic air pipes, refer to Ch 3, Sec 5, [2.2.5].

Note 2: For examination of automatic air pipe heads, reference is to be made to the requirements given in Ch 3, Sec 5, Tab 4.

6.2.5 Dry-docking survey (1/7/2008)

The class renewal survey is to include a bottom survey in dry condition as laid down in Ch 3, Sec 6, [2.2.1]. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the ballast tanks are to be carried out in accordance with the applicable requirements for class renewal surveys, if not already performed.

Note 1: Lower portions of the ballast tanks are considered to be the parts below the light ballast waterline.

6.2.6 Ballast tank protection (1/7/2008)

The condition of the corrosion prevention system of ballast tanks, where provided, is to be examined.

For tanks used for water ballast, excluding double bottom tanks, where a hard protective coating is found in poor condition and it is not renewed, where soft or semi-hard coating has been applied, or where a hard protective coating has not been applied since the time of construction, the tanks in question are to be examined at annual surveys. Thickness measurements are to be carried out as deemed necessary by the Surveyor.

When such breakdown of hard protective coating is found in water ballast double bottom tanks and it is not renewed, where a soft or semi-hard coating has been applied, or where a hard protective coating has not been applied since the time of construction, the tanks in question may be examined at annual surveys. When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurements are to be carried out.

6.2.7 Special consideration (1/7/2008)

Where the hard protective coating in ballast tanks is found to be in a good condition, the extent of close-up surveys and thickness measurements may be specially considered.

6.3 Extent of overall and close-up surveys

6.3.1 Overall surveys (1/7/2008)

An overall survey of all tanks and spaces, excluding fuel oil, lube oil and fresh water tanks, is to be carried out at each class renewal survey.

Note 1: For fuel oil, lube oil and fresh water tanks, reference is to be made to the requirements given in Ch 3, Sec 5, [2.4.1].

6.3.2 Close-up surveys (1/7/2008)

The minimum requirements for close-up surveys at class renewal survey are given in Tab 2.

6.3.3 Expansion of close-up surveys (1/7/2008)

The Surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and where tanks have structural arrangements or details which have suffered defects in similar spaces or on similar ships according to available information.

6.3.4 Special consideration (1/7/2008)

For areas in tanks where hard protective coatings are found to be in a good condition, the extent of close-up surveys according to Tab 2 may be specially considered.

6.4 Extent of thickness measurements

6.4.1 Minimum requirements (1/7/2008)

The minimum requirements for thickness measurements at class renewal survey are given in Tab 3.

6.4.2 Expansion of thickness measurements (1/7/2008)

The Surveyor may extend the thickness measurements as deemed necessary. When thickness measurements indicate substantial corrosion, the extent of such measurements is to be increased to determine the extent of areas of substantial corrosion. Tab 4 may be used as guidance for these additional thickness measurements.

6.4.3 Special consideration (1/7/2008)

For areas in tanks where hard protective coatings are found to be in a good condition, the extent of thickness measurement according to Tab 3 may be specially considered.

6.4.4 Choice of transverse sections (1/7/2008)

Transverse sections are to be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements.

6.5 Extent of tank testing

6.5.1 Testing requirements (1/7/2008)

All boundaries of water ballast tanks and deep tanks used for water ballast within the cargo area are to be pressure tested. For fuel oil tanks, representative tanks are to be pressure tested.

6.5.2 Expansion of tank testing (1/7/2008)

The Surveyor may extend the tank testing as deemed necessary.

6.5.3 Method of tank testing (1/7/2008)

Tank testing of fuel oil tanks is to be carried out with a head of liquid to the highest point that liquid will rise to under service conditions. Tank testing of fuel oil tanks may be specially considered based on a satisfactory external examination of the tank boundaries, and a confirmation from the Master stating that the pressure testing has been carried out according to the requirements with satisfactory results.

6.6 Emergency towing arrangement

6.6.1 (1/7/2008)

The survey is to include:

- a) an examination of the emergency towing arrangement
- b) confirmation that the arrangement is readily available with aft towing arrangement pre-rigged and forward chafing gear secured to the strong-point
- c) an examination of the pick-up gear, towing pennant and chafing gear over the full length for possible deterioration. Where the pennant line is stored in a watertight condition and can be confirmed as being maintained, consideration may be given to waiving the requirement to examine the pennant line over the full length
- d) an examination of the strong-points, fairleads and pedestal roller together with their attachments to the hull structure.

Table 2 : Minimum requirements for close-up survey at class renewal surveys of liquefied gas carriers (1/7/2008)

Age of ship (in years at time of class renewal survey due date)		
age ≤ 5	5 < age ≤ 10	age > 10
One web frame in a representative ballast tank of the topside, hopper side and double hull side type (1) One transverse bulkhead in a ballast tank (3)	All web frames in a ballast tank, which is to be a double hull side tank or a topside tank. If such tanks are not fitted, another ballast tank is to be selected (1) One web frame in each remaining ballast tank (1) One transverse bulkhead in each ballast tank (2)	All web frames in all ballast tanks (1) All transverse bulkheads in all ballast tanks (2)
<p>(1) Complete transverse web frame including adjacent structural members (2) Transverse bulkhead complete, including girder system and adjacent members, and adjacent longitudinal bulkhead structure (3) Transverse bulkhead lower part including girder system and adjacent structural members</p> <p>Note 1: Ballast tanks include topside, double hull side, double bottom, hopper side, or any combined arrangement of the aforementioned, and peak tanks where fitted. Note 2: For areas in tanks where coatings are found to be in good condition, as defined in Ch 2, Sec 2, [2.2.13], the extent of close-up surveys may be specially considered by the Society. Note 3: For ships having independent tanks of type C, with a midship section similar to that of a general cargo ship, the extent of close-up surveys may be specially considered by the Society. Note 4: The Surveyor may extend the close-up survey as deemed necessary, taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and also in the following cases:</p> <p>a) in particular, in tanks having structural arrangements or details which have suffered defects in similar tanks, or on similar ships according to available information; b) in tanks having structures approved with reduced scantlings.</p>		

Table 3 : Minimum requirements for thickness measurements at class renewal surveys of liquefied gas carriers (1/7/2008)

Age of ship (in years at time of class renewal survey due date)			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	age > 15
Suspect areas	Suspect areas	Suspect areas	Suspect areas
One section of deck plating for the full beam of the ship within 0,5 L amidships in way of a ballast tank, if any	Within the cargo area: <ul style="list-style-type: none"> • each deck plate • b)one transverse section within 0,5 L amidships in way of a ballast tank, if any 	Within the cargo area: <ul style="list-style-type: none"> • each deck plate • two transverse sections (1) • all wind and water strakes 	Within the cargo area: <ul style="list-style-type: none"> • each deck plate • three transverse sections (1) • each bottom plate • duct keel plating and internals
	Selected wind and water strakes outside the cargo area	Selected wind and water strakes outside the cargo area	All wind and water strakes, full length
Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Tab 2	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Tab 2	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Tab 2	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Tab 2
<p>(1) At least one section is to be within 0,5 L amidships and, where applicable, in way of a ballast tank. Note 1:For ships having independent tanks of type C, with a midship section similar to that of a general cargo ship, the extent of thickness measurements may be increased to include the tank top plating at the discretion of the Surveyor. Note 2:For areas in spaces where coatings are found to be in good condition, the extent of thickness measurements may be specially considered by the Society. Note 3:The Surveyor may extend the thickness measurements as deemed necessary. When thickness measurements indicate substantial corrosion, the extent of such measurements is to be increased to determine the extent of areas of substantial corrosion. Tab 4 may be used as guidance for these additional thickness measurements.</p>			

Table 4 : Guidance for additional thickness measurements in way of substantial corrosion (1/7/2008)

Structural member	Extent of Measurement	Pattern of Measurement
Plating	Suspect area and adjacent plates	5-point pattern over 1 square metre
Stiffeners	Suspect area	3 measurements each in line across web and flange

7 Class renewal survey - Cargo installation items

7.1 General

7.1.1 (1/7/2008)

The requirements of intermediate survey apply with the following additions.

7.2 Cargo containment

7.2.1 Cleaning and examination of tanks (1/7/2008)

All cargo tanks are to be cleaned and examined internally.

7.2.2 Insulation and cold spots (1/7/2008)

When accessible, the outer surface of uninsulated cargo tanks or the outer surface of cargo tank insulation together with any vapour or protective barrier is to be examined. Special attention is to be given to the cargo tank and insulation in way of chocks, supports and keys. Removal of insulation may be required in order to verify the condition of the tank or the insulation itself if found necessary by the Surveyor.

Where the arrangement is such that the insulation cannot be examined, the surrounding structures of wing tanks, double bottom tanks and cofferdams are to be examined for cold spots when the cargo tanks are in the cold condition unless voyage records together with the instrumentation give sufficient evidence of the integrity of the insulation system.

7.2.3 Non-destructive testing (1/7/2011)

Non-destructive testing is to supplement cargo tank inspection with special attention to be given to the integrity of the main structural members, tank shell and highly stressed parts, including welded connections as deemed necessary by the Surveyor. However, for type C tanks, this does not mean that non-destructive testing can be dispensed with totally. The following items are, inter alia, considered highly stressed parts:

- cargo tank supports and anti-rolling/anti-pitching devices,
- web frames or stiffening rings,
- Y-connections between tank shell and a longitudinal bulkhead of bilobe tanks,
- swash bulkhead boundaries,

- dome and stump connections to tank shell,
- foundations for pumps, towers, ladders, etc.,
- pipe connections.

Where the tanks are to be hydraulically tested in accordance with [7.2.7], non-destructive testing is to be carried out after the hydraulic testing.

7.2.4 Type B tanks (1/7/2008)

For independent tanks of type B, the extent of non-destructive testing is to be as given in a program specially prepared for the cargo tank design.

7.2.5 Tightness of tanks (1/7/2008)

The tightness of all cargo tanks is to be verified by an appropriate procedure. Provided that the effectiveness of the ship's gas detection equipment has been confirmed, it will be acceptable to utilise this equipment for the tightness test of independent tanks below deck.

7.2.6 Hydraulic or hydro-pneumatic test (1/7/2008)

Where the results of the examinations dealt with in [7.2.1] to [7.2.5] or the examination of the voyage records raise doubts as to the structural integrity of a cargo tank, a hydraulic or hydro-pneumatic test is to be carried out.

For integral tanks and for independent tanks of type A and B, the test pressure is to be not less than the MARVS.

For independent tanks of type C, the test pressure is to be not less than 1,25 times the MARVS.

7.2.7 Type C tanks (1/7/2009)

When the ship is 10 years old and thereafter at every alternate class renewal survey, independent cargo tanks of type C are to be either:

- hydraulically tested to 1,25 times the MARVS, and thereafter non-destructively tested in accordance with [7.2.3], or
- subjected to thorough non-destructive testing in accordance with a program specially prepared for the tank design. If a special program of non-destructive testing does not exist, special attention is to be given to the detection of surface cracks in welded connections in highly stressed areas as listed in [7.2.3]. At least 10% of the length of the welded connections in each of the above-mentioned areas is to be tested. This testing is to be carried out internally and externally, as applicable. Insulation is to be removed as necessary for the required non-destructive testing.

7.2.8 Hold spaces and secondary barriers (1/7/2008)

As far as accessible, all hold spaces and hull insulation (if provided), secondary barriers and tank supporting structures are to be visually examined.

The secondary barrier of tanks is to be checked for its effectiveness by means of a pressure/vacuum test, a visual examination or any other acceptable method.

7.2.9 Membrane and semi-membrane systems (1/7/2014)

a) For membrane containment systems, a tightness test of the primary and secondary barrier is to be carried out in accordance with the system Designers' procedures and acceptance criteria as approved by the Society.

Low differential pressure tests may be used to monitor the cargo containment system performance, but are not considered an acceptable test for the tightness of the secondary barrier.

b) For membrane containment systems with glued secondary barriers, if the designer's threshold values are exceeded, an investigation is to be carried out and additional testing such as thermographic or acoustic emissions testing should be carried out.

7.2.10 Gas-tight bulkheads (1/7/2008)

All gas-tight bulkheads are to be examined and the effectiveness of gas-tight shaft sealing is to be verified.

7.2.11 Tanks electrically bonded (1/7/2008)

It is to be verified that independent cargo tanks are electrically bonded to the hull.

7.2.12 Pressure relief valves (1/7/2008)

Pressure relief valves for cargo tanks are to be opened for examination, adjusted, function tested and sealed. If the cargo tanks are equipped with relief valves with non-metallic membranes in the main or pilot valves, these non-metallic membranes are to be replaced. Where a proper record of continuous overhaul and re-testing of individually identifiable relief valves is maintained, consideration may be given to acceptance on the basis of opening, internal examination and testing of a representative sample of valves, including each size and type of liquefied gas or vapour relief valves in use, provided there is evidence in the log-book that the remaining valves have been overhauled and tested since crediting of the previous class renewal survey.

7.2.13 Pressure/vacuum relief valves (1/7/2008)

Pressure/vacuum relief valves, rupture disc and other pressure relief devices for interbarrier spaces and hold spaces are to be opened, examined, tested and readjusted as necessary, depending on their design.

7.3 Piping systems

7.3.1 (1/7/2008)

Cargo, liquid nitrogen (if any), process, stripping and venting piping systems, including valves, actuators, compensators, etc. are to be opened for examination as deemed necessary. Insulation is to be removed as deemed necessary to ascertain the condition of the pipes. If the visual exami-

nation raises doubt as to the integrity of the pipelines, a pressure test at 1,25 times the MARVS for the pipeline is to be carried out. After reassembly the complete piping systems are to be tested for leaks.

7.3.2 (1/7/2008)

It is to be verified that all cargo piping systems are electrically bonded to the hull.

7.3.3 (1/7/2008)

Pressure relief valves on cargo piping are to be function tested. A random selection of valves is to be opened for examination and adjusted.

7.3.4 (1/7/2008)

Vent line drainage arrangements are to be examined.

7.4 Cargo area, cargo pump rooms, cargo compressor rooms

7.4.1 Examination of spaces (1/7/2008)

All cargo pump room, compressor room and control room boundaries are to be generally examined. Gas-tight shaft sealing devices are to be examined. The bottom of cargo pump rooms and cargo compressor rooms is to be presented clean for the examination of stripping devices and gutters.

7.4.2 Examination of pumps (1/7/2008)

Ballast and stripping pumps are to be internally examined and prime movers checked. A working test is to be carried out.

Maintenance records of cargo pumps are to be made available to the Surveyor.

7.4.3 Electrical equipment in dangerous zones (1/7/2008)

Electrical equipment and cables in dangerous zones such as cargo pump rooms, cargo compressor rooms and spaces adjacent to and areas above cargo tanks are to be examined as far as practicable and tested with particular regard to:

- protecting earthing (spot check)
- integrity of enclosures
- damage of outer sheath of cables
- function testing of pressurised equipment and associated alarms
- testing of systems for de-energising non-certified safe electrical equipment located in spaces protected by airlocks, such as electric motor rooms, cargo control rooms, etc.

7.4.4 Measurement of electrical insulation (1/7/2008)

The electrical insulation resistance of the electrical equipment and circuits in dangerous zones is to be measured. These measurements are only to be effected when the ship is in a gas-free or inerted condition. Where a proper record of testing is maintained, consideration may be given to accepting recent readings by the ship's personnel.

Reference is also to be made to IACS Recommendation No. 35 - Inspection and maintenance of electrical equipment installed in hazardous areas.

7.4.5 Reliquefaction or refrigeration plants, arrangements for the use of cargo as fuel
(1/7/2008)

When there is a reliquefaction or refrigeration plant, and/or arrangements for the use of cargo as fuel, the corresponding machinery and equipment, such as cargo pumps, compressors, heat exchangers, condensers, liquid nitrogen tanks, process pressure vessels and other components, are to be surveyed to the same extent as required for similar equipment on board oil tankers at the class renewal survey (refer to Sec 3).

7.4.6 Additional examinations (1/7/2008)

In addition to the requirements of [7.4.1] to [7.4.5], the survey also consists of:

- a) confirmation that the installation for heating the hull structure is in satisfactory working condition
- b) general examination and testing of leakage detection systems in interbarrier spaces and hold spaces
- c) examination of the gas detection piping system for corrosion or damage; checking, as far as possible, of the

integrity of suction lines between suction points and analysing units

- d) examination and tests of systems for the removal of water from interbarrier spaces and hold spaces
- e) examination of portable equipment, such as hoses and spool pieces used for segregation of piping systems for cargo, inert gas and bilge pumping.

7.5 Inert gas system

7.5.1 (1/7/2008)

If an inert gas system such as that installed on board oil tankers is fitted, the requirements given in Sec 3, [7.2] are to be complied with.

7.5.2 (1/7/2008)

In the case of low temperature liquid nitrogen storage, the plant and its associated arrangements for protecting the hull structure against liquid nitrogen leakage are to be examined.

Figure 1 : Typical midship sections of liquefied gas carriers (1/7/2008)

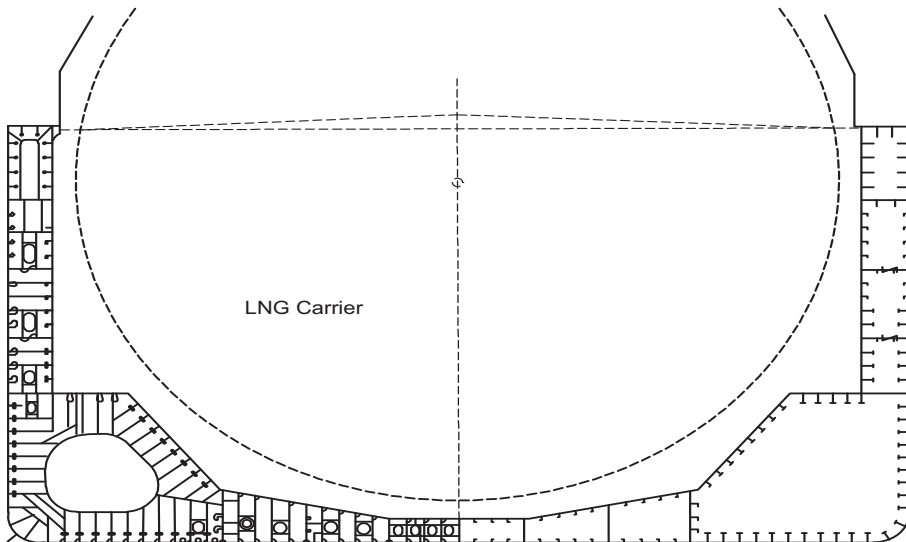


Figure 2 (1/7/2008)

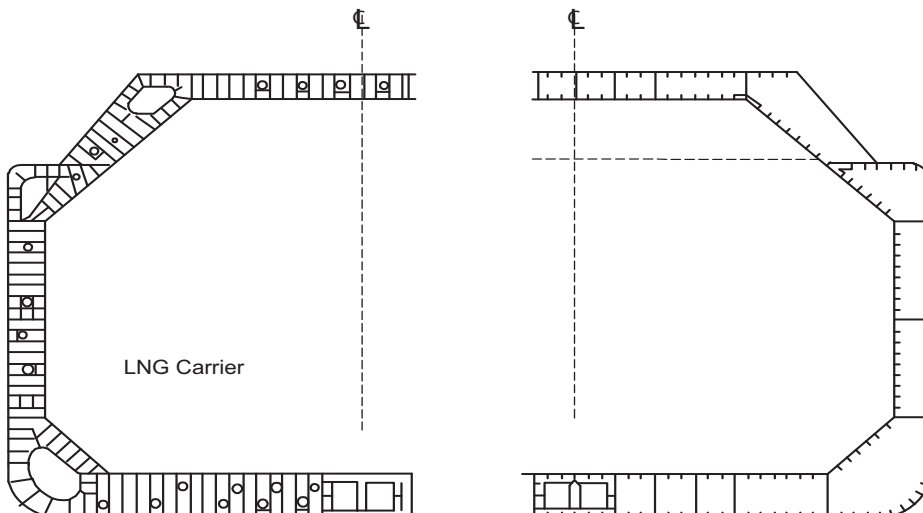


Figure 3 (1/7/2008)

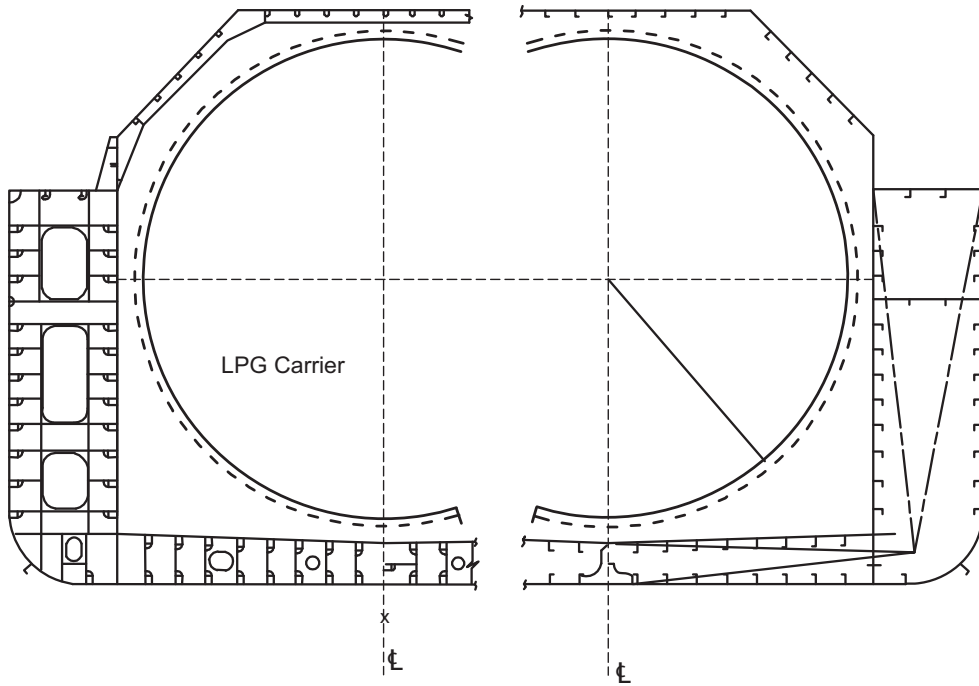
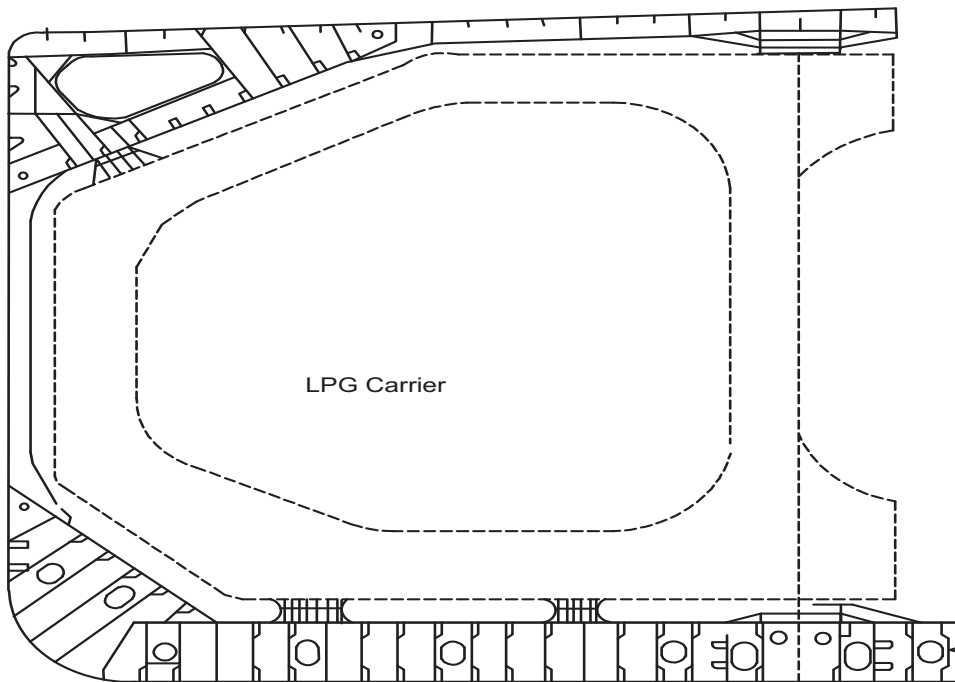


Figure 4 (1/7/2008)



SECTION 7

RO-RO CARGO SHIPS, CAR CARRIER PASSENGER SHIPS, RO-RO PASSENGER SHIPS

1 General

1.1

1.1.1 (1/7/2016)

The requirements of this Section are applicable after construction to all self-propelled ships which have been assigned one of the following service notations:

- **ro-ro cargo ship**
- **car carrier**
- **passenger ship**
- **ro-ro passenger ship.**

1.1.2 These requirements are additional to those laid down in Chapter 3, according to the relevant surveys.

1.1.3 Periodical lightweight check

At periodical intervals not exceeding five years, a lightweight survey is to be carried out on all ships having the service notation **passenger ship** or **ro-ro passenger ship** to verify any changes in lightship displacement and longitudinal centre of gravity. The ship is to be re-inclined whenever, in comparison with the approved stability information, a deviation from the lightship displacement exceeding 2% or a deviation of the longitudinal centre of gravity exceeding 1% of L is found, or anticipated.

1.2 Application

1.2.1 General (1/1/2012)

The survey requirements in [2.1], [3.1] and [6.1] for annual and renewal survey are applicable to the survey of bow, inner, side shell and stern doors of ro-ro passenger ships and ro-ro cargo ships, to the extent appropriate to the arrangement and equipment of each ship.

1.2.2 Special consideration (1/1/2012)

Special consideration may be given in application of relevant requirements of this Section to commercial vessels owned or chartered by Governments, which are utilised in support of military operations or service.

1.3 Definitions

1.3.1 General (1/1/2012)

For the purpose of the survey requirements for shell and inner doors laid down in [2.1], [3.1] and [6.1] for annual and renewal survey for ro-ro cargo ships and ro-ro passenger ships, the following definitions are given.

1.3.2 Ro-ro ship (1/1/2012)

A ro-ro ship is a ship which utilises a loading ramp to enable wheeled vehicles to be rolled on and rolled off the ship.

1.3.3 Ro-ro passenger ship (1/1/2012)

A ro-ro passenger ship is a passenger ship with ro-ro spaces or special category spaces.

1.3.4 Ro-ro spaces (1/1/2012)

Ro-ro spaces are spaces not normally subdivided in any way and normally extending to either a substantial length or the entire length of the ship, in which motor vehicles with fuel in their tanks for their own propulsion and/or goods (packaged or in bulk, in or on rail or road cars, vehicles (including road or rail tankers), trailers, containers, pallets, demountable tanks or in or on similar stowage units or, other receptacles) can be loaded and unloaded normally in a horizontal direction.

1.3.5 Special category spaces (1/1/2012)

Special category spaces are those enclosed vehicle spaces above or below the bulkhead deck, into and from which vehicles can be driven and to which passengers have access. Special category spaces may be accommodated on more than one deck provided that the total overall clear height for vehicles does not exceed 10 m.

1.3.6 Securing device (1/1/2012)

A securing device is a device used to keep the door closed by preventing it from rotating about its hinges.

1.3.7 Supporting device (1/1/2012)

A supporting device is a device used to transmit external or internal loads from the door to a securing device and from the securing device to the ship's structure, or a device other than a securing device, such as a hinge, stopper or other fixed device, that transmits loads from the door to the ship's structure.

1.3.8 Locking device (1/1/2012)

A locking device is a device that locks a securing device in the closed position.

1.3.9 Close-up survey (1/1/2012)

A close-up survey is a survey where the details of structural components are within the close visual inspection range of the Surveyor, i.e. normally within reach of hand.

2 Ro-ro cargo ships, Car Carrier - Annual survey

2.1 Shell and inner doors

2.1.1 Scope of survey (1/1/2012)

The survey is to consist of an examination to verify, as far as is practicable, that the bow, inner, side shell and stern doors are maintained in a satisfactory condition.

2.1.2 Unapproved changes (1/1/2012)

Confirmation is to be obtained that no unapproved changes have been made to the bow, inner, side shell and stern doors since the last survey.

2.1.3 Documents (1/1/2012)

If an Operating and Maintenance Manual (OMM) is required, it is to be verified that an approved copy is on board and any possible modifications are included.

It is to be verified that documented operating procedures for closing and securing doors are kept on board and posted at an appropriate place.

The Surveyor is to examine the OMM with special attention to the register of inspections and its contents as a basis for the survey.

2.1.4 Structural examination (1/1/2012)

Bow, inner, side shell and stern doors are to be examined with particular attention paid to:

- a) structural arrangement of doors including plating, secondary stiffeners, primary structure, hinging arms and welding;
- b) shell structure surrounding the opening of the doors and the securing, supporting and locking devices including shell plating, secondary stiffeners, primary structure and welding;
- c) hinges and bearings, thrust bearings;
- d) hull and door side supports for securing, supporting and locking devices;
- e) close-up survey of securing, supporting and locking devices including welding, in accordance with the requirements given in Tab 1.

Whenever a crack is found, an examination with NDT is to be carried out in the surrounding area and for similar items as considered necessary by the Surveyor.

2.1.5 Measurement of clearances (1/1/2012)

Clearances of hinges, bearings and thrust bearings are to be taken, where no dismantling is required. Where the function test is not satisfactory, dismantling may be required to measure the clearances. If dismantling is carried out, a visual examination of hinge pins and bearings together with NDT of the hinge pin is to be carried out. Clearances of securing, supporting and locking devices are to be measured, where indicated in the OMM.

2.1.6 Sealing arrangement (1/1/2012)

An examination of packing material/rubber gaskets and retaining bars or channels, including welding, is to be carried out.

2.1.7 Drainage arrangement (1/1/2012)

An examination of drainage arrangement, including bilge wells and drain pipes, where fitted, is to be carried out. A test of the bilge system between the inner and outer doors is to be carried out.

2.1.8 Function test of doors (1/1/2012)

A check of the satisfactory operation of the bow, inner, side shell and stern doors during a complete opening and closing operation is to be made, as applicable, including:

- a) proper working of the hinging arms and hinges;
- b) proper engagement of the thrust bearings;
- c) device for locking the door in the open position;
- d) securing, supporting and locking devices;
- e) proper sequence of the interlock system for the opening/closing system and the securing and locking devices;
- f) mechanical lock of the securing devices;
- g) proper locking of hydraulic securing devices in the event of a loss of the hydraulic fluid, according to the procedure provided by the OMM;
- h) correct indication of open/closed position of doors and securing/locking devices at navigation bridge and other control stations;
- i) isolation of the hydraulic securing/locking devices from other hydraulic systems;
- j) confirmation that the operating panels are inaccessible to unauthorised persons;
- k) verification that a notice plate giving instructions to the effect that all securing devices are to be closed and locked before leaving harbour is placed at each operating panel and supplemented by warning indicator lights;
- l) examination of electrical equipment for opening, closing and securing the doors.

2.1.9 Function test of the indicator system (1/1/2012)

A check of the satisfactory operation of the indicator system, where fitted, is to be carried out, as applicable, including:

- a) proper visible indication and audible alarm on the navigation bridge panel, according to the selected function "harbour/sea voyage" and on the operating panel;
- b) lamp test function on both panels;
- c) verification that it is not possible to turn off the indicator light on both panels;
- d) verification of fail-safe performance, according to the procedure provided by the OMM;
- e) confirmation that power supply for the indicator system is supplied by the emergency source or other secure power supply and independent of the power supply for operating the doors;
- f) proper condition of sensors and protection from water, ice formation and mechanical damage.

2.1.10 Test of water leakage detection system (1/1/2012)

Where fitted, the water leakage detection system is to be tested including proper audible alarm on the navigation bridge panel and on the engine control room panel, according to the procedure provided by the OMM.

2.1.11 Test of television surveillance system (1/1/2012)

Where fitted, the television surveillance system is to be tested including proper indication on the navigation bridge monitor and on the engine control room monitor.

2.1.12 Tightness test (1/1/2012)

A hose test or equivalent is to be carried out. If the visual examination and function test have shown satisfactory results, the tightness test of shell doors on ro-ro cargo ships need not be carried out unless considered necessary by the attending Surveyor.

2.1.13 NDT and thickness measurements (1/1/2012)

When considered necessary by the Surveyor, NDT and thickness measurements may be required after visual examination and function test.

2.2 Internal platforms and ramps

2.2.1 The annual survey of internal movable platforms and ramps (excluding those considered as inner doors and covered in [2.1]) and related equipment consists of:

- a general examination of the installation, particular attention being paid to the condition of steel cables
- confirmation of the proper operation of platforms/ramps and of mechanical stops and locks
- checking, as far as practicable, of the alarms and safety devices.

2.3 Fire protection, detection and extinction

2.3.1 (1/7/2012)

Within the scope of survey of fire protection, detection and extinction arrangements as required for the annual survey of all ships in Ch 3, Sec 3, [3.4], attention is to be given to the particular arrangements related to ro-ro cargo spaces, such as:

- fire detection systems and alarms
- electrical equipment of a safe type.

3 Ro-ro cargo ships, Car Carrier - Class renewal survey

3.1 Shell and inner doors

3.1.1 Scope of survey (1/1/2012)

The class renewal survey is to include, in addition to the requirements of the annual survey as stated in [2.1], examination, tests and checks of sufficient extent to verify that the bow, inner, side shell and stern doors are in satisfactory condition and considered able to remain in compliance with applicable requirements, subject to proper maintenance and operation in accordance with the Operation and

Maintenance Manual (OMM) or the Manufacturer's recommendations and the periodical surveys being carried out at the due dates for the five-year period until the next class renewal survey.

3.1.2 Thickness measurements and testing (1/1/2012)

The examinations of the doors are to be supplemented by thickness measurements and testing to verify compliance with applicable requirements so that the structural and weathertight integrity remain effective. The aim of the examination is to identify corrosion, significant deformation, fractures, damages or other structural deterioration, that may be present.

3.1.3 Survey of doors (1/1/2012)

The bow, inner, side shell and stern doors are to be surveyed as follows.

- a) A survey of the items listed in [2.1.4], including close-up survey of securing, supporting and locking devices, together with welding, is to be carried out in accordance with the requirements given in Tab 1.
- b) Non-destructive testing and thickness measurements are to be carried out on securing, supporting and locking devices, including welding, to the extent considered necessary by the Surveyor. Whenever a crack is found, an examination with NDT is to be carried out in the surrounding area and for similar items as considered necessary by the Surveyor.
- c) The maximum thickness diminution of hinging arms, securing, supporting and locking devices is not to be more than 15% of the as-built thickness.
- d) A check of the effectiveness of sealing arrangements by hose testing or equivalent is to be carried out.
- e) Clearances of hinges, bearings and thrust bearings are to be taken. Unless otherwise specified in the OMM or recommended by the Manufacturer, the measurement of clearances on ro-ro cargo ships may be limited to representative bearings where dismantling is needed in order to measure the clearances. If dismantling is carried out, a visual examination of hinge pins and bearings together with NDT of the hinge pin is to be carried out.
- f) The non-return valves of the drainage system are to be dismantled and examined.

3.2 Internal platforms and ramps

3.2.1 The condition of pulleys, axles, cables and structure of the platforms and ramps is to be checked.

Electric motors and/or hydraulically operated equipment are to be surveyed according to the scope detailed in Ch 3, Sec 5, [3] for the class renewal survey of machinery installations.

Table 1 : Minimum Requirements for Close-Up Surveys of Doors, Locking, Securing and Supporting Devices and Fittings (1/1/2012)

Items to be subjected to close-up survey at annual and class renewal surveys	
1	Cylinder securing pins, supporting brackets, back-up brackets (where fitted) and their welded connections
2	Hinge pins, supporting brackets, back-up brackets (where fitted) and their welded connections
3	Locking hooks, securing pins, supporting brackets, back-up brackets (where fitted) and their welded connections
4	Locking pins, supporting brackets, back-up brackets (where fitted) and their welded connections
5	Locating and stopper devices and their welded connections

3.3 Fire protection, detection and extinction

3.3.1 Within the scope of survey of fire protection, detection and extinction arrangements, attention is to be given to the particular arrangements related to ro-ro cargo spaces, such as those indicated in [2.3.1].

4 Passenger ships - Annual survey

4.1 Watertight bulkheads

4.1.1 The survey of watertight bulkheads and arrangements consists of:

- examination, as far as practicable, of collision and watertight bulkheads, and confirmation that their watertight integrity has not been impaired
- checking the diagram provided on the navigation bridge showing the location of the watertight doors and related indicators for their open/closed position
- testing operation of local and remote control (from the navigation bridge) of the watertight doors, and in particular, operation from each side of the bulkhead of audible alarms or visual signals and control handles, as required or fitted
- confirmation of operation of watertight doors in the event of failure of main and emergency sources of power
- confirmation that notices are affixed at appropriate locations.

4.2 Openings in shell plating

4.2.1 The survey consists of:

- examination of the arrangements for closing sidescuttles and their deadlights, as well as scuppers, sanitary dis-

charges and similar openings and other inlets and discharges in the shell plating below the margin line

- confirmation that valves for closing the main and auxiliary sea inlets and discharges in the machinery spaces are readily accessible, and that indicators showing the status of the valves are provided, as required or fitted
- confirmation that gangway access and cargo ports fitted below the margin line may be effectively closed and that the inboard ends of any ash or rubbish chutes are fitted with an effective cover.

4.3 Lightweight survey

4.3.1 (1/7/2001)

It is to be verified that the last lightweight survey was carried out not more than five years ago (refer to [1.1.3]).

5 Passenger ships - Class renewal survey

5.1

5.1.1 (1/7/2001)

It is to be verified that the last lightweight survey was carried out not more than five years ago (refer to [1.1.3]).

6 Ro-ro passenger ships - Annual and class renewal surveys

6.1

6.1.1 The scope of the annual survey and class renewal survey of **ro-ro passenger ship** is to include the scope of surveys required for the service notations **ro-ro cargo ship** and **passenger ship**, as detailed in [2] and [4] for annual survey and [3] and [5] for class renewal survey .

SECTION 8

GENERAL DRY CARGO SHIPS

1 General

1.1 Application

1.1.1 (1/7/2015)

The requirements of this Section apply to all self-propelled General Dry Cargo Ships 500 gt and above carrying solid cargoes other than (see Note 1):

- ships subject to the provisions of Sec 2 or Sec 9
- dedicated container carriers;
- ro-ro cargo ships;
- refrigerated cargo ships;
- dedicated wood chip carriers;
- dedicated cement carriers;
- livestock carriers;
- deck cargo ships (see Note 2):
- general dry cargo ships of double side-skin construction, with double side-skin extending for the entire length of the cargo area, and for the entire height of the cargo hold to the upper deck;
- sugar carriers;
- fly ash carriers.

Note 1: The requirements of [2.2.1] and [4.7.1] also apply to those cargo ships which, although belonging to the ship types listed in [1.1.1] that are excluded from the application of this Section, are fitted with a single cargo hold.

Note 2: A "deck cargo ship" is a ship that is designed to carry cargo exclusively above deck without any access for cargo below deck.

1.1.2 (1/1/2019)

For General Dry Cargo Ships with hybrid cargo hold arrangements, e.g. with some cargo holds of single-side skin and others of double-side skin, the requirements of this Section are to be applied only to structure in way of the single-side skin cargo hold region.

1.1.3 (1/7/2006)

The requirements apply to the surveys of the hull structure and piping systems in way of cargo holds, cofferdams, pipe tunnels, void spaces and fuel oil tanks within the cargo area and all ballast tanks. They are additional to the requirements applicable to the remainder of the ship, given in Chapter 3 according to the relevant surveys.

1.1.4 (1/7/2003)

The requirements contain the minimum extent of examination, thickness measurements and tank testing. When substantial corrosion, as defined in Ch 2, Sec 2, [2.2.9], and/or structural defects are found, the survey is to be extended

and is to include additional close-up surveys when necessary.

1.1.5 (1/7/2003)

When, in any survey, thickness measurements are required:

- the procedure detailed in Ch 2, Sec 2, [2.3] is to be applied
- the thickness measurement operator is to attend the survey planning meeting held prior to commencing the survey.

1.1.6 (1/1/2019)

When close-up surveys are required, consideration may be given by the Surveyor to allow the use of Remote Inspection Techniques (RIT), according to the provisions of Ch 2, Sec 2, [2.3.3] and Ch 2, Sec 2, [2.6].

1.2 Reporting and evaluation of surveys

1.2.1 (1/7/2003)

The data and information on the structural condition of the ship collected during survey are evaluated for acceptability and structural integrity of the ship's cargo area.

1.2.2 (1/7/2003)

The survey and thickness measurement reports are to be issued to the Owner and placed on board the ship for reference at future surveys.

2 Annual survey

2.1 Scope

2.1.1 General (1/7/2003)

The survey is to consist of an examination for the purpose of ensuring, as far as practicable, that the hull, hatch covers, coamings and piping are maintained in a satisfactory condition.

2.1.2 Examination of the Hull (1/7/2003)

- a) Examination of the hull plating and its closing appliances as far as can be seen.
- b) Examination of watertight penetrations as far as practicable.

2.1.3 Examination of weather decks, hatch covers and coamings (1/7/2006)

- a) Confirmation is to be obtained that no unapproved changes have been made to the hatch covers, hatch coamings and their securing and sealing devices since the last survey.

- b) Where mechanically operated steel covers are fitted, check of the satisfactory condition of:
- hatch covers; including close-up survey of hatch cover plating;
 - tightness devices of longitudinal, transverse and intermediate cross junctions (gaskets, gasket lips, compression bars, drainage channels);
 - clamping devices, retaining bars, cleating;
 - chain or rope pulleys;
 - guides;
 - guide rails and track wheels;
 - stoppers, etc.;
 - wires, chains, gypsies, tensioning devices;
 - hydraulic system essential to closing and securing;
 - safety locks and retaining devices.
- c) Where portable covers, wooden or steel pontoons are fitted, check of the satisfactory condition, where applicable, of:
- wooden covers and portable beams, carriers or sockets for the portable beam, and their securing devices;
 - steel pontoons;
 - tarpaulins;
 - cleats, battens and wedges;
 - hatch securing bars and their securing devices;
 - loading pads/bars and the side plate edge;
 - guide plates and chocks;
 - compression bars, drainage channels and drain pipes (if any).
- d) Check of the satisfactory condition of hatch coaming plating and its stiffeners, including close-up survey.
- e) A random check of the satisfactory operation of mechanically operated hatch covers is to be made, including:
- stowage and securing in open condition;
 - proper fit and efficiency of sealing in closed condition;
 - operational testing of hydraulic and power components, wires, chains, and link drives.

Note 1: For survey of air pipes, flame screens on vents and ventilators, refer to the requirements given in Ch 3, Sec 3, [2.2.1].

2.1.4 Suspect areas (1/7/2006)

Suspect areas identified at previous surveys are to be examined. Thickness measurements are to be taken of the areas of substantial corrosion and the extent of thickness measurements is to be increased to determine the extent of areas of substantial corrosion. Tab 3 may be used as guidance for these additional thickness measurements. These extended thickness measurements are to be carried out before the annual survey is credited as completed.

2.1.5 Examination of Cargo Holds (1/7/2006)

- a) For ships 10 - 15 years of age, the following is to apply:
- 1) Overall survey of one forward and one aft cargo hold and their associated tween deck spaces.
 - 2) When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurement is to be carried out. If the results of these thickness measurements indicate that there is substantial corrosion, then the extent of measurements is to be increased to determine the extent of areas of substantial corrosion. Tab 3 may be used as guidance for these additional measurements. These extended thickness measurements are to be carried out before the annual survey is credited as completed.
- b) For ships over 15 years of age, the following is to apply:
- 1) Overall survey of all cargo holds and 'tweendeck' spaces.
 - 2) Close-up examination of sufficient extent, with a minimum of 25% of frames, to establish the condition of the lower region of the shell frames including approximately the lower one third length of side frame at side shell and side frame end attachment and the adjacent shell plating in a forward lower cargo hold and one other selected lower cargo hold. Where this level of survey reveals the need for remedial measures, the survey is to be extended to include a close-up survey of all of the shell frames and adjacent shell plating of those cargo holds and associated 'tweendeck spaces (as applicable) as well as a close-up survey of sufficient extent of all remaining cargo holds and 'tweendeck spaces (as applicable).
 - 3) When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurement is to be carried out. If the results of these thickness measurements indicate that there is substantial corrosion, then the extent of measurements is to be increased to determine the extent of areas of substantial corrosion. Tab 3 may be used as guidance for these additional measurements. These extended thickness measurements are to be carried out before the annual survey is credited as completed.
 - 4) Where the protective coating in cargo holds, as applicable, is found to be in good condition, the extent of close-up surveys may be specially considered.
 - 5) All piping and penetrations in cargo holds, including overboard piping, are to be examined.

2.1.6 Examination of Ballast Tanks (1/7/2006)

Examination of ballast tanks is to be carried out when required as a consequence of the results of the class renewal survey and intermediate survey. When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurement is to be carried out. If the results of these thickness measurements indicate that there is substantial corrosion, then the extent of measurements is to be increased to determine the extent of areas of substantial corrosion. Tab 3 may be used as guidance for these additional measurements. These extended thickness meas-

urements are to be carried out before the annual survey is credited as completed.

2.2 Additional requirements for single hold cargo ships

2.2.1 (1/1/2009)

For ships complying with the requirements of SOLAS II-1/23-3 (effective from 1 January 2007 to 31 December 2008) and II-1/25 (effective from 1 January 2009) for hold water level detectors (see Note 1), the annual survey is to include an examination and a test, at random, of the water ingress detection system and of their alarms (see Note 2).

Note 1: This survey requirement is to be fulfilled at annual surveys carried out after the ship has been made compliant with the requirements of SOLAS regulations II-1/23-3 or II-1/25, as applicable (see above) and commenced on or after 1 July 2007

Note 2: This survey requirement also applies to those cargo ships which, although belonging to the ship types listed in [1.1.1] that are excluded from the application of this Section, are fitted with a single cargo hold.

3 Intermediate survey

3.1 Schedule

3.1.1 (1/7/2006)

A survey planning meeting is to be held prior to the commencement of the survey.

3.2 Scope

3.2.1 (1/7/2003)

The survey extent is dependent on the age of the vessel as specified in [3.2.2] to [3.2.4].

3.2.2 (1/7/2010)

For ships 5 - 10 years of age, the following is to apply:

a) Ballast tanks

- 1) For tanks used for water ballast, an overall survey of representative tanks selected by the Surveyor is to be carried out. If such overall survey reveals no visible structural defects, the examination may be limited to verification that the corrosion prevention system remains efficient.
- 2) Where poor coating condition, soft or semi-hard coating, corrosion or other defects are found in water ballast tanks or where a hard protective coating has not been applied since the time of construction, the examination is to be extended to other ballast tanks of the same type.
- 3) In water ballast tanks other than double bottom tanks, where a hard protective coating is found in poor condition and it is not renewed, where soft or semi-hard coating has been applied, or where a hard protective coating has not been applied since the time of construction, the tanks in question are to be examined and thickness measurements carried out as considered necessary at annual surveys. When such breakdown of hard protective coating is found in water ballast double bottom tanks, where a

soft or semi-hard coating has been applied, or where a hard protective coating has not been applied, the tanks in question may be examined at annual surveys. When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurements are to be carried out.

- 4) In addition to the requirements above, areas found suspect at previous surveys are to be surveyed in accordance with the provisions indicated in [2.1.4].

b) Cargo Holds

- 1) An overall survey of one forward and one aft cargo hold and their associated tween deck spaces.
- 2) Areas found suspect at previous surveys are to be surveyed in accordance with the provisions indicated in [2.1.4].

3.2.3 (1/7/2006)

For ships 10-15 years of age, the following is to apply:

a) Ballast Tanks

- 1) An overall survey of all tanks used for water ballast is to be carried out. If such overall survey reveals no visible structural defects, the examination may be limited to verification that the corrosion prevention system remains efficient.
- 2) In water ballast tanks other than double bottom tanks, where a hard protective coating is found in poor condition and it is not renewed, where soft coating has been applied, or where a hard protective coating has not been applied since the time of construction the tanks in question are to be examined and thickness measurements carried out as considered necessary at annual surveys. When such breakdown of hard protective coating is found in water ballast double bottom tanks, where a soft coating has been applied, or where a hard protective coating has not been applied the tanks in question may be examined at annual surveys. When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurements are to be carried out.
- 3) In addition to the requirements above, areas found suspect at previous surveys are to be surveyed in accordance with the provisions indicated in [2.1.4].

b) Cargo Holds

- 1) An overall survey of all cargo holds and 'tweendeck spaces.
- 2) Areas found suspect at previous surveys are to be surveyed in accordance with the provisions indicated in [2.1.4].
- 3) When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurements are to be carried out. If the results of these thickness measurements indicate that there is substantial corrosion, then the extent of measurements is to be increased to determine the extent of areas of substantial corrosion. Tab 3 may be used as guidance for these additional measurements. These extended thickness measurements are to be carried out before the survey is credited as completed.

3.2.4 (1/1/2013)

For ships exceeding 15 years of age, the following is to apply:

- a) The requirements of the intermediate survey are to be to the same extent as the previous class renewal survey as required in [4], except for item 2c) in column 4 of Tab 2. However tank testing specified in [4.6], survey of automatic air pipe heads (see Note 1 and Note 2 in [4.2.3]) and internal examination of fuel oil, lube oil and fresh water tanks (see Note 1 in [4.4.1]) are not required unless deemed necessary by the attending Surveyor.
- b) In lieu of the requirements of [4.2.5], an in water survey, according to the provisions of Ch 2, Sec 2, [7.1.4] may be considered as equivalent.

4 Class renewal survey**4.1 Schedule****4.1.1 (1/7/2003)**

A survey planning meeting is to be held prior to the commencement of the survey.

4.2 Scope of survey**4.2.1 (1/7/2006)**

In addition to the requirements of the annual surveys, the class renewal survey is to include examination, tests and checks of sufficient extent to ensure that the hull and related piping, as required in [4.2.3], are in a satisfactory condition and fit for the intended purpose for the new period of class of 5 years to be assigned, subject to proper maintenance and operation and to periodical surveys being carried out at the due dates.

4.2.2 (1/7/2006)

All cargo holds, water ballast tanks, including double bottom tanks, pipe tunnels, cofferdams and void spaces bounding cargo holds, decks and outer hull are to be examined, and this examination is to be supplemented by thickness measurement and testing as required in [4.5] and [4.6], to ensure that the structural integrity remains effective. The aim of the examination is to discover substantial corrosion, significant deformation, fractures, damage or other structural deterioration, that may be present.

4.2.3 (1/7/2006)

All piping systems within the above spaces are to be examined and operationally tested to working pressure to the attending Surveyor's satisfaction to ensure that tightness and condition remain satisfactory.

Note 1: For survey of automatic air pipes refer to Ch 3, Sec 5, [2.2.5].

Note 2: For examination of automatic air pipe heads, reference is to be made to the requirements given in Ch 3, Sec 5, Tab 4.

4.2.4 (1/7/2003)

The survey extent of ballast tanks converted to void spaces is to be specially considered in relation to the requirements for ballast tanks.

4.2.5 (1/7/2006)

The class renewal survey is to include a bottom survey in dry condition as laid down in Ch 3, Sec 6, [2.2.1]. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo holds and water ballast tanks are to be carried out in accordance with the applicable requirements for the class renewal surveys, if not already performed.

Note 1: Lower portions of the cargo holds and ballast tanks are considered to be the parts below the light ballast waterline.

4.2.6 (1/7/2010)

The condition of the corrosion prevention system of ballast tanks, where provided, is to be examined.

For tanks used for water ballast, excluding double bottom tanks, where a hard protective coating is found in poor condition and it is not renewed, where soft or semi-hard coating has been applied, or where a hard protective coating has not been applied since the time of construction, the tanks in question are to be examined at annual surveys. Thickness measurements are to be carried out as deemed necessary by the Surveyor.

When such breakdown of hard protective coating is found in water ballast double bottom tanks and it is not renewed, where a soft or semi-hard coating has been applied, or where a hard protective coating has not been applied since the time of construction the tanks in question may be examined at annual surveys. When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurements are to be carried out.

4.2.7 (1/7/2006)

Where the hard protective coating in spaces is found to be in good condition, the extent of close-up surveys and thickness measurements may be specially considered.

4.3 Hatch covers and coamings**4.3.1 (1/7/2003)**

A thorough inspection of the items listed in [2.1.3] is to be carried out.

4.3.2 (1/7/2003)

A check of the satisfactory operation of all mechanically operated hatch covers is to be made, including:

- stowage and securing in open condition;
- proper fit and efficiency of sealing in closed conditions;
- operational testing of hydraulic and power components, wires, chains and link drives.

4.3.3 (1/7/2003)

A check of the effectiveness of sealing arrangements of all hatch covers by hose testing or equivalent is to be carried out.

4.3.4 (1/7/2016)

Close-up survey and thickness measurement (see Note 1) of the hatch cover and coaming plating and stiffeners is to be carried out as given in Tab 1 and Tab 2, respectively.

Note 1: Subject to cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers structures.

4.4 Extent of overall and close-up surveys

4.4.1 (1/7/2006)

An overall survey of all tanks and spaces, excluding fuel oil, lube oil and fresh water tanks, is to be carried out at each class renewal survey.

Note 1: For fuel oil, lube oil and fresh water tanks, reference is to be made to the requirements given in Ch 3, Sec 5, [2.4.1].

4.4.2 (1/7/2006)

The minimum requirements for close-up surveys at class renewal survey are given in Tab 1.

4.4.3 (1/7/2006)

The Surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of the spaces under survey, the condition of the corrosion prevention system and where spaces have structural arrangements or details which have suffered defects in similar spaces or on similar ships according to available information.

4.4.4 (1/7/2006)

For areas in spaces where hard protective coatings are found to be in a good condition, the extent of close-up surveys according to Tab 1 may be specially considered.

4.5 Extent of thickness measurements

4.5.1 (1/7/2003)

The minimum requirements for thickness measurements at class renewal survey are given in Tab 2.

4.5.2 (1/7/2006)

The Surveyor may extend the thickness measurements as deemed necessary. When measurements indicate substantial corrosion, the extent of thickness measurements is to be increased to determine the extent of areas of substantial corrosion. Tab 3 may be used as guidance for these additional thickness measurements.

4.5.3 (1/7/2017)

For areas in spaces where hard protective coatings are found to be in a good condition, the extent of thickness measurement according to Tab 2 may be specially considered.

4.5.4 (1/7/2003)

Transverse sections are to be chosen where the largest reductions are suspected to occur or are revealed by deck plating measurements.

4.6 Tank testing

4.6.1 (1/7/2003)

All boundaries of water ballast tanks and deep tanks used for water ballast within the cargo length area are to be pressure tested. For fuel oil tanks, representative tanks are to be pressure tested.

4.6.2 (1/7/2003)

The Surveyor may extend the tank testing as deemed necessary.

4.6.3 (1/7/2006)

Tank testing of fuel oil tanks is to be carried out with a head of liquid to the highest point that liquid will rise to under service conditions. Tank testing of fuel oil tanks may be specially considered based on a satisfactory external examination of the tank boundaries and confirmation from the Master stating that pressure testing has been carried out according to the requirements with satisfactory results.

4.7 Additional requirements for single hold cargo ships

4.7.1 (1/1/2009)

For ships complying with the requirements of SOLAS II-1/23-3 (effective from 1 January 2007 to 31 December 2008) and II-1/25 (effective from 1 January 2009) for hold water level detectors (see Note 1), the class renewal survey is to include an examination and a test of the water ingress detection system and their alarms (see Note 2).

Note 1: This survey requirement is to be fulfilled at class renewal surveys carried out after the ship has been made compliant with the requirements of SOLAS regulations II-1/23-3 or II-1/25 as applicable (see above) and commenced on or after 1 July 2007.

Note 2: This survey requirement also applies to those cargo ships which, although belonging to the ship types listed in [1.1.1] that are excluded from the application of this Section, are fitted with a single cargo hold.

Table 1 : Minimum requirements for close-up survey at class renewal surveys of general dry cargo ships (1/7/2016)

Age of ship (in years at time of class renewal survey due date)			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	15 > age
<p>(A) Selected shell frames in one forward and one aft cargo hold and associated tween deck spaces.</p> <p>(B) One selected cargo hold transverse bulkhead.</p> <p>(D) All cargo hold hatch covers and coamings (plating and stiffeners).</p>	<p>(A) Selected shell frames in all cargo holds and tween deck spaces.</p> <p>(B) One transverse bulkhead in each cargo hold.</p> <p>(B) Forward and aft transverse bulkhead in one side ballast tank, including stiffening system.</p> <p>(C) One transverse web with associated plating and framing in two representative water ballast tanks of each type (i.e. top-side, hopper side, side tank or double bottom tank).</p> <p>(D) All cargo hold hatch covers and coamings (plating and stiffeners).</p> <p>(E) Selected areas of all deck plating and underdeck structure inside line of hatch openings between cargo hold hatches.</p> <p>(F) Selected areas of inner bottom plating.</p>	<p>(A) All shell frames in the forward lower cargo hold and 25% of frames in each of the remaining cargo holds and tween deck spaces including upper and lower end attachments and adjacent shell plating.</p> <p>(B) All cargo hold transverse bulkheads.</p> <p>(B) All transverse bulkheads in ballast tanks, including stiffening system.</p> <p>(C) All transverse webs with associated plating and framing in each water ballast tank.</p> <p>(D) All cargo hold hatch covers and coamings (plating and stiffeners).</p> <p>(E) All deck plating and underdeck structure inside line of hatch openings between cargo hold hatches.</p> <p>(F) All areas of inner bottom plating.</p>	<p>(A) All shell frames in all cargo holds and tween deck spaces including upper and lower end attachments and adjacent shell plating.</p> <p>Areas (B) - (F) as for class renewal survey for ships between 10 and 15 years of age.</p>
<p>(A) Cargo hold transverse frames.</p> <p>(B) Cargo hold transverse bulkhead plating, stiffeners and girders.</p> <p>(C) Transverse web frame or transverse watertight bulkhead in water ballast tanks.</p> <p>(D) Cargo hold hatch covers and coamings. Subject to cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers structures.</p> <p>(E) Deck plating and underdeck structure inside line of hatch openings between cargo hold hatches.</p> <p>(F) Inner bottom plating.</p> <p>See Fig 1 and Fig 2 for the areas corresponding to (A), (B), (C), (D), (E) and (F).</p> <p>Note 1:Close-up survey of cargo hold transverse bulkheads to be carried out at the following levels:</p> <ul style="list-style-type: none"> • Immediately above the inner bottom and immediately above the tween decks, as applicable. • Mid-height of the bulkheads for holds without tween decks. • Immediately below the main deck plating and tween deck plating. 			

Table 2 : Minimum requirements for thickness measurements at class renewal surveys of general dry cargo ships (1/7/2006)

Age of ship (in years at time of class renewal survey due date)			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	15 > age
1. Suspect areas.	1. Suspect areas. 2. One transverse section of deck plating in way of a cargo space within 0,5L amidships. 3. Measurement for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Tab 1.	1. Suspect areas. 2. Two transverse sections within 0,5L amidships in way of two different cargo spaces. 3. Measurement for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Tab 1 4. Within the cargo length area, each deck plate outside line of cargo hatch openings. 5. All wind and water strakes within the cargo length area. 6. Selected wind and water strakes outside the cargo length area.	1. Suspect areas. 2. Within the cargo length area: a) a minimum of three transverse sections within 0,5L amidships b) each deck plate outside line of cargo hatch openings c) each bottom plate, including lower turn of bilge d) duct keel or pipe tunnel plating and internals. 3. Measurement for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Tab 1. 4. All wind and water strakes, full length.
<p>Note 1: Thickness measurement locations are to be selected to provide the best representative sampling of areas likely to be most exposed to corrosion, considering the cargo and ballast history and arrangement and condition of protective coatings.</p> <p>Note 2: For ships less than 100 metres in length, the number of transverse sections required at class renewal survey for ships 10-15 years of age may be reduced to one and the number of transverse sections at class renewal surveys for ships 15 years of age and above may be reduced to two.</p>			

Table 3 : Guidance for additional thickness measurements in way of substantial corrosion (1/7/2003)

Structural Member	Extent of Measurement	Pattern of Measurement
Plating	Suspect area and adjacent plates	5 point pattern over 1 square metre
Stiffeners	Suspect area	3 measurements each in line across web and flange

Figure 1 : Areas for close-up survey of general dry cargo ships (1/7/2003)

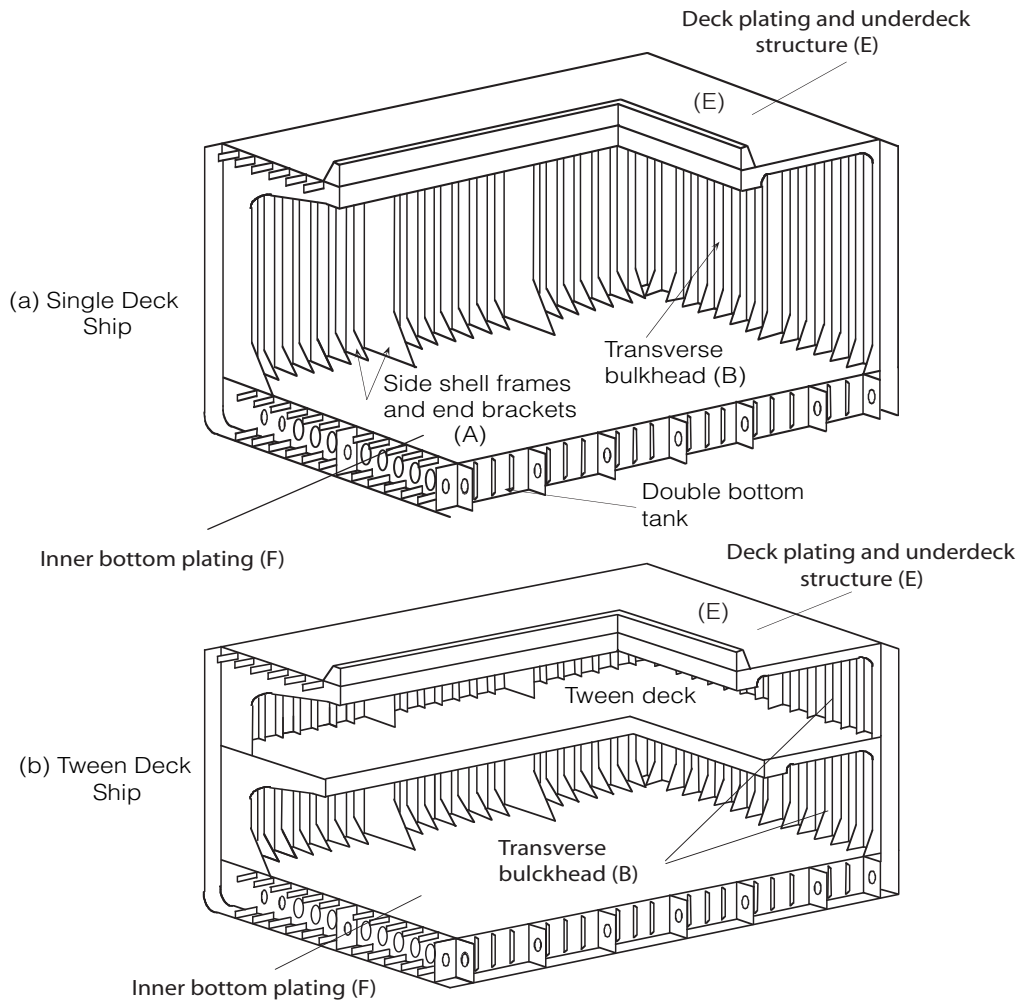
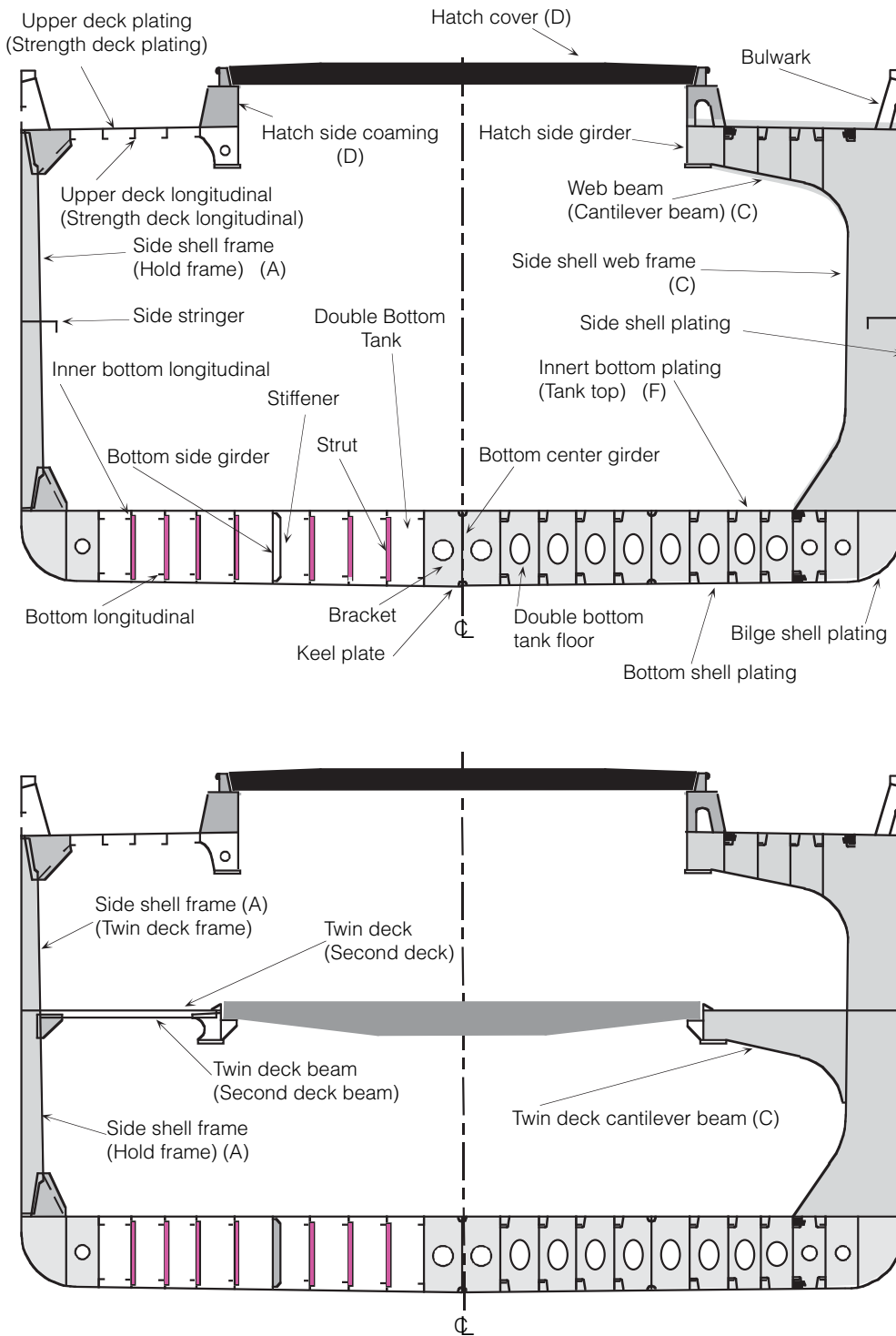


Figure 2 : Areas for close-up survey of general dry cargo ships (1/7/2003)



SECTION 9

DOUBLE SKIN BULK CARRIERS AND SELF-UNLOADING BULK CARRIERS OF DOUBLE SKIN CONSTRUCTION

1 General

1.1 Application

1.1.1 (1/1/2017)

The requirements of this Section apply to all self-propelled double skin bulk carriers. These ships are assigned with one of the following service notations:

- **bulk carrier ESP - double skin**
- **ore carrier ESP**
- **combination carrier/OBO ESP** (see Note 1)
- **combination carrier/OOC ESP** (see Note 1)
- **bulk carrier ESP CSR - double skin.**
- **Self-Unloading Bulk Carrier ESP - double skin.**

Note 1: For combination carriers with longitudinal bulkheads, additional requirements are specified in Sec 3 or Sec 4, as applicable.

1.1.2 (1/1/2005)

For bulk carriers with hybrid cargo hold arrangements, e.g. with some cargo holds of single side skin and others of double side skin, the requirements of Sec 2 are to apply to cargo holds of single side skin.

1.1.3 (1/1/2005)

The requirements apply to surveys of the hull structure and piping systems in way of cargo holds, cofferdams, pipe tunnels and void spaces within the cargo area and all salt water ballast tanks. They are additional to the requirements applicable to the remainder of the ship, given in Chapter 3 according to the relevant surveys.

1.1.4 (1/1/2005)

The requirements contain the minimum extent of examination, thickness measurements and tank testing. When substantial corrosion, as defined in Ch 2, Sec 2, [2.2.9], and/or structural defects are found, the survey is to be extended and is to include additional close-up surveys when necessary.

1.1.5 (1/1/2019)

When, in any survey, thickness measurements are required:

- the procedure detailed in Ch 2, Sec 2, [2.3] is to be applied
- the thickness measurement firm is to be part of the survey planning meeting held prior to commencing the survey.

1.1.6 (1/1/2017)

For self-unloading bulk carrier the additional requirements for the cargo handling system are given in Sec 2, [2.8] and Sec 2, [4.8], respectively for annual survey and class renewal survey.

1.2 Documentation on board

1.2.1 (1/7/2016)

The Owner is to supply and maintain documentation on board as specified in [1.2.2] and [1.2.3], which is to be readily available for examination by the Surveyor.

For bulk carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10, the Owner is to arrange the updating of the Ship Construction File (SCF) throughout the ship's life whenever a modification of the documentation included in the SCF has taken place.

Documented procedures for updating the SCF are to be included within the Safety Management System.

1.2.2 (1/1/2005)

A survey report file is to be a part of the documentation on board consisting of:

- reports of structural surveys
- hull condition evaluation report (summarising the results of class renewal surveys)
- thickness measurement reports.

The survey report file is also to be available in the Owner's management office.

1.2.3 (1/7/2016)

The following additional supporting documentation is to be available on board:

- a) survey program, as required in [4.1], until such time as the class renewal survey or the intermediate survey, as applicable, has been completed
- b) main structural plans of cargo holds and ballast tanks, (for CSR ships these plans are to include for each structural element both the as-built and renewal thickness. Any thickness for voluntary addition is also to be clearly indicated on the plans. The midship section plan to be supplied on board the ship is to include the minimum allowable hull girder sectional properties for hold transverse section in all cargo holds).
- c) previous repair history
- d) cargo and ballast history

- e) ship's personnel reports on:
- structural deterioration/defects in general
 - leakage in bulkheads and piping systems
 - condition of coatings or corrosion prevention systems, if any
- f) any other information that may help to identify critical structural areas and/or suspect areas requiring inspection.

For bulk carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10, the Ship Construction File (SCF), limited to the items to be retained onboard, is to be available on board.

1.2.4 (1/1/2018)

Prior to survey, the Surveyor examines the documentation on board and its contents, which are used as a basis for the survey.

For bulk carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10, on completion of the survey, the surveyor is to verify that the update of the Ship Construction File (SCF) has been done whenever a modification of the documentation included in the SCF has taken place.

For the SCF stored on board ship, the surveyor is to examine the information on board ship.

In cases where any major event, including, but not limited to, substantial repair and conversion, or any modification to the ship structures, the surveyor is to also verify that the updated information is kept on board the ship.

If the updating of the SCF onboard is not completed at the time of survey, the Surveyor records it and requires confirmation at the next periodical survey.

For the SCF stored on shore archive, the surveyor is to examine the list of information included on shore archive.

In cases where any major event, including, but not limited to, substantial repair and conversion, or any modification to the ship structures, the surveyor is to also verify that the updated information is stored on shore archive by examining the list of information included on shore archive or kept on board the ship.

In addition, the surveyor is to confirm that the service contract with of the Archive Center is valid.

If the updating of the SCF Supplement ashore is not completed at the time of survey, the Surveyor records it and requires confirmation at the next periodical survey.

For bulk carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10, on completion of the survey, the surveyor is to verify any addition and/or renewal of materials used for the construction of the hull structure are documented within the Ship Construction File list of materials.

1.3 Reporting and evaluation of surveys

1.3.1 (1/1/2005)

The data and information on the structural condition of the ship collected during survey are evaluated for acceptability and structural integrity of the ship's cargo area.

1.3.2 (1/7/2006)

For ships subject to the requirements of this Section, the surveys of hull structure and piping systems are reported in

conformance to the Survey Reporting Principles laid down in App 1.

1.3.3 (1/1/2005)

A hull condition evaluation report (summarising the results of class renewal surveys) is issued by the Society to the Owner, who is to place it on board the ship for reference at future surveys. The hull condition evaluation report is endorsed by the Society.

2 Annual survey

2.1 General

2.1.1 (1/1/2019)

The survey is to consist of an examination for the purpose of ensuring, as far as practicable, that the hull, weather decks, hatch covers, coamings and piping are maintained in a satisfactory condition and is to take into account the service history, condition and extent of the corrosion prevention system of ballast tanks and areas identified in the survey report file.

2.2 Hull Structure and Equipment

2.2.1 (1/1/2005)

Examination of:

- the hull plating and its closing appliances as far as can be seen
- the watertight penetrations as far as practicable.

2.3 Weather decks, hatch covers and coamings

2.3.1 (1/1/2005)

Confirmation is to be obtained that no unapproved changes have been made to the hatch covers, hatch coamings and their securing and sealing devices since the last survey.

2.3.2 (1/1/2008)

A thorough survey of cargo hatch covers and coamings is only possible by examination in the open as well as closed positions and is to include verification of proper opening and closing operation. As a result, the hatch cover sets within the forward 25% of the ship's length and at least one additional set, such that all sets on the ship are assessed at least once in every 5-year period, are to be surveyed open, closed and in operation to the full extent in each direction at each annual survey, including:

- a) stowage and securing in open condition;
- b) proper fit and efficiency of sealing in closed condition; and
- c) operational testing of hydraulic and power components, wires, chains, and link drives.

The closing of the covers is to include the fastening of all peripheral and cross-joint cleats or other securing devices. Particular attention is to be paid to the condition of the hatch covers in the forward 25% of the ship's length, where sea loads are normally greatest.

2.3.3 (1/1/2008)

If there are indications of difficulty in operating and securing hatch covers, additional sets above those required by

[2.3.2], at the discretion of the Surveyor, are to be tested in operation.

2.3.4 (1/1/2019)

Where the cargo hatch securing system does not function properly, repairs are to be carried out under the supervision of the Society. Where hatch covers or coamings undergo substantial repairs, the strength of securing devices is to be upgraded to comply with Pt B, Ch 9, Sec 7.

2.3.5 (1/1/2008)

For each cargo hatch cover set, at each annual survey, the following items are to be surveyed:

- a) cover panels, including side plates, and stiffener attachments that may be accessible in the open position by close-up survey (for corrosion, cracks, and deformation);
- b) sealing arrangements of perimeter and cross-joints (gaskets for condition and permanent deformation, flexible seals on combination carriers, gasket lips, compression bars, drainage channels and non-return valves);
- c) clamping devices, retaining bars, cleating (for wastage, adjustment and condition of rubber components);
- d) closed cover locating devices (for distortion and attachment);
- e) chain or rope pulleys;
- f) guides;
- g) guide rails and track wheels;
- h) stoppers;
- i) wires, chains, tensioners, and gypsies;
- j) hydraulic system, electrical safety devices and interlocks; and
- k) end and interpanel hinges, pins and stools where fitted.

2.3.6 (1/1/2019)

At each hatchway, at each annual survey, the coamings, with plating, stiffeners and brackets are to be checked for corrosion, cracks and deformation, especially of the coaming tops, including close-up survey.

2.3.7 (1/1/2008)

Where considered necessary, the effectiveness of sealing arrangements may be proved by hose or chalk testing supplemented by dimensional measurements of seal compressing components.

2.3.8 (1/1/2008)

Where portable covers or wooden or steel pontoons are fitted, they are to be examined to confirm the satisfactory condition, where applicable, of:

- a) wooden covers and portable beams, carriers or sockets for the portable beams, and their securing devices;
- b) steel pontoons, including close-up survey of hatch cover plating;
- c) tarpaulins;
- d) cleats, battens and wedges;
- e) hatch securing bars and their securing devices;
- f) loading pads/bars and the side plate edge;
- g) guide plates and chocks;

- h) compression bars, drainage channels and drain pipes (if any).

2.3.9 (1/7/2006)

Examination of flame screens on vents to all bunker tanks.

2.3.10 (1/7/2006)

Examination of bunker and vent piping systems, including ventilators.

2.4 Cargo holds

2.4.1 Ships between 10 and 15 years of age (1/7/2012)

The requirements of the survey are the following.

- a) Overall survey of two selected cargo holds.
- b) When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurement is to be carried out. If the results of these thickness measurements indicate that substantial corrosion is present, the extent of thickness measurements is to be increased in accordance with Tab 5 to Tab 8. These extended thickness measurements are to be carried out before the annual survey is credited as complete. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.

For ships built under the Common Structural Rules, the annual thickness gauging may be omitted where a protective coating has been applied in accordance with the coating manufacturer's requirements and is maintained in good condition.

- c) All piping and penetrations in cargo holds, including overboard piping, are to be examined.

2.4.2 Ships over 15 years of age (1/7/2012)

The requirements of the survey are the following.

- a) Overall survey of all cargo holds.
- b) When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurement is to be carried out. If the results of these thickness measurements indicate that substantial corrosion is present, the extent of thickness measurements is to be increased in accordance with Tab 5 to Tab 8. These extended thickness measurements are to be carried out before the annual survey is credited as complete. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.

For ships built under the Common Structural Rules, the annual thickness gauging may be omitted where a protective coating has been applied in accordance with the coating manufacturer's requirements and is maintained in good condition.

- c) All piping and penetrations in cargo holds, including overboard piping, are to be examined.

2.5 Ballast tanks

2.5.1 (1/1/2005)

Ballast tanks are to be internally examined when required as a consequence of the results of the class renewal survey or intermediate survey.

2.5.2 (1/7/2012)

When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurements are to be carried out. If the results of these thickness measurements indicate that substantial corrosion is present, the extent of thickness measurements is to be increased in accordance with Tab 5 to Tab 8. These extended thickness measurements are to be carried out before the annual survey is credited as complete.

2.5.3 (1/7/2012)

Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.

For ships built under the Common Structural Rules, the annual thickness gauging may be omitted where a protective coating has been applied in accordance with the coating manufacturer's requirements and is maintained in good condition.

2.5.4 (1/7/2011)

Confirmation is to be given that the corrosion prevention system fitted to dedicated ballast water tanks when appropriate is maintained.

2.6 Additional requirements after determining compliance with SOLAS regulations XII/12 (water level detectors) and XII/13 (availability of pumping systems)

2.6.1 (1/1/2007)

For ships complying with the requirements of SOLAS XII/12 for hold, ballast and dry space water level detectors, the annual survey is to include an examination and a test, at random, of the water ingress detection systems and of their alarms.

2.6.2 (1/1/2007)

For ships complying with the requirements of SOLAS XII/13 for the availability of pumping systems, the annual survey is to include an examination and a test of the means for draining and pumping ballast tanks forward of the collision bulkhead and bilges of dry spaces, any part of which extends forward of the foremost cargo hold, and of their controls.

2.7 Means of access

2.7.1 (1/7/2011)

Confirmation is to be given, when appropriate and as far as is practicable when internal spaces are examined, that the means of access to cargo and other spaces remain in good condition.

3 Intermediate survey

3.1 General

3.1.1 (1/7/2006)

The survey extent is dependent on the age of the vessel as specified in [3.2] to [3.4] and shown in Tab 1.

3.2 Ships between 5 and 10 years of age

3.2.1 Ballast tanks (1/7/2010)

- a) For tanks used for water ballast, an overall survey of representative tanks selected by the Surveyor is to be carried out. The selection is to include fore and aft peak tanks and a number of other tanks, taking into account the total number and type of ballast tanks. If such overall survey reveals no visible structural defects, the examination may be limited to verification that the corrosion prevention system remains efficient.
- b) Where poor coating condition, corrosion or other defects are found in water ballast tanks or where a hard protective coating has not been applied since the time of construction, the examination is to be extended to other ballast tanks of the same type.
- c) In ballast tanks other than double bottom tanks, where a hard protective coating is found in poor condition, and it is not renewed, or where a soft or semi-hard coating has been applied, or where a hard protective coating has not been applied since the time of construction, the tanks in question are to be examined and thickness measurements carried out as considered necessary at annual surveys. When such breakdown of hard protective coating is found in ballast double bottom tanks, or where a soft or semi-hard coating has been applied, or where a hard protective coating has not been applied, the tanks in question may be examined at annual surveys. When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurements are to be carried out.
- d) In addition to the requirements above, suspect areas identified at previous surveys are to be examined.

3.2.2 Cargo Holds (1/1/2005)

The requirements of the survey are the following.

- a) Overall survey of all cargo holds
- b) Where considered necessary by the Surveyor as a result of the overall survey as described in a), the survey is to be extended to include a close-up survey of those areas of structure in the cargo holds selected by the Surveyor.

3.2.3 Extent of thickness measurements (1/7/2012)

- a) Thickness measurements are to be carried out to an extent sufficient to determine both general and local corrosion levels in areas subject to close-up survey, where required as per [3.2.2] b), and as provided in [3.2.1] c).
- b) The extent of thickness measurement may be specially considered provided the Surveyor is satisfied by the close-up survey that there is no structural diminution and the hard protective coatings are found to be in a good condition.

- c) Where substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with the requirements of Tab 5 to Tab 8. These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.

For ships built under the Common Structural Rules, the identified substantial corrosion areas may be:

- 1) protected by coating applied in accordance with the coating manufacturer's requirements and examined at annual intervals to confirm the coating in way is still in good condition, or alternatively
 - 2) required to be measured at annual intervals.
- d) Where a hard protective coating is fitted in cargo holds, as defined in Sec 2, [1.1.7], and is found in good condition, the extent of close-up surveys and thickness measurements may be specially considered.

3.3 Ships between 10 and 15 years of age

3.3.1 (1/7/2006)

The requirements of the intermediate survey are to be to the same extent as the previous class renewal survey as required in [4]. However, internal examination of fuel oil tanks and pressure testing of all tanks are not required unless deemed necessary by the attending Surveyor.

3.3.2 (1/1/2005)

In application of [3.3.1], the intermediate survey may be commenced at the second annual survey and continued during the following year with a view to completion at the third annual survey in lieu of the application of Ch 2, Sec 2, [4.2.1].

3.3.3 (1/1/2005)

In application of [3.3.1], an underwater survey may be considered in lieu of the requirements of [4.2.6].

Table 1 : Minimum requirements of overall and close-up survey and thickness measurements at intermediate survey of double skin bulk carriers and self-unloading bulk carriers of double skin construction (1/1/2017)

Age of ship (in years) at time of intermediate survey		
5 < age ≤ 10	10 < age ≤ 15	age > 15
Overall survey of representative ballast tanks selected by the attending Surveyor (the selection is to include fore and aft peak tanks and a number of other ballast tanks, taking into account the total number and type of ballast tanks)	The requirements of the previous Renewal Survey. See [3.3].	The requirements of the previous Renewal Survey. See [3.4].
Overall and close-up survey of suspect areas identified at previous surveys		
Overall survey of all cargo holds		
Thickness measurements to an extent sufficient to determine both general and local corrosion levels in areas subject to close-up survey and suspect areas identified at previous surveys		

3.4 Ships over 15 years of age

3.4.1 (1/7/2006)

The requirements of the intermediate survey are to be to the same extent as the previous class renewal survey as required in [4]. However, internal examination of fuel oil tanks and pressure testing of all tanks are not required unless deemed necessary by the attending Surveyor.

3.4.2 (1/1/2005)

In application of [3.4.1], the intermediate survey may be commenced at the second annual survey and continued during the following year with a view to completion at the third annual survey in lieu of application of Ch 2, Sec 2, [4.2.1].

3.4.3 (1/7/2006)

In application of [3.4.1], a bottom survey in dry condition is to be part of the intermediate survey. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo holds and ballast tanks (see Note 1) are to be carried out in accordance with the applicable requirements for intermediate surveys, if not already performed.

Note 1: Lower portions of the cargo holds and ballast tanks are considered to be the parts below the light ballast waterline.

4 Class renewal survey

4.1 Survey program and preparation for survey

4.1.1 (1/1/2008)

The Owner, in cooperation with the Society, is to work out a specific survey program prior to the commencement of any part of:

- the class renewal survey
- the intermediate survey for double skin bulk carriers over 10 years of age.

Prior to the development of the survey program, the Survey Planning Questionnaire is to be completed by the Owner based on the information set out in [4.9], and forwarded to the Society.

The survey program is to be in a written format, based on the information in [4.8]. The survey is not to commence until the survey program has been agreed. The survey program at intermediate survey may consist of the survey program at the previous class renewal survey supplemented by

the condition evaluation report of that class renewal survey and later relevant survey reports.

The survey program is to be worked out taking into account any amendments to the survey requirements after the last class renewal survey carried out.

4.1.2 (1/7/2006)

In developing the survey program, the following documentation is to be collected and consulted with a view to selecting tanks, holds, areas and structural elements to be examined:

- survey status and basic ship information
- the documentation on board, as described in [1.2.2] and [1.2.3]
- main structural plans (scantling drawings), including information on use of high tensile steels (HTS)
- relevant previous survey and inspection reports from both the Society and the Owner
- information on the use of ship holds and tanks, with regard to the nature of the typical cargoes transported and other useful data
- information on the corrosion prevention level on the new building,
- information on the relevant maintenance level during operation.

4.1.3 (1/1/2005)

The survey program is to comply, at least, with the requirements for close-up surveys, thickness measurements and tank testing given in [4.4], [4.5] and [4.6], respectively. In addition, the survey program is to include at least:

- basic ship information and particulars
- main structural plans (scantling drawings), including information on the use of high tensile steels (HTS)
- plan of holds and tanks
- list of holds and tanks including information on their use, protective coating, if any, and its condition
- conditions for survey, with regard to holds, tanks and spaces which are to be safe for access, i.e. cleaned, gas freed, ventilated, illuminated
- provisions and methods for access to structures
- equipment for surveys
- selection of holds, spaces and areas for close-up surveys according to Tab 2
- selection of sections and areas for thickness measurements according to Tab 4
- selection of holds, if any, and tanks for tank testing according to [4.6]
- damage experience and repair history related to the ship in question.

4.1.4 (1/1/2005)

The survey program is also to include the maximum acceptable structural corrosion diminution levels applicable to the ship. The Society will advise the Owner of this information.

4.1.5 (1/1/2005)

In addition, the survey program is to include proposals on how to conduct surveys and tests in a safe and practical way, including the means of providing access to structures

for close-up survey, thickness measurements and tank testing. All other provisions described in Ch 2, Sec 2, [2.3], Ch 2, Sec 2, [2.5], Ch 2, Sec 2, [2.7], Ch 2, Sec 2, [2.8] and Ch 2, Sec 2, [2.10] regarding procedures for thickness measurements, conditions for survey, access to structures, equipment for survey and survey at sea or at anchorage, respectively, are also to be complied with.

4.1.6 Survey Planning Meeting (1/1/2019)

The establishment of proper preparation and close co-operation between the attending Surveyor(s) and the Owner's representatives on board prior to and during the survey are an essential part in the safe and efficient conduct of the survey. During the survey on board safety meetings are to be held regularly.

Prior to commencement of any part of the renewal and intermediate survey, a survey planning meeting is to be held between the attending Surveyor(s), the Owner's representative in attendance, the thickness measurement firm representative, where involved, and the Master of the ship or an appropriately qualified representative appointed by the Master or Company for the purpose of ascertaining that all the arrangements envisaged in the survey program are in place, so as to ensure the safe and efficient conduct of the survey work to be carried out. Refer also to Ch 2, Sec 2, [2.3.1].

The following is an indicative list of items that are to be addressed in the meeting:

- a) schedule of the ship (i.e. the voyage, docking and undocking manoeuvres, periods alongside, cargo and ballast operations etc);
- b) provisions and arrangements for thickness measurements (i.e. access, cleaning/de-scaling, illumination, ventilation, personal safety);
- c) extent of the thickness measurements;
- d) acceptance criteria (refer to the list of minimum thicknesses);
- e) extent of close-up survey and thickness measurement considering the coating condition and suspect areas/areas of substantial corrosion;
- f) execution of thickness measurements;
- g) taking representative readings in general and where uneven corrosion/pitting is found;
- h) mapping of areas of substantial corrosion;
- i) communication between the attending Surveyor(s), the thickness measurement firm operator(s) and the Owner's representative(s) concerning findings.

4.2 Scope of survey

4.2.1 (1/1/2005)

In addition to the requirements of annual surveys, the class renewal survey is to include examination, tests and checks of sufficient extent to ensure that the hull and related piping, as required in [4.2.3], are in satisfactory condition for the new period of class of five years to be assigned, subject to proper maintenance and operation and to periodical surveys being carried out at the due dates.

4.2.2 (1/7/2006)

All cargo holds, ballast tanks, including double bottom and double side tanks, pipe tunnels, cofferdams and void spaces bounding cargo holds, decks and outer hull are to be examined, and this examination is to be supplemented by thickness measurement and testing as required in [4.5] and [4.6], to ensure that the structural integrity remains effective. The aim of the examination is to discover substantial corrosion, significant deformation, fractures, damage or other structural deterioration, that may be present.

4.2.3 (1/1/2005)

All piping systems within the above spaces are to be examined and operationally tested to working pressure to the attending Surveyor's satisfaction to ensure that tightness and condition remain satisfactory.

4.2.4 (1/1/2005)

The survey extent of ballast tanks converted to void spaces will be specially considered by the Society in relation to the requirements for ballast tanks.

4.2.5 (1/7/2010)

Where provided, the condition of the corrosion prevention system of ballast tanks is to be examined.

For ballast tanks, excluding double bottom tanks, where a hard protective coating is found in poor condition, and it is not renewed, where a soft or semi-hard coating has been applied, or where a hard protective coating has not been applied since the time of construction, the tanks in question

are to be examined at annual surveys. Thickness measurements are to be carried out as deemed necessary by the Surveyor.

When such a breakdown of hard protective coating is found in water ballast double bottom tanks and it is not renewed, where a soft or semi-hard coating is applied, or where a hard protective coating has not been applied since the time of construction, the tanks in question may be examined at annual surveys. When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurements are to be carried out.

4.2.6 (1/7/2006)

The class renewal survey is to include a bottom survey in dry condition as laid down in Ch 3, Sec 6, [2.2.1].

The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo holds and ballast tanks (see Note 1) are to be carried out in accordance with the applicable requirements for class renewal surveys, if not already performed.

Note 1: Lower portions of the cargo holds and ballast tanks are considered to be the parts below the light ballast waterline.

4.2.7 (1/7/2006)

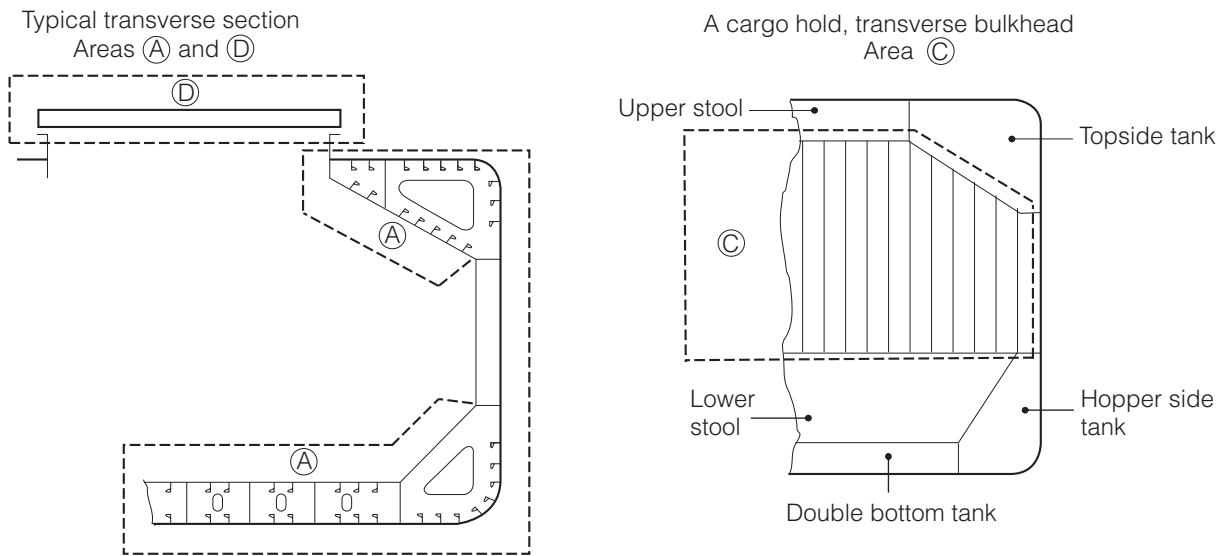
Where a hard protective coating is provided in cargo holds, as defined in Sec 2, [1.1.7], and is found in good condition, the extent of close-up surveys and thickness measurements may be specially considered.

Table 2 : Minimum requirements for close-up survey at class renewal hull survey of double skin bulk carriers and self-unloading bulk carriers of double skin construction, excluding ore carriers (1/1/2017)

Age of ship (in years) at time of class renewal survey			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	age >15
One transverse web with associated plating and longitudinals in two representative water ballast tanks of each type (This is to include the foremost topside and double side water ballast tanks on either side) (A)(see Note 1)	One transverse web with associated plating and longitudinals as applicable in each water ballast tank (A)(see Note 1)	All transverse webs with associated plating and longitudinals as applicable in each water ballast tank (A)(see Note 1)	All transverse webs with associated plating and longitudinals as applicable in each water ballast tank (A)(see Note 1)
<p>Note 1: (A),(B),(C),(D)and (E)are areas to be subjected to close-up surveys and thickness measurements (see Fig 1 and Fig 2).</p> <p>(A) : Transverse web frame or transverse watertight bulkhead in topside, hopper side and double side ballast tanks. In fore and aft peak tanks, transverse web frame means a complete transverse web frame ring including adjacent structural members</p> <p>(B) : Ordinary transverse frame in double side tanks</p> <p>(C) : Cargo hold transverse bulkhead plating, stiffeners and girders</p> <p>(D) : Cargo hold hatch covers and coamings. Subject to cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers structures.</p> <p>(E) : Deck plating inside line of hatch openings between cargo hold hatches</p> <p>Note 2: Close-up survey of transverse bulkheads to be carried out at four levels:</p> <p>Level (a) : Immediately above the inner bottom and immediately above the line of gussets (if fitted) and shedders for ships without lower stool)</p> <p>Level (b) : Immediately above and below the lower stool shelf plate (for those ships fitted with lower stools), and immediately above the line of the shedder plates.</p> <p>Level (c) : About mid-height of the bulkhead.</p> <p>Level (d) : Immediately below the upper deck plating and immediately adjacent to the upper wing tank, and immediately below the upper stool shelf plate for those ships fitted with upper stools, or immediately below the topside tanks.</p>			

Age of ship (in years) at time of class renewal survey			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	age >15
	Forward and aft transverse bulkheads including stiffening system in a transverse section comprising topside, hopper side and double side water ballast tanks on one side of the ship (i.e. port or starboard) (A)(see Note 1)	All transverse bulkheads including stiffening system in each water ballast tank (A)(see Note 1)	All transverse bulkheads including stiffening system in each water ballast tank (A)(see Note 1)
	25% of ordinary transverse frames for transverse framing system or 25% of longitudinals for longitudinal framing system on side shell and inner side plating at forward, middle and aft part in the foremost double side tanks (B)(see Note 1) All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches (E) (see Note 1)	25% of ordinary transverse frames for transverse framing system or 25% of longitudinals for longitudinal framing system on side shell and inner side plating at forward, middle and aft parts, in all double side tanks (B)(see Note 1) All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches (E) (see Note 1)	All ordinary transverse frames for transverse framing system or all of longitudinals for longitudinal framing system on side shell and inner side plating at forward, middle and aft parts, in all double side tanks (B)(see Note 1)
Two selected cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted (C)(see Note 1)	One transverse bulkhead in each cargo hold, including internal structure of upper and lower stools, where fitted (C)(see Note 1)	All cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted (C) (see Note 1)	Areas (C)-(E) as for class renewal survey for ships between 10 and 15 years of age (see Note 1)
All cargo hold hatch covers and coamings (plating and stiffeners) (D)(see Note 1)	All cargo hold hatch covers and coamings (plating and stiffeners) (D)(see Note 1)	All cargo hold hatch covers and coamings (plating and stiffeners) (D)(see Note 1)	
	All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches (E)(see Note 1)	All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches (E)(see Note 1)	
<p>Note 1: (A),(B),(C),(D)and (E)are areas to be subjected to close-up surveys and thickness measurements (see Fig 1 and Fig 2).</p> <p>(A) : Transverse web frame or transverse watertight bulkhead in topside, hopper side and double side ballast tanks. In fore and aft peak tanks, transverse web frame means a complete transverse web frame ring including adjacent structural members</p> <p>(B) : Ordinary transverse frame in double side tanks</p> <p>(C) : Cargo hold transverse bulkhead plating, stiffeners and girders</p> <p>(D) : Cargo hold hatch covers and coamings. Subject to cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers structures.</p> <p>(E) : Deck plating inside line of hatch openings between cargo hold hatches</p> <p>Note 2: Close-up survey of transverse bulkheads to be carried out at four levels:</p> <p>Level (a) : Immediately above the inner bottom and immediately above the line of gussets (if fitted) and shedders for ships without lower stool)</p> <p>Level (b) : Immediately above and below the lower stool shelf plate (for those ships fitted with lower stools), and immediately above the line of the shedder plates.</p> <p>Level (c) : About mid-height of the bulkhead.</p> <p>Level (d) : Immediately below the upper deck plating and immediately adjacent to the upper wing tank, and immediately below the upper stool shelf plate for those ships fitted with upper stools, or immediately below the topside tanks.</p>			

Figure 1 : Close-up Survey and Thickness Measurement Areas (1/1/2005)



Typical areas of deck plating and underdeck structure inside line of hatch openings between cargo hold hatches
Area (E)

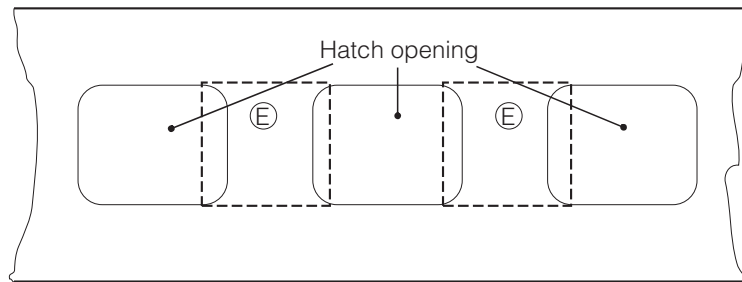


Figure 2 : Ordinary transverse frame in double skin tank (1/1/2019)

Framing in double-side tanks
Area (B)

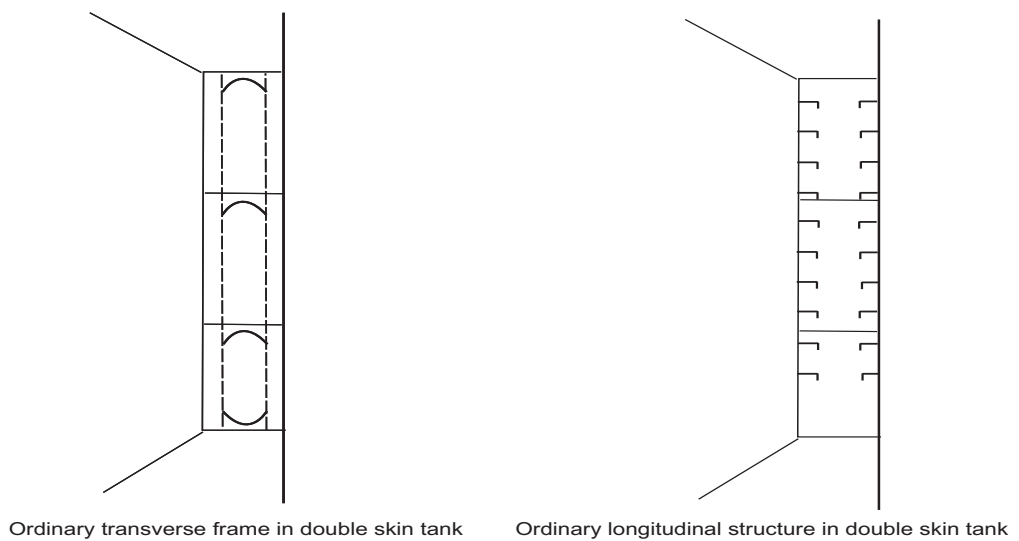
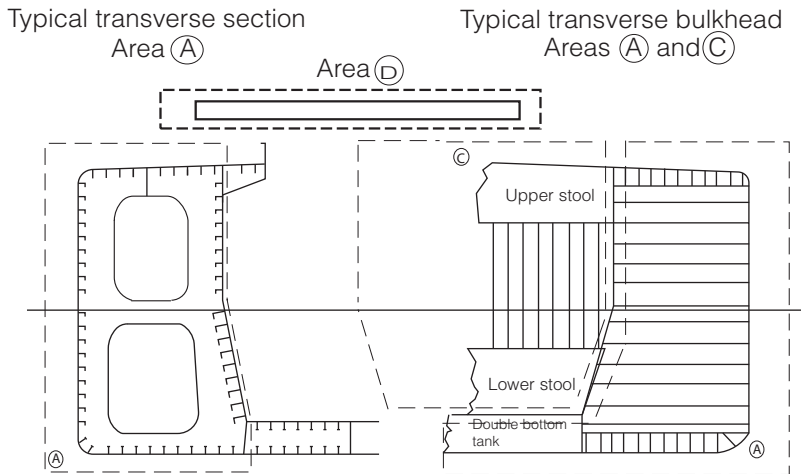


Table 3 : Minimum requirements for close-up survey at class renewal hull survey of ore carriers (1/7/2016)

Age of ship (in years) at time of class renewal survey			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	age >15
One web frame ring complete including adjacent structural members in a ballast wing tank. (A)(see Note 1)	All web frame rings complete including adjacent structural members in a ballast wing tank. (A)(see Note 1)	All web frame rings complete including adjacent structural members in each ballast tank. (A) (see Note 1)	All web frame rings complete including adjacent structural members in each ballast tank. (A)(see Note 1)
One transverse bulkhead lower part - including girder system and adjacent structural members - in a ballast tank. (A)(see Note 1)	One deck transverse including adjacent deck structural members in each remaining ballast tank. (A)(see Note 1) Forward and aft transverse bulkheads complete - including girder system and adjacent structural members - in a ballast wing tank. (A)(see Note 1) One transverse bulkhead lower part - including girder system and adjacent structural members - in each remaining ballast tank. (A)(see Note 1)	All transverse bulkheads complete - including girder system and adjacent structural members - in each ballast tank. (A)(see Note 1) One web frame ring complete including adjacent structural members in each wing void space. (A)(see Note 1) Additional web frame rings in void spaces as deemed necessary by the Society. (A)(see Note 1)	All transverse bulkheads complete - including girder system and adjacent structural members - in each ballast tank. (A)(see Note 1) One web frame ring complete including adjacent structural members in each wing void space. (A)(see Note 1) Additional web frame rings in void spaces as deemed necessary by the Society. (A)(see Note 1)
Two selected cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted. (C)(see Note 1)	One transverse bulkhead in each cargo hold, including internal structure of upper and lower stools, where fitted. (C)(see Note 1)	All cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted. (C)(see Note 1)	All cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted. (C)(see Note 1)
All cargo hold hatch covers and coamings (plating and stiffeners). (D)(see Note 1)	All cargo hold hatch covers and coamings (plating and stiffeners). (D)(see Note 1)	All cargo hold hatch covers and coamings (plating and stiffeners). (D)(see Note 1)	All cargo hold hatch covers and coamings (plating and stiffeners). (D)(see Note 1)
	All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches. (E)(see Note 1)	All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches. (E)(see Note 1)	All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches. (E)(see Note 1)
<p>Note 1:(A), (C), (D) and (E) are areas to be subjected to close-up surveys and thickness measurements according to Tab 4 (see Fig 3).</p> <p>(A) : Transverse web frame or transverse watertight bulkhead in topside, hopper side and double side ballast tanks. In fore and aft peak tanks, transverse web frame means a complete transverse web frame ring including adjacent structural members</p> <p>(C) : Cargo hold transverse bulkhead plating, stiffeners and girders</p> <p>(D) : Cargo hold hatch covers and coamings. Subject to cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers structures</p> <p>(E) : Deck plating and under deck structure inside line of hatch openings between cargo hold hatches.</p> <p>Note 2:Close-up Survey of transverse bulkheads to be carried out at four levels:</p> <p>Level (a) : Immediately above the inner bottom and immediately above the line of gussets (if fitted) and shedders for ships without lower stool.</p> <p>Level (b) : Immediately above and below the lower stool shelf plate (for those ships fitted with lower stools), and immediately above the line of the shedder plates.</p> <p>Level (c) : About mid-height of the bulkhead.</p> <p>Level (d) : Immediately below the upper deck plating and immediately adjacent to the upper wing tank, and immediately below the upper stool shelf plate for those ships fitted with upper stools, or immediately below the topside tanks.</p>			

Figure 3 : Close-up Survey and Thickness Measurement Areas of ore carriers (1/7/2009)



Typical areas of deck plating and underdeck structure inside line of hatch openings between cargo hold hatches
Area (E)

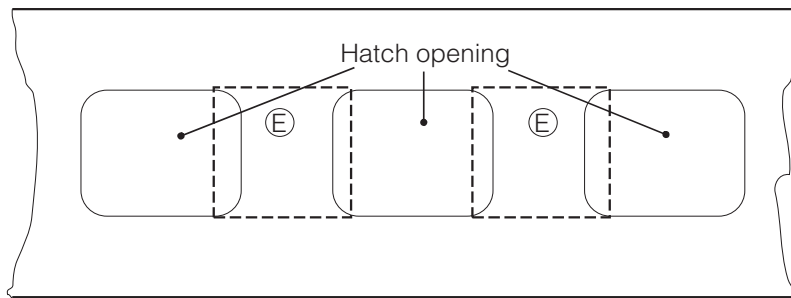


Table 4 : Minimum requirements to thickness measurements at class renewal hull survey of double skin bulk carriers and self-unloading bulk carriers of double skin construction, excluding ore carriers (1/1/2017)

Age of ship (in years) at time of class renewal survey			
age ≤ 5	5 < age ≤ 10	10 < age ≤ 15	age >15
Suspect areas	Suspect areas	Suspect areas	Suspect areas
	Within the cargo length: <ul style="list-style-type: none"> Two transverse sections of deck plating outside line of cargo hatch openings 	Within the cargo length: <ul style="list-style-type: none"> each deck plate outside line of cargo hatch openings two transverse sections, one in the amidships area, outside line of cargo hatch openings 	Within the cargo length: <ul style="list-style-type: none"> each deck plate outside line of cargo hatch openings three transverse sections, one in the amidships area, outside line of cargo hatch openings each bottom plate
	Wind and water strakes in way of the two transverse sections considered above	All wind and water strakes within the cargo length area	All wind and water strakes, full length
	Selected wind and water strakes outside the cargo length area	Selected wind and water strakes outside the cargo length area	
	Measurements, for general assessment and recording of corrosion pattern, of Tab 2 or Tab 3, as applicable.	Measurements, for general assessment and recording of corrosion pattern, of Tab 2 or Tab 3, as applicable.	Measurements, for general assessment and recording of corrosion pattern, of Tab 2 or Tab 3, as applicable.

Table 5 : Requirements for extent of thickness measurements in those areas of substantial corrosion of double skin bulk carriers and self-unloading bulk carriers of double skin construction, within the cargo length area (1/1/2017)

BOTTOM, INNER BOTTOM AND HOPPER STRUCTURE		
Structural member	Extent of measurement	Pattern of measurement
Bottom, inner bottom and hopper structure plating	Minimum of three bays across double bottom tank, including aft bay Measurements around and under all suction bell mouths	Five-point pattern for each panel between longitudinals and floors
Bottom, inner bottom and hopper structure longitudinals	Minimum of three longitudinals in each bay where bottom plating measured	Three measurements in line across flange and three measurements on the vertical web
Bottom girders, including watertight girders	At fore and aft watertight floors and in centre of tanks	Vertical line of single measurements on girder plating with one measurement between each panel stiffener, or a minimum of three measurements
Bottom floors, including watertight floors	Three floors in bays where bottom plating measured, with measurements at both ends and middle	Five-point pattern over two square metre area
Hopper structure web frame ring	Three floors in bays where bottom plating measured	Five-point pattern over one square metre of plating Single measurements on flange
Hopper structure transverse watertight bulkhead or swash bulkhead	• lower 1/3 of bulkhead	• five-point pattern over one square metre of plating
	• upper 2/3 of bulkhead	• five-point pattern over two square metres of plating
	• stiffeners (minimum of three)	• For web, five-point pattern over span (two measurements across web at each end and one at centre of span). For flange, single measurements at each end and centre of span
Panel stiffening	Where applicable	Single measurements

4.3 Hatch covers and coamings

4.3.1 (1/1/2008)

A thorough inspection of the items listed in [2.3] is to be carried out, in addition to all hatch covers and coamings.

4.3.2 (1/1/2005)

A check of the satisfactory operation of all mechanically operated hatch covers is to be made, including:

- stowage and securing in open condition;
- proper fit and efficiency of sealing in closed condition;
- operational testing of hydraulic and power components, wires, chains and link drives.

4.3.3 (1/1/2005)

A check is to be made of the effectiveness of sealing arrangements of all hatch covers by hose testing or equivalent.

4.3.4 (1/7/2016)

Close-up survey and thickness measurement (see Note 1) of the hatch cover and coaming plating and stiffeners is to be carried out as given in Tab 2 or Tab 3, as applicable, and Tab 4.

Note 1: Subject to cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers structures.

4.4 Overall and close-up surveys

4.4.1 (1/7/2006)

An overall survey of all cargo holds, tanks and spaces is to be carried out at each class renewal survey. For fuel oil tanks in the cargo length area, the requirements given in Ch 3, Sec 5, Tab 5 are to be complied with.

4.4.2 (1/7/2008)

The minimum requirements for close-up surveys at each class renewal survey are given in Tab 2 for double skin bulk carriers, excluding ore carriers, and in Tab 3 for ore carriers.

4.4.3 (1/1/2005)

The Surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of the spaces under survey, the condition of the corrosion prevention system and where spaces have structural arrangements or details which have suffered defects in similar spaces or on similar ships according to available information.

4.4.4 (1/1/2008)

For areas in spaces where hard protective coatings are found to be in a good condition, the extent of close-up surveys according to Tab 2 may be specially considered. Refer also to [4.2.7].

4.5 Thickness measurements

4.5.1 (1/1/2005)

The minimum requirements for thickness measurements at class renewal surveys are given in Tab 4.

4.5.2 (1/7/2012)

Provisions for extended measurements for areas with substantial corrosion as defined in Ch 2, Sec 2, [2.2.9] are given in Tab 5 to Tab 8 and as may be additionally specified in the survey program as required in [4.1]. These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to be subjected to thickness measurements.

For ships built under the Common Structural Rules, the identified substantial corrosion areas may be:

- a) protected by coating applied in accordance with the coating manufacturer's requirements and examined at annual intervals to confirm the coating in way is still in good condition, or alternatively
- b) required to be measured at annual intervals.

4.5.3 (1/7/2006)

The Surveyor may further extend the thickness measurements as deemed necessary.

4.5.4 (1/7/2006)

For areas in tanks where hard protective coatings are found to be in a good condition, the extent of thickness measurements according to Tab 4 may be specially considered. Refer also to [4.2.7].

4.5.5 (1/7/2012)

Transverse sections are to be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements, one of which is to be in the amidships area.

4.5.6 (1/7/2006)

Representative thickness measurement to determine both general and local levels of corrosion in the transverse web frames in all water ballast tanks is to be carried out. Thickness measurement is also to be carried out to determine the corrosion levels on the transverse bulkhead plating. The extent of thickness measurements may be specially considered, provided the Surveyor is satisfied by the close-up survey that there is no structural diminution and the hard protective coating where applied remains efficient.

4.5.7 (1/1/2016)

For ships not built under the Common Structural Rules, when pitting is found on bottom plating and its intensity is 20% or more, thickness measurements are to be extended in order to determine the actual plate thickness out of the pits and the depth of the pits. Where the wastage is in the substantial corrosion range or the average depth of pitting is 1/3 or more of the actual plate thickness, the pitted plate is to be considered as a substantially corroded area.

For ships built under the Common Structural Rules, the acceptance criteria for pitting is:

- according to Chapter 13 of the Common Structural Rules for Bulk Carriers and as specified in Ch 2, App 3, [4.2.2] for ships contracted for construction on or after 1 April 2006 but before 1 July 2015, or
- according to Ch 2, App 3, [4.2.2] for ships contracted for construction on or after 1 July 2015.

Table 6 : Requirements for extent of thickness measurements in those areas of substantial corrosion of double skin bulk carriers and self-unloading bulk carriers of double skin construction within the cargo length area (1/1/2017)

DECK STRUCTURE INCLUDING CROSS STRIPS, MAIN CARGO HATCHWAYS, HATCH COVERS, COAMINGS AND TOPSIDE TANKS		
Structural member	Extent of measurement	Pattern of measurement
Cross Deck Strip plating	Suspect Cross Deck Strip plating	Five-point pattern between underdeck stiffeners over 1 metre length
Underdeck Stiffeners	Transverse members	Five-point pattern at each end and mid span
	Longitudinal member	Five-point pattern on both web and flange
Hatch Covers	Side and end skirts, each three locations Three longitudinal bands, outboard strakes (2) and centreline strake (1)	Five-point pattern at each location Five-point measurement each band
Mastre delle boccaporte	Each side and end of coaming, one band lower 1/3, one band upper 2/3 of coaming	Five-point measurement each band i.e. end or side coaming
Topside Ballast Tanks	Transverse watertight bulkheads: <ul style="list-style-type: none"> • Bulkhead • Stiffeners 	Five-point pattern over 1 sq. metre of plating Five-point pattern over 1 metre length
	Two representative transverse swash bulkheads: <ul style="list-style-type: none"> • Bulkhead • Stiffeners 	Five-point pattern over 1 sq. metre of plating Five-point pattern over 1 metre length
	Three representative bays of slope plating in all plating	Five point pattern over 1 sq. metre of plating
	Longitudinals, suspect and adjacent	Five point pattern over 1 sq. metre of plating
Main Deck Plating	Suspect plates and adjacent (4)	Five-point pattern over 1 sq. metre of plating
Main Deck Longitudinals	Suspect Plates	Five point pattern on both web and flange over 1 metre length
Web Frames/Transverses	Suspect Plates	Five-point pattern over 1 sq. metre

Table 7 : Requirements for extent of thickness measurements in those areas of substantial corrosion of double skin bulk carriers and self-unloading bulk carriers of double skin construction within the cargo length area (1/1/2017)

STRUCTURE IN DOUBLE SIDE SPACES OF DOUBLE SKIN BULK CARRIERS INCLUDING WING VOID SPACES OF ORE CARRIERS		
Structural member	Extent of measurement	Pattern of measurement
Side shell and inner plating: <ul style="list-style-type: none"> Upper strake and strakes in way of horizontal girders all other strakes 	<ul style="list-style-type: none"> Plating between each pair of transverse frames/longitudinals in a minimum of three bays (along the tank) Plating between every third pair of longitudinals in same three bays 	Single measurement
Side shell and inner side transverse frames /longitudinals on: <ul style="list-style-type: none"> upper strake all other strakes 	<ul style="list-style-type: none"> Each transverse frame/longitudinal in same three bays Every third transverse frame/longitudinal in same three bays 	Three measurements across web and 1 measurement on flange
Transverse frames /longitudinals	Minimum of three at top, middle and bottom of tank in same three bays	Five-point pattern over area of bracket
Vertical web and transverse bulkheads: <ul style="list-style-type: none"> strakes in a way of horizontal girders other strakes 	<ul style="list-style-type: none"> Minimum of two webs and both transverse bulkheads Minimum of two webs and both transverse bulkheads 	<ul style="list-style-type: none"> Five-point pattern over approx. two square metre area Two measurements between each pair of vertical stiffeners
Two measurements between each pair of vertical stiffeners	Plating on each girder in a minimum of three bays	Two measurements between each pair of longitudinal girder stiffeners
Panel stiffening	Where applicable	Single measurements

Table 8 : Requirements for extent of thickness measurements in those areas of substantial corrosion of double skin bulk carriers and self-unloading bulk carriers of double skin construction within the cargo length area (1/1/2017)

TRANSVERSE BULKHEADS IN CARGO HOLDS		
Structural member	Estensione delle misurazioni	Distribuzione delle misurazioni
Lower stool, where fitted	<ul style="list-style-type: none"> Transverse band within 25mm of welded connection to inner bottom Transverse band within 25mm of welded connection to shelf plate 	Five-point pattern between stiffeners over one metre length
Transverse bulkheads	<ul style="list-style-type: none"> Transverse band at approximately mid height Transverse band at part of bulkhead adjacent to upper deck or below upper stool shelf plate (for those ships fitted with upper stools) 	Five-point pattern over one square metre of plating

4.6 Tank testing

4.6.1 (1/7/2006)

All boundaries of water ballast tanks, deep tanks and cargo holds used for water ballast within the cargo length area are to be pressure tested. For fuel oil tanks, only representative tanks are to be pressure tested.

4.6.2 (1/1/2005)

The Surveyor may extend the tank testing as deemed necessary.

4.6.3 (1/7/2006)

Boundaries of ballast tanks are to be tested with a head of liquid to the top of air pipes.

4.6.4 (1/7/2006)

Boundaries of ballast holds are to be tested with a head of liquid to near the top of hatches.

4.6.5 (1/7/2006)

Boundaries of fuel oil tanks are to be tested with a head of liquid to the highest point that liquid will rise to under service conditions. Tank testing of fuel oil tanks may be specially considered based on a satisfactory external examination of the tank boundaries and confirmation from the Master stating that pressure testing has been carried out according to the requirements with satisfactory results.

4.6.6 (1/7/2006)

The testing of double bottom tanks and other spaces not designed for the carriage of liquid may be omitted, provided a satisfactory internal examination is carried out together with an examination of the tank top.

4.7 Additional requirements after determining compliance with SOLAS XII/12 (water level detectors) and XII/13 (availability of pumping systems)

4.7.1 (1/1/2007)

For ships complying with the requirements of SOLAS XII/12 for hold, ballast and dry space water level detectors, the class renewal survey is to include an examination and a test of the water ingress detection systems and of their alarms.

4.7.2 (1/1/2007)

For ships complying with the requirements of SOLAS XII/13 for the availability of pumping systems, the class renewal survey is to include an examination and a test of the means for draining and pumping ballast tanks forward of the collision bulkhead and bilges of dry spaces, any part of which

extends forward of the foremost cargo hold, and of their controls.

4.8 Survey Program

4.8.1 Basic information and particulars (1/1/2008)

Basic information and particulars of the ship are indicated in Tab 9.

4.8.2 Scope (1/1/2008)

The present survey program covers the minimum extent of overall surveys, close-up surveys, thickness measurements and pressure testing within the cargo length area, of cargo holds and ballast tanks, including fore and aft peak tanks, required by the Rules.

The arrangements and safety aspects of the survey are to be acceptable to the attending Surveyor(s).

4.8.3 Documentation (1/1/2008)

All documents used in the development of the survey program are to be available on board during the survey as required in [1.2].

4.8.4 Arrangement of tanks and spaces (1/1/2008)

This section of the survey program is to provide information (either in the form of plans or text) on the arrangement of cargo holds, tanks and spaces that fall within the scope of the survey.

4.8.5 List of cargo holds, tanks and spaces with information on their use, extent of coatings and corrosion protection system (1/1/2008)

This section of the survey program is to indicate any changes relating to (and is to update) the information on the use of the holds and tanks of the ship, the extent of coatings and the corrosion protective system provided in the Survey Planning Questionnaire referred to in [4.9].

4.8.6 Conditions for survey (1/1/2008)

This section of the survey program is to provide information on the conditions for survey, e.g. information regarding cargo hold and tank cleaning, gas freeing, ventilation, lighting etc.

4.8.7 Provisions and methods of access to structures (1/1/2008)

This section of the survey program is to indicate any changes relating to (and is to update) the information on the provisions and methods of access to structures provided in the Survey Planning Questionnaire referred to in [4.9].

Table 9 : Basic information and particulars (1/1/2019)

Name of ship:	
IMO number:	
Flag State:	
Port of registry:	
Gross tonnage:	
Deadweight (metric tonnes):	
Length between perpendiculars (m):	
Shipbuilder:	
Hull number:	
Classification Society:	
Register Number:	
Date of build:	
Owner:	
Thickness measurement firm:	
Any other information which may be useful	

4.8.8 List of equipment for survey (1/1/2008)

This section of the survey program is to identify and list the equipment that will be made available for carrying out the survey and the required thickness measurements.

4.8.9 Survey requirements (1/1/2008)

a) Overall survey

This section of the survey program is to identify and list the spaces that are to undergo an overall survey for the ship in accordance with [4.3] and [4.4.1].

b) Close-up survey

This section of the survey program is to identify and list the hull structures that are to undergo a close-up survey for the ship in accordance with [4.4.2].

4.8.10 Identification of tanks for tank testing (1/1/2008)

This section of the survey program is to identify and list the cargo holds and tanks that are to undergo tank testing for the ship in accordance with [4.6].

4.8.11 Identification of areas and sections for thickness measurements (1/1/2008)

This section of the survey program is to identify and list the areas and sections where thickness measurements are to be taken in accordance with [4.3.4] and [4.5].

4.8.12 Minimum thickness of hull structures (1/1/2008)

This section of the survey program is to specify the minimum thickness for hull structures of the ship that are subject to survey, according to (a) or (b):

- determined from the attached wastage allowance table and the original thickness according to the hull structure plans of the ship (see Note 1);
- given in the following Tab 10:

Note 1: The wastage allowance tables are to be attached to the survey program.

4.8.13 Thickness measurement firm (1/1/2019)

This section of the survey program is to identify changes, if any, relating to the information on the thickness measurement firm provided in the Survey Planning Questionnaire referred to in [4.9].

4.8.14 Damage experience related to the ship (1/1/2008)

This section of the survey program, using Tab 11, shown below, is to provide details of the hull damage for at least the last three years in way of the cargo holds, ballast tanks and void spaces within the cargo length area. This damage is subject to survey.

4.8.15 Areas identified with substantial corrosion from previous surveys (1/1/2008)

This section of the survey program is to identify and list the areas of substantial corrosion from previous surveys.

Table 10 : As-built and minimum thickness for hull structures (1/1/2008)

Area or location	Original as-built thickness (mm)	Minimum thickness (mm)	Substantial corrosion thickness (mm)
Deck			
Plating			
Longitudinals			
Longitudinal girders			
Cross deck plating			
Cross deck stiffeners			
Bottom			
Plating			
Longitudinals			
Longitudinal girders			
Inner bottom			
Plating			
Longitudinals			
Longitudinal girders			
Floors			
Ship side in way of topside tanks			
Plating			
Longitudinals			
Ship side in way of hopper side tanks			
Plating			
Longitudinals			
Ship side in way of double hull tanks			
Plating			
Longitudinals or ordinary transverse frames			
Longitudinal stringers			
Longitudinal bulkhead (inner side)			
Plating			
Longitudinals or ordinary transverse frames			
Longitudinal girders			
Transverse bulkheads			
Plating			
Stiffeners, if applicable			
Upper stool plating			
Upper stool stiffeners			
Lower stool plating			
Lower stool stiffeners			
Transverse web frames in topside tanks			

Area or location	Original as-built thickness (mm)	Minimum thickness (mm)	Substantial corrosion thickness(mm)
Plating			
Flanges			
Stiffeners			
Transverse web frames in hopper tanks			
Plating			
Flanges			
Stiffeners			
Transverse web frames in double hull tanks			
Plating			
Flanges			
Stiffeners			
Hatch covers			
Plating			
Stiffeners			
Hatch coamings			
Plating			
Stiffeners			

Table 11 : Hull damage sorted by location for the ship concerned and for sister or similar ships (if available) in the case of design related damage (1/1/2008)

Cargo hold, tank or space number or area	Possible cause,if known	Description of the damage	Location	Repair	Date of repair

4.8.16 Critical structural areas and suspect areas (1/1/2008)

This section of the survey program is to identify and list the critical structural areas and the suspect areas, if such information is available.

4.8.17 Other relevant comments and information (1/1/2008)

This section of the survey program is to provide any other comments and information relevant to the survey.

4.8.18 Appendices to be provided (1/1/2008)

The following appendices are to be attached to the survey program:

- a) Appendix 1 - List of plans

This appendix is to identify and list the main structural plans of cargo holds and ballast tanks (scantling drawings), including information regarding use of high tensile steel (HTS), as required by the second item of the list in [4.1.3].

- b) Appendix 2 - Survey Planning Questionnaire
The Survey Planning Questionnaire (refer to [4.9]), which has been submitted by the Owner.
- c) Appendix 3 - Other documentation
This part of the survey program is to identify and list any other documentation that forms part of the plan.

4.8.19 Date and signature (1/1/2008)

The survey program is to be completed with the following wording:

Prepared by the Owner in co-operation with the Society for compliance with [4.1.3] of Pt A, Ch 4, Sec 9 of the Rules.

Date:..... (name and signature of authorised Owner's representative)

Date:..... (name and signature of authorised representative of the Society)

4.9 Survey Planning Questionnaire

4.9.1 General (1/1/2008)

The following information will enable the Owner in co-operation with the Society to develop a survey program complying with the requirements given in [4.8]. It is essential that, when completing the present questionnaire, the Owner provides up-to-date information. The present questionnaire, when completed, is to provide all information and material required in [4.8].

4.9.2 Particulars (1/1/2008)

The particulars of the ship are indicated in Tab 12.

4.9.3 Information on access provision for close-up surveys and thickness measurement (1/1/2008)

The Owner is to indicate in Tab 13 the means of access to the structures subject to close-up survey and thickness measurement. A close-up survey is an examination where the details of structural components are within the close

visual inspection range of the attending Surveyor, i.e. normally within reach of hand.

4.9.4 History of cargo (1/1/2008)

The Owner is to provide history of bulk cargoes of corrosive nature, e.g. with high sulphur content.

4.9.5 Owner's inspections (1/1/2008)

Using a format similar to that of Tab 14 (which is given as an example), the Owner is to provide details of the results of their inspections for the last three years on all cargo holds and ballast tanks and void spaces within the cargo area, including peak tanks.

4.9.6 Reports of Port State Control inspections (1/1/2008)

The Owner is to provide a list of any reports of Port State Control inspections containing hull structural related deficiencies and relevant information on rectification of the deficiencies.

4.9.7 Safety Management System (1/1/2008)

The Owner is to provide a list of any non-conformities related to hull maintenance, including the associated corrective actions.

4.9.8 Approved thickness measurement firm (1/1/2019)

The Owner is to provide the name and address of the approved thickness measurement firm.

4.9.9 Date and signature (1/1/2008)

The Survey Planning Questionnaire is to be completed with the date, the name of the Owner's representative responsible for filling in the document and his signature.

4.9.10 Availability of the form (1/1/2008)

An example of the "Survey Planning Questionnaire" form to be filled in by the Owner is available on the Society website or may be supplied upon request; application may be made to dry.cargoships@rina.org.

Table 12 : Particulars of the ship (1/1/2008)

Name of ship:	
IMO number:	
Flag State:	
Port of registry:	
Gross tonnage:	
Deadweight (metric tonnes):	
Classification Society:	
Register Number:	
Date of build:	
Owner:	

Table 13 : Means of access to hull structures (1/1/2008)

Hold/Tank No. Other spaces	Structure	Temporary staging	Rafts	Ladders	Direct access	Other means (please specify)
Peaks	Fore Peak					
	Aft Peak					
Cargo Holds	Hatch side coamings					
	Topside sloping plate					
	Upper stool plating					
	Cross deck					
	Double side tank plating					
	Transverse bulkhead					
	Hopper tank plating					
	Lower stool plating					
Topside Tanks	Tank top					
	Underdeck structure					
	Side shell and structure					
	Sloping plate and structure					
Hopper Tanks	Webs and bulkheads					
	Hopper sloping plate and structure					
	Side shell and structure					
	Bottom structure					
Double side Tanks	Webs and bulkheads					
	Side shell structure					
	Inners skin structure					
Other spaces	Webs and bulkheads					
	Double bottom structure					
	Upper stool internal structure					
Wing tanks of Ore Carriers	Lower stool internal structure					
	Underdeck and structure					
	Side shell and structure					
	Side shell vertical web and structure					
	Longitudinal bulkhead and structure					
	Longitudinal bulkhead web and structure					
	Bottom plating and structure					
Cross-ties/stringers						

Table 14 : Owner's inspection report (1/1/2008)

Tank/Hold No. Other spaces	Corrosion protection (1)	Coating extent (2)	Coating condition (3)	Structural deterioration (4)	Hold and tank history (5)
Cargo holds					
Topside tanks					
Hopper tanks					
Double side skin tanks					
Double bottom tanks					
Upper stools					
Lower stools					
Wing tanks (ore carriers)					
Fore peak					
Aft peak					
Miscellaneous other spaces:					

Note 1: Indicate tanks which are used for oil/ballast.

- (1) HC=hard coating; SC=soft coating; SH=semi-hard coating; NP=no protection
- (2) U=upper part; M=middle part; L=lower part; C=complete
- (3) G=good; F=fair; P=poor; RC=recoated (during the last three years)
- (4) N=no findings recorded; Y=findings recorded, description of findings is to be attached to the questionnaire
- (5) DR=damage and repair; L=leakages; CV= conversion (description is to be attached to this questionnaire)

SECTION 10

OTHER SERVICE NOTATIONS

1 General

1.1

1.1.1 (1/7/2016)

The requirements of this Section are applicable to ships to be assigned one of the following service notations, and given in the Articles specified below:

- **container ship**, or **ship equipped for the carriage of containers**, in [2]
- **livestock carrier**, in [3]
- **FLS tanker**, in [4]
- dredging units, i.e. ships with the service notations **dredger**, **hopper dredger**, **hopper unit**, **split hopper unit**, **split hopper dredger**, in [5]
- **tug**, **salvage tug**, **escort tug**, in [6]
- **supply vessel**, in [7]
- **fire-fighting ship**, in [8]
- **oil recovery ship**, in [9]
- **cable laying ship**, in [10]
- **fishing vessel**, in [11]
- **pipe laying ship**, in [12]
- **research ship**, in [13]
- **cement carrier**, in [14]
- **asphalt tanker**, in [15]
- **compressed natural gas carrier**, in [16]
- **barge, with the additional service features - accommodation or -oil**, in [17]
- **oil carrier, palm oil carrier**, in [18]
- **transshipping unit, transshipping floating terminal**, in [19]
- **sugar carrier**, in [20]
- **fly ash carrier**, in [21]
- **ships with additional service feature BC**, in [22]
- **ships with additional service feature BC-XII**, in [23]
- **well stimulation**, in [24].
- **car carrier with additional service feature H-CNG**, in [25].

1.1.2 These requirements are additional to those given in Chapter 3, according to the relevant surveys.

1.1.3 (1/7/2015)

When the service notation **special service**, as per Ch 1, Sec 2, [4.12.1], is assigned, regardless of whether any additional survey requirements are indicated in the annex to the Certificate of Classification, the Annual Survey and the Renewal Survey are, in any case, to include the examination, to the extent deemed necessary by the Surveyor, of the equipment and arrangements on the basis of which the service notation has been assigned.

2 Container ship or ship equipped for the carriage of containers

2.1 Annual survey

2.1.1 The survey is to include:

- confirmation of the availability of instructions and instruments for stowage of containers, as required or fitted
- examination of container supports welded to the ship's structure or on to the hatch covers
- examination of cell guides, if fitted.

2.2 Class renewal survey

2.2.1 The renewal is to include:

- examination of container supports welded to the ship's structure or on to the hatch covers, checking for possible cracks and deformations
- examination of cell guides and associated elements, checking for possible cracks, deformations or corrosion.

2.2.2 For ships assigned with the service notation **container ship**, examination of the torsion box girder or equivalent structure at the top sides is carried out. Thickness measurements additional to those related to the transverse sections may be required.

3 Livestock carrier

3.1 Annual survey

3.1.1 (1/1/2007)

The survey is to include a general examination of:

- spaces for the livestock and related hatch covers (to be surveyed according to Ch 3, Sec 3, [2])
- ventilation means, including prime movers
- main, emergency and portable lighting systems in livestock spaces, passageways and access routes
- the drainage system
- fodder and fresh water system.

3.2 Class renewal survey

3.2.1 The equipment related to ventilation, lighting and the related power supply is to be submitted to a survey to the same extent as required for similar equipment at the class renewal survey as indicated in Ch 3, Sec 5.

3.2.2 The drainage, fodder and fresh water systems, including piping and pumps, are to be surveyed to the same

extent as required for similar equipment at the class renewal survey as indicated in Ch 3, Sec 5.

The fresh water tanks are to be internally examined in accordance with the periodicity given in Ch 3, Sec 5, Tab 5.

4 FLS tanker

4.1 Annual survey - Hull items

4.1.1 Weather decks

The survey is to include:

- examination of cargo tank openings, including gaskets, covers, coamings and screens
- examination of cargo tank pressure/vacuum valves and flame screens
- examination of flame screens on vents to all bunker, oily ballast and oily slop tanks
- examination of cargo, bunker, ballast and vent piping systems, including remote control valves, safety valves and various safety devices, as well as vent masts and headers
- confirmation that wheelhouse doors and windows, sidescuttles and windows in superstructure and deck-house ends facing the cargo area are in satisfactory condition
- confirmation that pumps, valves and pipelines are identified and distinctively marked.

4.1.2 Cargo pump rooms and pipe tunnels

The survey is to include:

- examination of all pump room bulkheads and pipe tunnels (if any) for signs of chemical cargo leakage or fractures and, in particular, the sealing arrangements of penetrations in pump room bulkheads
- examination of the condition of all piping systems, in cargo pump rooms and pipe tunnels (if any)
- examination of the bilge and ballast arrangements and confirmation that pumps and pipelines are identified.

4.2 Annual survey - Cargo machinery items

4.2.1 Cargo area and cargo pump rooms

The Owner or his representative is to declare to the attending Surveyor that no modifications or alterations which might impair safety have been made to the various installations in dangerous zones without prior approval from the Society.

The survey is to include:

- confirmation that potential sources of ignition in or near the cargo pump rooms, such as loose gear, excessive product in bilge, excessive vapours, combustible materials, are eliminated and that access ladders are in satisfactory condition
- examination, as far as practicable, of cargo, bilge, ballast and stripping pumps for excessive gland seal leakage, verification of proper operation of electrical and mechanical remote operating and shutdown devices

and operation of pump room bilge system, and checking that pump foundations are intact

- confirmation that the ventilation system, including portable equipment, if any, of all spaces in the cargo area (including cargo pump room) is operational, ducting is intact and screens are clean
- confirmation that electrical equipment in dangerous zones, cargo pump rooms and other spaces is in satisfactory condition and has been properly maintained
- confirmation that the remote operation of the cargo pump room bilge system is satisfactory
- examination of the cargo heating system
- examination of the cargo-transfer arrangement and confirmation that the ship's cargo hoses are suitable for their intended purpose and in satisfactory condition
- confirmation that any special arrangement made for bow or stern loading/unloading is in satisfactory condition.

4.2.2 Instrumentation and safety devices

The survey is to include the following items, as far as required or fitted:

- examination of cargo tank gauging devices, high level alarms and valves associated with overflow control
- confirmation that installed pressure gauges on cargo discharge lines are properly operational
- confirmation that the required gas detection instruments are on board and satisfactory arrangements have been made for the supply of any required vapour detection tubes
- confirmation that devices provided for measuring the temperature of the cargo, if any, operate satisfactorily.

4.2.3 Inert gas system

If an inert gas system such as that installed on board oil tankers is fitted, the requirements given in Sec 3, [3.3] are to be complied with.

4.3 Intermediate survey - Hull items

4.3.1 The survey is to include:

- examination, as far as applicable, of cargo, stripping, cargo tank washing, bunker, ballast, steam and vent piping systems as well as vent masts and headers. If upon examination there is any doubt as to the condition of the piping, pressure testing, thickness measurement or both may be required.
- confirmation that the pipelines are electrically bonded to the hull
- examination of vent line drainage arrangements.

4.4 Intermediate survey - Cargo machinery items

4.4.1 Electrical equipment in dangerous zones

A general examination of the electrical equipment and cables in dangerous zones such as cargo pump rooms and areas adjacent to cargo tanks is to be carried out for defective and non-certified safe type electrical equipment, non-

approved lighting and fixtures, and improperly installed or defective or dead-end wiring.

The electrical insulation resistance of the electrical equipment and circuits terminating in or passing through the dangerous zones is to be tested; however, in cases where a proper record of testing is maintained, consideration may be given to accepting recent test readings effected by the ship's personnel.

4.4.2 Cargo heating system

The satisfactory condition of the cargo heating system is to be verified.

4.4.3 Inert gas system

For ships over 10 years old at the time of the intermediate survey due date, if an inert gas system such as that installed on board oil tankers is fitted, the requirements given in Sec 3, [5.2] for intermediate survey of oil tankers are to be complied with.

4.5 Class renewal survey - Hull items

4.5.1 Piping

Piping for cargo, ballast, stripping and venting systems is to be examined to the Surveyor's satisfaction. Dismantling and/or thickness measurements of these items may be required. A hydraulic test is to be carried out in the event of repair or dismantling of cargo or ballast piping, or where doubts arise.

Vent line drainage arrangements are to be examined.

It is to be verified that cargo piping is electrically bonded to the hull.

4.5.2 Safety valves

All safety valves on cargo piping and of cargo tanks are to be dismantled for examination, adjusted and, as applicable, resealed.

4.5.3 Cargo pump rooms

All cargo pump room boundaries are to be generally examined. All gas-tight shaft sealing devices are to be examined. The bottom of cargo pump rooms is to be presented clean for the examination of stripping devices and gutters.

4.6 Class renewal survey - Cargo machinery items

4.6.1 Pumps

Ballast and stripping pumps are to be internally examined and prime movers checked. A working test is to be carried out.

Maintenance records of cargo pumps are to be made available to the Surveyor.

4.6.2 Washing system

Where a washing system is fitted, piping, pumps, valves and deck-mounted washing machines are to be examined and tested for signs of leakage, and anchoring devices of deck-mounted washing machines are to be checked to the Surveyor's satisfaction.

4.6.3 Cargo heating system

The apparent satisfactory condition of the cargo heating system such as clamping, external condition of piping is to be verified and, if deemed necessary by the Surveyor, the system is to be pressure tested.

4.6.4 Remote controls

An operating test of the emergency remote control of pumps and valves and of automatic closing valves is to be carried out.

4.6.5 Electrical equipment in dangerous zones

A general examination of the electrical equipment and cables in dangerous zones such as cargo pump rooms and areas adjacent to cargo tanks is to be carried out for defective and non-certified safe type electrical equipment, non-approved lighting and fixtures, and improperly installed or defective or dead-end wiring.

The electrical insulation resistance of the electrical equipment and circuits terminating in or passing through the dangerous zones is to be tested; however, in cases where a proper record of testing is maintained, consideration may be given to accepting recent test readings effected by the ship's personnel.

4.6.6 Inert gas system

If an inert gas system such as that installed on board oil tankers is fitted, the requirements given Sec 3, [5.2] for intermediate survey and in Sec 3, [7.2] for class renewal survey of oil tankers are to be complied with.

5 Dredging units

5.1 Annual survey

5.1.1 The survey is to include the following items, as far as required or fitted, according to the service notation of the ship:

- for **split hopper unit, split hopper dredger**, visual examination, as far as practicable, of superstructure hinges and blocks, deck hinges, hydraulic jacks and associated piping systems and alarms
- for **dredger, hopper dredger, split hopper dredger**:
 - visual examination, as far as practicable, of attachments of suction piping and lifting systems to the structure and external examination of piping in dredging machinery spaces for absence of corrosion and leakage
 - checking the condition of the dredging machinery space and related equipment with regard to electrical shocks, protection from rotating machinery, fire and explosion hazards.

5.2 Class renewal survey

5.2.1 The survey is to include the following items, as far as required or fitted, according to the service notation of the ship:

- for **hopper dredger, hopper unit**, visual examination of hopper bottom doors or valves and accessories, such as

hinges, actuating rods, hydraulic systems, with dismantling as deemed necessary by the Surveyor

- for **split hopper unit, split hopper dredger**, visual examination, as far as practicable, of superstructure hinges and blocks, deck hinges, hydraulic jacks and associated piping systems and alarms, with dismantling and/or further checks as deemed necessary by the Surveyor
- for **dredger, hopper dredger, split hopper dredger**:
 - visual examination, as far as practicable, of attachments of suction piping and lifting systems to the structure and external examination of piping in dredging machinery spaces for absence of corrosion and leakage
 - checking the condition of the dredging machinery space and related equipment with regard to electrical shocks, protection from rotating machinery, fire and explosion hazards.

6 Tug, salvage tug, escort tug

6.1 Annual survey

6.1.1 The survey is to include a general external examination of the towing hook or towing winch, as fitted, and unhooking device, as far as practicable.

6.1.2 In addition to [6.1.1] above, for **salvage tug**, the availability and satisfactory condition of specific equipment as required in Pt E, Ch 14, Sec 2, [3] is to be verified.

6.1.3 For **tug - barge combined**, an examination of the accessible parts of the connection system is to be carried out.

6.2 Class renewal survey

6.2.1 The survey is to include:

- checking the condition of the connection of the towing hook or towing winch to the structure, including related reinforcements of the structure
- checking the external condition of the towing hook or towing winch; when applicable, a no-load test of the unhooking device is to be carried out.

6.2.2 (1/7/2004)

In addition to [6.2.1] above, for **salvage tug**, the survey is to include:

- a check and working test of specific equipment as required in Pt E, Ch 14, Sec 2, [3]
- checking of the satisfactory condition of the towing line(s).

6.2.3 For **tug - barge combined**, a visual examination of components of the connection system is to be carried out, completed by thickness measurements and non-destructive tests as deemed necessary by the Surveyor. A connection/disconnection test is to be carried out, including a check of related remote control, safety and alarm devices.

7 Supply vessel

7.1 Supply vessel - Oil product or Supply vessel - Chemical product

7.1.1 General

The additional survey items for annual survey, intermediate survey and class renewal survey are applicable only to ships having the service notation **supply vessel** assigned the additional service features **oil product** or **chemical product**.

7.1.2 Annual survey - Hull items

a) Weather decks

The survey is to include:

- examination of cargo tank openings, including gaskets, covers, coamings and screens
- examination of cargo tank pressure/vacuum valves and flame screens
- examination of flame screens on vents to all bunker, oily ballast and oily slop tanks
- examination of cargo, bunker, ballast and vent piping systems, including remote control valves, safety valves and various safety devices, as well as vent masts and headers
- confirmation that wheelhouse doors and windows, sidescuttles and windows in superstructure and deckhouse ends facing the cargo area are in satisfactory condition
- confirmation that pumps, valves and pipelines are identified and distinctively marked.

b) Cargo pump rooms and pipe tunnels

The survey is to include:

- examination of all pump room bulkheads and pipe tunnels (if any) for signs of oil or chemical product leakage or fractures and, in particular, the sealing arrangements of penetrations in pump room bulkheads
- examination of the condition of all piping systems, in cargo pump rooms and pipe tunnels (if any)
- examination of the bilge and ballast arrangements and confirmation that pumps and pipelines are identified.

7.1.3 Annual survey - Cargo machinery items (1/1/2007)

a) Cargo area and cargo pump rooms

The Owner or his representative is to declare to the attending Surveyor that no modifications or alterations which might impair safety have been made to the various installations in dangerous zones without prior approval from the Society.

The survey is to include:

- confirmation that potential sources of ignition in or near the cargo pump rooms, such as loose gear, excessive product in bilge, excessive vapours, combustible materials, etc., are eliminated and that access ladders are in satisfactory condition
- examination, as far as practicable, of cargo, bilge, ballast and stripping pumps for excessive gland seal

leakage, verification of proper operation of electrical and mechanical remote operating and shutdown devices and operation of pump room bilge system, and checking that pump foundations are intact

- confirmation that the ventilation system, including portable equipment, if any, of all spaces in the cargo area (including cargo pump rooms) is operational, ducting is intact and screens are clean
- confirmation that electrical equipment in dangerous zones, cargo pump rooms and other spaces is in satisfactory condition and has been properly maintained
- confirmation that the remote operation of the cargo pump room bilge system, if fitted, is satisfactory
- examination of the cargo heating system
- examination of the cargo-transfer arrangement and confirmation that the ship's cargo hoses are suitable for their intended purpose and in satisfactory condition.

b) Instrumentation and safety devices

The survey is to include the following items, as far as required or fitted:

- examination of cargo tank gauging devices, high level alarms and valves associated with overflow control
- confirmation that installed pressure gauges on cargo discharge lines are properly operational
- confirmation that the required gas detection instruments are on board and satisfactory arrangements have been made for the supply of any required vapour detection tubes
- confirmation that devices provided for measuring the temperature of the cargo, if any, operate satisfactorily.

7.1.4 Intermediate survey - Hull items

The survey is to include:

- examination, as far as applicable, of cargo, stripping, bunker, ballast, steam and vent piping systems as well as vent masts and headers. If upon examination there is any doubt as to the condition of the piping, pressure testing, thickness measurement or both may be required.
- confirmation that the pipelines are electrically bonded to the hull
- examination of vent line drainage arrangements.

7.1.5 Intermediate survey - Cargo machinery items

a) Electrical equipment in dangerous zones

A general examination of the electrical equipment and cables in dangerous zones such as cargo pump rooms and areas adjacent to cargo tanks is to be carried out for defective and non-certified safe type electrical equipment, non-approved lighting and fixtures, and improperly installed or defective or dead-end wiring.

The electrical insulation resistance of the electrical equipment and circuits terminating in or passing through the dangerous zones is to be tested; however, in

cases where a proper record of testing is maintained, consideration may be given to accepting recent test readings effected by the ship's personnel.

b) Cargo heating system

The satisfactory condition of the cargo heating system is to be verified.

7.1.6 Class renewal survey - Hull items

a) Piping

Piping for cargo, ballast, stripping and venting systems is to be examined to the Surveyor's satisfaction. Dismantling and/or thickness measurements of these items may be required. A hydraulic test is to be carried out in the event of repair or dismantling of cargo or ballast piping, or where doubts arise.

Vent line drainage arrangements are to be examined.

b) Safety valves

All safety valves on cargo piping and of cargo tanks are to be dismantled for examination, adjusted and, as applicable, resealed.

c) Cargo pump rooms

All cargo pump room boundaries are to be generally examined. All gas-tight shaft sealing devices are to be examined. The bottom of cargo pump rooms is to be presented clean for the examination of stripping devices and gutters.

7.1.7 Class renewal survey - Cargo machinery items

a) Pumps

Ballast and stripping pumps are to be internally examined and prime movers checked. A working test is to be carried out.

Maintenance records of cargo pumps are to be made available to the Surveyor.

b) Cargo heating system

The apparent satisfactory condition of the cargo heating system such as clamping, external condition of piping is to be verified and, if deemed necessary by the Surveyor, the system is to be pressure tested.

c) Remote controls

An operating test of the emergency remote control of pumps and valves and of automatic closing valves is to be carried out.

d) Electrical equipment in dangerous zones

A general examination of the electrical equipment and cables in dangerous zones such as cargo pump rooms and areas adjacent to cargo tanks is to be carried out for defective and non-certified safe type electrical equipment, non-approved lighting and fixtures, and improperly installed or defective or dead-end wiring.

The electrical insulation resistance of the electrical equipment and circuits terminating in or passing through the dangerous zones is to be tested; however, in cases where a proper record of testing is maintained, consideration may be given to accepting recent test readings effected by the ship's personnel.

7.2 Supply vessel - Anchor handling or Supply vessel - Anchor handling stab

7.2.1 General (1/7/2011)

The additional survey items for annual survey and class renewal survey are applicable only to ships having the service notation **supply vessel** assigned the additional service features **anchor handling** or **anchor handling stab**.

7.2.2 Annual Survey (1/7/2011)

The survey is to include:

- a general external examination of the anchor handling winch and foundations, as fitted
- a function test of the winch, to the extent deemed necessary by the Surveyor.

The Manufacturer's recommendations are to be taken into account.

7.2.3 Class renewal survey (1/7/2011)

In addition to the requirements in [7.2.2], a function test of emergency release systems is to be carried out.

8 Fire-fighting ship

8.1 Annual survey

8.1.1 Ship's fire protection

The survey is to include:

- general examination of arrangements for structural fire protection
- ships equipped with a self-protection water-spraying system: general examination of all parts, as far as practicable and visible, of self-protection water-spraying system, and of scuppers and freeing ports for water drainage from deck surfaces
- ships not equipped with a self-protection water-spraying system: general examination of steel deadlights and shutters.

8.1.2 Water monitor system

The survey is to include:

- general examination of all parts of the water monitor system (pumps, piping system, valves and other fittings)
- checking for proper operation of the system, including local manual control
- general examination of foundations of water monitors and check of local manual control.

8.1.3 Fixed and portable foam systems (1/1/2013)

The survey is to include:

- general examination of the systems
- confirmation that the foam concentrates are periodically tested, either by the Manufacturer or by an organisation agreed by him
- general examination of foundations of foam monitors and check of local manual control

In addition, for fixed foam systems, the survey requirements are to include:

- test to confirm that the minimum number of jets of water at the required pressure in the fire main is obtained when the system is in operation
- checking the supplies of foam concentrate and receiving confirmation that it is periodically tested (not later than three years after manufacture and annually thereafter) by the Manufacturer or an agent.

8.1.4 Machinery installations, control room and other devices

The survey is to include:

- general examination of spaces containing auxiliary machinery for fire-fighting systems, particular attention being paid to arrangements, piping systems and instruments; check of tools and of pressure vessels and their fittings, if any
- general examination of the control station and check of all communication and remote control means, of ventilation system
- general examination of sea suction of fire-fighting systems, of relevant remote and local control and of piping systems, including the relevant protection against corrosion
- general external examination of electrical installations for fire-fighting systems, with particular regard to the alarms and searchlights,
- checking of other fire-fighting arrangements
- checking of firemen's outfits, confirmation that they are stored in the appropriate locations, and checking of air compressor and other equipment.

8.2 Class renewal survey

8.2.1 The survey is to include:

- complete test of water fire-extinguishing systems, including the internal examination, as required by the Surveyor, of the relevant pumps
- partial test, at the Surveyor's discretion, of fixed foam fire-extinguishing systems
- test of self-protection fixed water-spraying systems, putting into operation the spray nozzles, including the internal examination, as required by the Surveyor, of the relevant pumps
- examination and test of prime movers of machinery relevant to fire-fighting systems and of the air compressor for refilling of air bottles of breathing apparatuses
- examination and test of the electrical generating plant supplying power to fire-fighting systems and searchlights
- test of searchlights.

9 Oil recovery ship

9.1 Annual survey

9.1.1 (1/1/2007)

The survey is to include:

- confirmation of the availability of the operating manual
- examination of cargo tank openings, including gaskets, covers, coamings and screens
- general examination of cargo, ballast and vent piping systems, including control, gauging, alarm and safety devices
- general examination of the cargo pump room, as regards ventilation systems, condition of pumps and piping systems, and signs of any oil leakage
- confirmation that electrical equipment in dangerous areas, cargo pump rooms and other spaces, if fitted, is in satisfactory condition; the Owner or his representative is to declare to the attending Surveyor that this equipment has been properly maintained
- confirmation of the availability and satisfactory condition of the fixed cargo gas detection system, including related alarms, portable gas detection equipment, and oil flash point measurement equipment.

If any inert gas system is fitted, the requirements for the annual survey of such installations given in Sec 3, [3.3] are applicable.

9.2 Class renewal survey

9.2.1 Piping

Cargo, ballast, stripping and vent piping is to be examined to the Surveyor's satisfaction. Dismantling and/or thickness measurements may be required. Tightness or working tests are to be carried out. A hydraulic or hydropneumatic test is to be carried out in the event of repair or dismantling of cargo or ballast piping, or where doubts arise.

Vent line drainage arrangements are to be examined.

It is to be verified that cargo piping is electrically bonded to the hull.

9.2.2 Safety valves

Safety valves on cargo piping and of cargo tanks are to be dismantled for examination, adjusted and, as applicable, resealed.

9.2.3 Pumps

Ballast and stripping pumps are to be internally examined and prime movers checked. A working test is to be carried out.

Maintenance records of cargo pumps are to be made available to the Surveyor.

9.2.4 Cargo pump rooms

Cargo pump room boundaries are to be generally examined. Gas-tight shaft sealing devices are to be examined. The bottom of cargo pump rooms is to be presented clean for the examination of stripping devices and gutters.

9.2.5 Electrical equipment in dangerous zones

A general examination of the electrical equipment and cables in dangerous zones such as cargo pump rooms and areas adjacent to cargo tanks is to be carried out for defective and non-certified safe type electrical equipment, non-approved lighting and fixtures, and improperly installed or defective or dead-end wiring.

An insulation test of circuits is to be carried out; however, where a proper record of testing is maintained, consideration may be given to accepting recent readings effected by the ship's personnel.

9.2.6 Instrumentation and safety devices

The fixed cargo gas detection system, including related alarms, portable gas detection equipment, and oil flash-point measurement equipment, is to be tested.

9.2.7 Inert gas system

If any inert gas system is fitted, the requirements for the class renewal survey of such installations given in Sec 3, [7.2] are applicable.

10 Cable laying ship

10.1 Annual survey

10.1.1 (1/1/2007)

The survey is to include a general examination of sheaves, drums and tensioners for damage, cracks or wastage. The connections of these appliances to the structure are also to be checked.

10.2 Class renewal survey

10.2.1 The equipment mentioned in [10.1.1] is to be dismantled, to the extent deemed necessary by the Surveyor, in order to check its condition. Clearances of sheaves and cable drum axles are to be ascertained.

11 Fishing vessel

11.1 Annual survey

11.1.1 The survey is to include:

- general examination of areas subject to damage, corrosion or wastage, such as the stern ramp, weather deck in way of the working area of the nets, connections to hull structure of masts, gantries, winches and traw gallows (for side trawlers)
- general examination of the measures for the protection of the crew against falling overboard, such as storm rails, means of protection near stern ramp, etc.

11.2 Class renewal survey

11.2.1 For fishing vessels of 10 years age and over, the class renewal survey is to include thickness measurements of structural elements prone to rapid wastage, such as the stern ramp, weather deck in way of the working area of the nets, connections to hull structure of masts, gantries, winches and traw gallows (for side trawlers).

12 Pipe laying ship

12.1 Annual survey

12.1.1 (1/1/2005)

The survey is to include:

- general examination of the pipe laying and anchoring equipment for damage, cracks or wastage; the connections of these appliances to the structure are also to be checked
- general examination of areas subject to damage, cracks or wastage of the weather deck in way of the working area and pipe storage area.

The annual survey of dynamic positioning equipment is to be carried out in accordance with the requirements of Ch 5, Sec 12, [6.1].

12.2 Class renewal survey

12.2.1 (1/1/2005)

The equipment mentioned in [12.1.1] is to be dismantled, to the extent deemed necessary by the Surveyor, in order to check its condition. Tests are to be carried out to verify the proper operation of all machinery and equipment intended for pipe laying and anchoring equipment.

The renewal survey of dynamic positioning equipment is to be carried out in accordance with the requirements of Ch 5, Sec 12, [6.2].

13 Research ship

13.1 Annual and Class renewal survey

13.1.1 (1/1/2005)

The survey is to include the examination, to the extent deemed necessary by the Surveyor, of the equipment and arrangements on the basis of which the service notation has been assigned.

14 Cement carrier

14.1 Annual survey

14.1.1 (1/2/2005)

The survey is to include the general examination of the cement handling system for damage, cracks or wastage; the connections of the system to the hull structure are also to be checked.

14.2 Class renewal survey

14.2.1 (1/2/2005)

The cement handling system is to be dismantled, to the extent deemed necessary by the Surveyor, in order to check its condition; the connections of the system to the hull structure are also to be checked. Tests are to be carried out to verify the proper operation of machinery and equipment intended for the cement handling system.

15 Asphalt tanker

15.1 Annual survey - Hull items

15.1.1 Weather decks (1/7/2011)

The survey is to include:

- a) examination of cargo tank openings, including gaskets, covers, coamings and screens
- b) examination of cargo tank pressure/vacuum valves and flame screens
- c) examination of flame screens on vents to all bunker tanks
- d) examination of cargo, bunker, ballast and vent piping systems, including remote control valves, safety valves and various safety devices
- e) confirmation that wheelhouse doors and windows, sidescuttles and windows in superstructure and deck-house ends facing the cargo area are in satisfactory condition
- f) confirmation that pumps, valves and pipelines are identified and distinctively marked.

15.1.2 Cargo pump rooms and pipe tunnels (1/7/2011)

The survey is to include:

- a) examination of all pump room bulkheads and pipe tunnels (if any) for signs of cargo leakage or fractures and, in particular, the sealing arrangements of penetrations in pump room bulkheads
- b) examination of the condition of all piping systems, in cargo pump rooms and pipe tunnels (if any)
- c) examination of the bilge and ballast arrangements and confirmation that pumps and pipelines are identified.

15.1.3 Independent cargo tanks (1/7/2011)

The survey is to include, as far as practicable, the general external examination of the structure surrounding the independent cargo tanks for damage, cracks or wastage, including the thermal isolating material and elements supporting and/or securing the cargo tanks.

15.2 Annual survey - Cargo machinery items

15.2.1 Cargo area and cargo pump rooms (1/7/2011)

The survey is to include:

- a) confirmation that potential sources of ignition in or near the cargo pump rooms, such as loose gear, excessive product in bilge, excessive vapours, combustible materials, are eliminated and that access ladders are in satisfactory condition
- b) examination, as far as practicable, of cargo, bilge, ballast and stripping pumps for excessive gland seal leakage, verification of proper operation of electrical and mechanical remote operating and shutdown devices and operation of the pump room bilge system, and checking that pump foundations are intact
- c) confirmation that the ventilation system, including portable equipment, if any, of all spaces in the cargo area

(including cargo pump room) is operational, ducting is intact and screens are clean

- d) confirmation that electrical equipment in cargo pump rooms and other spaces is in satisfactory condition and has been properly maintained
- e) confirmation that the remote operation of the cargo pump room bilge system is satisfactory
- f) examination of the cargo heating system
- g) examination of the cargo-transfer arrangement and confirmation that any hoses are suitable for their intended purpose and, where appropriate, type approved or marked with the date of testing.

15.2.2 Instrumentation and safety devices (1/7/2011)

The survey is to include the following items, as far as required or fitted:

- a) examination of cargo tank gauging devices
- b) confirmation that installed pressure gauges on cargo discharge lines are properly operational
- c) confirmation that devices provided for measuring the temperature of the cargo, if any, operate satisfactorily.

15.3 Intermediate survey - Hull items

15.3.1 (1/7/2011)

The survey is to include:

- a) examination of weather decks,
- b) examination, as far as applicable, of cargo, stripping, bunker, ballast, steam and vent piping systems. If upon examination there is any doubt as to the condition of the piping, pressure testing, thickness measurement or both may be required.

15.4 Class renewal survey - Hull items

15.4.1 Piping (1/7/2011)

Piping for cargo, ballast, stripping and venting systems is to be examined to the Surveyor's satisfaction. Dismantling and/or thickness measurements of these items may be required. A hydraulic test is to be carried out in the event of repair or dismantling of cargo or ballast piping, or where doubts arise.

15.4.2 Safety valves (1/7/2011)

All safety valves on cargo piping and of cargo tanks are to be dismantled for examination, adjusted and, as applicable, resealed.

15.4.3 Cargo pump rooms (1/7/2011)

All cargo pump room boundaries are to be generally examined. All gas-tight shaft sealing devices are to be examined. The bottom of cargo pump rooms is to be presented clean for the examination of stripping devices and gutters.

15.4.4 Independent cargo tanks (1/7/2011)

The survey is to include the internal examination of the independent cargo tanks and external examination of the structure surrounding the independent cargo tanks for damage, cracks or wastage, including the thermal isolating

material and elements supporting and/or securing the cargo tanks.

15.5 Class renewal survey - Cargo machinery items

15.5.1 Pumps (1/7/2011)

Ballast and stripping pumps are to be internally examined and prime movers checked. A working test is to be carried out.

Maintenance records of cargo pumps are to be made available to the Surveyor.

15.5.2 Cargo heating system (1/7/2011)

The apparent satisfactory condition of the cargo heating system such as clamping and piping is to be verified and, if deemed necessary by the Surveyor, the system is to be pressure tested.

16 Compressed natural gas carrier

16.1 Annual and Class renewal survey

16.1.1 (1/7/2012)

The survey is to include the examination, to the extent deemed necessary by the Surveyor, of the equipment and arrangements specific to the **compressed natural gas carrier** service notation, in accordance with the recommendations of the manufacturers, the criteria of certification of the cargo tanks and any special safety item included in the classification requirements of the ship.

17 Barge

17.1 General

17.1.1 Barge-accommodation - Periodical lightweight check (1/7/2014)

At periodical intervals not exceeding five years, a lightweight survey is to be carried out on all barges having the additional service feature - accommodation to verify any changes in lightship displacement and longitudinal centre of gravity. The unit is to be re-inclined whenever, in comparison with the approved stability information, a deviation from the lightship displacement exceeding 2% or a deviation of the longitudinal centre of gravity exceeding 1% of L is found, or anticipated.

17.2 Barge-accommodation - Annual survey

17.2.1 Watertight bulkheads (1/7/2014)

The survey of watertight bulkheads and arrangements consists in:

- an examination, as far as practicable, of collision and watertight bulkheads, and confirmation that their watertight integrity has not been impaired
- checking the diagram provided on the navigation bridge showing the location of the watertight doors and related indicators for their open/closed position

- testing operation of local and remote control (from the navigation bridge) of the watertight doors, and in particular, operation from each side of the bulkhead of audible alarms or visual signals and control handles, as required or fitted
- confirmation of operation of watertight doors in the event of failure of main and emergency sources of power
- confirmation that notices are affixed at appropriate locations.

17.2.2 Openings in shell plating (1/7/2014)

The survey consists of:

- an examination of the arrangements for closing sidescuttles and their deadlights, as well as scuppers, sanitary discharges and similar openings and other inlets and discharges in the shell plating below the margin line
- confirmation that valves for closing the main and auxiliary sea inlets and discharges in the machinery spaces are readily accessible, and that indicators showing the status of the valves are provided, as required or fitted
- confirmation that gangway access and cargo ports fitted below the margin line may be effectively closed and that the inboard ends of any ash or rubbish chutes are fitted with an effective cover.

17.2.3 Lightweight survey (1/7/2014)

It is to be verified that the last lightweight survey was carried out not more than five years ago (refer to [17.1.1]).

17.2.4 Positional mooring system (1/7/2014)

A periodic inspection program of the component parts of the mooring system is to be developed by the Owners/operators and submitted to the Society for approval.

At each annual survey a part of such items is to be examined.

The scope of the annual survey is to determine the condition of the mooring system on the basis, as far as practicable, of an examination of above water items in order to verify their satisfactory condition.

In particular the following items are to be examined, as appropriate:

- a) Anchor chain stopper structural arrangements and relevant foundations
- b) Anchor chain catenary angles to verify compliance with design values. In the case of anchor cables, their tensions are to be checked against allowable tensions
- c) Cable or chain in contact with fairleads, etc.
- d) Cable or chain in way of winches, stoppers and splash zone.

17.3 Barge-accommodation - Renewal survey

17.3.1 Lightweight survey (1/7/2014)

It is to be verified that the last lightweight survey was carried out not more than five years ago (refer to [17.1.1]).

17.3.2 Positional mooring systems (1/7/2014)

- a) On units fitted with positional mooring equipment, the requirements for annual surveys in [17.2.4] are to be complied with.
- b) Where practicable, mooring cables, chains and anchors are to be lifted to the surface for detailed inspection in accordance with c) and d) at each Special Survey.
Alternatively, in situ inspection, using acceptable techniques, will be considered by the Society when requested.
- c) As far as practicable, the surveyor is to determine the general condition of the mooring system including cables, chains, fibre ropes, fittings, fairleads, connections and equipment. Particular attention is to be given to the following, as appropriate:
 - 1) Cable or chain in contact with fairleads, etc.
 - 2) Cable or chain in way of winches and stoppers.
 - 3) Cable or chain in way of the splash zone.
 - 4) Cable or chain in the contact zone of the sea bed.
 - 5) Damage to mooring system.
 - 6) Extent of marine growth.
 - 7) Condition and performance of corrosion protection.
- d) Wire rope anchor cables are to be examined. If cables are found to contain broken, badly corroded or bird caging wires they are to be renewed. Chain cables are to be examined. Maximum acceptable diminution of anchor chain in service will normally be limited to a two per cent reduction from basic chain diameter. (Basic chain diameter can be taken as the diameter, excluding any design corrosion allowance, which satisfies the Rule requirement for minimum factors of safety).
- e) The windlasses or winches are to be examined.
- f) Structure in way of anchor racks and anchor cable fairleads is to be examined.

17.4 Barge-oil - Application

17.4.1 (1/7/2014)

The requirements for hull surveys apply to the surveys of the hull structure and piping systems in way of cargo tanks, pump rooms, cofferdams, pipe tunnels and void spaces within the cargo area and all salt water ballast tanks, and are additional to those given in Chapter 3 for all ships.

17.4.2 (1/7/2014)

When, in any survey, thickness measurements are required:

- the procedure detailed in Ch 2, Sec 2, [2.3] is to be applied
- the thickness measurement company is to be part of the survey planning meeting held prior to commencing the survey.

17.4.3 (1/7/2014)

The requirements for machinery surveys apply to surveys of the machinery and equipment in the cargo area or dedicated to cargo service systems and are additional to those given in Chapter 3 for all ships.

17.5 Barge-oil - Annual survey

17.5.1 Hull and weather decks (1/7/2014)

The survey is to include:

- examination of cargo tank openings, including gaskets, covers, coamings and flame screens
- examination of cargo tank pressure/vacuum valves and flame screens
- examination of flame screens on vents to all bunker, tanks
- examination of cargo, crude oil washing, bunker and vent piping systems, including vent masts and headers
- confirmation that wheelhouse doors and windows, sidescuttles and windows in superstructure and deck-house ends facing the cargo area are in satisfactory condition.

17.5.2 Hull - Cargo pump rooms and pipe tunnels (1/7/2014)

The survey is to include:

- examination of all pump room bulkheads and pipe tunnels (if any) for signs of oil leakage or fractures and, in particular, the sealing arrangements of penetrations in these bulkheads
- examination of the condition of all piping systems, in cargo pump rooms and pipe tunnels (if any)
- examination of the bilge and ballast arrangements.

17.5.3 Machinery - Cargo pump rooms and pipe tunnels (1/7/2014)

The Owner or his representative is to declare to the attending Surveyor that no modifications or alterations which might impair safety have been made to the various installations in dangerous zones without prior approval from the Society.

The survey is to include:

- confirmation that potential sources of ignition in or near the cargo pump rooms, such as loose gear, excessive product in bilge, excessive vapours, combustible materials, etc., are eliminated and that access ladders are in satisfactory condition
- examination, as far as practicable, of cargo, bilge, ballast and stripping pumps for excessive gland seal leakage
- verification of proper operation of electrical and mechanical remote operating and shutdown devices and checking that pump foundations are intact
- confirmation that the ventilation system, including portable equipment, if any, of all spaces in the cargo area

(including cargo pump rooms) is operational, ducting is intact and screens are clean

- confirmation that electrical equipment in dangerous zones, cargo pump rooms and other spaces is in satisfactory condition and has been properly maintained
- confirmation that the remote operation of the cargo pump room bilge system is satisfactory
- examination of the cargo heating system
- examination of the cargo-transfer arrangement and confirmation that the ship's cargo hoses are suitable for their intended purpose and in satisfactory condition
- confirmation that any special arrangement made for bow or stern loading/unloading is in satisfactory condition and test of the means of communication and remote shutdown of the cargo pumps
- examination of the emergency lighting in all cargo pump rooms.

17.5.4 Machinery - Instrumentation and safety devices (1/7/2014)

The survey is to include:

- a) examination of cargo tank gauging devices, high level alarms and valves associated with overflow control
- b) verification that installed pressure gauges on cargo discharge lines are properly operational
- c) confirmation that the required gas detection instruments are on board and satisfactory arrangements have been made for the supply of any required vapour detection tubes
- d) confirmation that devices provided to measure the temperature of the cargo, if any, operate satisfactorily
- e) check of protection of the cargo pump room, and in particular of:
 - 1) temperature sensing devices for bulkhead glands and alarms;
 - 2) interlock between lighting and ventilation;
 - 3) gas detection system;
 - 4) bilge level monitoring devices and alarms.

17.5.5 Machinery - Inert gas system (1/7/2014)

The survey is to include:

- a) external examination of the whole system, to check the condition of all piping, including vent piping above the upper deck in the cargo tank area and overboard discharges through the shell so far as practicable, and associated components to verify, in particular, the absence of signs of corrosion and leakage of gas, water or other

liquid from inert gas and water piping systems or from the pressure/vacuum breaking device

- b) check of proper operation of both inert gas blowers
- c) check of proper operation of ventilation system required for scrubber room (if any)
- d) check of deck water seal for automatic water filling and draining
- e) check of absence of water carry over in the inert gas from the deck water seal and check of the condition of the non-return valve
- f) check of proper operation of all remotely operated or automatically controlled valves and, in particular, of the flue gas isolating valve located on the inert gas supply main after the blowers
- g) check of proper operation of the interlocking feature fitted to prevent soot blowers from operating when the inert gas system is working
- h) check that the gas pressure regulating valve automatically closes when gas blowers are stopped
- i) check, as far as practicable and using simulated conditions where necessary, of the following alarms and safety devices of the inert gas system:
 - 1) high oxygen content of gas in the inert gas main
 - 2) low gas pressure in the inert gas main
 - 3) low pressure in the supply to the deck water seal
 - 4) high temperature of gas in the inert gas main, including automatic shutdown devices
 - 5) low water pressure to the scrubber, including automatic shutdown devices
 - 6) accuracy of portable and fixed oxygen measuring equipment by means of calibration gases
 - 7) high water level in the scrubber, including automatic shutdown devices
 - 8) failure of the inert gas blowers
 - 9) failure of the power supply to the automatic control system for the gas regulating valve and to the instrumentation for continuous indication and permanent recording of pressure and oxygen content in the inert gas main
 - 10) high pressure of gas in the inert gas main
- j) check, when practicable, of the proper operation of the inert gas system on completion of the checks listed above.

17.6 Barge-oil - Intermediate survey

17.6.1 Hull and weather decks (1/7/2014)

The survey is to include:

- examination, as far as applicable, of cargo, crude oil washing, bunker, ballast, steam and vent piping systems as well as vent masts and headers. If upon examination there is any doubt as to the condition of the piping,

pressure testing, thickness measurement or both may be required

- confirmation that pipelines are electrically bonded to the hull or alternatively, verification of electrical resistance to the hull
- examination of vent line drainage arrangements.

17.6.2 Machinery - Cargo pump rooms and pipe tunnels (1/7/2014)

The survey is to include:

- a general examination of the electrical equipment and cables in dangerous zones such as cargo pump rooms and areas adjacent to cargo tanks is to be carried out for defective and non-certified safe type electrical equipment and fixtures, non-approved lighting and fixtures, and improperly installed or defective or dead-end wiring
- the verification of electrical insulation resistance of the electrical equipment and circuits terminating in or passing through the dangerous zones; however, in cases where a proper record of testing is maintained, consideration may be given to accepting recent test readings effected by the ship's personnel
- verification of the satisfactory condition of the cargo heating system.

17.6.3 Machinery - Inert gas system (1/7/2014)

For units over 10 years old at the time of the intermediate survey due date, the following is to be carried out:

- main parts such as the scrubber, washing machines, blowers, deck water seal and non-return valve are to be opened out as considered necessary and examined
- gas distribution lines and shut-off valves, including soot blower interlocking devices, are to be examined as deemed necessary
- all automatic shutdown devices and alarms are to be examined and tested.

17.7 Barge-oil - Renewal survey

17.7.1 General - Scope of survey (1/7/2014)

In addition to the requirements of annual surveys, the class renewal survey is to include examination, tests and checks of sufficient extent to ensure that the hull and related piping, as required in [17.7.2], [17.7.3] are in satisfactory condition and fit for their intended purpose for the new period of class to be assigned, subject to proper maintenance and operation and to periodical surveys being carried out at the due dates.

17.7.2 Hull - Cargo area and cargo pump rooms (1/7/2014)

- a) Cargo piping on deck, including crude oil washing (cow) piping, and cargo and ballast piping within the cargo area are to be examined and operationally tested to working pressure to the attending Surveyor's satisfaction to ensure that their tightness and condition remain satisfactory. Special attention is to be given to any ballast piping in cargo tanks and cargo piping in ballast tanks and void spaces. Surveyors are to be advised on all occasions when this piping, including valves and fit-

tings, is opened during repair periods and can be examined internally.

The Surveyor may require dismantling and/or thickness measurements of piping. A hydraulic test is to be carried out in the event of repair or dismantling of cargo, crude oil washing, or ballast piping, or where doubts arise.

It is to be confirmed that pipelines are electrically bonded to the hull or, alternatively, electrical resistance to the hull is to be verified.

- b) All safety valves on cargo piping and of cargo tanks are to be dismantled for examination, adjusted and, as applicable, resealed.
- c) All cargo pump room boundaries are to be generally examined. All gas-tight shaft sealing devices are to be examined. The bottom of cargo pump rooms is to be presented clean for the examination of stripping devices and gutters.

17.7.3 Machinery - Cargo area and cargo pump rooms (1/7/2014)

- a) Ballast and stripping pumps are to be internally examined and prime movers checked. A working test is to be carried out, as far as practicable. Maintenance records of cargo pumps are to be made available to the Surveyor.
- b) Where a crude oil washing system is fitted, piping, pumps, valves and deck-mounted washing machines are to be examined and tested for signs of leakage, and anchoring devices of deck-mounted washing machines are to be checked to the Surveyor's satisfaction.
- c) The satisfactory condition of the cargo heating system is to be verified and, if deemed necessary by the Surveyor, the system is to be pressure tested.
- d) An operating test of the remote control of pumps and valves and of automatic closing valves is to be carried out.
- e) A general examination of the electrical equipment and cables in dangerous zones such as cargo pump rooms and areas adjacent to cargo tanks is to be carried out for defective and non-certified safe type electrical equipment and fixtures, non-approved lighting and fixtures, and improperly installed or defective or dead-end wiring. The electrical insulation resistance of the electrical equipment and circuits terminating in or passing through the dangerous zones is to be tested; however, in cases where a proper record of testing is maintained, consideration may be given to accepting recent test readings effected by the ship's personnel.

17.7.4 Machinery - Inert gas system (1/7/2014)

In addition to the inspections required at the intermediate survey, the following is to be carried out:

- a) an internal examination of:
 - 1) the inert gas generator, where fitted
 - 2) the scrubber
 - 3) the deck water seal including the non-return valve
 - 4) the pressure/vacuum breaking device
 - 5) the cooling water systems including overboard discharge from the scrubber
 - 6) all valves
- b) a test to verify the proper operation of the system upon completion of all survey checks.

18 Oil Carrier-Assisted Propulsion, Palm Oil Carrier-Assisted Propulsion

18.1 Annual survey - Hull items

18.1.1 Weather decks (1/7/2014)

The survey is to include:

- examination of cargo tank openings, including gaskets, covers, coamings and screens
- examination of cargo tank pressure/vacuum valves and flame screens
- examination of flame screens on vents to all bunker, oily ballast and oily slop tanks
- examination of cargo, bunker, ballast and vent piping systems, including remote control valves, safety valves and various safety devices, as well as vent masts and headers
- confirmation that wheelhouse doors and windows, sidescuttles and windows in superstructure and deck-house ends facing the cargo area are in satisfactory condition
- confirmation that pumps, valves and pipelines are identified and distinctively marked.

18.1.2 Cargo pump rooms and pipe tunnels (1/7/2014)

The survey is to include:

- examination of all pump room bulkheads and pipe tunnels (if any) for signs of chemical cargo leakage or fractures and, in particular, the sealing arrangements of penetrations in pump room bulkheads
- examination of the condition of all piping systems, in cargo pump rooms and pipe tunnels (if any)
- examination of the bilge and ballast arrangements and confirmation that pumps and pipelines are identified.

18.2 Annual survey - Cargo machinery items

18.2.1 Cargo area and cargo pump rooms (1/7/2014)

The Owner or his representative is to declare to the attending Surveyor that no modifications or alterations which might impair safety have been made to the various installations in dangerous zones without prior approval from the Society.

The survey is to include:

- confirmation that potential sources of ignition in or near the cargo pump rooms, such as loose gear, excessive

product in bilge, excessive vapours, combustible materials, are eliminated and that access ladders are in satisfactory condition

- examination, as far as practicable, of cargo, bilge, ballast and stripping pumps for excessive gland seal leakage, verification of proper operation of electrical and mechanical remote operating and shutdown devices and operation of pump room bilge system, and checking that pump foundations are intact
- confirmation that the ventilation system, including portable equipment, if any, of all spaces in the cargo area (including cargo pump room) is operational, ducting is intact and screens are clean
- confirmation that electrical equipment in dangerous zones, cargo pump rooms and other spaces is in satisfactory condition and has been properly maintained
- confirmation that the remote operation of the cargo pump room bilge system is satisfactory
- examination of the cargo heating system
- examination of the cargo-transfer arrangement and confirmation that the ship's cargo hoses are suitable for their intended purpose and in satisfactory condition
- confirmation that any special arrangement made for bow or stern loading/unloading is in satisfactory condition.

18.2.2 Instrumentation and safety devices (1/7/2015)

The survey is to include the following items, as far as required or fitted:

- examination of cargo tank gauging devices, high level alarms and valves associated with overflow control
- confirmation that installed pressure gauges on cargo discharge lines are properly operational
- confirmation that the required gas detection instruments are on board and satisfactory arrangements have been made for the supply of any required vapour detection tubes
- confirmation that devices provided to measure the temperature of the cargo, if any, operate satisfactorily.

In addition, for oil tankers the protection of the cargo pump room is to be verified, and in particular:

- temperature sensing devices for bulkhead glands and alarms
- interlock between lighting and ventilation
- gas detection system
- bilge level monitoring devices and alarms.

18.2.3 Inert gas system (1/7/2014)

If an inert gas system such as that installed on board oil tankers is fitted, the requirements given in Sec 3, [3.3] are to be complied with.

18.3 Intermediate survey - Hull items

18.3.1 (1/7/2014)

The survey is to include:

- examination, as far as applicable, of cargo, stripping, cargo tank washing, bunker, ballast, steam and vent piping systems as well as vent masts and headers. If upon

examination there is any doubt as to the condition of the piping, pressure testing, thickness measurement or both may be required

- confirmation that the pipelines are electrically bonded to the hull
- examination of vent line drainage arrangements.

18.4 Intermediate survey - Cargo machinery items

18.4.1 Electrical equipment in dangerous zones (1/7/2014)

A general examination of the electrical equipment and cables in dangerous zones such as cargo pump rooms and areas adjacent to cargo tanks is to be carried out for defective and non-certified safe type electrical equipment, non-approved lighting and fixtures, and improperly installed or defective or dead-end wiring.

The electrical insulation resistance of the electrical equipment and circuits terminating in or passing through the dangerous zones is to be tested; however, in cases where a proper record of testing is maintained, consideration may be given to accepting recent test readings effected by the ship's personnel.

18.4.2 Cargo heating system (1/7/2014)

The satisfactory condition of the cargo heating system is to be verified.

18.4.3 Inert gas system (1/7/2014)

For ships over 10 years old at the time of the intermediate survey due date, if an inert gas system such as that installed on board oil tankers is fitted, the requirements given in Sec 3, [5.2] for intermediate survey of oil tankers are to be complied with.

18.5 Class renewal survey - Hull items

18.5.1 Piping (1/7/2014)

Cargo piping on deck, including crude oil washing (cow) piping, and cargo and ballast piping within the cargo area are to be examined and operationally tested to working pressure to the attending Surveyor's satisfaction to ensure that their tightness and condition remain satisfactory. Special attention is to be given to any ballast piping in cargo tanks and cargo piping in ballast tanks and void spaces. Surveyors are to be advised on all occasions when this piping, including valves and fittings, is opened during repair periods and can be examined internally.

The Surveyor may require dismantling and/or thickness measurements of piping. A hydraulic test is to be carried out in the event of repair or dismantling of cargo, crude oil washing, or ballast piping, or where doubts arise. It is to be confirmed that pipelines are electrically bonded to the hull or, alternatively, electrical resistance to the hull is to be verified.

18.5.2 Safety valves (1/7/2014)

All safety valves on cargo piping and of cargo tanks are to be dismantled for examination, adjusted and, as applicable, resealed.

18.5.3 Cargo pump rooms (1/7/2014)

All cargo pump room boundaries are to be generally examined. All gas-tight shaft sealing devices are to be examined. The bottom of cargo pump rooms is to be presented clean for the examination of stripping devices and gutters.

18.6 Class renewal survey - Cargo machinery items**18.6.1 Pumps (1/7/2014)**

Ballast and stripping pumps are to be internally examined and prime movers checked. A working test is to be carried out.

Maintenance records of cargo pumps are to be made available to the Surveyor.

18.6.2 Washing system (1/7/2014)

Where a crude oil or other kind of washing system is fitted, piping, pumps, valves and deck-mounted washing machines are to be examined and tested for signs of leakage, and anchoring devices of deck-mounted washing machines are to be checked to the Surveyor's satisfaction.

18.6.3 Cargo heating system (1/7/2014)

The apparent satisfactory condition of the cargo heating system such as clamping, external condition of piping is to be verified and, if deemed necessary by the Surveyor, the system is to be pressure tested.

18.6.4 Remote controls (1/7/2014)

An operating test of the emergency remote control of pumps and valves and of automatic closing valves is to be carried out.

18.6.5 Electrical equipment in dangerous zones (1/7/2014)

A general examination of the electrical equipment and cables in dangerous zones such as cargo pump rooms and areas adjacent to cargo tanks is to be carried out for defective and non-certified safe type electrical equipment, non-approved lighting and fixtures, and improperly installed or defective or dead-end wiring.

The electrical insulation resistance of the electrical equipment and circuits terminating in or passing through the dangerous zones is to be tested; however, in cases where a proper record of testing is maintained, consideration may be given to accepting recent test readings effected by the ship's personnel.

18.6.6 Inert gas system (1/7/2014)

If an inert gas system such as that installed on board oil tankers is fitted, the requirements given Sec 3, [5.2] for

intermediate survey and in Sec 3, [7.2] for class renewal survey of oil tankers are to be complied with.

19 Transshipping Unit, Transshipping Floating Terminal**19.1 Annual survey - Hull items****19.1.1 Weather decks (1/7/2014)**

The survey is to include:

- verification that no modification of the cargo handling system(s) layout has been made. Particular attention is to be paid to cargo handling arrangements passing in close proximity to accommodation and/or control stations
- verification that, when expected and fitted, special arrangements to avoid unintentional release of lifted cargo are maintained and unmodified
- general examination, as far as applicable, of cargo handling system(s) with particular attention to the connection of their foundations to the hull structure
- general examination of the ship-to-unit mooring arrangements, including winches, cables, fairleads and mooring cleats, bumpers, fenders and relevant connection to the hull structures
- for Transshipping units and Transshipping floating terminals, which are intended to be moored alongside in between two other ships (e.g. a barge being discharged and a bulk carrier being loaded), examination of the means of access and verification that they are available in all operational conditions.

19.2 Annual survey - Cargo handling system(s)**19.2.1 General (1/7/2014)**

Cargo handling systems not covered by the additional class notation **CARGO HANDLING** such as, but not limited to

- belt conveyors,
- spiral conveyors,
- screw conveyors
- pneumatic conveyors
- chain conveyors (buckets , pockets, etc..)
- wire conveyors
- cable conveyors (wagons, buckets, pockets, ...)
- chain elevators (buckets, pockets, etc..)
- cable elevators (buckets, pockets, etc..)
- loading and discharging boom(s)

and combinations of these, have to be annually inspected according to the provision in [18.2.2].

19.2.2 (1/7/2014)

The annual survey is to include:

- an examination of the instruction/installation manual to verify the layout of the complete system(s) and confirm correspondence to the actual system(s) fitted on board
- verification that maintenance of the system(s) has been carried out according to the Manufacturer's instructions and schedules
- a general examination of components of the system in order to verify their satisfactory condition of maintenance
- verification and test of the cargo handling system alarm and safety devices
- a running test of the system in order to verify the satisfactory working and operation conditions.

19.3 Renewal survey - Hull items

19.3.1 (1/7/2014)

The survey is to include

- examination of cargo handling system(s) with particular attention to the structures pertaining to the system(s), such as pillars, columns, girders, support trusses connection of their foundations to the hull structure. The examination may be supported by thickness measurements as deemed necessary by the surveyor
- examination of hull structures underneath the foundations of the cargo handling system(s) with particular attention to the areas where stress concentration or increased corrosion are likely to develop
- a general examination of components of the system in order to verify their satisfactory condition of maintenance
- examination of the ship-to-unit mooring arrangements, including winches, cables, fairleads and mooring cleats, bumpers, fenders and relevant connection to the hull structures, with disassembly as deemed necessary to verify the condition of the equipment and control and safety devices
- examination of hull structures underneath the foundations of the ship-to-unit mooring arrangements with particular attention to the areas where stress concentration or increased corrosion are likely to develop.

19.4 Renewal survey - Cargo handling system(s)

19.4.1 (1/7/2014)

Survey of the Cargo Handling System(s), as listed in [18.2.1], is to include:

- examination of components of the system(s) in order to verify their satisfactory condition of maintenance. The inspections may be supplemented by dismantling of the

system components as deemed necessary by the surveyor

- examination and working test of the hydraulic oil system, as applicable, pertaining to the cargo handling system(s)
- examination and test of all electrical systems related to the cargo handling system(s). Examination is to be supplemented by insulation tests of all electrical equipment
- overload test of the cargo handling system (s) to be performed with test loads as expected by the System(s) Manufacturer(s). In the absence of data, the test loads should be at least 1.1 times the Safety Working Load (SWL) of the system. If a Cargo Handling System is equipped with a gearing system(s) it is necessary to verify, during the test, that each gear tooth is tested under testing load(s).

After testing, fixed structures and associated gear are to be disassembled and examined as deemed necessary by the surveyor. The tests and inspections are not to reveal deformations or unacceptable defects.

20 Sugar carrier

20.1 Annual survey

20.1.1 (1/7/2015)

The survey is to include a general examination of the sugar handling system for damage, cracks or wastage; the connections of the system to the hull structure are also to be checked.

20.2 Class renewal survey

20.2.1 (1/7/2015)

The sugar handling system is to be dismantled, to the extent deemed necessary by the Surveyor, in order to check its condition; the connections of the system to the hull structure are also to be checked. Tests are to be carried out to verify the proper operation of machinery and equipment intended for the sugar handling system.

21 Fly ash carrier

21.1 Annual survey

21.1.1 (1/7/2015)

The survey is to include a general examination of the fly ash handling system for damage, cracks or wastage; the connections of the system to the hull structure are also to be checked.

21.2 Class renewal survey

21.2.1 (1/7/2015)

The fly ash handling system is to be dismantled, to the extent deemed necessary by the Surveyor, in order to check its condition; the connections of the system to the hull structure are also to be checked. Tests are to be carried out to verify the proper operation of machinery and equipment intended for the fly ash handling system.

22 Ships with additional service feature BC

22.1 Annual and renewal survey

22.1.1 (1/7/2015)

The survey is to include verification of the efficient condition of the following items:

- electronic loading instrument, including standard test;
- hold, ballast and dry space water ingress alarms;
- the means for draining and pumping ballast tanks forward of the collision bulkhead and bilges of dry spaces, any part of which extends forward of the foremost cargo hold.

23 Ships with additional service feature BC-XII

23.1 Annual and renewal survey

23.1.1 (1/7/2015)

The survey is to include verification of the efficient condition of the following items:

- electronic loading instrument, including standard test;
- hold, ballast and dry space water ingress alarms;
- the means for draining and pumping ballast tanks forward of the collision bulkhead and bilges of dry spaces, any part of which extends forward of the foremost cargo hold.

24 Well stimulation

24.1 General

24.1.1 Application (1/4/2016)

Provisions regarding fire protection, detection and extinction are not mandatory for the purpose of classification, except where the Society carries out surveys relevant to fire protection statutory requirements on behalf of the flag Administration.

In such cases, fire protection statutory requirements are considered a matter of class and therefore compliance with these requirements is also verified by the Society for classification purposes at class surveys.

Thus, the survey requirements for class surveys (annual, class renewal surveys and others) no longer include those related to fire protection statutory requirements.

24.2 Annual survey

24.2.1 General (1/4/2016)

Annual survey is generally carried out with the ship in service and is aimed to confirm that the systems and equipment are maintained in good order and efficiency. Neither overhauling nor pressure test is foreseen unless deemed necessary by surveyor. Before starting the survey, review of

ships logs and operation record is to be carried out as guidance and reference.

The following ascertainments are to be carried out:

- a) examination of the tanks and associated piping system, including pumps, heat exchangers
- b) confirmation that electrical plant is in good order with particular regard to the electrical equipment installed in hazardous areas
- c) test of mechanical ventilation
- d) test of all control and monitoring systems, alarm, safety systems and shutdown devices
- e) other possible ascertainment at satisfaction of surveyor.

24.3 Renewal survey

24.3.1 General (1/4/2016)

Renewal survey has generally the same extent of the initial survey except that the check of compliance with approved drawings is not due unless modification has occurred. The survey includes overhauling of machinery and components.

The following ascertainments are to be carried out:

- a) general examination of well stimulating system including verification of tank location, dangerous areas
- b) hydrostatic test of tanks and piping
- c) thorough examination of the well stimulating system and relevant machinery and equipment including testing of all control and monitoring systems, alarm, safety systems and shutdown devices
- d) check of the power supplies, including the emergency sources of electrical power, when required for the emergency control
- e) check and test of mechanical ventilation for spaces housing acid, nitrogen and additives liquids
- f) check of firefighting system and appliances.

25 Car carrier with additional service feature H-CNG

25.1 Annual and renewal survey

25.1.1 (1/7/2016)

The survey is to include:

- a) confirmation that electrical equipment in spaces intended for carriage of motor vehicles with compressed natural gas and/or hydrogen in their tanks, for their own propulsion, are in satisfactory condition. The Owner or his representative is to declare to the attending Surveyor that the electrical equipment have been properly maintained.
- b) confirmation that electrical equipment if installed in ventilation ducts of spaces intended for carriage of motor vehicles with compressed natural gas and/or hydrogen in their tanks, for their own propulsion, are in satisfactory condition. The Owner or his representative

is to declare to the attending Surveyor that the electrical equipment have been properly maintained.

- c) confirmation that the wire mesh guards fitted over inlet and outlet ventilation openings are in satisfactory condition.
- d) verification of that at least two portable gas detectors, suitable for the detection of the gas fuel and of a certi-

fied safe type for use in the explosive gas and air mixture, are present on board.

- e) confirmation that for each type of gas detector a calibration device or, alternatively, that the annual calibration report from the manufacturer/specialist is present on board.

APPENDIX 1

SURVEY REPORTING PRINCIPLES FOR SHIPS SUBJECT TO ENHANCED SURVEY PROGRAM

1 Survey reporting principles

1.1 General

1.1.1 (1/7/2006)

As a principle, for ships subject to the requirements of Sec 2, Sec 3, Sec 4, Sec 5 and Sec 9, the report for surveys of hull structure and piping systems, as relevant for the survey, is to include the content indicated in this Appendix.

1.2 Issue of a survey report

1.2.1 (1/7/2006)

A survey report is to be issued in the following cases:

- In connection with commencement, continuation and / or completion of periodical hull surveys, i.e. annual, intermediate and class renewal surveys, as relevant
- When structural damage / defects have been found
- When repairs, renewals or modifications have been carried out
- When condition of class (recommendation) has been imposed or deleted.

1.3 Purpose of reporting

1.3.1 (1/7/2006)

The purpose of reporting is to provide:

- Evidence that prescribed surveys have been carried out in accordance with applicable classification Rules
- Documentation of surveys carried out with findings, repairs carried out and recommendations imposed or deleted
- Survey records, including actions taken, which are to form an auditable documentary trail. Survey reports are to be kept in the survey report file required to be on board
- Information for planning of future surveys
- Information which may be used as input for maintenance of classification Rules and instructions.

1.4 Surveys split between different stations

1.4.1 (1/7/2006)

When a survey is split between different survey stations, a report is to be made for each portion of the survey. A list of items surveyed, relevant findings and an indication of whether the item has been credited are to be made available to the next attending Surveyor, prior to continuing or completing the survey. Thickness measurement and tank

testing carried out are also to be listed for the use of the next Surveyors.

1.5 Identification of spaces and areas

1.5.1 (1/7/2006)

The following spaces, locations, structures and systems, as applicable, are to be identified:

- the compartments where an overall survey has been carried out;
- the locations, in each ballast tank and cargo hold including hatch covers and coamings, where a close-up survey has been carried out, together with information of the means of access used (see Note 1);
- the locations, in each ballast tank and cargo hold including hatch covers and coamings, where thickness measurements have been carried out (see Note 1);

Note 1: As a minimum, the identification of locations of close-up survey and thickness measurements is to include a description of individual structural members corresponding to the extent of requirements stipulated in the pertinent Section of this Chapter based on the type of periodical survey and the ship's age. Where only partial survey is required owing to the ship's age, the identification is to include the location within each ballast tank or cargo hold by reference to frame numbers.

- the structures subject to special consideration for those areas in ballast tanks or cargo holds where protective coating is found to be in good condition and the extent of close-up survey and / or thickness measurement has been specially considered;
- the tanks subjected to tank testing;
- the piping systems on deck, including cargo and crude oil washing (COW) piping and cargo and ballast piping within cargo and ballast tanks and/or holds, as applicable, pipe tunnels, cofferdams and void spaces where:
 - examination including internal examination of piping with valves and fittings and thickness measurement, as relevant, has been carried out;
 - an operational test to working pressure has been carried out.

1.6 Items surveyed

1.6.1 (1/7/2006)

The following items of the survey are to be reported:

- type, extent and condition of protective coating in each tank, as relevant (rated good, fair or poor);

- b) structural condition of each compartment with information on the identified findings, as relevant, such as:
- 1) corrosion with description of location, type and extent
 - 2) areas with substantial corrosion
 - 3) cracks / fractures with description of location and extent
 - 4) buckling with description of location and extent
 - 5) indents with description of location and extent
- c) compartments where no structural damage / defects have been found

The report may be supplemented by sketches and/or photos.

1.7 Thickness measurement report

1.7.1 (1/7/2006)

The thickness measurement report is to be verified and signed by the Surveyor controlling the measurements on board.

1.8 Longitudinal strength

1.8.1 (1/7/2006)

For oil tankers of both single and double hull construction of 130 m in length and upwards and over 10 years of age, for which the longitudinal strength of the hull girder is to be evaluated, the following data is to be included, as relevant:

- a) measured and as-built transverse sectional areas of deck and bottom flanges
- b) diminution of transverse sectional areas of deck and bottom flanges
- c) details of renewals or reinforcements carried out, as relevant (as per [1.10.1]).

1.9 List of required repairs

1.9.1 (1/7/2012)

Whenever the attending Surveyor is of the opinion that repairs are required, each item to be repaired is to be identified in the survey report.

1.10 List of repairs carried out

1.10.1 (1/7/2012)

Whenever repairs are carried out, details of the repairs effected are to be reported by making specific reference to the relevant items in the survey report. Repairs carried out are to be reported with identification of:

- a) compartment
- b) structural member
- c) repair method (i.e. renewal or modification) including:
 - steel grades and scantlings (if different from the original),
 - sketches/photos, as appropriate,
- d) repair extent
- e) NDT / Tests.

1.11 List of repairs not completed

1.11.1 (1/7/2006)

For repairs not completed at the time of survey, a recommendation is to be imposed with a specific time limit for the repairs. In order to provide correct and proper information to the Surveyor attending for survey of the repairs, the recommendation is to be sufficiently detailed with identification of each item to be repaired. For identification of extensive repairs, reference may be made to the survey report.

SCOPE OF SURVEYS RELATED TO ADDITIONAL CLASS NOTATIONS

SECTION 1	GENERAL
SECTION 2	STAR (SYSTEM OF TRACE AND ANALYSIS OF RECORDS)
SECTION 3	AVAILABILITY OF MACHINERY
SECTION 4	AUTOMATED MACHINERY SYSTEMS
SECTION 5	INTEGRATED SHIP SYSTEMS
SECTION 6	MONITORING EQUIPMENT
SECTION 7	POLLUTION PREVENTION
SECTION 8	REFRIGERATING INSTALLATIONS
SECTION 9	ARRANGEMENTS FOR NAVIGATION IN ICE - ICE CLASS AND POLAR CLASS
SECTION 10	WINTERIZATION (TEMP)
SECTION 11	HELIDECK
SECTION 12	OTHER NOTATIONS

SECTION 1

GENERAL

1 General

1.1

1.1.1 The purpose of this Chapter is to give details on the scope of surveys of specific equipment and systems fitted on board the ship, which are covered by an additional class notation. Unless otherwise specified in Ch 1, Sec 2, [6], the scope of these surveys provides the requirements to be complied with for the maintenance of the relevant additional class notation.

1.1.2 These specific requirements are additional to those laid down in Chapter 3 and Chapter 4. These surveys are to be carried out at intervals as described in Ch 2, Sec 2, as far as possible concurrently with the surveys of the same type, i.e. annual, intermediate or class renewal survey.

1.1.3 The equipment and systems are also to be submitted to occasional survey whenever one of the cases indicated in Ch 2, Sec 2, [11] occurs.

1.1.4 Where specific requirements are given in this Chapter for the class renewal survey, they are additional to the applicable requirements for the annual survey.

1.1.5 For the assignment of the additional class notations, ships are to be submitted to an admission to class survey as described in Ch 2, Sec 1, [2] and Ch 2, Sec 1, [3] for new and existing installations, respectively, as applicable.

2 Additional class notations subject to additional surveys

2.1

2.1.1 The specific requirements detailed in this Chapter are linked to the additional class notation(s) assigned to the ship. Where a ship has more than one additional class notation, the specific requirements linked to each additional class notation are applicable as long as they are not contradictory.

2.1.2 Tab 1 indicates which additional class notations are subject to specific requirements, and in which Section and/or Article they are specified.

Table 1 : Additional class notations for which specific survey requirements are applicable (1/1/2019)

Additional class notation	Section or Article applicable in this Chapter	Type of surveys affected by these specific requirements	Remarks
STAR STAR-HULL STAR-MACH	Sec 2	See Remarks	The scope and periodicity of surveys are stipulated by specific requirements given in Pt F, Ch 1, Sec 1, [5] and Pt F, Ch 1, Sec 2, [4]
Availability of machinery: AVM-APS AVM-IAPS AVM-DPS AVM-IPS	Sec 3	annual survey class renewal survey	
Automated machinery systems: AUT-UMS AUT-CCS AUT-PORT	Sec 4	annual survey class renewal survey	
Integrated ship systems: SYS-NEQ SYS-NEQ-1 SYS-COM SYS-IBS	Sec 5	annual survey class renewal survey	
Monitoring equipment: MON-HULL MON-SHAFT	Sec 6	annual survey class renewal survey tailshaft survey	

Additional class notation	Section or Article applicable in this Chapter	Type of surveys affected by these specific requirements	Remarks
Pollution prevention CLEAN-SEA CLEAN-AIR GREEN PLUS GREEN PLUS T GREEN STAR 3 GREEN STAR 3 DESIGN LOWSO_x (N) GC CARGO HANDLING	Sec 7	annual survey class renewal survey	
Refrigerating installations REF-CARGO REF-CONT REF-STORE	Sec 8	annual survey class renewal survey	
Navigation in ice environment ICE CLASS IA SUPER ICE CLASS IA ICE CLASS IB ICE CLASS IC ICE CLASS ID ICE POLAR CLASS	Sec 9	class renewal survey	
PMS PMS-CM(PROP) PMS-CM(HVAC) PMS-CM(CARGO) PMS-CM(ELE) PMS-CM(FDS)	See Remarks	See Remarks	The scope and periodicity of surveys are stipulated by specific requirements given in Part F, Chapter 12
WINTERIZATION	Sec 10	annual survey	

Additional class notation	Section or Article applicable in this Chapter	Type of surveys affected by these specific requirements	Remarks
HELIDECK HELIDECK H	Sec 11	annual survey class renewal survey	
Other notations STRENGTHBOTTOM GRABLOADING - GRAB [X] SPM DYNAPOS VCS COVENT CARGOCONTROL COAT-WBT DIVINGSUPPORT HVSC FIRE SELF-UNLOADING TAS EFFICIENT SHIP (S,DWT) MOORING CARGO HANDLING ☾ SAHARA, SAHARA COMF NOISE RISK MITIGATION (...) AIR MON DANGEROUS GOODS INF 1, INF 2, INF 3 INERTGAS A, INERTGAS B, INERTGAS C GAS FUELLED GAS FUELLED (Main) GAS FUELLED (Aux) MAN OVERBOARD DETECTION SYSTEM CYBER RESILIENCE DIGITAL SHIP	Sec 12	As applicable in accordance with the related Articles in Sec 12	

SECTION 2

STAR (SYSTEM OF TRACE AND ANALYSIS OF RECORDS)

1 General

1.1 Application

1.1.1 (1/7/2009)

The requirements of this Section apply to ships which have been assigned one of the following additional class notations related to the STAR system, as described in Ch 1, Sec 2, [6.2]:

STAR

STAR-HULL

STAR-MACH

1.1.2 When the **STAR** notation is assigned, the survey requirements stipulated for both **STAR-HULL** and **STAR-MACH** are to be complied with.

2 STAR-HULL

2.1 Survey scope and periodicity

2.1.1 The scope and periodicity of surveys for the maintenance of the **STAR-HULL** notation are given in Pt F, Ch 1, Sec 1, [5].

3 STAR-MACH

3.1 Survey scope and periodicity

3.1.1 (1/7/2009)

The scope and periodicity of surveys for the maintenance of the **STAR-MACH** notation are given in Pt F, Ch 1, Sec 2, [4].

SECTION 3

AVAILABILITY OF MACHINERY

1 General

1.1

1.1.1 (1/7/2008)

The requirements of this Section apply to ships which have been assigned one of the following additional class notations related to availability of machinery, as described in Ch 1, Sec 2, [6.3] :

AVM-APS or **AVM-APS-NS**

AVM-IAPS

AVM-DPS or **AVM-DPS-NS**

AVM-IPS.

2 Annual survey

2.1

2.1.1 At each annual survey the Owner or his representative is to declare to the attending Surveyor that no modifications have been made to the systems affecting the notations without prior approval by the Society.

3 Class renewal survey

3.1

3.1.1 At each class renewal survey a test is to be conducted in order to ascertain that the systems affecting the notations operate satisfactorily. This test is usually to be carried out during sea trials.

SECTION 4

AUTOMATED MACHINERY SYSTEMS

1 General

1.1

1.1.1 (1/7/2009)

The requirements of this Section apply to ships which have been assigned one of the following additional class notations related to automated machinery systems, as described in Ch 1, Sec 2, [6.4]:

AUT-UMS

AUT-CCS

AUT-PORT

2 Annual survey

2.1

2.1.1 The Owner or his representative is to declare to the attending Surveyor that no significant modifications have been made without prior approval by the Society.

2.1.2 The annual survey is to include:

- an examination of the engineers' log-book to verify the proper operation of automation systems in the period subsequent to the last survey and measures taken to avoid repetition of any malfunctions or failures which have occurred during the same period

- a general examination of the control systems covered by the notation, including a random check of the proper operation and calibration of main measuring, monitoring, alarm, and automatic shut-off devices
- a check of the fire detectors
- a check of the bilge flooding alarms
- a running test which may be also performed by a spot check method.

3 Class renewal survey

3.1

3.1.1 The requirements given in [2] for annual survey are to be complied with. An additional program of examinations, checks and tests is to be devised in agreement with the Owner and based on the operational data and experience of previous surveys. This program is to include verification of the calibration of instruments and testing of control and safety functions of the machinery. The Owner is to produce evidence that all these checks and tests have been carried out and this will be verified by the Surveyor at random. In addition, the proper operation of the control system of propulsion machinery is to be checked during sea trials.

SECTION 5

INTEGRATED SHIP SYSTEMS

1 General

1.1

1.1.1 (1/1/2007)

The requirements of this Section apply to ships which have been assigned one of the following additional class notations related to integrated ship systems, as described in Ch 1, Sec 2, [6.5]:

SYS-NEQ

SYS-NEQ-1

SYS-COM

SYS-IBS

2 Annual survey

2.1 All notations

2.1.1 The Owner or his representative is to declare to the attending Surveyor that no significant modifications have been made to the relevant installations without the prior approval by the Society.

An examination of the log-books is to be carried out to verify the proper operation of systems in the period subsequent to the last survey and measures taken to avoid repetition of any malfunctions or failures which have occurred during the same period

2.2 Notations **SYS-NEQ** and **SYS-NEQ-1**

2.2.1 The annual survey is to include:

- a) general:
 - general examination of the bridge layout, with regard to the field of vision, window wipe and wash system, wheelhouse lighting and heating/cooling systems, and arrangements for the safety of navigators
- b) propulsion and steering controls:
 - test of the steering gear to confirm the proper operation of the various remote controls from the wheelhouse
 - test, as far as practicable, of the propulsion control, including propeller pitch control, where fitted
 - check of the relevant indicators such as rudder angle, ahead/astern position, propeller rpm or pitch
- c) navigation aids:
 - test of the satisfactory operating condition of radars
 - test of the functions available at quay side of the ARPA and collision avoidance system

- test of the position fixing system
 - test of the gyro compass system
 - test of the echo sounding device, using appropriate scale of depth
 - test of other available alarms (sounding equipment, self-checking device, etc.), as far as practicable
- d) communications:
 - test of the whistle control device from the relevant workstation
 - check of the different communication systems (internal communication, VHF radiotelephone installation, NAVTEX)
 - e) bridge safety and alarm system (notation **SYS-NEQ-1**)
 - test, as far as practicable, of the vigilance system and related alarm/warning transfer system.

2.3 Notation **SYS-COM**

2.3.1 The annual survey is to include a check of the means of transmission (hardware and software) as follows :

- a) compliance of the environmental conditions of use of the components (such as temperature, power supply) with those for which they were approved
- b) verification of the correct installation on board, including hardware (cabling, location of aerial, layout of console) and software (such as compatibility of assembled software, man machine interface)
- c) verification by means of an appropriate test of the proper function of:
 - the internal communication between the different workstations, checking at random the availability of data
 - the external communication with the shore; consideration may be given to recent records of such external communication from ship to shore and from shore to ship

2.4 Notation **SYS-IBS**

2.4.1 The annual survey is to include a check of the condition of the different workstations that belong to the IBS system, and a test, as far as practicable, of:

- the main functions of the IBS; in this respect, the examinations and tests given in [2.2.1] are to be carried out, where applicable
- the transitional and emergency sources required for the system and recovery of systems after restoring power
- the alarm and monitoring system in the wheelhouse, at random.

3 Class renewal survey

3.1 All notations

3.1.1 The requirements given in [2] for annual survey are to be complied with. An additional program of examinations, checks and tests is to be devised in agreement with the Owner and based on the operational data and experi-

ence of previous surveys. This program is to include verification of the calibration of instruments and testing of control and safety functions of the installation. An additional program of random tests of the systems is to be performed during sea trials.

The Owner is to confirm that any modification to the hardware and software is fully documented and properly recorded.

SECTION 6

MONITORING EQUIPMENT

1 General

1.1 Application

1.1.1 The requirements of this Section apply to ships which have been assigned one of the following additional class notations related to hull and tailshaft monitoring equipment, as described in Ch 1, Sec 2, [6.6]:

MON-HULL

MON-SHAFT

2 MON-HULL

2.1 Annual and class renewal survey

2.1.1 The Owner or his representative is to declare to the attending Surveyor that the hull monitoring equipment has been recently calibrated using a reference loading case.

3 MON-SHAFT

3.1 Tailshaft survey

3.1.1 When the records of the tailshaft bearing temperature readings are checked and doubts arise, the Surveyor may require the verification of the accuracy of the gauging devices.

SECTION 7

POLLUTION PREVENTION

1 General

1.1 Application

1.1.1 (1/7/2013)

The requirements of this Section apply to ships which have been assigned one of the following additional class notations related to pollution prevention systems, as described in Ch 1, Sec 2, [6.8]:

CLEAN-SEA

CLEAN-AIR

GREEN PLUS

GREEN PLUS T

GREEN STAR 3

GREEN STAR 3 DESIGN

LOW SO_x (N)

GC CARGO HANDLING

1.1.2 (1/7/2006)

When the **GREEN STAR 3 DESIGN** notation is assigned, the survey requirements of [2] and [3] are to be complied with.

2 CLEAN-SEA

2.1 Annual and class renewal survey

2.1.1 (1/7/2012)

The survey is, as far as applicable, to include:

a) Certificates and documents

- confirmation that the IOPP certificate is valid
- confirmation that the "International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk" or the "International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk" (ICOF CHE Certificate), as applicable, is valid
- confirmation that the "International Sewage Pollution Prevention Certificate" (ISPP Certificate) is valid
- confirmation that the "International Anti Fouling System Certificate" (AFS Certificate) or statement of compliance is valid
- confirmation that an approved SOPE Plan or SMPE Plan, as applicable, is available on board
- verification of the proper updating of the sewage record book
- confirmation that an approved Ballast Water Management Plan is available on board and verification of the proper updating of the ballast water record book
- confirmation that an approved Garbage Management Plan is available on board and verification of the proper updating of the garbage record book

- confirmation that the Ship Environmental Management Plan is available on board
 - verification that an officer, defined as Ship Environmental Manager, is in service on board
 - confirmation that the special list or manifest or a detailed stowage plan related to the harmful substances carried is available on board
- b) for oily wastes
- check of the compliance of the bilge system with the approved drawings (no bypasses for overboard discharge)
 - verification that a periodical calibration of the bilge water filtering equipment has been carried out when required by the Manufacturer's instructions or, in the absence of specific indications, at least every 6 months and that documents reporting the last calibration are available on board
 - verification that the Oil Systems log-book is duly filled in (at least every week)
 - verification that the overflow system and high level alarm, or overflow system and flow alarm in the overflow main, or two high level alarms (90% and 95%), installed on fuel oil and lubricating oil tanks with volume >10m³ are well maintained and in good working condition
 - verification that each fixed container or enclosed deck area provided with fuel or lubricating oil tank vents, overflows and fill pipe connection on the weather and/or superstructure decks is well maintained and in good working condition
- c) for sewage
- confirmation of the proper operation of the sewage treatment plant
 - verification of the satisfactory condition of the standard sewage discharge connection
 - verification that high level alarms for sewage holding tanks are well maintained and in good working condition
- d) for grey water (only for passenger ships)
- verification that the grey water record book is duly filled in (grey water discharge into the sea is to be performed at a distance of more than 4 nautical miles from the nearest land)
 - verification that high level alarms for grey water holding tanks are well maintained and in good working condition
- e) for garbage
- verification of the effective application of the Ship Environmental Management Plan
 - verification of proper location of placards for garbage discharge

- confirmation of the proper operation of the garbage treatment plant fitted on board
 - verification that the garbage record book is properly filled in
 - only for passenger ships other than ro-ro passenger, verification that the total quantity of wastes landed for recycling (Wr) is over the minimum limit fixed by **CLEAN SEA** regulation and of corrective actions undertaken if the minimum limit has not been reached
- f) for harmful aquatic organisms in ballast water
- verification that the ballast water exchanges took place, during international voyages, at a distance of more than 200 nautical miles from the nearest land or, if not possible, at a distance of more than 50 miles from the nearest land in a zone with water depth not less than 200 m
 - examination of the ballast water treatment system, where fitted, based on the Manufacturer's maintenance instructions
- g) for harmful substances carried in packaged form
- verification, to the Surveyor's satisfaction, that the harmful substances are properly stowed as specified in the above documentation
- h) for ship recycling
- verification that the Green Passport is available on board and verification, to the Surveyor's satisfaction, of proper updating, where the ship has undergone modification work affecting the Green Passport.

3 CLEAN-AIR

3.1 Annual and class renewal survey

3.1.1 (1/7/2004)

The survey is, as far as applicable, to include:

- a) Certificates and documents
- confirmation that the Ship Environmental Management Plan is available on board.
 - confirmation that the "Engine International Air Pollution Prevention Certificates " (EIAPP Certificate or Document of Compliance) are available on board as applicable
 - confirmation that the engine technical file and record book are available on board and properly updated
 - verification that the **VCS** notation is still granted to the ship (this item applies to ships classed with one or more of the following service notations: **oil tanker - chemical tanker - FLS tanker - liquefied gas carrier - combination carrier OOC - combination carrier OBO**)
 - verification of the records kept on board of the purchase orders and sulphur content check of the fuel and of the management of fuels when fuels with different sulphur contents are used
 - confirmation that the Manufacturer's operating manuals for incinerators are available on board
- b) for emissions of ozone depleting substances
- verification of the availability of the operating manual detailing the procedures to be followed to minimise the risk of releasing ozone depleting substances in all the operative and emergency conditions
 - verification of the annual consumption figures of refrigerants and of corrective actions undertaken if the 10% limit has been exceeded
- c) for emissions of nitrogen oxides (NOx)
- verification of the proper operation of the devices to control NOx emissions
 - verification that engine parameters are as specified in the engine technical file
 - verification of replacements of engine components with those specified in the engine technical file
- d) for emissions of sulphur exhaust (SOx)
- examination of the exhaust gas cleaning system, where fitted, based on the Manufacturer's maintenance instructions
- e) for emissions from incinerators
- examination of the incinerators in working conditions, including monitoring and control devices.

4 GREEN PLUS

4.1 Annual and class renewal survey

4.1.1 (1/7/2012)

The survey is, as far as practicable, to include the following checks:

- a) verification that a responsible person is appointed as Ship Environmental Manager and is present on board,
- b) verification that all the additional systems and components involved in the ship's environmental index calculation (see Pt F, Ch 7, Sec 1, Tab 2 and Pt F, Ch 7, Sec 1, [7], if any) are well maintained and in good working condition;
- c) verification that all the additional procedural means involved in the ship's environmental index calculation (see Pt F, Ch 7, Sec 1, Tab 2 and Pt F, Ch 7, Sec 1, [7], if any) are followed and documented by appropriate recording;
- d) verification that adequate training on environmental issues is planned, carried out and documented for all the persons on board having influence on the environmental behavior of the ship.

5 GREEN PLUS T

5.1 Annual survey

5.1.1 (1/7/2013)

The Owner or his representative is to declare to the attending Surveyor that no significant alterations have been made without the prior approval of the Society.

5.1.2 (1/7/2013)

The annual survey is to include:

- a) verification required for the **GREEN PLUS** notation in [4.1.1];
- b) verification that the periodical surveys of the equipment fitted above the deck have been carried out and recorded in the dedicated certificates/document (applicable to equipment listed in the cargo gear booklet, "ILO Register", or analogous document required by the "Rules for loading and unloading arrangements and for other lifting appliances on board ships");
- c) a general examination of all components of the equipment fitted above the deck and related installation to verify their satisfactory condition (applicable to equipment not listed in the cargo gear booklet, "ILO Register", or analogous document required by the "Rules for loading and unloading arrangements and for other lifting appliances on board ships").

The examination includes inspections to guarantee appropriate maintenance of the appliances and components, i.e. their general condition of efficiency and the system operativeness. All loose gears pertaining to the equipment shall be inspected by verifying its suitability for use and the consistency of its testing marks with those reported on the relevant test certificates.

5.2 Class renewal survey

5.2.1 (1/7/2013)

The Owner or his representative is to declare to the attending Surveyor that no significant alterations have been made without the prior approval of the Society.

5.2.2 (1/7/2013)

The class renewal survey is to include:

- a) verification required for the **GREEN PLUS** notation in [4.1.1];
- b) verification that the overload test of the equipment fitted above the deck has been carried out and recorded in the dedicated certificates/document (applicable to equipment listed in the cargo gear booklet, "ILO Register", or analogous document required by the "Rules for loading and unloading arrangements and for other lifting appliances on board ships") and that the date of execution is within the period of class of the ship;
- c) a close-up examination of all components of the equipment fitted above the deck and related installation (applicable to equipment not listed in the cargo gear booklet, "ILO Register", or analogous document required by the "Rules for loading and unloading arrangements and for other lifting appliances on board ships"), execution of the overload test.

Disassembly may be required, depending on the type of system, when needed to ensure suitability for further use after the overload test.

Where deemed necessary by the Surveyor, non-destructive tests to measure thickness deterioration or check for fractures or other defects may be required.

6 GREEN STAR 3

6.1 Annual and class renewal survey

6.1.1 (1/7/2012)

The survey is, as far as applicable, to include the checks required in [2] and [3] and, in addition, the following:

- a) Certificates and documents
 - confirmation that the "International Anti Fouling System Certificate" (AFS Certificate) or statement of compliance is valid (Antifouling systems applied on existing ships and not in compliance with IMO Res./MEPC.102(48) are to be removed or sealed the next time the ship is in dry dock).
 - confirmation that the engine technical file and record book are available on board and properly updated
 - confirmation that the ship is enrolled in the "Society's Emergency Response Service"
- b) for oily wastes
 - verification that the emergency equipment for accidental spillage of oil, listed in the SOPE Plan, is on board and in good condition and that the crew is confident with such equipment
- c) for garbage
 - only for passenger ships other than ro-ro passenger, verification that the total quantity of wastes landed for recycling (Wr) is over the minimum limit fixed by **GREEN STAR 3** regulation and of corrective actions undertaken if the minimum limit has not been reached
- d) for emissions of ozone depleting substances
 - verification of the annual consumption figures of refrigerants and of corrective actions undertaken if the allowable limit has been exceeded.

7 LOW SO_x (N)

7.1 Annual and class renewal survey

7.1.1 (1/7/2006)

The survey is to include:

- confirmation that the IAPP certificate is valid
- confirmation that detailed plans of systems and equipment to limit SO_x emission in the SO_x emission control areas are available on board
- confirmation that the Ship SO_x Environmental Management Plan is available on board.

8 GC CARGO HANDLING

8.1 Annual survey

8.1.1 (1/7/2013)

The Owner or his representative is to declare to the attending Surveyor that no significant alterations have been made without the prior approval of the Society.

8.1.2 (1/7/2013)

The annual survey is to include:

- a) verification that the periodical surveys of the equipment fitted above the deck have been carried out and recorded in the dedicated certificates/document (applicable to equipment listed in the cargo gear booklet, "ILO Register", or analogous document required by the "Rules for loading and unloading arrangements and for other lifting appliances on board ships");

- b) a general examination of all components of the equipment fitted above the deck and related installation to verify their satisfactory condition (applicable to equipment not listed in the cargo gear booklet, "ILO Register", or analogous document required by the "Rules for loading and unloading arrangements and for other lifting appliances on board ships").

The examination includes inspections to guarantee appropriate maintenance of the appliances and components, i.e. their general condition of efficiency and the system operativeness. All loose gears pertaining to the equipment shall be inspected by verifying its suitability for use and the consistency of its testing marks with those reported on relevant test certificates.

Disassembly may be required, depending on the type of system, when needed to ensure the above.

- c) a general examination of all components of the equipment that is fitted inside the cargo holds and related installation to verify their satisfactory condition.

The examination includes inspections to guarantee appropriate maintenance of the appliances and components, i.e. their general condition of efficiency and the system operativeness.

Disassembly may be required, depending on the type of system, when needed to ensure the above.

- d) verification that all the additional systems and components related to the ship's environmental impact, as per

Pt F, Ch 7, Sec 6, [3], are well-maintained and in good working condition.

8.2 Class renewal survey**8.2.1 (1/7/2013)**

The class renewal survey is to include:

- a) all verifications required at the annual survey;
- b) verification that the overload test of the equipment fitted above the deck has been carried out and recorded in the dedicated certificates/document (applicable to equipment listed in the cargo gear booklet, "ILO Register", or analogous document required by the "Rules for loading and unloading arrangements and for other lifting appliances on board ships") and that the date of execution is within the period of class of the ship;
- c) a close-up examination of all components of the equipment fitted above the deck and related installation (applicable to equipment not listed in the cargo gear booklet, "ILO Register", or analogous document required by the "Rules for loading and unloading arrangements and for other lifting appliances on board ships"), execution of the overload test.

Disassembly may be required, depending on the type of system, when needed to ensure suitability for further use after the overload test.

Where deemed necessary by the Surveyor, non-destructive tests to measure thickness deterioration or check for fractures or other defects may be required.

- d) verification that all the additional systems and components related to the ship's environmental impact, as per Pt F, Ch 7, Sec 6, [3], are well-maintained and in good working condition.

SECTION 8

REFRIGERATING INSTALLATIONS

1 General

1.1

1.1.1 The requirements of this Section apply to ships which have been assigned one of the following additional class notations related to refrigerating installations, as described in Ch 1, Sec 2, [6.9]:

REF-CARGO

REF-CONT

REF-STORE

as well as the following specific notations:

-PRECOOLING

-QUICKFREEZE

-AIRCONT.

2 Annual survey

2.1 General

2.1.1 The annual survey of refrigerating installations (plants and spaces) is to be carried out with the installation in running condition and, whenever possible, during unloading operations or without cargo in refrigerated spaces.

2.1.2 The refrigeration installation log-book (or other similar record) is to be made available to the Surveyor for examination of the records since the last survey, and checking any unusual consumption of refrigerant, breakdown or defective items.

2.1.3 Decks, bulkheads or ship sides adjacent to refrigerated spaces are to be checked as far as practicable in order to verify the absence of cold spots.

2.1.4 The Owner or his representative is to declare to the attending Surveyor that no significant modifications have been made to the installations that could affect the class notations without the prior approval by the Society.

2.2 Refrigerating plant

2.2.1 Refrigerating machines and related accessories, including compressors, condensers, pumps and piping are to be examined externally and in running condition. Insula-

tion of insulated parts is to be checked for possible signs of humidity or wear. The tightness of the system is to be ascertained.

2.2.2 The electrical installation is to be generally examined, and the insulation resistance of the installation is to be checked as deemed necessary by the Surveyor.

2.2.3 If independent from the electrical installation of the ship, the generators supplying electrical power to the refrigerating installation are to be examined to the same extent as described in Ch 3, Sec 3, [3.3].

2.3 Refrigerated spaces

2.3.1 Refrigerated spaces are to be generally examined to ascertain the condition of:

- insulation lining; removable panels or covers may be dismantled for examination of insulation, as deemed necessary by the Surveyor
- hatch covers, doors, access panels (including gaskets and securing devices) and dampers of ventilation ducts
- air coils, coolers, fans, air ducts, brine piping systems and associated equipment; cleanliness of grids
- bilge wells
- protection of fans and other rotating machinery, battens for air circulation within the space.

2.4 Instrumentation and safety devices

2.4.1 Thermometers used for measurement of temperature in refrigerated spaces, air ducts and other elements of the installation are to be examined and checked for their accuracy. The Surveyor may require the calibration of one or more thermometers and one or more automation devices to be checked in his presence or, failing this, a certificate of calibration is to be presented to him.

2.4.2 The following alarm and safety devices are also to be checked, as required or fitted:

- alarm and emergency shutdown devices
- CO₂ detectors, if any
- refrigerant leakage detectors
- access to spaces, with regard to possibilities of escape and prevention of personnel being trapped within spaces.

2.5 Notation -AIRCONT

2.5.1 The requirements of this item apply to installations assigned the notation **-AIRCONT**. They are additional to the requirements given in [2.1] to [2.4].

2.5.2 The installation is to be visually examined and tested to verify that the controlled atmosphere system remains satisfactory. The survey is to include the following items:

- examination of voyage logs, records of controlled atmosphere zone air-tightness and calibration of instruments
- confirmation that an operating and safety manual is available on board, complete and duly endorsed by the officers responsible
- examination of controlled atmosphere zone sealing arrangements including cleats and hinges, pressure/vacuum valves, door locks, ventilation of adjacent spaces, warning notices
- test to design pressure of controlled atmosphere zones for air-tightness. Tests by ship's staff within one month prior to the survey may be accepted, based on a written report by the Master subject to visual inspection confirming the air-tightness.
- operation and performance test of the gas supply equipment, including controls, alarms, interlocks and safety devices
- examination and test of ventilation arrangements including fans as deemed necessary
- examination of electrical supply arrangements
- check of gas analysers, analysing equipment and calibration
- check of relative humidity sensors and calibration
- check of permanent and portable gas monitoring, including calibration, and of personnel safety equipment.

3 Class renewal survey

3.1 General

3.1.1 The installation is to be surveyed out of operation in order to enable examinations in opened condition of certain items.

3.1.2 After completion of these examinations, the installation is to be checked while cooling down from the ambient temperature to the lowest design temperature for the refrigerated spaces. The plant is to be examined for ability to maintain stable air temperatures and defrosting operation is to be checked.

3.2 Refrigerating plant

3.2.1 The equipment is to be dismantled to a sufficient extent to enable the following examinations:

- reciprocating compressors: examination of cylinders, valves, crankshaft, connecting rods, pistons, bearings and safety devices
- screw compressors, turbo compressors and pumps: parts subject to wear and tear; the equipment may not need to be opened up if log-book records and a running test show proper functioning.

3.2.2 Prime movers of pumps, compressors and fans are to be examined to the same extent as required in Ch 3, Sec 5, [3] for similar equipment for the class renewal survey of machinery.

3.2.3 Condensers and coolers are to be opened up for examination of tube plates, tubes and end covers.

Condensers are to be pressure tested to 1,2 times the rated working pressure.

3.2.4 Insulation of insulated parts (such as piping and pressure vessels) may need to be removed at random, to ascertain the condition of such parts and of the insulation itself.

3.2.5 The electrical installation of the plant is to be examined and insulation tests checked.

3.2.6 If independent from the electrical installation of the ship, the generators supplying electrical power to the refrigerating installation are to be examined to the same extent as described in Ch 3, Sec 5, [3.6].

3.2.7 Sea connections to condenser circulating pumps are to be opened up and piping examined.

3.2.8 Other equipment, such as oil separators on refrigerant systems, filters and dehydrators, are to be examined to the satisfaction of the Surveyor.

3.3 Refrigerated spaces

3.3.1 The lining and insulation in the refrigerated spaces may need to be partly removed for examination of its condition. The condition of the hull part under the insulation is then ascertained, as well as that of girders, meat rails, hooks and coil/cooler supports.

3.3.2 Air coolers and coils are to be examined and pressure tested at the rated working pressure and at 1,2 times such pressure in the case of hydraulic test after repairs.

3.3.3 Air cooler fans are to be examined and their prime movers are to be checked to the same extent as stated in [3.2.2].

3.3.4 The electrical installation in the refrigerated spaces is to be examined and insulation tests checked.

3.3.5 Defrosting and heating systems are to be examined to the satisfaction of the Surveyor.

3.4 Instrumentation and safety devices

3.4.1 Pressure relief valves and safety disks are to be checked. Discharge piping is to be examined with regard to integrity and non-obstructed flow.

3.5 Notation -AIRCONT

3.5.1 The requirements of this item apply to installations assigned the notation **-AIRCONT**. They are additional to the requirements given in [3.1] to [3.4].

3.5.2 Air compressors, pressure vessels and other equipment are to be examined to the same extent as required in Ch 3, Sec 5, [3] for similar equipment for the class renewal survey of machinery.

3.5.3 Each controlled atmosphere zone is to be subjected to an air-tightness test.

SECTION 9

ARRANGEMENTS FOR NAVIGATION IN ICE - ICE CLASS AND POLAR CLASS

1 General

1.1

1.1.1 (1/3/2008)

The requirements of this Section apply to ships which have been assigned one of the following additional class notations related to navigation in an ice environment, as described in Ch 1, Sec 2, [6.10] (ICE CLASS) and Ch 1, Sec 2, [6.11] (POLAR CLASS):

Class notations for navigation in ice (ICE CLASS):

- ICE CLASS IA SUPER
- ICE CLASS IA
- ICE CLASS IB
- ICE CLASS IC
- ICE CLASS ID
- ICE

Class notations for navigation in ice (POLAR CLASS):

- POLAR CLASS PC1
- POLAR CLASS PC2
- POLAR CLASS PC3
- POLAR CLASS PC4
- POLAR CLASS PC5
- POLAR CLASS PC6
- POLAR CLASS PC7

2 Class renewal survey

2.1 Thickness measurements

2.1.1 Additional systematic thickness measurements are required in the areas where strengthening for navigation in an ice environment has been applied in accordance with the requirements in Part F, Chapter 9 (ICE CLASS) or Part F, Chapter 10 (POLAR CLASS), as per Tab 1.

Table 1

Age of ship (in years at time of class renewal survey)		
age ≤ 5	5 < age ≤ 10	age > 10
	selected plates	all plates
		selected internal frames, stiffeners and stringers

2.2 Sea chests

2.2.1 During the bottom survey in dry condition which is to be carried out concurrently with the class renewal survey (see Ch 3, Sec 5, [2.1]), the specific arrangements related to sea chests protected against ice blocking, such as heating coil and cooling water discharge piping, are to be checked.

SECTION 10

WINTERIZATION (TEMP)

1 General

1.1

1.1.1 (15/11/2007)

The requirements of this Section apply to ships which have been assigned the additional class notation **WINTERIZATION (temp)**, as described in Ch 1, Sec 2, [6.12.1].

2 Annual survey

2.1 Anti-icing arrangements

2.1.1 (15/11/2007)

The anti-icing arrangements for the following items are to be examined:

- navigation
- communication
- watchman location
- steering
- propulsion
- air pipe vent heads for tanks
- scuppers and drains
- anchoring
- emergency towing
- cargo systems and ancillary systems
- fire-fighting systems
- crew thermal protection
- life-saving appliances (including launching devices, heating system of lifeboat engine, storage facilities for life-saving outfit)
- ship whistle
- access way to the bow
- escape exits.

2.2 De-icing arrangements

2.2.1 (15/11/2007)

The de-icing arrangements for the following items are to be examined:

- open deck
- gangways/stairways
- superstructures
- railings
- mooring
- outdoor piping
- winches not provided with anti-icing
- deck lighting
- helicopter decks.

2.3 Anti-freezing arrangements

2.3.1 (15/11/2007)

The anti-freezing arrangements for the following items are to be examined:

- fresh water
- ballast
- fuel oil tanks
- piping systems
- fire-extinguishing systems
- water pipes on decks/non-heated spaces
- hydraulic oil systems on decks/non-heated spaces
- lifeboat equipment.

2.4 Distribution switchboards for de-icing

2.4.1 (15/11/2007)

It is to be verified that the distribution switchboards for de-icing equipment are provided with the indication of the device in service.

2.5 Heating equipment

2.5.1 Electrical cables (15/11/2007)

The electrical cables for heating systems are to be examined for correct fastening.

2.5.2 Valves (15/11/2007)

The valves are to be examined for:

- correct marking of relevant areas or equipment to be heated, and
- the indication of closed/open position.

2.6 Tests

2.6.1 (15/11/2007)

The anti-icing, de-icing and anti-freezing systems are to be tested for their correct functioning in accordance with the requirements of Ch 3, Sec 3, [3], as far as applicable.

2.7 Special equipment

2.7.1 (15/11/2007)

It is to be verified that:

- a sufficient quantity of protective clothing, safety lines, hand tools, and crampons for shoes and similar equipment for de-icing purposes is available on board, and
- this equipment is kept in storage facilities and at locations adequately protected against the accretion of ice.

SECTION 11

HELIDECK

1 General

1.1 Application

1.1.1 (1/7/2015)

The requirements of this Section apply to units which have been assigned one of the following additional class notations related to helicopter facilities, as described in Ch 1, Sec 2, [6.14.20]:

- HELIDECK
- HELIDECK-H

2 Annual survey

2.1

2.1.1 (1/7/2015)

The Owner or his representative is to declare to the attending Surveyor that no significant modifications to structure, systems and fire protection have been made without prior approval by the Society.

2.1.2 (1/7/2015)

The annual survey is to include:

- a) examination of the supporting structures of the helicopter deck, including the connections to the deck of the unit;
- b) examination of the details of the arrangements in way of the bimetallic connections, where aluminium alloy platforms are connected to steel structures;
- c) checking that the overall coating of non-slip material or other arrangements, provided to minimize the risk of personnel or helicopters sliding off the landing area, are in satisfactory condition;
- d) checking that the drainage system, if fitted, provided in association with a perimeter guttering system or slightly raised curb to prevent spilled fuel falling on to other parts of the unit and led to a safe area, is in satisfactory condition;
- e) confirmation that a sufficient number of tie-down points are provided to secure the helicopter;
- f) confirmation that a wind pennant or flag is fitted and properly illuminated;
- g) verification that the peripheral safety net system, if any, is in satisfactory condition;

- h) when refuelling facilities are fitted:
 - 1) confirmation that fuel storage area is provided with arrangements whereby fuel spillage may be collected and drained to a safe location;
 - 2) confirmation that "NO SMOKING" signs are displayed at appropriate locations;
 - 3) confirmation that tanks and associated equipment are to be protected against physical damage and from a fire in an adjacent space or area;
 - 4) confirmation that remote shutdown of storage tank fuel pumps (or equivalent closing arrangements for gravity tanks) are in working condition;
 - 5) verification that the fuel pumping unit is connected to one tank at a time and the piping between the tank and the pumping unit is of steel or equivalent material, as short as possible, and protected against damage;
 - 6) verification that electrical equipment in the refueling systems, refuelling area, hangars containing refuelling systems are in satisfactory condition and have been properly maintained;
- i) for fire-fighting appliances and rescue equipment, verification that the following are stored in close proximity to the helideck and are ready for efficient use:
 - 1) at least two dry powder extinguishers having a total capacity of not less than 45 kg,
 - 2) carbon dioxide extinguishers of a total capacity of not less than 18 kg or equivalent,
 - 3) a suitable foam application system consisting of monitors or foam making branch pipes capable of delivering foam to all parts of the helideck,
 - 4) the principal agent suitable for use with salt water and conforming to performance standards not inferior to those acceptable to the Society,
 - 5) at least two nozzles of an approved dual-purpose type (jet/spray) and hoses sufficient to reach any part of the helideck,
 - 6) at least the following equipment:
 - adjustable wrench,
 - blanket, fire resistant,
 - cutters, bolt 60 cm,
 - hook, grab or salving,
 - hacksaw, heavy duty complete with 6 spare blades,
 - ladder,
 - lift line 5 mm diameter x 15 m in length,
 - pliers, side cutting,
 - set of assorted screwdrivers; and
 - harness knife complete with sheath;

- j) for hangars or spaces containing refuelling installations:
- 1) verification that the hangar's ventilation system is capable of at least 6 air changes per hour,
 - 2) verification that the system is entirely separated from other ventilation systems,
 - 3) verification that the system is such as to prevent air stratification and the development of air pockets,
 - 4) verification that means are provided to indicate on the navigating bridge any loss or reduction of the required ventilating capacity,
 - 5) verification that arrangements are provided to permit a rapid shutdown and effective closure of the ventilation ducts and openings from outside of the served space in the case of fire,
- k) for hangars, refuelling and maintenance facilities:
- 1) verification of the operational readiness and maintenance of fixed fire-fighting systems,
 - 2) examination, as far as possible, and testing, as feasible, of fixed fire detection and alarm systems,

- 3) examination of the provision and condition of:
 - the portable foam applicator unit of 20 l capacity with a spare charge;
 - the foam-type fire extinguishers, each of at least 45 l capacity or equivalent;
 - a sufficient number of portable foam extinguishers or equivalent which are to be so located that no point in the space is more than 10 m walking distance from an extinguisher and that there are at least two such extinguishers in each such space;
- l) confirmation that the means of escape from the helideck and associated spaces are satisfactory.

3 Class renewal survey

3.1

3.1.1 (1/7/2015)

The requirements, given in [2] for annual surveys, are to be complied with. An additional planned survey program detailing checks and tests, as applicable, is to be devised in agreement with the Owner and based on the operational data and experience of previous surveys.

SECTION 12

OTHER NOTATIONS

1 General

1.1

1.1.1 (1/1/2019)

The requirements of this Section apply to ships which have been assigned one of the following additional class notations described in Ch 1, Sec 2, [6.14]:

STRENGTHBOTTOM

GRABLOADING

GRAB [X]

SPM

DYNAPOS

VCS

COVENT

CARGOCONTROL

COAT-WBT

DIVINGSUPPORT

HVSC

FIRE

SELF-UNLOADING

TAS

EFFICIENT SHIP (S, DWT)

MOORING

CARGO HANDLING

☾ SAHARA, SAHARA

COMF NOISE

RISK MITIGATION

AIR MON

DANGEROUS GOODS

INF 1, INF 2, INF 3

INERTGAS A, INERTGAS B, INERTGAS C

GAS FUELLED, GAS FUELLED (Main), GAS FUELLED (Aux)

MAN OVERBOARD DETECTION SYSTEM

CYBER RESILIENCE

DIGITAL SHIP

2 STRENGTHBOTTOM

2.1 Dry-docking survey

2.1.1 The reinforced area of bottom plating and internal associated structures are to be visually examined for possible deformations, fractures or other damage. If deemed necessary, thickness measurements may be required.

3 GRABLOADING and GRAB [X]

3.1 Class renewal survey

3.1.1 The reinforced area of double bottom plating and adjacent associated structures are to be visually examined for possible deformations, fractures or other damage. If deemed necessary, thickness measurements may be required.

4 SPM

4.1 Annual survey

4.1.1 The Owner or his representative is to declare to the attending Surveyor that no significant alterations have been made without the prior approval of the Society.

4.1.2 The annual survey is to include:

- a general examination of all components of the installation (bow chain stoppers, bow fairleads, pedestal roller fairleads, winches and capstans) to verify their satisfactory condition
- an examination of the hull structures supporting and adjacent to the installation to verify that no deformations or fractures have developed.

4.2 Class renewal survey

4.2.1 The class renewal survey is to include:

- a close-up examination of all components of the installation (bow chain stoppers, bow fairleads, pedestal roller fairleads, winches and capstans) to verify their satisfactory condition
- a close-up examination of the hull structures supporting and adjacent to the installation to verify that no deformations or fractures have developed.

Where deemed necessary by the Surveyor, non-destructive tests for measuring thickness deterioration or checking for fractures or other defects may be required.

5 LASHING and ROUTE DEPENDENT LASHING

5.1 General

5.1.1 (1/11/2013)

For the additional class notation **ROUTE DEPENDENT LASHING** the approved route or routes, for which the notation is granted, may be modified. In this case the Society is to be informed in advance and the required modifications are to be reflected in the approved documentation (see Pt F,

Ch 13, Sec 5, [1]) and are to be confirmed through an on-board survey having the consistency of a Renewal Survey.

5.2 Class renewal survey

5.2.1 (1/11/2013)

The survey is to include:

- a) a review of the required on board documentation (see Pt F, Ch 13, Sec 5, [1])
- b) a check of the availability of computer and software in the approved edition.

6 DYNAPOS

6.1 Annual survey

6.1.1 The program of the annual survey may be previously agreed with the Society.

The Owner or his representative is to declare to the attending Surveyor that no significant alterations have been made without the prior approval of the Society.

6.1.2 The annual survey is to include:

- an examination of the log-books to verify the proper operation of systems in the period subsequent to the last survey and measures taken to avoid repetition of any malfunctions or failures which have occurred during the same period
- general examination of visible parts of thrust units, including their prime movers
- general examination of the electrical power system and switchboards
- general examination of control, monitoring and alarm devices
- running test of the installation, including random test by simulation of different alarms and relevant backup systems and switching modes.

6.2 Class renewal survey

6.2.1 In general, the class renewal survey consists of the checks detailed in [6.2.3] to [6.2.6]. However, a specific program of the class renewal survey prepared by the Owner and taking into account the maintenance procedures of the Manufacturers of the system is to be submitted to the Society prior to the survey.

6.2.2 The Owner is to confirm that any modification to the software is fully documented and properly recorded.

6.2.3 Prime movers of thrust units, electrical installations and electric power generators are to be surveyed and tested to the same extent as required in Ch 3, Sec 5, [3] for similar equipment for the class renewal survey of machinery.

6.2.4 During the bottom survey in dry condition which is to be carried out concurrently with the class renewal survey (see Ch 3, Sec 5, [2.1]), the thrust units are to be generally examined. Other checks are to be carried out, such as taking clearances, examination of the orientation device or variable pitch system, if any, verifying tightness devices, examination of results of lube oil analysis for detection of

possible deterioration of internal gears and bearings. Dismantling of internal parts may be required if the above examinations are not satisfactory.

6.2.5 Sensors and position reference systems are to be tested to check their accuracy. Failure of sensors is to be simulated in order to check the related alarm system and switching logic. Switch over to the different reference systems is to be checked.

6.2.6 An operational test of the installation is to be performed, including:

- test of each thrust unit at different loads, pitches and speeds, and check of monitoring devices
- test of the thrust controls in the different available modes (automatic, semi-automatic, manual), and the switch over between the different modes
- test of the different alarms and safety systems, using simulated conditions as necessary
- test of power supply failure and verification of intended functioning in such cases
- final test to verify the capacity of the system to keep the ship in the intended position and maintain the heading, with related alarm and monitoring devices. The accuracy of the system is to be checked and compared with previous results for evaluation of drift
- test of the power management system.

7 VCS

7.1 Annual survey

7.1.1 The Owner or his representative is to declare to the attending Surveyor that no significant modifications have been made without the prior approval of the Society.

7.1.2 The annual survey is to include:

- an examination of the instruction manual to verify the layout of the complete system and confirm the correspondence to the actual system fitted on board
- a general examination of components of the system such as vapour piping (including manifold and hoses), cargo tank gauging equipment, cargo tank level alarms, vapour pressure alarms and vapour balancing, if any, to verify their satisfactory condition.

7.2 Class renewal survey

7.2.1 The requirements given in [7.1] for annual survey are to be complied with. Additionally, the following is to be carried out:

- a pressure test of the vapour piping, including manifold and hoses
- a check and test of the instrumentation (cargo tank gauging equipment, cargo tank level alarms, vapour pressure alarms)
- an inspection and test of the vapour balancing equipment, if any
- a running test of the system.

8 COVENT

8.1 Annual survey

8.1.1 The Owner or his representative is to declare to the attending Surveyor that no significant modifications have been made without the prior approval of the Society.

8.1.2 The annual survey is to include a general examination of components of the system such as ventilation piping and fans.

8.2 Class renewal survey

8.2.1 The requirements given in [8.1] for annual survey are to be complied with. Additionally, the following is to be carried out:

- an inspection of the components of the system to the same extent as required in Ch 3, Sec 5, [3] for similar equipment for the class renewal survey of machinery
- a running test of the system.

9 CARGOCONTROL

9.1 Annual survey

9.1.1 The Owner or his representative is to declare to the attending Surveyor that no significant modifications have been made without the prior approval of the Society.

9.1.2 The annual survey is to include:

- a general examination of the items of equipment regarding remote control of operations and gauging/alarms provided for all those parameters that are required to be kept under control to verify their satisfactory condition
- a running test which may be also performed by a spot check method.

9.2 Class renewal survey

9.2.1 The requirements given in [9.1] for annual survey are to be complied with. Additionally, the following is to be carried out:

- a check and test of the instrumentation fitted to the components of the system
- an overall running test of the system.

10 COAT-WBT

10.1 General

10.1.1 (1/7/2006)

For the additional class notation **COAT-WBT** to be retained during the lifetime of the ship, the protective coatings are to be checked by the Society during the examination of the water ballast tanks at class surveys and their condition is to

be assessed as GOOD, as per the definition given in Ch 2, Sec 2, [2.2.13].

The scope of the coating examination during intermediate and class renewal surveys is laid down in [10.2].

In addition, the Owner is to notify the Society of any damage to the protective coatings, as laid down in [10.3].

10.2 Intermediate and class renewal surveys

10.2.1 (1/7/2006)

The protective coatings of all water ballast tanks subject to examination at intermediate and class renewal surveys are to be checked.

10.2.2 (1/7/2006)

In addition, where any remarks or damage to the protective coatings have been recorded, the relevant areas inside water ballast tanks are also to be examined.

10.2.3 (1/7/2006)

When the coating is found to be in less than GOOD condition, as defined in Ch 2, Sec 2, [2.2.13], the Owner is to carry out those repairs as required by the attending Surveyor to restore the coating condition to GOOD at the intermediate or class renewal surveys. Failure to carry out the above repairs will result in suspension of the additional class notation **COAT-WBT**.

10.3 Coating damage and repairs

10.3.1 (1/7/2006)

The Owner is to keep records and inform the attending Surveyor at the first subsequent attendance on board about any damage to the protective coatings which has been found and left for further inspection or already repaired since the date of first classification or last intermediate or class renewal survey, as applicable. However, where the nature and/or extent of damage to the coating is significant, the Owner is to inform the Society for the attendance of a Surveyor before repairs are carried out.

10.3.2 (1/7/2006)

Coating is to be repaired in accordance with the paint Manufacturer's recommendations.

The attending Surveyor is to check that damage to the coating has been properly repaired according to the technical specifications and that it has been restored to GOOD condition; this may be done during the intermediate or class renewal survey, or during an occasional survey, upon the Owner's request or subject to the decision of the Society.

11 DIVINGSUPPORT

11.1 Annual survey

11.1.1 (1/10/2008)

The Owner or his representative is to declare to the attending Surveyor that no significant alterations have been made without the prior approval of the Society.

11.1.2 (1/10/2008)

The annual survey is to include:

- a) a general examination of all components of the diving system arrangements and installation to verify their satisfactory condition
- b) an examination of the hull structures supporting and adjacent to the diving system arrangements and installation to verify that no deformations or fractures have developed
- c) a functional test of electrical systems and communication systems.

11.2 Class renewal survey

11.2.1 (1/10/2008)

The class renewal survey is to include:

- a) a close-up examination of all components of the diving system arrangements and installation to verify their satisfactory condition
- b) a close-up examination of the hull structures supporting and adjacent to the diving system arrangements and installation to verify that no deformations or fractures have developed
- c) checking the ship's capability to maintain its position during diving operations
- d) a functional test of electrical systems and communication systems and measurement of insulation resistance.

Where deemed necessary by the Surveyor, non-destructive tests for measuring thickness deterioration or checking for fractures or other defects may be required.

12 HVSC

12.1 Annual and class renewal survey

12.1.1 (1/7/2009)

The survey is, as far as practicable, to include the checks required in Ch 3, Sec 3, [3.3] and Ch 3, Sec 5, [3.6] and [3.7].

In addition a record of annual maintenance, repair, equipment modifications (if any) and the results of relevant tests carried out is to be available for the shipside HVSC-System.

13 FIRE

13.1 General

13.1.1 (1/7/2011)

For the maintenance of the class notations **FIRE**, **FIRE-AS**, **FIRE-MS** and **FIRE-CS** as described in Ch 1, Sec 2, [6.14.23] the following applies:

- a) Chapter I of the SOLAS Convention as amended, as far as types, periodicity and scope of surveys are concerned;
- b) IMO Resolution A.997(25) "Survey guidelines under the harmonised system of survey and certification, 2007" as

amended, as far as fire protection survey requirements are concerned;

- c) The "Rules for Fire Protection, Detection and Extinction for the Issue and Maintenance of Statutory Certificates other than SOLAS Certificates", as appropriate for the specific systems to be surveyed.

14 SELF-UNLOADING

14.1 Annual survey

14.1.1 (1/7/2013)

The Owner or his representative is to declare to the attending Surveyor that no significant alterations have been made without the prior approval of the Society.

14.1.2 (1/7/2013)

The annual survey is to include:

- a) verification that the periodical surveys of the equipment fitted above the deck have been carried out and recorded in the dedicated certificates/document (applicable to equipment listed in the cargo gear booklet, "ILO Register", or analogous document required by the "Rules for loading and unloading arrangements and for other lifting appliances on board ships").
- b) a general examination of all components of the equipment fitted above the deck and related installation to verify their satisfactory condition (applicable to equipment not listed in the cargo gear booklet, "ILO Register", or analogous document required by the "Rules for loading and unloading arrangements and for other lifting appliances on board ships").

The examination includes inspections to guarantee appropriate maintenance of the appliances and components, i.e. their general condition of efficiency and the system operativeness. All loose gears pertaining to the equipment shall be inspected by verifying its suitability for use and the consistency of its testing marks with those reported on the relevant test certificates.

Disassembly may be required, depending on the type of system, when needed to ensure the above.

- c) an examination of the hull structures supporting and adjacent to the equipment fitted above the deck and installation to verify that no deformations or fractures have developed;
- d) a general examination of all components of the equipment fitted inside the cargo holds and related installation to verify their satisfactory condition.

The examination includes inspections to guarantee appropriate maintenance of the appliances and components, i.e. their general condition of efficiency and the system operativeness.

Disassembly may be required, depending on the type of system, when needed to ensure the above.

- e) an examination of the hull structures supporting and adjacent to the equipment fitted inside the cargo holds

and related installation to verify that no deformations or fractures have developed;

- f) a functional test of the power system driving the equipment, including alarm and safety devices.
- g) verification that (when required) the ventilation system(s) is/are efficiently maintained and that its/their ventilation ducts are provided with suitable wire meshes against blockage (and spark screens in the case of ventilation serving a hazardous area);
- h) in the case of equipment and installations in hazardous areas/dangerous zones, such as cargo holds intended for the carriage of chemically hazardous bulk material, or equipment intended to load/unload such material, verification that all explosion-proof fittings (mechanical, electrical, etc..) and precautions are maintained.

14.2 Class renewal survey

14.2.1 (1/7/2013)

The class renewal survey is to include:

- a) all verifications required at the annual survey
- b) verification that the overload test of the equipment fitted above the deck has been carried out and recorded in the dedicated certificates/document (applicable to equipment listed in the cargo gear booklet, "ILO Register", or analogous document required by the "Rules for loading and unloading arrangements and for other lifting appliances on board ships") and that the date of execution is within the period of class of the ship.
- c) a close-up examination of all components of the equipment fitted above the deck and related installation (applicable to equipment not listed in the cargo gear booklet, "ILO Register", or analogous document required by the "Rules for loading and unloading arrangements and for other lifting appliances on board ships"), execution of the overload test.

Disassembly may be required, depending on the type of system, when needed to ensure their suitability for further use after the overload test.

Where deemed necessary by the Surveyor, non-destructive tests to measure thickness deterioration or check for fractures or other defects may be required.

- d) verification of the electrical insulation of the electrical devices associated with all the equipment (fitted on deck and/or in cargo holds);
- e) The electrical insulation resistance of the electrical equipment and circuits in hazardous areas/dangerous zones is to be measured. These measurements are only to be effected when the ship is in a gas-free or inerted condition. Where a proper record of testing is maintained, consideration may be given to accepting recent readings by the ship's personnel.

Reference is also to be made to IACS Recommendation No. 35 - Inspection and maintenance of electrical equipment installed in hazardous areas

15 TAS

15.1 Annual survey

15.1.1 (1/7/2013)

The Owner or his representative is to declare to the attending Surveyor that no significant alterations to the ship's structures and geometry have been made without the prior approval of the Society and without updating the electronic format of geometry and structural data.

15.1.2 (1/7/2013)

The annual survey is to include verification that arrangements are in place to provide prompt access to shore-based damage stability and residual structural strength computerized calculation programs.

16 EFFICIENT SHIP (S, DWT)

16.1 Annual and class renewal survey

16.1.1 (1/2/2014)

The survey is to include:

- a) examination of the engineers' log book to ascertain the proper operation of monitoring system in the period subsequent to the last survey and to verify actions and their effectiveness taken to:
 - 1) avoid repetition of any malfunctions or failures which have occurred during the same time
 - 2) restore the correct (and efficient) function of the monitoring system in case this was necessary
- b) examination of the monitoring system, including a random check of the proper operation of sensors and equipment;
- c) examination of evidence that maintenance of monitoring system has been carried out in accordance with maker's instruction.

In case the fuel consumption is measured through a periodic stocktakes of fuel tanks (see Pt F, Ch 13, Sec 19, [5.2]), the survey is to include the examination of evidence that, in the period subsequent to the last survey, the checks have been carried out with the frequency and the methodology described in the procedure previously examined and accepted by the Society.

17 MOORING

17.1 Annual survey

17.1.1 (1/7/2014)

The Owner or his representative is to declare to the attending Surveyor that no significant alterations have been made without the prior approval of the Society.

17.1.2 (1/7/2014)

Scope of the annual survey is to determine the condition of the mooring system on the basis, as far as practicable, of an examination of above water items in order to verify their satisfactory condition.

In particular, the following items are to be examined:

- Anchor chain stopper structural arrangements and relevant foundations

- Anchor chain catenary angles to verify compliance with design values. In the case of anchor cables, their tensions are to be checked against allowable tensions
- Cable or chain in contact with fairleads, etc.
- Cable or chain in way of winches, stoppers and splash zone.

17.2 Renewal survey

17.2.1 (1/7/2014)

The requirements for annual surveys in [17.1.1] are to be complied with.

17.2.2 (1/7/2014)

Where practicable, mooring cables, chains and anchors are to be lifted to the surface for detailed inspection in accordance with [17.2.3] and [17.2.4] at each Renewal Survey.

Alternatively, in situ inspection, using acceptable techniques, will be considered by the Society when requested by the interested parties.

17.2.3 (1/7/2014)

As far as practicable, the surveyor is to determine the general condition of the mooring system including cables, chains, fiber ropes, fittings, fairleads, connections and equipment.

Particular attention is to be given to the following:

- cable or chain in contact with fairleads, etc,
- cable or chain in way of winches and stoppers
- cable or chain in way of the splash zone
- cable or chain in the contact zone of the sea bed
- damage to mooring system
- extent of marine growth
- condition and performance of corrosion protection.

17.2.4 (1/7/2014)

Wire rope anchor cables are to be examined. If cables are found to contain broken, badly corroded or bird caging wires they are to be renewed.

Chain cables are to be examined. Maximum acceptable diminution of anchor chain in service will normally be limited to a two per cent reduction from basic chain diameter. (Basic chain diameter can be taken as the diameter, excluding any design corrosion allowance, which satisfies the Rule requirement for minimum factors of safety).

17.2.5 (1/7/2014)

The windlasses or winches are to be examined.

17.2.6 (1/7/2014)

Structure in way of anchor racks and anchor cable fairleads is to be examined.

18 CARGO HANDLING

18.1 General

18.1.1 (1/7/2014)

Cargo handling systems covered by the additional Class notation **CARGO HANDLING** are those, but not limited to, having the configuration of a:

- crane
- slewing crane

- gantry travelling crane
- portal cranes
- swinging jib crane
- deck cargo jib crane
- container crane
- fixed crane with derrick or retractable jib
- A-frame crane.

18.2 Annual survey

18.2.1 (1/7/2014)

The Owner or his representative is to declare to the attending Surveyor that no significant alterations have been made without the prior approval of the Society.

18.2.2 (1/7/2014)

The annual survey is to include:

- an examination of the instruction/installation manual to verify the layout of the complete system and confirm correspondence to the actual system(s) fitted on board
- verification that maintenance of the system(s) has been carried out according to the Manufacturer's instructions and schedules
- examination of the structural parts, including bolts and welds, of the cargo handling system, such as foundations, columns, fixed structure of the crane, arm, jib, jib heel pins, jib slewing rings, fixed sheaves, blocks, axle pins and housings
- examination of hydraulic cylinders, winches (electrical and/or hydraulically driven), driving motors and related attachments
- examination of the electrical systems, switchboard, etc)
- examination of the components and loose gears, such as shackle, links, rings, hooks, etc, in order to verify their satisfactory condition of maintenance
- examination of all cables (spans, runners, maneuvering cables) with particular attention to their ends and terminal fittings
- verification and test of the alarm and safety devices
- a running test of the system in order verify the satisfactory working and operation conditions.

18.3 Renewal survey

18.3.1 (1/7/2014)

The requirements for annual surveys in [18.1.1] are to be complied with.

18.3.2 (1/7/2014)

- Working test of the hydraulic oil system(s), as applicable, pertaining to the cargo handling system(s)
- insulation tests of all electrical equipment of the crane(s)
- overload test is to be performed with test loads as shown in Tab 1.

The winch of the system is to be able to raise a test load of at least 1.1 P and to support the full test load even if it cannot raise it.

When due to the pressure valve setting, hydraulic cranes cannot raise the full test load, a smaller test load may be accepted but in no case is it to be less than 1.1P.

For variable load-radius cranes, the jib is to be tested with the above-mentioned test load, for maximum and minimum jib outreach. For cranes or similar lifting appliances having variable working load as a function of the luffing, the most severe testing conditions resulting from the diagrams of the approved forces are to be considered both for structures and fittings.

During the test, it is necessary to verify that each gear tooth is subjected to stress.

For travelling cranes, the test load is to be traversed slowly over the full length of the track.

The suspended load is to be as lateral as possible, and it is to be tested for working on both port and starboard sides of the ship.

Following the overload test, the crane is to be subjected to testing of the brakes for all movements at maximum speed with suspended load. For cranes slewing over a range of 360°, the slewing test includes two complete turns from starting position.

All limit switches are to be tested.

Table 1 (1/7/2014)

Working load P, in kN	Test load, in kN
$P \leq 200$	1,25 P
$200 < P \leq 500$	P + 50
$P > 500$	1,10 P

After testing, fixed structures and associated gear are to be disassembled and examined where necessary. The tests and inspections are not to reveal deformations or unacceptable defects.

19 SAHARA and SAHARA

19.1 Annual survey

19.1.1 (1/7/2014)

The Owner or his representative is to declare to the attending Surveyor that no significant alterations have been made without the prior approval of the Society.

The annual survey is to include:

- examination, where fitted, of the wooden sheathing protecting the cargo deck
- verification from the on-board records that performance of the fresh water generator(s) is regularly monitored
- visual examination of mechanical components used for cooling and maintaining an ambient temperature, including the test of the audible and visual alarms fitted, at a continually manned control station, to indicate any malfunction of the cooling units.

19.2 Renewal survey

19.2.1 (1/7/2014)

The requirements for annual surveys in [19.1.1] are to be complied with.

19.2.2 (1/7/2014)

Internal examination and working test of fresh water generator (s).

20 COMF-NOISE

20.1 Renewal survey

20.1.1 (1/7/2014)

Verification that the ship has not been subjected to modifications, refitting or major repairs that may affect its level of comfort.

In particular, the following items have to be verified:

- main engine(s)
- propulsion shafting and its components such as reduction gear (if fitted), intermediate bearings, etc.
- propeller(s)
- air-conditioning System(s) and Ventilation System(s), including their intake and delivery ducts or plenum.

21 RISK MITIGATION (...)

21.1 Annual and renewal survey

21.1.1 (1/7/2015)

The verifications to be carried out at periodical surveys are established on a case by case basis according to the measures adopted in order to reduce the risk of failures of the specific technical matters indicated between brackets in the notation itself.

22 AIR MON

22.1 Annual and renewal survey

22.1.1 (1/7/2015)

The survey is to include:

- verification that the maintenance and inspection of the HVAC system are carried out according to the makers recommendations and internal procedures;
- checking that the monitoring plan is available, updated and implemented;
- checking the reports of the required analysis and their review for compliance as evidence of monitoring plan implementation.

In addition, a record of extraordinary maintenance, repairs, equipment modifications (if any) and the results of relevant tests carried out is to be available.

23 DANGEROUS GOODS

23.1 Annual and renewal survey

23.1.1 (1/7/2015)

The survey is to include:

- a) verification that the "Record for the Carriage of Dangerous Goods in Packaged Form and Dangerous Solid Cargoes in Bulk" is present on board;
- b) verification, when appropriate, that there is a special list, manifest or stowage plan for the carriage of dangerous goods;
- c) verification, as applicable, that the approved Cargo Securing Manual, according to (SOLAS 74/2011 Reg.VII/5) is present on board (applicable only to dangerous goods in package form)
- d) verification of the consistency and efficiency of the specific constructional and carriage requirements imposed for the carriage of the goods listed in the "Record for the Carriage of Dangerous Goods in Packaged Form and Dangerous Solid Cargoes in Bulk".

24 INF 1, INF 2, INF 3

24.1 Annual and renewal survey

24.1.1 (1/7/2015)

The survey is to include:

- a) verification that the "Damage Stability booklet", related to the carriage of INF materials, is present on board;
- b) verification that the "shipboard emergency plan", related to the carriage of INF materials, is present on board;
- c) verification of additional arrangements, if any, for radiological protection related to the carriage of INF materials;
- d) verification of additional equipment, if any, for radiological protection related to the carriage of INF materials;
- e) verification of the permanent securing devices provided to prevent movement of the packages within the cargo spaces;
- f) verification of the efficiency of the ventilation, or refrigeration, of enclosed cargo spaces and relevant control, safety and alarm systems;
- g) test and verification of the fixed cargo space cooling arrangements;
- h) test of the water fire-extinguishing system;
- i) test and verification of the fixed fire detection and fire alarm system.

25 INERTGAS A, INERTGAS B, INERTGAS C

25.1 Annual survey

25.1.1 (1/7/2016)

For the additional class notations **INERTGAS A** and **INERTGAS C** the survey is carried out according the requirements of Ch 4, Sec 3, [3.3].

25.1.2 (1/7/2016)

For the additional class notations **INERTGAS B** the survey is to include, according to the type of system installed:

- a) external examination of the whole system, to check the condition of all piping, including vent piping above the upper deck in the cargo tank area and overboard discharges through the shell so far as practicable, and associated components to verify, in particular, the absence of signs of corrosion and leakage of gas, water or other liquid from inert gas and water piping systems
- b) check of proper operation of both inert gas blowers or, in case of a nitrogen generator, of the compressor(s)
- c) check of proper operation of ventilation system required for scrubber room (if any). In case of nitrogen generators verify the proper operations of the ventilation system of the nitrogen generator room (if any), and the extraction system of the nitrogen buffer tank room (if any)
- d) check of deck water seal for automatic water filling and draining
- e) check of absence of water carry over in the inert gas from the deck water seal and check of the condition of the non-return valve In case of nitrogen generator verify the condition of the no return devices
- f) check of proper operation of all remotely operated or automatically controlled valves and, in particular, of the flue gas isolating valve located on the inert gas supply main after the blowers. For the nitrogen generators check the proper operation of the insulation valves between the generator and the buffer tank(s)
- g) check of proper operation of the interlocking feature fitted to prevent soot blowers from operating when the inert gas system is working
- h) check that the gas pressure regulating valve automatically closes when gas blowers are stopped
- i) check, as far as practicable and using simulated conditions where necessary, of the following alarms and safety devices of the inert gas system:
 - 1) high oxygen content of gas in the inert gas main
 - 2) low gas pressure in the inert gas main
 - 3) accuracy of portable and fixed oxygen measuring equipment by means of calibration gases
 - 4) high pressure of gas in the inert gas main
In addition for the nitrogen generator check the following alarms and safety devices:
 - 5) temperature and pressure devices of the suction side of the generator
 - 6) electric failure alarm
 - 7) high level alarm of condensate in the system
 - 8) low feed alarm or low pressure alarm at the delivery side of air compressor(s)
 - 9) high temperature alarm at the delivery side of air compressor(s).
- j) check, when practicable, of the proper operation of the inert gas system on completion of the checks listed above.

25.2 Renewal survey

25.2.1 (1/7/2016)

For the additional class notations **INERTGAS A** and **IINERTGAS C** the survey is carried out according the requirements of Ch 4, Sec 3, [5.2].

25.2.2 (1/7/2016)

For the additional class notation **INERTGAS B** the survey is to include, according to the type of system installed.

25.2.3 (1/7/2016)

For ships over 10 years old at the time of the intermediate survey due date, the following is to be carried out:

- main parts such as the scrubber, washing machines, blowers, deck water seal and non-return valve are to be opened out as considered necessary and examined
- gas distribution lines and shut-off valves, including soot blower interlocking devices, are to be examined as deemed necessary
- all automatic shutdown devices and alarms are to be examined and tested.

26 GAS FUELLED additional class notations (GAS FUELLED, GAS FUELLED (Main), GAS FUELLED (Aux))

26.1 Annual survey

26.1.1 Ship other than liquefied gas carriers (1/7/2018)

For the additional class notations **GAS FUELLED** the survey carried out according to the requirements of Ch 3, Sec 9, [1.2].

26.1.2 Liquefied gas carriers (1/7/2018)

For the additional class notations **GAS FUELLED** the survey carried out according to the requirements of Ch 3, Sec 9, [2.1].

26.2 Intermediate Survey

26.2.1 Ship other than liquefied gas carriers (1/7/2018)

For the additional class notations **GAS FUELLED** the survey carried out according to the requirements of Ch 3, Sec 9, [1.3].

26.2.2 Liquefied gas carriers (1/7/2018)

For the additional class notations **GAS FUELLED** the survey carried out according to the requirements of Ch 3, Sec 9, [2.2].

26.3 Renewal survey

26.3.1 Ship other than liquefied gas carriers (1/7/2018)

For the additional class notations **GAS FUELLED** the survey carried out according to the requirements of Ch 3, Sec 9, [1.4].

26.3.2 Liquefied gas carriers (1/7/2018)

For the additional class notations **GAS FUELLED** the survey carried out according to the requirements of Ch 3, Sec 9, [2.3].

27 MAN OVERBOARD DETECTION SYSTEM

27.1 Annual survey

27.1.1 (1/11/2018)

For maintaining the additional class notation **MOB**, the Man Overboard Detection System is to be surveyed periodically in order to confirm that the operational conditions are satisfactory.

A reasonable number of dropping tests - not less than 4 - is to be carried out in specific ship's areas, identified taking into account the system history in terms of detection failures and false alarms.

Any modification to the ship which may affect the MOB performance and/or any modification to the MOB system itself modification is to be checked and recorded in accordance with relevant operational procedures.

27.2 Renewal survey

27.2.1 (1/11/2018)

During renewal surveys, in addition to [27.1.1], verifications are to be carried out to ensure that the MOB detection system complies with the requirements in Pt F, Ch 13, Sec 27, [6].

28 CYBER RESILIENCE

28.1 Annual survey and renewal survey

28.1.1 (1/1/2019)

The scope of annual and renewal surveys for maintaining the additional class notations **CYR**, **CYR-OT** and **CYR-IT** is given in Pt F, Ch 13, Sec 29, [1.3.2].

29 DIGITAL SHIP

29.1 Annual survey and renewal survey

29.1.1 (1/1/2019)

For maintaining the additional class notation **DIGITAL SHIP**, the data collection system is to be surveyed periodically (yearly), found in good working conditions and capable to transfer data on shore. These ascertainment are carried out from a remote connection (e.g. without a visit on board) and data are to be made available on RINA Cube for the assessment time period.

Real time data availability from the connected ship is also to be ascertained.

Any modification to the data collection system and to the software release is to be found properly recorded.

RETROACTIVE REQUIREMENTS FOR EXISTING SHIPS

- SECTION 1 GENERAL**
- SECTION 2 BULK CARRIERS, ORE CARRIERS AND COMBINATION CARRIERS**
- SECTION 3 SHIPS CARRYING LIQUID CARGO IN BULK**
- SECTION 4 PASSENGER SHIPS, RO-RO PASSENGER SHIPS AND RO-RO CARGO SHIPS**
- SECTION 5 GENERAL DRY CARGO SHIPS**
- SECTION 6 SHIPS WITH ICE CLASS NOTATION**
- APPENDIX 1 TECHNICAL RETROACTIVE REQUIREMENTS FOR BULK CARRIERS**
- APPENDIX 2 GUIDELINES FOR THE THICKNESS MEASUREMENTS OF SIDE SHELL FRAMES AND BRACKETS IN SINGLE SIDE SKIN BULK CARRIERS SUBJECT TO COMPLIANCE WITH THE REQUIREMENTS OF SECTION 2, [7]**

SECTION 1

GENERAL

1 General

1.1

1.1.1 (1/7/2005)

The purpose of this Chapter is to deal with the retroactive rule requirements applicable to existing ships which derive from the implementation of SOLAS regulations, IACS Unified Requirements and/or specific regulations from an Administration.

1.1.2 (1/7/2008)

These requirements are relevant to both construction features and surveyable items. They are laid down in the following Sections according to the notations assigned to ships.

This Chapter also contains an Appendix for ready reference reproducing the text of the retroactive IACS Unified

Requirements relevant to ships assigned the service notation **bulk carrier ESP**.

Note 1: The retroactive requirements laid down in this Chapter are also applicable to the service notations adopted in compliance with the previous Rules which correspond to the present ones in accordance with the relevant tables contained in Ch 1, App 1 of the 2002 edition of the Rules.

1.1.3 (1/10/2000)

The retroactive requirements applicable to existing ships, contained in the European Union Directive No 98/18/CE adopted by the Council on 17 March 1998, are applied by the Society to those ships subject to this Directive, at the request of Interested Parties.

1.2 List of retroactive rule requirements

1.2.1 Tab 1 summarises these retroactive requirements indicating the notations to which they are applicable and in which Section they are given.

Table 1 : Summary of retroactive rule requirements (1/7/2007)

Service or additional notation	Section in Chapter 6	Ship's survey items or features concerned
bulk carrier ESP	Sec 2	<ul style="list-style-type: none"> - Scantlings of transverse bulkhead between the two foremost cargo holds - Allowable hold loading of the foremost cargo hold - Damage stability - Intermediate survey in lieu of annual survey in the foremost cargo hold - Bilge well high water level alarms in all cargo holds - Longitudinal strength of hull girder - Scantlings of transverse bulkheads in all cargo holds - Allowable hold loading in all cargo holds - Loading conditions, loading manuals and loading instruments - Strength and securing of small hatches on the exposed fore deck - Strength requirements for fore deck fittings and equipment - Cargo hatch cover securing arrangements - Side shell frames and brackets in cargo holds of single side skin bulk carriers
combination carrier/OBO ESP	Sec 2	<ul style="list-style-type: none"> - Loading conditions, loading manuals and loading instruments - Strength and securing of small hatches on the exposed fore deck - Strength requirements for fore deck fittings and equipment - Side shell frames and brackets in cargo holds of single side skin combination carriers/OBO
ore carrier ESP combination carrier/OOC ESP	Sec 2	<ul style="list-style-type: none"> - Loading conditions, loading manuals and loading instruments - Strength and securing of small hatches on the exposed fore deck - Strength requirements for fore deck fittings and equipment
oil tanker ESP combination carrier/OBO ESP combination carrier/OOC ESP chemical tanker ESP FLS tanker liquefied gas carrier	Sec 3	<ul style="list-style-type: none"> - Safe access to ship's bow
oil tanker ESP combination carrier/OBO ESP combination carrier/OOC ESP chemical tanker ESP FLS tanker	Sec 3	<ul style="list-style-type: none"> - Secondary means of flow in the cargo tank venting systems
ro-ro passenger ship passenger ship ro-ro cargo ship	Sec 4	<ul style="list-style-type: none"> - Increased stability and watertight integrity - Side Shell Doors and Stern Doors - Bow Doors and Inner Doors
general dry cargo ship	Sec 5	<ul style="list-style-type: none"> - Strength and securing of small hatches on the exposed fore deck - Strength requirements for fore deck fittings and equipment
Ice Class IASuper, IA, IB, IC	Sec 6	<ul style="list-style-type: none"> - a warning triangle and an ice class draught mark at the maximum permissible ice class draught amidships

SECTION 2

BULK CARRIERS, ORE CARRIERS AND COMBINATION CARRIERS

1 Requirements for the foremost cargo hold

1.1 Application

1.1.1 (1/7/2001)

The requirements in [1.3], [1.4] and [1.5] apply to all bulk carriers of 150 m in length and above, in the foremost cargo hold, intending to carry solid bulk cargoes having a density of 1,78 t/m³, or above, with single deck, topside tanks and hopper tanks and, for the requirements in [1.3], fitted with vertically corrugated transverse watertight bulkheads between cargo holds No. 1 and 2 where:

- a) the foremost cargo hold is bounded by the side shell only for ships which were contracted for construction prior to 1 July 1998, and have not been constructed in compliance with the applicable requirements for new buildings contracted after that date, and given in Pt E, Ch 4, Sec 3
- b) the foremost cargo hold is double side skin construction of less than 760 mm breadth measured perpendicular to the side shell in ships, the keels of which were laid, or which were at a similar stage of construction, before 1 July 1999 and have not been constructed in compliance with the applicable requirements for new buildings contracted after that date, and given in Pt E, Ch 4, Sec 3.

1.2 Schedule for compliance

1.2.1 (1/1/2003)

The requirements in [1.3.1], [1.4.1] and [1.5.1] are to be complied with by the following limit dates:

- for ships which were 20 years of age or more on 1st July 1998, the due date of the first intermediate survey or the due date of the first class renewal survey, to be held after 1st July 1998, whichever comes first
- for ships which were 15 years of age or more, but less than 20 years on 1st July 1998, the due date of the first class renewal survey to be held after 1st July 1998, but not later than 1st July 2002
- for ships which were 10 years of age or more, but less than 15 years on 1st July 1998, the due date of the first intermediate survey or the due date of the first class renewal survey to be held after the date on which the ship reaches 15 years of age, but not later than the date on which the ship reaches 17 years of age
- for ships which were 5 years of age or more, but less than 10 years of age on 1st July 1998, the due date, after 1st July 2003, of the first intermediate survey or the first

class renewal survey after the date on which the ship reaches 10 years of age, whichever occurs first

- for ships which were less than 5 years of age on 1st July 1998, the date on which the ship reaches 10 years of age.

1.2.2 (1/7/2003)

Completion, prior to 1st July 2003, of an intermediate or class renewal survey with a due date after 1st July 2003, cannot be used to postpone compliance. However, completion prior to 1 July 2003 of an intermediate survey whose window straddles 1 July 2003 may be accepted.

1.3 Scantlings of the transverse bulkhead between the two foremost cargo holds

1.3.1 The net scantlings of the transverse bulkhead between the two foremost cargo holds are to be assessed in accordance with the method given in App 1, [2].

In these requirements, homogeneous loading condition means a loading condition in which the ratio between the highest and the lowest filling ratio, evaluated for the two foremost cargo holds, does not exceed 1,20, to be corrected for different cargo densities.

1.3.2 Thickness measurements are necessary to determine the general condition of the structure and to define the extent of possible repairs and/or reinforcements of the vertically corrugated transverse watertight bulkhead for verification of the compliance with the requirements given in App 1, [2].

Thickness measurements and assessment of the scantlings are to be carried out for the initial evaluation at the limit date as defined in [1.2.1], and thereafter at each subsequent class renewal survey for verification of continued compliance with the above-mentioned requirements.

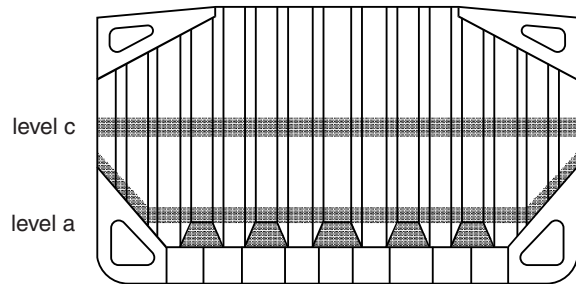
1.3.3 Taking into account the buckling criteria applied in App 1, [2] in the evaluation of strength of the bulkhead, it is essential to determine the thickness diminution at the critical levels shown in Fig 1 and Fig 2.

1.3.4 Thickness measurements are to be carried out at the levels indicated in [1.3.5]. To adequately assess the scantlings of each individual vertical corrugation, each corrugation flange, web, shedder plate (see App 1, Fig 4 and App 1, Fig 5) and gusset plate (see App 1, Fig 6, App 1, Fig 7 and App 1, Fig 8) within each of the levels indicated in [1.3.5] is to be measured.

1.3.5 The locations at which thickness measurements are to be carried out are as follows for each of the prescribed levels a, b and c:

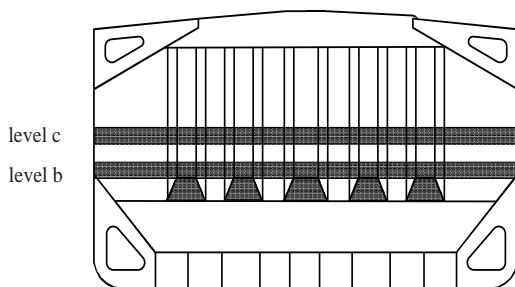
- level a - bulkheads without lower stool (see Fig 1)
 - the mid-breadth of the corrugation flanges and webs at approximately 200 mm above the line of shedder plates
 - the middle of gusset plates between corrugation flanges, where fitted
 - the middle of the shedder plates

Figure 1 : Thickness measurement areas of cargo hold transverse bulkhead without lower stool



- level b - bulkheads with lower stool (see Fig 2)
 - the mid-breadth of the corrugation flanges and webs at approximately 200 mm above the line of shedder plates
 - the middle of gusset plates between corrugation flanges, where fitted
 - the middle of the shedder plates

Figure 2 : Thickness measurement areas of cargo hold transverse bulkhead with lower stool



- level c - bulkheads with or without lower stool (see Fig 1 and Fig 2)
 - the mid-breadth of the corrugation flanges and webs at approximately the mid-height of the corrugation.

Where the thickness changes within the horizontal levels, the thinner plate is to be measured.

1.3.6 Where necessary, steel renewal and/or reinforcements are to meet the requirements given in App 1, [2.6].

1.4 Allowable hold loading of the foremost cargo hold with the same hold flooded

1.4.1 The loading in the foremost cargo hold is not to exceed the allowable hold loading in the flooded condition. The method of calculation is laid down in App 1, [4].

In no case is the allowable hold loading in the flooding condition to be taken greater than the design hold loading in the intact condition.

1.5 Damage stability

1.5.1 Bulk carriers which are subject to compliance with the requirements laid down in [1.3.1] and [1.4.1] are, when loaded to the summer loadline, to be able to withstand flooding of the foremost cargo hold in all loading conditions and remain afloat in a satisfactory condition of equilibrium, as specified in [1.5.2].

1.5.2 The condition of equilibrium after flooding is to satisfy the condition of equilibrium laid down in Regulation 27 of Part 3, Annex I, Chapter III of the International Convention on Load Lines, 1966 and Protocol of 1988, as amended. The assumed flooding need only take into account flooding of the cargo hold. The permeability of a loaded hold is to be assumed as 0,9 and the permeability of an empty hold is to be assumed as 0,95, unless a permeability relevant to a particular cargo is assumed for the volume of a flooded hold occupied by cargo and a permeability of 0,95 is assumed for the remaining empty volume of the hold.

1.5.3 Bulk carriers which have been assigned a reduced freeboard in compliance with the provisions of Regulation 27 of Part 3, Annex I, Chapter III of the International Convention on Load Lines, 1966 and Protocol of 1988, as amended, may be considered as complying with [1.5.1].

1.6 Alternative requirements

1.6.1 (1/1/2003)

Bulk carriers within the application limits of the provisions in [1.5.2] which have been constructed with an insufficient number of transverse watertight bulkheads to satisfy this requirement may be exempted from the application of the requirements given in [1.3.1], [1.4.1] and [1.5.1] provided that they fulfil those stipulated in [1.6.2], [1.6.3] and [1.6.4].

1.6.2 (1/7/2001)

For the foremost cargo hold, the additional survey requirements given in Ch 4, Sec 2, Tab 1B) are to be included in the scope of the annual survey.

1.6.3 In all cargo holds, or in cargo conveyor tunnels, as appropriate, approved bilge well high water level alarms are to be fitted, providing an audible and visual alarm on the navigation bridge.

1.6.4 In addition to the bilge well high water level alarms required as per [1.6.3], all bulk carriers described in [1.1.1] and to which [1.6.1] applies are to be provided with an approved permanent means of detecting the presence of water in cargo holds in excess of the small amounts which

may normally be expected in bilge wells. The features of water ingress detectors and their installation on board are described in [3].

1.6.5 The requirement given in [1.6.4] is to be complied with according to the following implementation schedule:

- for ships of 20 years of age or more on 1st July 1998, the due date of the first intermediate survey or the due date of the first class renewal survey, to be held after 1st July 1998, whichever comes first
- for ships of 15 years of age or more, but less than 20 years on 1st July 1998, the due date of the first class renewal survey to be held after 1st July 1998, but not later than 1st July 2002
- for ships of 10 years of age or more, but less than 15 years on 1st July 1998, the due date of the next class renewal survey after the date on which the ship reaches 15 years of age, but not later than the date on which the ship reaches 17 years of age
- for ships less than 10 years of age on 1st July 1998, the date on which the ship reaches 15 years of age.

In any event, ships which have already passed their due date as specified herein are to fulfil this requirement not later than the first intermediate survey or the first class renewal survey to be held after 1st January 1999, whichever comes first.

1.7 Loading conditions, loading manuals and loading instruments

1.7.1 Bulk carriers, ore carriers and combination carriers, which are assigned one of the following service notations:

- **bulk carrier ESP**
- **ore carrier ESP**
- **combination carrier/OBO ESP**
- **combination carrier/OOC ESP**

of 150 m length and above, which were contracted for construction before 1st July 1998, are to be provided with an approved loading instrument of a type to the satisfaction of the Society not later than their entry into service or 1st January 1999, whichever occurs later.

1.7.2 (1/7/2001)

Bulk carriers which are assigned the service notation **bulk carrier ESP**, of 150 m length and above, where one or more cargo holds are bounded by the side shell only, which were contracted for construction before 1st July 1998 are to be provided, with an approved loading manual with typical loading sequences where the ship is loaded from commencement of cargo loading to reaching full deadweight capacity, for homogeneous conditions, relevant part load conditions and alternate conditions, where applicable. Typical unloading sequences for these conditions are also to be included.

2 Requirements for all cargo holds

2.1 Application

2.1.1 (1/7/2001)

The requirements in [2.2], [2.3], [2.4] are to be complied with in respect of the flooding of any cargo hold of bulk carriers of 150 m in length and above, intending to carry solid bulk cargoes having a density of 1,0 t/m³, or above, with single deck, topside tanks and hopper tanks and, for the requirements in [2.3], fitted with vertically corrugated transverse watertight bulkheads, which are contracted for construction on or after 1 July 1998, except as stipulated below:

- a) Cargo holds of double side skin construction in ships, the keels of which were laid, or which were at a similar stage of construction, before 1 July 1999,
- b) Cargo holds of double side skin construction of not less than 760 mm breadth at any location within the hold length, measured perpendicular to the side shell in ships, the keels of which were laid, or which were at a similar stage of construction, before 1 January 2000,
- c) Cargo holds of double side skin construction of not less than 1,000 mm breadth at any location within the hold length, measured perpendicular to the side shell in ships, the keels of which are laid, or which are at a similar stage of construction, on or after 1 January 2000.

2.2 Longitudinal strength of hull girder

2.2.1 (1/7/2001)

The hull girder strength is to be checked for specified flooded conditions, in each of the cargo and ballast conditions considered in the intact longitudinal strength calculations.

2.2.2 (1/7/2001)

The ships categorised in [2.1], the keels of which are laid or which are at a similar stage of construction prior to 1 July 1999, are also to comply with the damage stability requirements laid down in Pt F, Ch 13, Sec 11.

2.3 Scantlings of transverse bulkheads in all cargo holds

2.3.1 (1/7/2001)

The scantlings of the vertically corrugated transverse watertight bulkheads in all cargo holds are to be evaluated in accordance with the requirements laid down in Pt E, Ch 4, Sec 3.

2.4 Allowable hold loading in all cargo holds

2.4.1 (1/7/2001)

The maximum allowable hold loading in each cargo hold are not to exceed the value determined in accordance with the requirements laid down in Pt E, Ch 4, Sec 3.

3 Detection of water ingress into cargo holds

3.1 Requirements for installation of detectors

3.1.1 The method of detection is to be by direct means. A direct means is one where the presence of water is detected by physical contact of the water with the measuring device. Examples of direct means are pressure sensitive tape and individual liquid actuated switches.

3.1.2 The water ingress detectors are to actuate audible and visual alarms in a permanently manned space when water has reached the preset detection level for the cargo hold (see [3.1.6]). When the alarm is actuated, the cargo hold affected is to be identifiable on a control panel in the permanently manned space.

These visual and audible alarms are to be in accordance with the relevant requirements for bilge alarms in the IMO "Code on Alarms and Indicators 1995".

3.1.3 A water ingress detector is to be fitted in the aft part of each cargo hold or in cargo conveyor tunnels, as appropriate, in addition to the bilge well high water level alarm required by [1.6.3].

3.1.4 An interlocking device may be installed in the water detection system for the floodable cargo hold.

3.1.5 Detectors, such as pressure sensitive tapes, are to be installed in tubes or similarly protected locations to protect them from mechanical damage and to isolate them from the cargo.

3.1.6 Water ingress detectors are to be arranged to detect water when it reaches a level 2 metres above the inner bottom.

3.2 Requirements for testing and survey

3.2.1 The system is to be installed and tested in accordance with the Manufacturer's specifications. At the initial installation and at each subsequent class renewal survey, the proper operation of the water detection system is to be verified.

4 Strength and securing of small hatches on the exposed fore deck

4.1 General

4.1.1 (1/1/2004)

This item provides the schedule for compliance with the strength requirements, indicated in Pt B, Ch 9, Sec 7, [9], of small hatches and their securing devices fitted on the exposed fore deck.

4.1.2 (1/1/2004)

Small hatches in the context of this item are hatches designed for access to spaces below the deck and are capable of being closed weather-tight or watertight, as applicable. Their opening is normally 2,5 square metres or less.

4.1.3 (1/7/2007)

Hatches designed for emergency escape need not comply with the requirements [9.4.1] a) and b), [9.4.3] and [9.5] Pt B, Ch 9, Sec 7, [9].

4.1.4 (1/7/2007)

Securing devices of hatches designed for emergency escape are to be of a quick-acting type (e.g. one action wheel handles are provided as central locking devices for latching/unlatching of hatch cover) operable from both sides of the hatch cover.

4.2 Application

4.2.1 (1/1/2005)

For ships that are contracted for construction prior to 1 January 2004, only for hatches on the exposed deck giving access to spaces forward of the collision bulkhead, and to spaces which extend over this line aftwards, applicable to the following ships of length 100m or more (the ship's length is as defined in Pt B, Ch 1, Sec 2, [3.1]):

- bulk carriers,
- ore carriers, and
- combination carriers.

as defined in Ch 1, Sec 2, [4.3].

4.3 Implementation

4.3.1 (1/7/2007)

Ships described in [4.2.1] that are contracted for construction prior to 1 January 2004 are to comply with the requirements indicated above in accordance with the following schedule:

- for ships 15 years of age or more on 1 January 2004, by the due date of the first intermediate or class renewal survey after that date;
- for ships 10 years of age or more but less than 15 years on 1 January 2004, by the due date of the first class renewal survey after that date;
- for ships being less than 10 years of age on 1 January 2004, by the date on which the ship reaches 10 years of age.

4.3.2 (1/7/2007)

Ships that are contracted for construction prior to 1 July 2007 are to comply with the requirements in [4.1.4] by the compliance date specified in [4.3.1] or by the due date of the first class renewal survey after 1 July 2007, whichever is later.

Completion prior to 1 July 2007 of a class renewal survey with a due date after 1 July 2007 cannot be used to postpone compliance.

5 Strength requirements for fore deck fittings and equipment

5.1 General

5.1.1 (1/1/2004)

This item provides the schedule for compliance with the strength requirements, indicated in Pt B, Ch 9, Sec 9, [8] and Pt C, Ch 1, Sec 10, to resist green sea forces for the fol-

lowing items located within the forward quarter length (the ship's length L is as defined in Pt B, Ch 1, Sec 2, [3.1]):

- air pipes,
- ventilator pipes and their closing devices,
- securing of windlasses.

Note 1: If the nominal diameter of the air pipe is 40 or 50 mm (values not accepted for new ships), the minimum height of the brackets to be fitted is 520 mm.

5.1.2 (1/1/2004)

For windlasses, these requirements are additional to those for the anchor and chain performance criteria indicated in Pt B, Ch 10, Sec 4, [3].

5.1.3 (1/1/2004)

Where mooring winches are integral with the anchor windlass, they are to be considered as part of the windlass.

5.2 Application

5.2.1 (1/7/2005)

For ships that are contracted for construction prior to 1 January 2004, only for air pipes, ventilator pipes and their closing devices on the exposed deck serving spaces forward of the collision bulkhead, and spaces which extend over this line aftwards, the requirements are applicable to the following ships of length 100m or more (the ship length is as defined in Pt B, Ch 1, Sec 2, [3.1]):

- bulk carriers,
- ore carriers, and
- combination carriers (see Note 1)

as defined in Ch 1, Sec 2, [4.3].

Note 1: This does not apply to the cargo tank venting systems and the inert gas systems of these ships.

5.3 Implementation

5.3.1 (1/1/2004)

Ships described in [5.2.1] that are contracted for construction prior to 1 January 2004 are to comply with the requirements indicated above in accordance with the following schedule:

- for ships 15 years of age or more on 1 January 2004, by the due date of the first intermediate or class renewal survey after that date;
- for ships 10 years of age or more, but less than 15 years on 1 January 2004, by the due date of the first class renewal survey after that date;
- for ships less than 10 years of age on 1 January 2004, by the date on which the ship reaches 10 years of age.

Completion prior to 1 January 2004 of an intermediate or class renewal survey with a due date after 1 January 2004 cannot be used to postpone compliance. However, completion prior to 1 January 2004 of an intermediate survey whose window straddles 1 January 2004 can be accepted.

6 Cargo hatch cover securing arrangements for bulk carriers not built in accordance with Part B, Ch 9, Sec 7

6.1 General

6.1.1 (1/1/2005)

This item provides the strength requirements, and schedule for compliance, for steel hatch cover securing devices and stoppers for cargo hold hatchways No.1 and No.2 which are wholly or partially within 0.25L of the fore perpendicular, except pontoon type hatch covers (the ship's length L is as defined in Pt B, Ch 1, Sec 2, [3.1]).

6.2 Application

6.2.1 (1/1/2004)

These requirements apply to all bulk carriers, as defined in Ch 1, Sec 2, [4.3.2], whose hatch covers were not built in accordance with Pt B, Ch 9, Sec 7.

6.3 Implementation

6.3.1 (1/1/2004)

Ships described in [6.2.1] are to comply with the requirements of this item in accordance with the following schedule:

- for ships 15 years of age or more on 1 January 2004, by the due date of the first intermediate or class renewal survey after that date;
- for ships 10 years of age or more, but less than 15 years on 1 January 2004, by the due date of the first class renewal survey after that date;
- for ships less than 10 years of age on 1 January 2004, by the date on which the ship reaches 10 years of age.

Completion prior to 1 January 2004 of an intermediate or class renewal survey with a due date after 1 January 2004 cannot be used to postpone compliance. However, completion prior to 1 January 2004 of an intermediate survey whose window straddles 1 January 2004 can be accepted.

6.4 Securing Devices

6.4.1 (1/1/2004)

The strength of securing devices is to comply with the following requirements:

- Panel hatch covers are to be secured by appropriate devices (bolts, wedges or similar) suitably spaced alongside the coamings and between cover elements.
Arrangement and spacing are to be determined with due attention to the effectiveness for weather-tightness, depending upon the type and the size of the hatch cover, as well as on the stiffness of the cover edges between the securing devices.
- The net sectional area of each securing device is to be not less than:

$$A = 1,4 a / f \text{ (cm}^2\text{)}$$

where:

- a : spacing between securing devices not to be taken less than 2 m

- f : $(\sigma_y / 235)^e$
- σ_y : specified minimum upper yield stress in N/mm² of the steel used for fabrication, not to be taken greater than 70% of the ultimate tensile strength.
- e : 0,75 for $\sigma_y > 235$
1,0 for $\sigma_y \leq 235$

Rods or bolts are to have a net diameter not less than 19 mm for hatchways exceeding 5 m² in area.

- c) Between cover and coaming and at cross-joints, a packing line pressure sufficient to obtain weathertightness is to be maintained by the securing devices.
For packing line pressures exceeding 5 N/mm, the cross-sectional area is to be increased in direct proportion. The packing line pressure is to be specified.
- d) The cover edge stiffness is to be sufficient to maintain adequate sealing pressure between securing devices. The moment of inertia, I of edge elements is to be not less than:
 $I = 6 p a^4 \text{ (cm}^4\text{)}$
p = packing line pressure in N/mm, minimum 5 N/mm
a = spacing in m of securing devices.
- e) Securing devices are to be of reliable construction and securely attached to the hatchway coamings, decks or covers. Individual securing devices on each cover are to have approximately the same stiffness characteristics.
- f) Where rod cleats are fitted, resilient washers or cushions are to be incorporated.
- g) Where hydraulic cleating is adopted, a positive means is to be provided to ensure that it remains mechanically locked in the closed position in the event of failure of the hydraulic system.

6.5 Stoppers

6.5.1 (1/1/2004)

No.1 and 2 hatch covers are to be effectively secured, by means of stoppers, against the transverse forces arising from a pressure of 175 kN/m².

6.5.2 (1/1/2004)

No.2 hatch covers is to be effectively secured, by means of stoppers, against the longitudinal forces acting on the forward end arising from a pressure of 175 kN/m².

6.5.3 (1/1/2004)

No.1 hatch cover is to be effectively secured, by means of stoppers, against the longitudinal forces acting on the forward end arising from a pressure of 230 kN/m².

This pressure may be reduced to 175 kN/m² if a forecastle is fitted.

6.5.4 (1/1/2004)

The equivalent stress:

- in stoppers and their supporting structures, and
- calculated in the throat of the stopper welds

is not to exceed the allowable value of $0,8\sigma_y$.

6.6 Materials and Welding

6.6.1 (1/1/2004)

Where stoppers or securing devices are fitted to comply with the requirements of this item, they are to be made of materials, including welding electrodes, meeting the relevant Rule requirements.

7 Renewal criteria for side shell frames and brackets in cargo holds of single side skin bulk carriers and single side skin OBO carriers not built in accordance with Part E, Ch 4, Sec 3, [3.2] and Part E, Ch 4, Sec 3, [6.2]

7.1 General

7.1.1 (1/1/2004)

The requirements of item [7] define:

- steel renewal criteria or other measures to be taken for the webs and flanges of side shell frames and brackets in cargo holds as indicated in [7.5.2] to [7.5.4];
- reinforcing measures for side shell frames and brackets as indicated in [7.5.5];
- the schedule for compliance with the requirements indicated in [7.5], where the assessment carried out determines the need for remedial measures to be taken.

7.1.2 (1/7/2008)

Finite element or other numerical analysis or direct calculation procedures cannot be used as an alternative to compliance with the requirements of item [7], except in cases of unusual side structure arrangements or framing to which the requirements of this item cannot be directly applied. In such cases, the analysis criteria and the strength check criteria are to be in accordance with the criteria to be defined on a case by case basis taking into consideration the general requirements given in Part B, Chapter 7.

7.2 Application

7.2.1 (1/1/2004)

The requirements of item [7] apply to bulk carriers having cargo holds bounded by single side shell and constructed with single deck, topside tanks and hopper tanks in cargo spaces intended primarily to carry dry cargo in bulk, which were not built in accordance with Pt E, Ch 4, Sec 3, [3.2] and Pt E, Ch 4, Sec 3, [6.2].

7.2.2 (1/7/2005)

In addition, these requirements also apply to the side shell frames and brackets of cargo holds bounded by the single side shell of ships having the service notation **combination carrier/OBO ESP**, as defined in Ch 1, Sec 2, [4.3.6], but of single side skin construction.

7.2.3 (1/7/2005)

For the purpose of this item [7], "ships" means both "bulk carriers" and "combination carriers/OBO" as defined above, unless otherwise specified.

7.2.4 (1/7/2006)

Where a ship as defined above does not satisfy the above definition in one or more holds, the requirements of item [7] do not apply to these individual holds.

7.3 Implementation**7.3.1 (1/7/2005)**

Bulk carriers described in [7.2.1] are to be assessed for compliance with the requirements of this item and steel renewal, reinforcement or coating, where required in compliance with this item, is to be carried out in accordance with the following schedule and at subsequent intermediate and class renewal surveys:

- for ships 15 years of age or more on 1 January 2004, by the due date of the first intermediate or class renewal survey after that date;
- for ships at least 10 years of age but less than 15 years of age on 1 January 2004, by the due date of the first class renewal survey after that date;
- for ships less than 10 years of age on 1 January 2004, by the date on which the ship reaches 10 years of age.

Completion prior to 1 January 2004 of an intermediate or class renewal survey with a due date after 1 January 2004 cannot be used to postpone compliance. However, completion prior to 1 January 2004 of an intermediate survey the window for which straddles 1 January 2004 can be accepted.

7.3.2 (1/7/2005)

Combination carriers/OBO described in [7.2.2] subject to these requirements are to be assessed for compliance with the requirements of this item and steel renewal, reinforcement or coating, where required in accordance with this item, is to be carried out in accordance with the following schedule and at subsequent intermediate and renewal surveys:

- for combination carriers/OBO which will be 15 years of age or more on 1 July 2005, by the due date of the first intermediate or class renewal survey after that date;
- for combination carriers/OBO which will be 10 years of age or more on 1 July 2005, by the due date of the first class renewal survey after that date;
- for combination carriers/OBO which will be less than 10 years of age on 1 July 2005, by the date on which the ship reaches 10 years of age.

Completion prior to 1 July 2005 of an intermediate or renewal survey with a due date after 1 July 2005 cannot be used to postpone compliance. However, completion prior to 1 July 2005 of an intermediate survey the window for which straddles 1 July 2005 can be accepted.

7.4 Ice strengthened ships**7.4.1 (1/7/2005)**

Where ships are reinforced to comply with an ice class notation, the intermediate frames are not to be included when considering compliance with the requirements of this item.

7.4.2 (1/1/2004)

The renewal thicknesses for the additional structure required to meet the ice strengthening notation are to be based on the specific requirements given in Ch 5, Sec 9.

7.4.3 (1/1/2004)

If the ice class notation is requested to be withdrawn, the additional ice strengthening structure, with the exception of tripping brackets (see [7.5.2] a), 1) and [7.5.5]), is not to be considered as contributing to compliance with this item.

7.5 Renewal or other measures**7.5.1 Symbols (1/7/2013)**

t_M	: thickness as measured, in mm
t_{REN}	: thickness at which renewal is required (see [7.5.2])
$t_{REN,d/t}$: thickness criteria based on d/t ratio (see [7.5.2])
$t_{REN,S}$: thickness criteria based on strength (see [7.5.2])
t_{COAT}	: $0,75 t_{S12}$
t_{S12}	: thickness in mm as required by Tab 1 for frame webs and upper and lower bracket webs
t_{AB}	: thickness as built, in mm
t_C	: see Tab 2.

Table 1 (1/7/2013)

Item	Minimum net thickness, in mm
Side frame webs	$t_{S12} = C_L (7,0 + 0,03 L_1)$
Lower end bracket	t_{S12} = the greater of: <ul style="list-style-type: none"> • $C_L (7,0 + 0,03 L_1) + 2$ • as fitted net thickness of side frame web
Upper end bracket	t_{S12} = the greater of: <ul style="list-style-type: none"> • $C_L (7,0 + 0,03 L_1)$ • as fitted net thickness of side frame web
Note 1:	
C_L	: coefficient equal to: <ul style="list-style-type: none"> • 1,15 for side frames in way of the foremost cargo hold • 1,0 for side frames in way of other cargo holds
L_1	: Ship's length, in m, defined in Pt B, Ch 1, Sec 2, [2].

7.5.2 Criteria for webs (shear and other checks) (1/7/2008)

The webs of side shell frames and brackets are to be renewed when the measured thickness (t_M) is equal to or less than the thickness (t_{REN}) as defined below:

t_{REN} is the greatest of:

- $t_{COAT} - t_C$
- $0,75 t_{AB}$
- $t_{REN,d/t}$ (applicable to zones A and B only)
- $t_{REN,S}$ (where required by [7.5.2] b).

a) Thickness criteria based on d/t ratio:

Subject to (2) and (3) below, $t_{REN,d/t}$ is given by the following equation:

$$t_{REN,d/t} = (\text{web depth in mm}) / R$$

where R is equal to:

- 65 $k^{0.5}$ for symmetrically flanged frames
- 55 $k^{0.5}$ for asymmetrically flanged frames

and for the lower brackets (see (1) below):

- 87 $k^{0.5}$ for symmetrically flanged frames
- 73 $k^{0.5}$ for asymmetrically flanged frames

where $k = 1,0$ for ordinary hull structural steel and according to Pt B, Ch 4, Sec 1, [2.3] for higher tensile steel.

In no instance is $t_{REN,d/t}$ for lower integral brackets to be taken as less than $t_{REN,d/t}$ for the frames they support.

1) Lower brackets

Lower brackets are to be flanged or a face plate is to be fitted, refer to [7.5.3].

In calculating the web depth of the lower brackets, the following will apply:

- The web depth of lower bracket may be measured from the intersection of the sloped bulkhead of the hopper tank and the side shell plate, perpendicularly to the face plate of the lower bracket (see Fig 5).
- Where stiffeners are fitted on the lower bracket plate, the web depth may be taken as the distance between the side shell and the stiffener, between the stiffeners, or between the outermost stiffener and the face plate of the brackets, whichever is the greatest.

2) Tripping bracket alternative

When t_M is less than $t_{REN,d/t}$ at section b) of the side frames, tripping brackets in accordance with [7.5.5] may be fitted as an alternative to the requirements for the web depth to thickness ratio of side frames, in which case $t_{REN,d/t}$ may be disregarded in the determination of t_{REN} in accordance with [7.5.2]. The value of t_M is to be based on zone B according to Appendix 2 (see Fig 3).

3) Immediately abaft collision bulkhead

For side frames, including the lower bracket, located immediately abaft the collision bulkhead, whose scantlings are increased in order that their moment

of inertia is such as to avoid undesirable flexibility of the side shell, when their web as-built thickness t_{AB} is greater than $1,65 \cdot t_{REN,S}$, the thickness $t_{REN,d/t}$ may be taken as the value $t'_{REN,d/t}$ obtained from the following equation:

$$t'_{REN,d/t} = \sqrt[3]{t_{REN,d/t}^2 t_{REN,S}}$$

where $t_{REN,S}$ is obtained from [7.6.6].

b) Thickness criteria based on shear strength check

Where t_M in the lower part of side frames, as defined in Fig 3, is equal to or less than t_{COAT} , $t_{REN,S}$ is to be determined in accordance with [7.6.6].

c) Thickness of renewed webs of frames and lower brackets

Where steel renewal is required, the renewed webs are to be of a thickness not less than t_{AB} , $1,2t_{COAT}$ or $1,2 t_{REN}$, whichever is the greatest.

d) Criteria for other measures

When $t_{REN} < t_M = t_{COAT}$, measures are to be taken, consisting of all the following:

- 1) sandblasting, or equivalent, and coating (see [7.5.4]),
- 2) fitting tripping brackets (see [7.5.5]), when the above condition occurs for any of the side frame zones A, B, C and D, shown in Fig 3. Tripping brackets not connected to flanges are to have soft toe, and the distance between the bracket toe and the frame flange is not to be greater than about 50 mm; see Fig 6.
- 3) maintaining the coating in "as-new" condition (i.e. without breakdown or rusting) at class renewal and intermediate surveys.

The above measures may be waived if the structural members show no thickness diminution with respect to the as-built thicknesses and coating is in "as-new" condition (i.e. without breakdown or rusting).

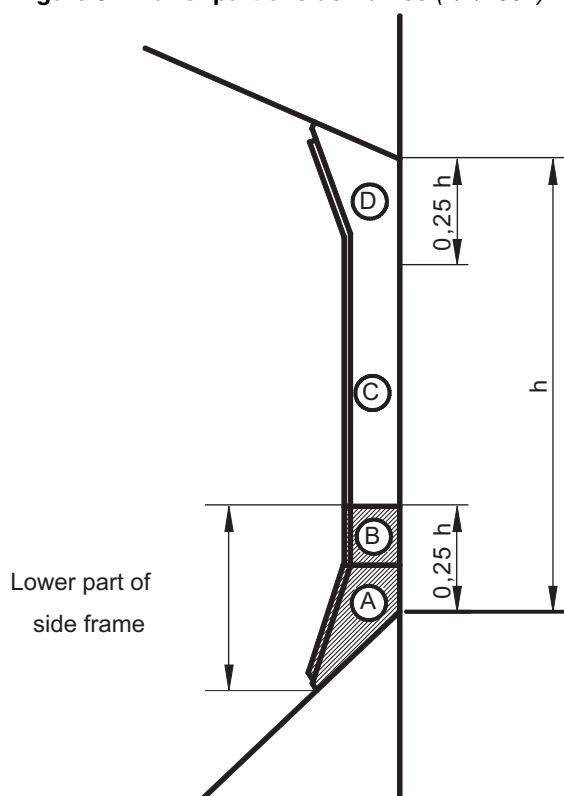
When the measured frame web thickness t_M is such that $t_{REN} < t_M \leq t_{COAT}$ and the coating is in good condition, sand blasting and coating as required in d) 1) above may be waived even if not found in "as-new" condition, as defined above, provided that tripping brackets are fitted and the coating damaged in way of the tripping bracket welding is repaired.

Table 2 : t_c values, in mm (1/1/2004)

Ship's length L, in m	Holds other than No. 1		Hold No. 1	
	Span and upper brackets	Lower brackets	Span and upper brackets	Lower brackets
≤ 100	2,0	2,5	2,0	3,0
150	2,0	3,0	3,0	3,5
≥ 200	2,0	3,0	3,0	4,0

Note 1: For intermediate ship lengths, t_c is obtained by linear interpolation between the above values.

Figure 3 : Lower part of side frames (1/1/2004)



7.5.3 Criteria for frames and brackets (bending check) (1/7/2008)

When lower end brackets were not fitted with flanges at the design stage, flanges are to be fitted so as to meet the bending strength requirements in [7.6.7]. The full width of the bracket flange is to extend up beyond the point at which the frame flange reaches full width. Adequate backup structure in the hopper is to be ensured, and the bracket is to be aligned with the backup structure.

Where the length or depth of the lower bracket does not meet the requirements in Pt E, Ch 4, Sec 3, [6.2], a bending strength check in accordance with [7.6.7] is to be carried out and renewals or reinforcements of frames and/or brackets are to be effected as required therein.

The bending check need not be carried out where the bracket geometry is modified so as to comply with the requirements of Pt E, Ch 4, Sec 3.

7.5.4 Thickness measurements, steel renewal, sandblasting and coating (1/7/2008)

For the purpose of steel renewal, sandblasting and coating, four zones A, B, C and D are defined, as shown in Fig 3. When renewal is to be carried out, surface preparation and coating are required for the renewed structures as given in Pt E, Ch 4, Sec 3, [11.2] for cargo holds of new buildings.

Representative thickness measurements are to be taken for each zone and they are to be assessed against the criteria in [7.5.1] to [7.5.3].

When zone B is made up of different plate thicknesses, the lesser thickness is to be used for the application of the requirements in item [7].

In the case of integral brackets, when the criteria in [7.5.1] to [7.5.3] are not satisfied for zone A or B, steel renewal, sandblasting and coating, as applicable, are to be carried out for both zones A and B.

In the case of separate brackets, when the criteria in [7.5.1] to [7.5.3] are not satisfied for zone A or B, steel renewal, sandblasting and coating are to be carried out for each of these zones, as applicable.

When steel renewal is required for zone C according to [7.5.1] to [7.5.3], it is to be done for both zones B and C. When sandblasting and coating are required for zone C according to [7.5.1] to [7.5.3], they are to be carried out for zones B, C and D.

When steel renewal is required for zone D according to [7.5.1] to [7.5.3], it needs only to be carried out for this zone. When sandblasting and coating are required for zone D according to [7.5.1] to [7.5.3], they are to be carried out for both zones C and D.

Special consideration may be given by the Society to zones previously renewed or re-coated, if found in "as-new" condition (i.e. without breakdown or rusting).

When adopted, on the basis of the renewal thickness criteria in [7.5.1] to [7.5.3], coating is generally to be applied in compliance with the requirements of Ch 4, Sec 2, [1.1.5], as applicable.

Where, according to the requirements in [7.5.1] to [7.5.3], a limited number of side frames and brackets are shown to require coating over part of their length, the following criteria apply.

- a) The part to be coated includes:
 - the web and the face plate of the side frames and brackets,
 - the hold surface of side shell, hopper tank and top-side tank plating, as applicable, over a width not less than 100 mm from the web of the side frame.
- b) Epoxy coating or equivalent is to be applied.

In all cases, all the surfaces to be coated are to be sandblasted prior to coating application.

When flanges of frames or brackets are to be renewed according to item [7], the outstanding breadth to thickness ratio is to comply with the requirements in Pt E, Ch 4, Sec 3, [3.2.4] and Pt E, Ch 4, Sec 3, [3.2.5].

7.5.5 Reinforcing measures (1/7/2008)

Reinforcing measures are constituted by tripping brackets, located at the lower part and at mid-span of side frames (see Fig 6). Tripping brackets may be located at every two frames, but lower and mid-span brackets are to be fitted in line between alternate pairs of frames.

The thickness of the tripping brackets is to be not less than the as-built thickness of the side frame webs to which they are connected.

Double continuous welding is to be adopted for the connections of tripping brackets to the side shell frames and shell plating.

Where side frames and side shell are made of Higher Strength Steel (HSS), Normal Strength Steel (NSS) tripping brackets may be accepted, provided the electrodes used for welding are those required for the particular HSS grade, and the thickness of the tripping brackets is equal to the frame web thickness, regardless of the frame web material.

7.5.6 Weld throat thickness (1/1/2004)

In the case of steel renewal, the welded connections are to comply with the requirements in Pt E, Ch 4, Sec 3, [10.1].

7.5.7 Pitting and grooving (1/1/2004)

If pitting intensity is higher than 15% in an area (see Fig 7), thickness measurement is to be taken to check pitting corrosion.

The minimum acceptable remaining thickness in pits or grooves is equal to:

- 75% of the as-built thickness, for pitting or grooving in the frame and brackets, webs and flanges
- 70% of the as-built thickness, for pitting or grooving in the side shell, hopper tank and topside tank plating attached to the side frame, over a width up to 30 mm from each side of it.

7.5.8 Renewal of all frames in one or more cargo holds (1/7/2006)

When all frames in one or more holds are required to be renewed according to item [7], compliance with the requirements in Pt E, Ch 4, Sec 3, [3.2] and Pt E, Ch 4, Sec 3, [6.2] may be accepted in lieu of compliance with the requirements in item [7], provided that:

- it is applied at least to all the frames of the hold(s)
- the coating requirements for side frames of "new ships" are complied with
- the section modulus of side frames is calculated according to the requirements in Pt B, Ch 7, Sec 2 or Pt B, Ch 8, Sec 4, as applicable.

7.5.9 Renewal of damaged frames (1/7/2008)

In the event of renewal of a damaged frame already complying with item [7], the following requirements apply:

- The conditions accepted in compliance with item [7] are to be restored as a minimum.
- For localised damage, the extension of the renewal is to be carried out according to the standard practice of the Society.

7.6 Strength check criteria

7.6.1 General (1/1/2004)

In general, loads are to be calculated and strength checks are to be carried out for the aft, middle and forward frames of each hold. The scantlings required for frames in intermediate positions are to be obtained by linear interpolation between the results obtained for the above frames.

When scantlings of side frames vary within a hold, the required scantlings are also to be calculated for the mid-frame of each group of frames having the same scantlings. The scantlings required for frames in intermediate positions are to be obtained by linear interpolation between the results obtained for the calculated frames.

7.6.2 Load model - Loading conditions (1/7/2008)

The following loading conditions are to be considered:

- Homogeneous heavy cargo (density greater than 1,78 t/m³)
- Homogeneous light cargo (density less than 1,78 t/m³)
- Non-homogeneous heavy cargo, if allowed
- Multiport loading/unloading conditions need not be considered.

7.6.3 Load model - Forces (1/1/2004)

The forces $P_{fr,a}$ and $P_{fr,b}$, in kN, to be considered for the strength checks at sections a) and b) of side frames (specified in Fig 4; in the case of separate lower brackets, section b) is at the top of the lower brackets), are given by:

$$P_{fr,a} = P_s + \max(P_1, P_2)$$

$$P_{fr,b} = P_{fr,a} \frac{h - 2h_B}{h}$$

where:

P_s : still water force, in kN given by:

- $p_s = sh \left(\frac{p_{s,u} + p_{s,l}}{2} \right)$ when the upper end of the side frame span h (see Fig 3) is below the load waterline

- $p_s = sh' \left(\frac{p_{s,l}}{2} \right)$ when the upper end of the side frame span h (see Fig 3) is at or above the load waterline

p_1 : wave force, in kN, in head sea given by:

$$sh = \left(\frac{p_{1,u} + p_{1,l}}{2} \right)$$

p_2 : wave force, in kN, in beam sea given by:

$$sh = \left(\frac{p_{2,u} + p_{2,l}}{2} \right)$$

h, h_B : side frame span and lower bracket length, in m, defined in Fig 3 and Fig 4, respectively

h' : distance, in m, between the lower end of side frame span h (see Fig 7) and the load waterline

s : frame spacing, in m

$p_{s,u}, p_{s,l}$: still water pressure, in kN/m², at the upper and lower ends of the side frame span h (see Fig 3), respectively

$p_{1,u}, p_{1,l}$: wave pressure, in kN/m², as defined in [7.6.4] a) below for the upper and lower ends of the side frame span h , respectively

$p_{2,u}, p_{2,l}$: wave pressure, in kN/m², as defined in [7.6.4] b) below for the upper and lower ends of the side frame span h , respectively.

7.6.4 Load model - Wave pressure (1/1/2004)

a) Wave pressure p_1

The wave pressure p_1 , in kN/m², at and below the waterline is given by:

$$p_1 = 1,50 \left[p_{11} + 135 \frac{B}{2(B+75)} - 1,2(T-z) \right]$$

$$p_{11} = 3k_s C + k_f$$

The wave pressure p_1 , in kN/m², above the waterline is given by:

$$p_1 = p_{1wl} - 7,50(z - T)$$

b) Wave pressure p_2

The wave pressure p_2 , in kN/m², at and below the waterline is given by:

$$p_2 = 13,0 \left[0,5B \frac{50C_f}{2(B+75)} + C_B \frac{0,5B + k_f}{14} \left(0,7 + 2\frac{z}{T} \right) \right]$$

The wave pressure p_2 , in kN/m², above the waterline is given by:

$$p_2 = p_{2wl} - 5,0(z - T)$$

where:

p_{1wl} : p_1 wave sea pressure at the waterline

p_{2wl} : p_2 wave sea pressure at the waterline

L : rule length, in m, as defined in Pt B, Ch 1, Sec 2, [3.1]

B : greatest moulded breadth, in m

C_B : block coefficient, as defined in Pt B, Ch 1, Sec 2, [2], but not to be taken less than 0,6

T : maximum design draught, in m

C : coefficient given by:

$$\bullet C = 10,75 - \left(\frac{300 - L}{100} \right)^{1,5}$$

for $90 \text{ m} \leq L \leq 300 \text{ m}$

$$\bullet C = 10,75 \text{ for } L > 300 \text{ m}$$

$$C_f : \left(1,25 - 0,025 \frac{2k_f}{\sqrt{GM}} \right) k$$

k : $\bullet 1,2$ for ships without bilge keel

$\bullet 1,0$ for ships with bilge keel

k_f : roll radius of gyration. If the actual value of k_f is not available:

$\bullet 0,39 B$ for ships with even distribution of mass in transverse section (e.g. alternate heavy cargo loading or homogeneous light cargo loading)

$\bullet 0,25 B$ for ships with uneven distribution of mass in transverse section (e.g. homogeneous heavy cargo distribution)

GM : $0,12 B$ if the actual value of GM is not available

z : vertical distance, in m, from the base line to the load point

k_s : $\bullet k_s = C_B + \frac{0,83}{\sqrt{C_B}}$ at aft end of L

$\bullet k_s = C_B$ between $0,2 L$ and $0,6 L$ from aft end of L

$\bullet k_s = C_B + \frac{1,33}{C_B}$ at forward end of L

Between the above specified points, k_s is to be interpolated linearly

k_f : $0,8 C$

7.6.5 Allowable stresses (1/1/2004)

The allowable normal and shear stresses σ_a and τ_a , in N/mm², in the side shell frames and brackets are given by:

$$\sigma_a = 0,90 \sigma_F$$

$$\tau_a = 0,40 \sigma_F$$

where σ_F is the minimum upper yield stress, in N/mm², of the material.

7.6.6 Shear strength check (1/1/2004)

Where t_M in the lower part of side frames, as defined in Fig 3, is equal to or less than t_{COAT} , a shear strength check is to be carried out in accordance with the following.

The thickness $t_{REN,Sr}$ in mm, is the greater of the thicknesses $t_{REN,Sa}$ and $t_{REN,Sb}$ obtained from the shear strength check at sections a) and b) (see Fig 4 and [7.6.3]) given by the following, but need not be taken in excess of $0,75t_{S12}$:

$$\bullet \text{ at section a): } t_{REN,Sa} = \frac{1000k_s P_{fr,a}}{d_a \sin \phi \tau_a}$$

$$\bullet \text{ at section b): } t_{REN,Sb} = \frac{1000k_s P_{fr,b}}{d_b \sin \phi \tau_a}$$

where:

k_s : shear force distribution factor, to be taken equal to 0,6

$P_{fr,a}$, $P_{fr,b}$: forces defined in [7.6.3]

d_a , d_b : bracket and frame web depth, in mm, at sections a) and b), respectively (see Fig 4); in the case of separate (non integral) brackets, d_b is to be taken as the minimum web depth deducting possible scallops

ϕ : angle between frame web and shell plate

τ_a : allowable shear stress, in N/mm², defined in [7.6.5].

Figure 4 : Sections a) and b) (1/1/2004)

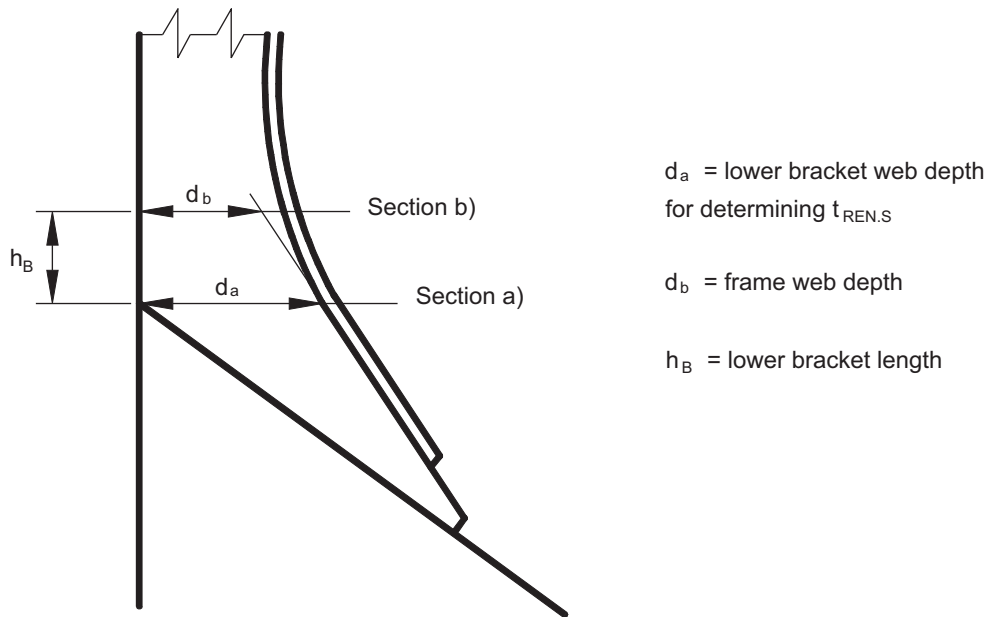
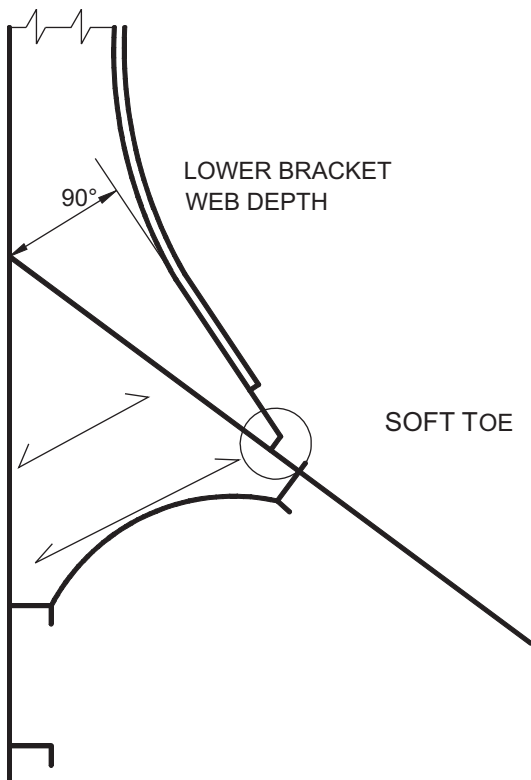


Figure 5 : Definition of the lower bracket web depth for determining $t_{REN,S}$ (1/1/2004)



section modulus, in cm^3 , of the brackets and side frames at sections a) and b) is to be not less than:

- at section a): $Z_a = \frac{1000P_{fr,a}h}{m_a\sigma_a}$
- at section b): $Z_b = \frac{1000P_{fr,a}h}{m_b\sigma_a}$

where:

- $P_{fr,a}$: force defined in [7.6.3]
- h : side frame span, in m, defined in Fig 3
- σ_a : allowable normal stress, in N/mm^2 , defined in [7.6.5]
- m_a, m_b : bending moment coefficients defined in Tab 3.

The actual section modulus of the brackets and side frames is to be calculated about an axis parallel to the attached plate, based on the measured thicknesses. For pre-calculations, alternative thickness values may be used, provided they are not less than:

- t_{REN} , for the web thickness
- the minimum thicknesses allowed by the Society renewal criteria for flange and attached plating.

The attached plate breadth is equal to the frame spacing, measured along the shell at mid-span of h .

If the actual section moduli at sections a) and b) are less than the values Z_a and Z_b , the frames and brackets are to be renewed or reinforced in order to obtain actual section moduli not less than $1,2 Z_a$ and $1,2 Z_b$, respectively.

In such case, renewal or reinforcement of the flange is to be extended over the lower part of side frames, as defined in Fig 3.

7.6.7 Bending strength check (1/1/2004)

Where the lower bracket length or depth does not comply with the requirements in Pt E, Ch 4, Sec 3, [6.2], the actual

Table 3 : Bending moment coefficients m_a and m_b (1/7/2006)

	m_a	m_b		
		$h_B \leq 0,08 h$	$h_B = 0,1 h$	$h_B \geq 0,125 h$
Empty holds of ships approved to operate in non-homogeneous loading conditions	10	17	19	22
Other cases	12	20	22	26

Note 1: Non-homogeneous loading condition means a loading condition in which the ratio between the highest and the lowest filling ratio, evaluated for each hold, exceeds 1,20 corrected for different cargo densities.
Note 2: For intermediate values of the bracket length h_B , the coefficient m_b is obtained by linear interpolation between the table values.

Figure 6 : Tripping brackets (1/7/2008)

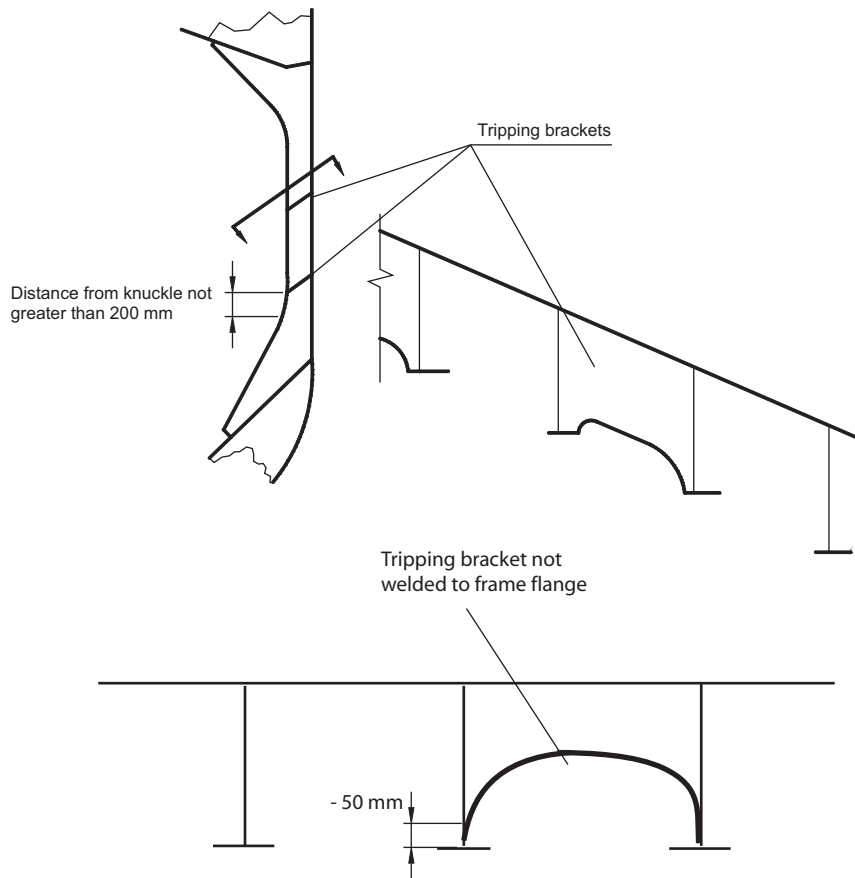
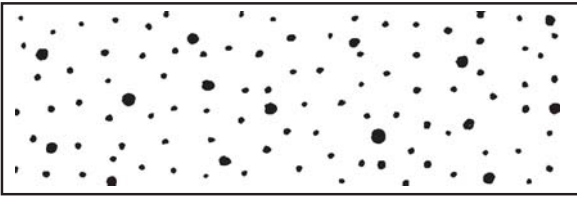
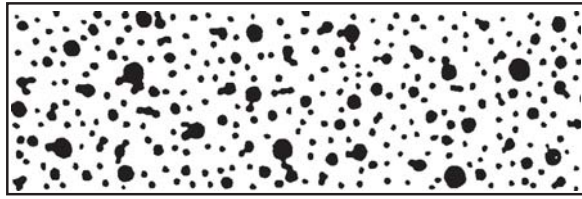


Figure 7 : Pitting intensity diagrams (from 5% to 25% intensity) (1/7/2004)

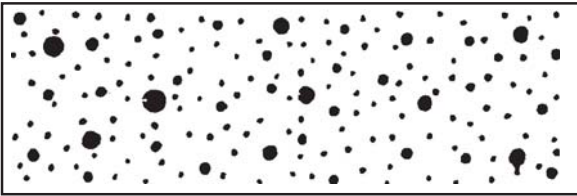
5% SCATTERED



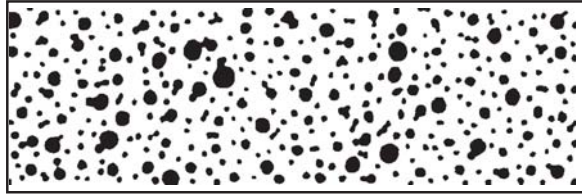
20% SCATTERED



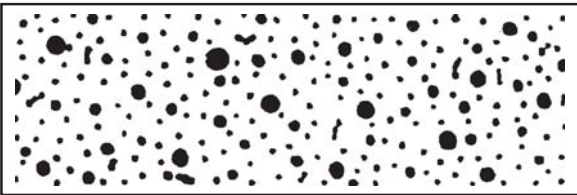
10% SCATTERED



25% SCATTERED



15% SCATTERED



SECTION 3

SHIPS CARRYING LIQUID CARGO IN BULK

1 General

1.1 Application

1.1.1 (1/7/2001)

The requirement given in [1.2.1] applies to ships carrying liquid cargo in bulk constructed before 1st July 1998, which are assigned the following service notations:

- **oil tanker ESP**
- **combination carrier/OBO ESP**
- **combination carrier/OOC ESP**
- **chemical tanker ESP**
- **FLS tanker**
- **liquefied gas carrier.**

1.1.2 (1/7/2001)

The requirement given in [1.3.1] applies to ships carrying liquid cargo in bulk constructed before 1st July 1998, which are assigned the following service notations:

- **oil tanker ESP**
- **combination carrier/OBO ESP**
- **combination carrier/OOC ESP**
- **FLS tanker.**

1.1.3 (1/7/2001)

The requirement given in [1.3.2] applies to ships carrying liquid cargo in bulk constructed before 1st July 2002, which are assigned the service notation **chemical tanker ESP**.

1.2 Safe access to ship bows

1.2.1 Ships listed in [1.1.1] are to be provided with acceptable means to enable the crew to gain safe access to the ship's bow at the first scheduled dry-docking after 1st July 1998, but not later than 1st July 2001.

Note 1: The Society considers means complying with the Guidelines adopted by the Maritime Safety Committee of IMO with Resolution MSC.62(67) on 5 December 1996 as being acceptable.

1.2.2 Arrangements already approved for ships having the service notations listed in [1.1.1] constructed before 1st July 1998 may be accepted provided that such arrangements achieve an equivalent level of safety for access to the bow.

1.3 Secondary means of flow in the cargo tanks venting systems

1.3.1 (1/7/2001)

Ships defined in [1.1.2] are to be provided with a secondary means of allowing full flow relief of vapour to prevent over-pressure or under-pressure in the event of failure of main means of vapour flow by the date of the first scheduled dry-docking after 1st July 1998, but not later than 1st July 2001.

1.3.2 (1/7/2001)

Ships defined in [1.1.3] are to be provided with a secondary means of allowing full flow relief of vapour to prevent over-pressure or under-pressure in the event of failure of main means of vapour flow by the date of the first scheduled dry-docking after 1st July 2002, but not later than 1st July 2005.

SECTION 4

PASSENGER SHIPS, RO-RO PASSENGER SHIPS AND RO-RO CARGO SHIPS

1 General

1.1 Application

1.1.1 (1/7/2001)

Ships which have been assigned the service notation **ro-ro passenger ship** are to comply with:

- a) all the requirements indicated in [2], if constructed before 1st July 1997;
- b) all the requirements indicated in [3].

1.1.2 Ships which have been assigned the service notation **ro-ro cargo ship** constructed before 1st July 1997 are to comply with the requirements indicated in [2.1.2].

1.1.3 (1/7/2001)

Ships which have been assigned the service notation **passenger ship** are to comply with:

- a) the requirements indicated in [2.1.3], if constructed before 1st July 1997,
- b) all the requirements indicated in [3].

2 Increased stability and watertight integrity

2.1

2.1.1 (1/1/2001)

Ships referred to in [1.1.1] are to comply with the following provisions not later than the date of the first class renewal survey after 1st July 1997:

- all accesses from the ro-ro deck that lead to spaces below the bulkhead deck are to be made weathertight
- means are to be provided on the navigation bridge, indicating whether the access is open or closed

2.1.2 Ships referred to in [1.1.1] and [1.1.2] are to comply with the following provision not later than the date of the first class renewal survey after 1st July 1997:

- where all or part of the penetration of the bulkhead deck is on the main ro-ro deck, the trunk is to be capable of withstanding impact pressure due to internal water motions (sloshing) of water trapped on the ro-ro deck.

2.1.3 (1/1/2001)

Ships referred to in [1.1.1] and [1.1.3] are to comply with the following provisions not later than the date of the first class renewal survey after 1st July 1997:

- a) Where a long forward superstructure is fitted, the fore peak or collision bulkhead on all passenger ships including ro-ro passenger ships is to be extended weathertight to the next complete deck above the bulkhead

deck. The extension is to be so arranged as to preclude the possibility of the bow door causing damage to it in the case of damage to, or detachment of, a bow door.

- b) The extension required in a) need not be fitted directly above the bulkhead below, provided that no part of the extension is located forward of the forward limits specified in Note 1 or Note 2. However:

- where a sloping ramp forms part of the extension, the part of the extension which is more than 2,3 m above the bulkhead deck may extend no more than 1 m forward of the forward limits specified in Note 1 or Note 2; and
- where the existing ramp does not comply with the requirements for acceptance as an extension to the collision bulkhead and the position of the ramp prevents the siting of such extension within the limits specified in Note 1 or Note 2, the extension may be sited within a limited distance aft of the aft limit specified in Note 1 or Note 2. The limited distance aft is to be no more than is necessary to ensure non-interference with the ramp. The extension to the collision bulkhead is to open forward and comply with the requirements of a) and is to be so arranged as to preclude the possibility of the ramp causing damage to it in the case of damage to, or detachment of, the ramp.

- c) Ramps not meeting the above requirements are to be disregarded as an extension of the collision bulkhead.

Note 1: The forward limit is located at a distance, in metres, from the forward perpendicular of not less than 5% of the length of the ship and not more than 3m plus 5% of the length of the ship.

Note 2: Where any part of the ship below the waterline extends forward of the forward perpendicular, e.g. a bulbous bow, the distances stipulated in Note 1 are to be measured from a point either:

- at the mid-length of such extension, or
- at a distance 1,5% of the length of the ship forward of the forward perpendicular, or
- at a distance 3 metres forward of the forward perpendicular, whichever gives the smallest measurement.

- d) where a ventilation trunk passing through a structure penetrates the bulkhead deck, the trunk is to be capable of withstanding the water pressure that may be present within the trunk, after having taken into account the maximum heel angle allowable during intermediate stages of flooding.

Note 3: Without information regarding the above angle of heel, the water pressure relevant to the transverse location of the ventilation trunk is to be linearly interpolated between 0,5 m at the centreline and a height corresponding to an angle of 15° from the bulkhead deck plus 0,5 m at the side shell.

3 Side Shell Doors, Stern Doors, Bow Doors and Inner Doors

3.1 Side Shell Doors and Stern Doors

3.1.1 (1/7/2001)

The structural condition of side shell doors and stern doors, especially the primary structure, the securing and supporting arrangements and the hull structure alongside and above the doors, are to be specially examined and any defects rectified.

3.1.2 (1/1/2005)

The following measures are to be complied with by all existing ro-ro passenger ships with the date of building before 30th June 1996, including ships only engaged on domestic sea voyages unless otherwise decided by the competent flag Administrations.

- a) The structural arrangement of securing devices and supporting devices of inwards opening doors in way of these securing devices and, where applicable, of the surrounding hull structure is to be re-assessed in accordance with the applicable requirements of Pt B, Ch 9, Sec 6, [4] and modified accordingly.
- b) The securing and locking arrangements for side shell doors and stern doors which may lead to the flooding of a special category space or ro-ro cargo space as defined in Pt E, Ch 12, Sec 2, [1.2.7] are to comply with the following requirements:
 - separate indicator lights and audible alarms are to be provided on the navigation bridge and on each operating panel to indicate that the doors are closed and that their securing and locking devices are properly positioned,
 - the indication panel is to be provided with a lamp test function. It is not to be possible to turn off the indicator light,
 - the indication panel on the navigation bridge is to be equipped with a mode selection function "harbour/sea voyage", so arranged that audible alarm is given if the vessel leaves harbour with side shell or stern doors not closed or with any of the securing devices not in the correct position,
 - a water leakage detection system with audible alarm and television surveillance is to be arranged to provide an indication to the navigation bridge and to the engine control room of any leakage through the doors.

3.1.3 (1/7/2001)

Documented operating procedures for closing and securing side shell and stern doors are to be kept on board and posted at the appropriate places.

3.2 Bow Doors and Inner Doors

3.2.1 (1/7/2001)

The structural condition of bow doors and inner doors, especially the primary structure, the securing and supporting arrangements and the hull structure alongside and above the doors, are to be specially examined and any defects rectified.

3.2.2 (1/7/2001)

The requirements of Pt B, Ch 9, Sec 5, [8] concerning operating procedures of the bow doors and inner doors are to be complied with.

3.2.3 (1/1/2005)

The following measures are to be complied with by all existing ro-ro passenger ships with the date of building before the 30th June 1996 including ships only engaged on domestic sea voyages, unless otherwise decided by the competent flag Administrations.

- a) The location and arrangement of inner doors are to comply with the applicable requirements of the SOLAS Convention and with Pt B, Ch 9, Sec 5, [1.3.4].
- b) Ships with visor door are to comply with Pt B, Ch 9, Sec 5, [5.2.7] requiring redundant provision of securing devices preventing the upward opening of the bow door. In addition, where the visor door is not self-closing under external loads (i.e. the closing moment M_y calculated in accordance with Pt B, Ch 9, Sec 5, [2.1.3] is less than zero) then the opening moment M_o is not to be taken less than $-M_y$. If drainage arrangements in the space between the inner and bow doors are not fitted, the value of M_o is to be specially considered. Where available space above the tank top does not enable the full application of Pt B, Ch 9, Sec 5, [5.2.7], equivalent measures are to be taken to ensure that the door has positive means for being kept closed during seagoing operation.
- c) Ships with visor door are to comply with Pt B, Ch 9, Sec 5, [5.2.8] requiring securing and supporting devices excluding hinges to be capable of bearing the vertical design force ($F_z - 10W$) without exceeding the permissible stresses given in Pt B, Ch 9, Sec 5, [6.1.1].
- d) For side-opening doors, the structural arrangements for supporting vertical loads, including securing devices, supporting devices and, where applicable, hull structure above the door, are to be re-assessed in accordance with the applicable requirements of Pt B, Ch 9, Sec 5, [5] and modified accordingly.
- e) The securing and locking arrangements for bow doors and inner doors which may lead to the flooding of a special category space or ro-ro space as defined in Pt E, Ch 12, Sec 2, [1.2.7] are to comply with the following requirements:
 - Separate indicator lights and audible alarms are to be provided on the navigation bridge and on each panel to indicate that the doors are closed and that

their securing and locking devices are properly positioned.

- The indication panel is to be provided with a lamp test function. It is not to be possible to turn off the indicator light.
- The indication panel on the navigation bridge is to be equipped with a mode selection function "harbour/sea voyage", so arranged that audible alarm is

given if the vessel leaves harbour with the bow doors or inner doors not closed or with any of the securing devices not in the correct position.

- A water leakage detection system with audible alarm and television surveillance is to be arranged to provide an indication to the navigation bridge and to the engine control station of any leakage through the doors.

SECTION 5

GENERAL DRY CARGO SHIPS

1 Strength and securing of small hatches on the exposed fore deck

1.1 General

1.1.1 (1/1/2004)

This item provides the schedule for compliance with the strength requirements, indicated in Pt B, Ch 9, Sec 7, [9], of small hatches and their securing devices fitted on the exposed fore deck.

1.1.2 (1/1/2004)

Small hatches in the context of this item are hatches designed for access to spaces below the deck and are capable of being closed weather-tight or watertight, as applicable. Their opening is normally 2,5 m² or less.

1.1.3 (1/1/2004)

Hatches designed for emergency escape are to comply with the requirements of Pt B, Ch 9, Sec 7, [9], except for [9.4.1] a) and b), [9.4.3] and [9.5].

1.2 Application

1.2.1 (1/1/2004)

For ships that are contracted for construction prior to 1 January 2004, only for hatches on the exposed deck giving access to spaces forward of the collision bulkhead, and to spaces which extend over this line aftwards, applicable to the following ships of length 100m or more (the ship's length is as defined in Pt B, Ch 1, Sec 2, [3.1]):

- general dry cargo ships (excluding container ships, vehicle carriers, ro-ro ships and woodchip carriers).

1.3 Implementation

1.3.1 (1/1/2004)

Ships described in [1.2.1] that are contracted for construction prior to 1 January 2004 are to comply with the requirements indicated above in accordance with the following schedule:

- for ships 15 years of age or more on 1 January 2004, by the due date of the first intermediate or class renewal survey after that date;
- for ships 10 years of age or more, but not less than 15 years on 1 January 2004, by the due date of the first class renewal survey after that date;
- for ships less than 10 years of age on 1 January 2004, by the date on which the ship reaches 10 years of age.

Completion prior to 1 January 2004 of an intermediate or class renewal survey with a due date after 1 January 2004 cannot be used to postpone compliance. However, completion prior to 1 January 2004 of an intermediate survey whose window straddles 1 January 2004 can be accepted.

2 Strength requirements for fore deck fittings and equipment

2.1 General

2.1.1 (1/1/2004)

This item provides the schedule for compliance with the strength requirements, indicated in Pt B, Ch 9, Sec 9, [8] and Pt C, Ch 1, Sec 10, to resist green sea forces for the following items located within the forward quarter length (the ship's length L is as defined in Pt B, Ch 1, Sec 2, [3.1]):

- air pipes,
- ventilator pipes and their closing devices,
- securing of windlasses.

Note 1: If the nominal diameter of the air pipe is 40 or 50 mm (values not accepted for new ships), the minimum height of the brackets to be fitted is 520 mm.

2.1.2 (1/1/2004)

For windlasses, these requirements are additional to those for the anchor and chain performance criteria indicated in Pt B, Ch 10, Sec 4, [3].

2.1.3 (1/1/2004)

Where mooring winches are integral with the anchor windlass, they are to be considered as part of the windlass.

2.2 Application

2.2.1 (1/1/2004)

For ships that are contracted for construction prior to 1 January 2004 only for air pipes, ventilator pipes and their closing devices on the exposed deck serving spaces forward of the collision bulkhead, and spaces which extend over this line aftwards, applicable to the following ships of length 100m or more (the ship's length is as defined in Pt B, Ch 1, Sec 2, [3.1]):

- general dry cargo ships (excluding container ships, vehicle carriers, ro-ro ships and woodchip carriers).

2.3 Implementation

2.3.1 (1/1/2004)

Ships described in [2.2.1] that are contracted for construction prior to 1 January 2004 are to comply with the requirements indicated above in accordance with the following schedule:

- for ships 15 years of age or more on 1 January 2004, by the due date of the first intermediate or class renewal survey after that date;
- for ships 10 years of age or more, but not less than 15 years on 1 January 2004, by the due date of the first class renewal survey after that date;

Pt A, Ch 6, Sec 5

- for ships less than 10 years of age on 1 January 2004, by the date on which the ship reaches 10 years of age.

Completion prior to 1 January 2004 of an intermediate or class renewal survey with a due date after 1 January 2004

cannot be used to postpone compliance. However, completion prior to 1 January 2004 of an intermediate survey whose window for straddles 1 January 2004 can be accepted.

SECTION 6

SHIPS WITH ICE CLASS NOTATION

1 General

1.1 Definitions

1.1.1 (1/7/2005)

For general information and definitions, see Pt F, Ch 9, Sec 1, [3.1.1]

1.2 Application

1.2.1 (1/7/2005)

Ships which have been assigned the additional class notations **ICE CLASS IB** or **ICE CLASS IC**, the keel of which was laid or was at a similar stage of construction before 1st September 2003, are to comply with the requirements indicated in [2.1.1].

1.2.2 (1/7/2005)

Ships which have been assigned the additional class notations **ICE CLASS IA SUPER** or **ICE CLASS IA**, the keel of which was laid or was at a similar stage of construction before 1st September 2003, are to comply with the requirements indicated in [2.1.2].

2 Requirements to retain ICE CLASS notations

2.1 General

2.1.1 (1/7/2005)

Ships referred to in [1.2.1] are to comply with the provisions of Pt F, Ch 9, Sec 1, [3.1.2] of RINA Rules, 2000 edition, in order to retain their additional class notations **ICE CLASS IB** or **ICE CLASS IC**.

2.1.2 (1/7/2005)

Ships referred to in [1.2.2] are to comply with the provisions of Pt F, Ch 9, Sec 1, [3.1.2], in order to retain their additional class notations **ICE CLASS IA SUPER** or **ICE CLASS IA**, no later than the following dates:

- 1st January 2005 or
- 1st January in the year when 20 years have elapsed since the ship was delivered,

whichever occurs the later.

When, for an existing ship, the values for some of the hull form parameters required for the calculation method in Pt F, Ch 9, Sec 1, [3.1.2] are difficult to obtain, the following alternative formulae can be used:

$$R_{CH} = C_1 + C_2 + C_3(H_F + H_M)^2(B + 0,658H_F) + C_4LH_F^2 + C_5\left(\frac{LT}{B^2}\right)^3\frac{B}{4}$$

The parameters in the above formula are given below.

For **ICE CLASS IA**, C_1 and C_2 are to be taken as zero.

For **ICE CLASS IA SUPER**, for ships without a bulb, C_1 and C_2 are to be calculated as follows:

$$C_1 = f_1 \frac{BL}{2\frac{T}{B} + 1} + 1, 84(f_2B + f_3L + f_4BL)$$

$$C_2 = 3,52(g_1 + g_2B) + g_3\left(1 + 1,2\frac{T}{B}\right)\frac{B^2}{\sqrt{L}}$$

For **ICE CLASS IA SUPER**, for ships with a bulb, C_1 and C_2 are to be calculated as follows:

$$C_1 = f_1 \frac{BL}{2\frac{T}{B} + 1} + 2,89(f_2B + f_3L + f_4BL)$$

$$C_2 = 6,67(g_1 + g_2B) + g_3\left(1 + 1,2\frac{T}{B}\right)\frac{B^2}{\sqrt{L}}$$

$$C_3 = 460 \text{ kg/m}^2\text{s}^2$$

$$C_4 = 18,7 \text{ kg/m}^2\text{s}^2$$

$$C_5 = 825 \text{ kg/s}^2$$

$$f_1 = 10,3 \text{ N/m}^2$$

$$f_2 = 45,8 \text{ N/m}$$

$$f_3 = 2,94 \text{ N/m}$$

$$f_4 = 5,8 \text{ N/m}^2$$

$$g_1 = 1530 \text{ N}$$

$$g_2 = 170 \text{ N/m}$$

$$g_3 = 400 \text{ N/m}^{1,5}$$

$\left(\frac{LT}{B^2}\right)^3$ is not to be taken less than 5 or more than 20

The other parameters are those defined in Pt F, Ch 9, Sec 1

3 Other methods of determining K_C or R_{CH}

3.1 General

3.1.1 (1/7/2005)

For an individual ship, in lieu of the K_C or R_{CH} values defined in Pt F, Ch 9, Sec 1, [3.1.2], the Society may approve the use of K_C values based on more exact calculations or R_{CH} values based on model tests. Such approval will be given on the understanding that it may be revoked if experience of the ship's performance in practice warrants this.

4 Draught limitation in ice

4.1 Warning triangle

4.1.1 (1/7/2007)

For ships built before 1 July 2007, if the UIWL (see Pt F, Ch 9, Sec 1, [2.1.1]) is below the summer load line, the ship's sides are to be provided with a warning triangle and with an ice class draught mark at the maximum permissible ice class draught amidships (see Fig 1), not later than the first scheduled dry docking after 1 July 2007. The purpose of the warning triangle is to provide information on the draught limitation of the ship when it is sailing in ice for Masters of icebreakers and for inspection personnel in ports.

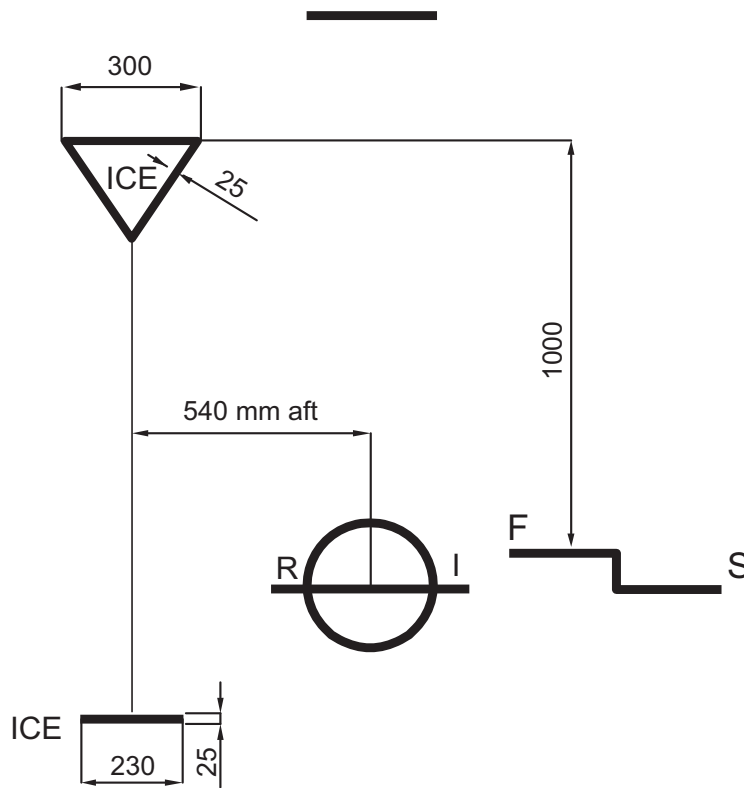
The upper edge of the warning triangle is to be located vertically above the "ICE" mark, 1000 mm higher than the summer load line in fresh water but in no case higher than the deck line. The sides of the triangle are to be 300 mm in length.

The ice class draught mark is to be located 540 mm abaft the centre of the load line ring or 540 mm abaft the vertical line of the timber load line mark, if applicable.

The marks and figures are to be cut out of 5 - 8 mm plate and then welded to the ship's side. The marks and figures are to be painted in a red or yellow reflecting colour so that they are plainly visible even in ice conditions.

The dimensions of all figures are to be the same as those used in the load line mark.

Figure 1 : Warning triangle (1/7/2007)



APPENDIX 1

TECHNICAL RETROACTIVE REQUIREMENTS FOR BULK CARRIERS

1 General

1.1

1.1.1 This Appendix contains the technical requirements applicable retroactively to existing ships listed in Sec 2.

2 Evaluation of scantlings of the transverse watertight vertically corrugated bulkheads between the two foremost cargo holds

2.1 Application and definitions

2.1.1 These requirements apply to ships indicated in Sec 2, [1.1.1].

2.1.2 In these requirements, homogeneous loading condition means a loading condition in which the ratio between the highest and the lowest filling ratio, evaluated for the two foremost cargo holds, does not exceed 1,20, to be corrected for different cargo densities.

2.1.3 The net scantlings of the transverse bulkhead between the two foremost cargo holds are to be calculated using the loads given in [2.2], the bending moment and shear force given in [2.3] and the strength criteria given in [2.4].

Where necessary, steel renewal and/or reinforcements are required as per [2.6].

2.2 Load model

2.2.1 General

The loads to be considered as acting on the bulkhead are those given by the combination of the cargo loads with those induced by the flooding of the foremost cargo hold.

The most severe combinations of cargo induced loads and flooding loads are to be used for the check of the scantlings of the bulkhead, depending on the loading conditions included in the loading manual:

- homogeneous loading conditions
- non-homogeneous loading conditions.

Non-homogeneous part loading conditions associated with multipoint loading and unloading operations for homogeneous loading conditions need not be considered according to these requirements.

2.2.2 Bulkhead corrugation flooding head

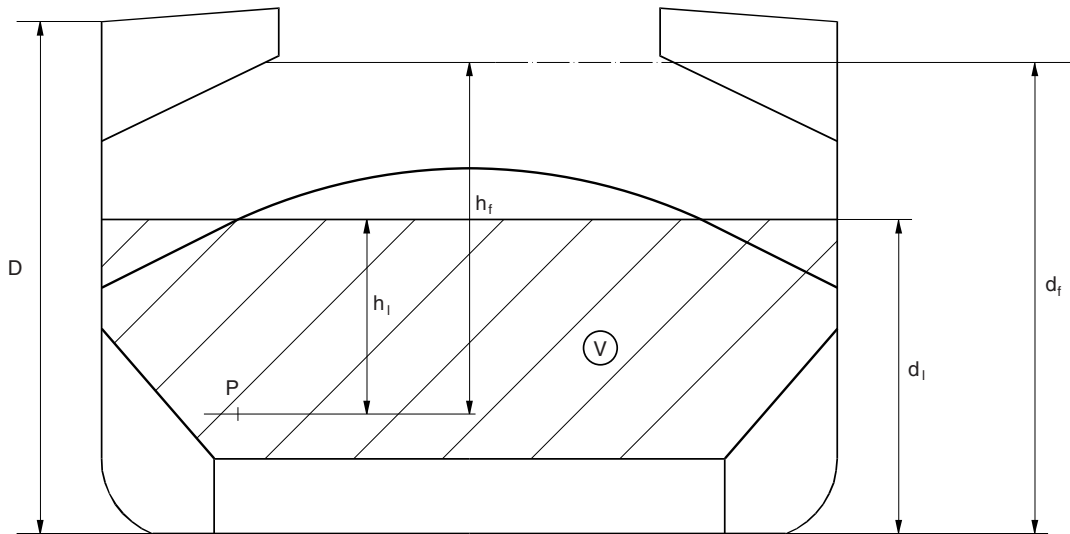
The flooding head h_f (see Fig 1) is the distance, in m, measured vertically with the ship in the upright position, from the calculation point to a level located at a distance d_f , in m, from the base line equal to:

- D in general
- $0,95D$ for ships less than 50000 t deadweight with type B freeboard,

D being the distance, in m, from the base line to the freeboard deck at side amidships (see Fig 1).

For ships to be operated at an assigned load line draught T_r , less than the permissible load line draught T , the flooding head defined for the two cases above may be reduced by $(T-T_r)$.

Figure 1 : Calculation of pressure on the bulkhead in the flooded cargo hold



V = Volume of cargo
P = Calculation point

2.2.3 Pressure in the flooded hold: bulk cargo loaded hold

Two cases are to be considered, depending on the values of d_l and d_f , d_l (see Fig 1) being a distance from the base line given, in m, by:

$$d_l = \frac{M_c}{\rho_c l_c B} + \frac{V_{LS}}{l_c B} + (h_{HT} - h_{DB}) \frac{b_{HT}}{B} + h_{DB}$$

where:

- M_c : Mass of cargo, in t, in the foremost cargo hold
- ρ_c : Bulk cargo density, in t/m^3
- l_c : Length of the foremost cargo hold, in m
- B : Ship's breadth amidships, in m
- V_{LS} : Volume, in m^3 , of the bottom stool above the inner bottom
- h_{HT} : Height of the hopper tanks amidships, in m, from the base line
- h_{DB} : Height of the double bottom, in m
- b_{HT} : Breadth of the hopper tanks amidships, in m.

a) Case when $d_f \geq d_l$

At each point of the bulkhead located at a distance between d_l and d_f from the base line, the pressure $p_{c,f}$, in kN/m^2 , is given by:

$$p_{c,f} = \rho g h_f$$

where:

- ρ : Sea water density, in t/m^3
- g : 9,81 m/s^2 , gravity acceleration
- h_f : Flooding head as defined in [2.2.2].

At each point of the bulkhead located at a distance lower than d_l from the base line, the pressure $p_{c,f}$, in kN/m^2 , is given by:

$$p_{c,f} = \rho g h_f + [\rho_c - \rho(1 - perm)] g h_l \tan^2 \gamma$$

where:

- ρ, g, h_f : As given above
- ρ_c : Bulk cargo density, in t/m^3

- perm : Permeability of cargo, to be taken as 0,3 for ore (corresponding bulk cargo density for iron ore may generally be taken as 3,0 t/m^3)
- h_l : Vertical distance, in m, from the calculation point to a level located at a distance d_l , as defined above, from the base line (see Fig 1)
- γ : $\gamma = 45^\circ - (\phi/2)$
- ϕ : Angle of repose of the cargo, in degrees, and may generally be taken as 35° for iron ore.

The force $F_{c,f}$, in kN, acting on a corrugation is given by:

$$F_{c,f} = s_1 \left[\rho g \frac{(d_f - d_l)^2}{2} + \frac{\rho g (d_f - d_l) + (p_{c,i})_{le}}{2} (d_l - h_{DB} - h_{LS}) \right]$$

where:

- s_1 : Spacing of corrugations, in m (see Fig 2)
- ρ, g, d_l, h_{DB} : As given above
- d_f : As given in [2.2.2]
- $(p_{c,i})_{le}$: Pressure, in kN/m^2 , at the lower end of the corrugation
- h_{LS} : Height of the lower stool, in m, from the inner bottom.

b) Case when $d_f < d_l$

At each point of the bulkhead located at a distance between d_f and d_l from the base line, the pressure $p_{c,f}$, in kN/m^2 , is given by:

$$p_{c,f} = \rho_c g h_l \tan^2 \gamma$$

where:

- ρ_c, g, h_l, γ : as given in a) above

At each point of the bulkhead located at a distance lower than d_f from the base line, the pressure $p_{c,f}$, in kN/m^2 , is given by:

$$p_{c,f} = \rho g h_f + [\rho_c h_l - \rho(1 - perm) h_l] g \tan^2 \gamma$$

where:

- $\rho, g, h_f, \rho_c, h_l, perm, \gamma$: as given in a) above

The force $F_{c,f}$, in kN, acting on a corrugation is given by:

$$F_{c,f} = s_1 \left[\rho_c g \frac{(d_l - d_f)^2}{2} \tan^2 \gamma \right] + s_1 \left[\frac{\rho_c g (d_l - d_f) \tan^2 \gamma + (p_{c,f})_{le}}{2} (d_f - h_{DB} - h_{LS}) \right]$$

where:

$s_1, \rho_c, g, \gamma, (p_{c,f})_{le}, h_{LS}$: As given in a) above

d_l, h_{DB} : as given in [2.2.3]

d_f : as given in [2.2.2].

2.2.4 Pressure in the flooded hold: empty hold

At each point of the bulkhead, the hydrostatic pressure p_f induced by the flooding head h_f is to be considered.

The force F_f , in kN, acting on a corrugation is given by:

$$F_f = s_1 \rho g \frac{(d_f - h_{DB} - h_{LS})^2}{2}$$

where:

s_1, ρ, g, h_{LS} : as given in [2.2.3] a)

h_{DB} : as given in [2.2.3]

d_f : as given in [2.2.2].

2.2.5 Pressure in the non-flooded bulk cargo loaded hold

At each point of the bulkhead, the pressure p_c , in kN/m², is given by:

$$p_c = \rho_c g h_l \tan^2 \gamma$$

where:

ρ_c, g, h_l, γ : as given in [2.2.3] a).

The force F_c , in kN, acting on a corrugation is given by:

$$F_c = s_1 \rho_c g \frac{(d_l - h_{DB} - h_{LS})^2}{2} \tan^2 \gamma$$

where:

$\rho_c, g, s_1, h_{LS}, \gamma$: as given in [2.2.3] a)

d_l, h_{DB} : as given in [2.2.3].

2.2.6 Resultant pressure in homogeneous loading conditions

At each point of the bulkhead structures, the resultant pressure p , in kN/m², to be considered for the scantlings of the bulkhead is given by:

$$p = p_{c,f} - 0,8 p_c$$

The resultant force F , in kN, acting on a corrugation is given by:

$$F = F_{c,f} - 0,8 F_c$$

2.2.7 Resultant pressure in non-homogeneous loading conditions

At each point of the bulkhead structures, the resultant pressure p , in kN/m², to be considered for the scantlings of the bulkhead is given by:

$$p = p_{c,f}$$

The resultant force F , in kN, acting on a corrugation is given by:

$$F = F_{c,f}$$

Where the foremost cargo hold, in non-homogeneous loading conditions, is not allowed to be loaded, the resultant pressure p , in kN/m², to be considered for the scantlings of the bulkhead is given by:

$$p = p_f$$

and the resultant force F , in kN, acting on a corrugation is given by:

$$F = F_f$$

2.3 Bending moment and shear force in the bulkhead corrugations

2.3.1 General

The bending moment M and the shear force Q in the bulkhead corrugations are obtained using the formulae given in [2.3.2] and [2.3.3]. The M and Q values are to be used for the checks in [2.4].

2.3.2 Bending moment

The design bending moment M , in kN.m, for the bulkhead corrugations is given by:

$$M = \frac{F\ell}{8}$$

where:

F : Resultant force in kN, as given in [2.2.6] or [2.2.7]

ℓ : Span of the corrugation, in m, to be taken according to Fig 2 and Fig 3.

2.3.3 Shear force

The shear force Q , in kN, at the lower end of the bulkhead corrugations is given by:

$$Q = 0,8 F$$

where:

F : As given in [2.2.6] or [2.2.7].

Figure 2 : Parameters of vertically corrugated bulkhead

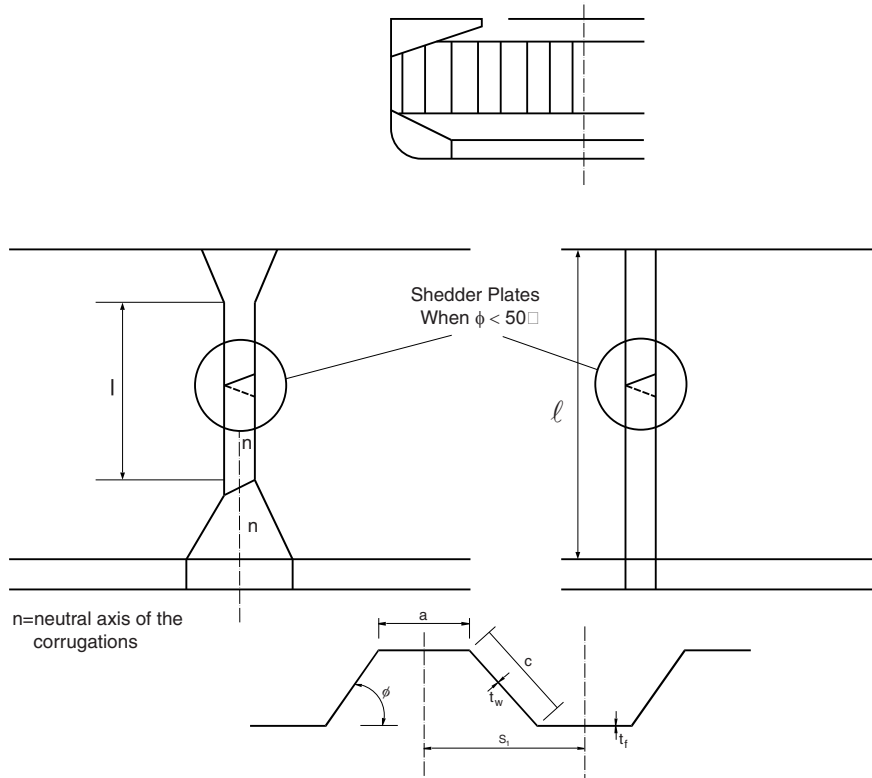
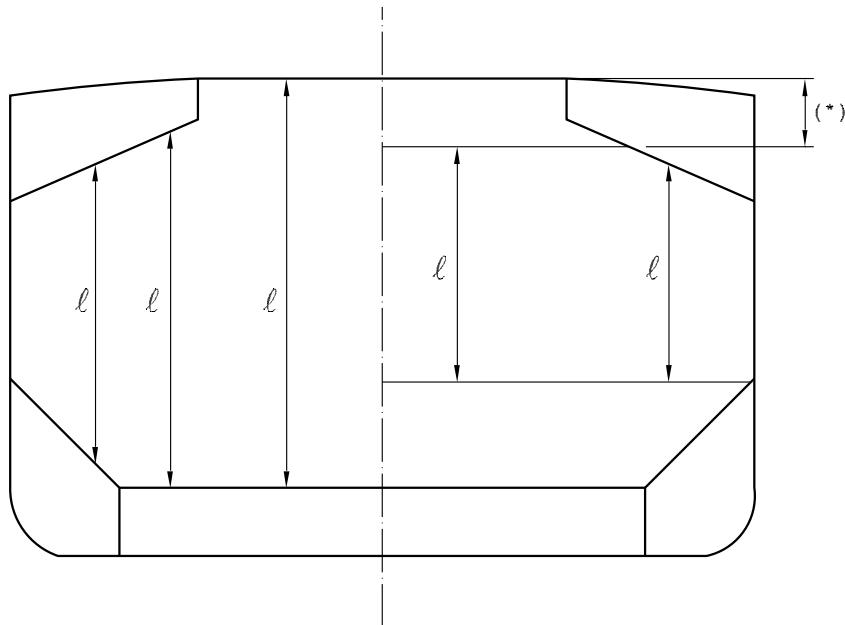


Figure 3 : Definition of the corrugation span



(*): For the definition of l , the internal end of the upper stool is not to be taken more than a distance from the deck at the centreline equal to:

- three times the depth of corrugations, in general
- twice the depth of corrugations, for rectangular stool.

2.4 Strength criteria

2.4.1 General

The following criteria are applicable to transverse bulkheads with vertical corrugations (see Fig 2).

Requirements for local net plate thickness are given in [2.4.8].

In addition, the criteria given in [2.4.2] and [2.4.5] are to be complied with.

Where the corrugation angle ϕ shown in Fig 2 is less than 50° , a horizontal row of staggered shedder plates is to be fitted at approximately mid-depth of the corrugations (see Fig 2) to help preserve dimensional stability of the bulkhead under flooding loads. The shedder plates are to be welded to the corrugations by double continuous welding, but they are not to be welded to the side shell.

The thicknesses of the lower part of corrugations considered in the application of [2.4.2] and [2.4.3] are to be maintained for a distance from the inner bottom (if no lower stool is fitted) or the top of the lower stool not less than $0,15\ell$.

The thicknesses of the middle part of corrugations considered in the application of [2.4.2] and [2.4.4] are to be maintained to a distance from the deck (if no upper stool is fitted) or the bottom of the upper stool not greater than $0,3\ell$.

2.4.2 Bending capacity and shear stress τ

The bending capacity is to comply with the following relationship:

$$10^3 \frac{M}{0,5Z_{le}\sigma_{a,le} + Z_m\sigma_{a,m}} \leq 1,0$$

where:

- M : Bending moment, in kN.m, as given in [2.3.2]
- Z_{le} : Section modulus of one half pitch corrugation, in cm^3 , at the lower end of corrugations, to be calculated according to [2.4.3]
- Z_m : Section modulus of one half pitch corrugation, in cm^3 , at the mid-span of corrugations, to be calculated according to [2.4.4].
- $\sigma_{a,le}$: Allowable stress, in N/mm^2 , as given in [2.4.5], for the lower end of corrugations
- $\sigma_{a,m}$: Allowable stress, in N/mm^2 , as given in [2.4.5], for the mid-span of corrugations.

In no case is Z_m to be taken greater than the lesser of $1,15Z_{le}$ and $1,15Z'_{le}$ for calculation of the bending capacity, Z'_{le} being defined below.

Where effective shedders plates are fitted which:

- are not knuckled
- are welded to the corrugations and the top of the lower stool by one side penetration welds or equivalent
- are fitted with a minimum slope of 45° and their lower edge is in line with the stool side plating,

or effective gusset plates are fitted which:

- are fitted in line with the stool side plating
- have material properties at least equal to those provided for the flanges,

the section modulus Z_{le} , in cm^3 , is to be taken not larger than the value Z'_{le} , in cm^3 , given by:

$$Z'_{le} = Z_g + 10^3 \frac{Qh_g - 0,5h_g^2s_1p_g}{\sigma_a}$$

where:

- Z_g : Section modulus of one half pitch corrugation, in cm^3 , according to [2.4.4], in way of the upper end of shedder or gusset plates, as applicable
- Q : Shear force, in kN, as given in [2.3.3]
- h_g : Height, in m, of shedders or gusset plates, as applicable (see Fig 4, Fig 5, Fig 6, Fig 7 and Fig 8)
- s_1 : As given in [2.2.3] a)
- p_g : Resultant pressure, in kN/m^2 , as defined in [2.2.6] and [2.2.7], calculated in way of the middle of the shedders or gusset plates, as applicable
- σ_a : Allowable stress, in N/mm^2 , as given in [2.4.5].

Stresses τ are obtained by dividing the shear force Q by the shear area. The shear area is to be reduced in order to account for possible non-perpendicularity between the corrugation webs and flanges. In general, the reduced shear area may be obtained by multiplying the web sectional area by $(\sin\phi)$, ϕ being the angle between the web and the flange.

When calculating the section moduli and the shear area, the net plate thicknesses are to be used.

The section moduli of corrugations are to be calculated on the basis of the requirements given in [2.4.3] and [2.4.4].

2.4.3 Section modulus at the lower end of corrugations

The section modulus is to be calculated with the compression flange having an effective flange width, b_{ef} , not larger than as given in [2.4.6].

If the corrugation webs are not supported by local brackets below the stool top (or below the inner bottom) in the lower part, the section modulus of the corrugations is to be calculated considering the corrugation webs 30% effective.

- a) Provided that effective shedder plates, as defined in [2.4.2], are fitted (see Fig 4 and Fig 5), when calculating the section modulus of corrugations at the lower end (cross-section 1 in Fig 4 and Fig 5, the area of flange plates, in cm^2 , may be increased by the following value (which is not to be taken greater than: $2,5 a_t$)

$$2,5 a_t \sqrt{t_i t_{sh}} \sqrt{\frac{\sigma_{Fsh}}{\sigma_{Ffl}}}$$

Figure 4 : Symmetrical shedder plates

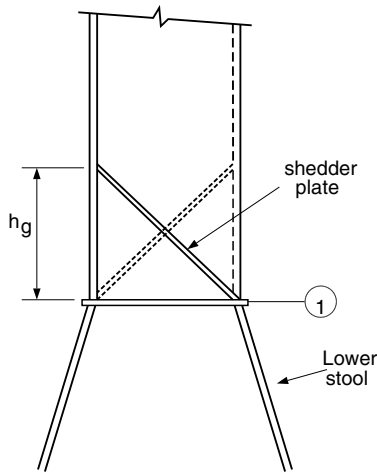
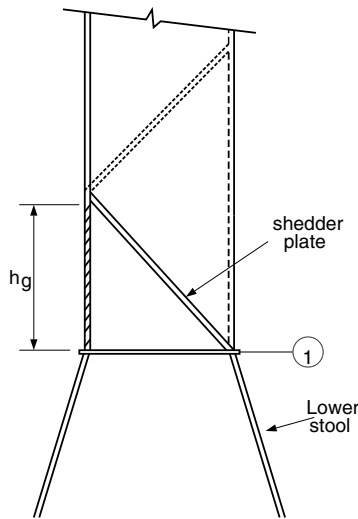


Figure 5 : Asymmetrical shedder plates

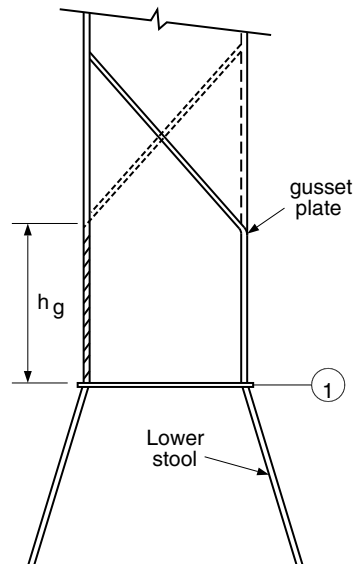


t_{gu} : Net gusset plate thickness, in mm, not to be taken greater than t_f
 t_f : Net flange thickness, in mm, based on the as-built condition.

- c) If the corrugation webs are welded to a sloping stool top plate, which is at an angle not less than 45° with the horizontal plane, the section modulus of the corrugations may be calculated considering the corrugation webs fully effective. Where effective gusset plates are fitted, when calculating the section modulus of corrugations the area of flange plates may be increased as specified in b) above. No credit can be given to shedder plates only.

For angles less than 45° , the effectiveness of the web may be obtained by linear interpolation between 30% for 0° and 100% for 45° .

Figure 6 : Symmetrical gusset/shedder plates



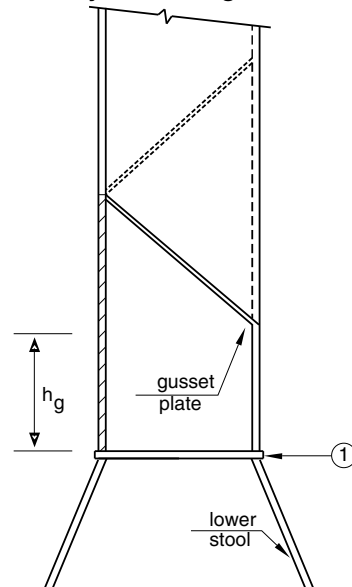
where:

- a : Width, in m, of the corrugation flange (see Fig 2)
- t_{sh} : Net shedder plate thickness, in mm
- t_f : Net flange thickness, in mm
- σ_{Fsh} : Minimum upper yield stress, in N/mm^2 , of the material used for the shedder plate
- σ_{Ffl} : Minimum upper yield stress, in N/mm^2 , of the material used for the corrugation flanges.

- b) Provided that effective gusset plates, as defined in [2.4.2], are fitted (see Fig 6, Fig 7 and Fig 8) when calculating the section modulus of corrugations at the lower end (cross-section 1 in Fig 6, Fig 7 and Fig 8), the area of flange plates, in cm^2 , may be increased by $7h_g t_{gu}$, where:

- h_g : Height of gusset plate in m, see Fig 6, Fig 7 and Fig 8, not to be taken greater than $s_{gu}/0,7$
- s_{gu} : Width of the gusset plates, in mm

Figure 7 : Asymmetrical gusset/shedder plates



2.4.4 Section modulus of corrugations at cross-sections other than the lower end

The section modulus is to be calculated with the corrugation webs considered effective and the compression flange having an effective flange width b_{ef} not larger than as given in [2.4.6].

2.4.5 Allowable stress check

The normal and shear stresses σ and τ are not to exceed the allowable values σ_a and τ_a , in N/mm², given by:

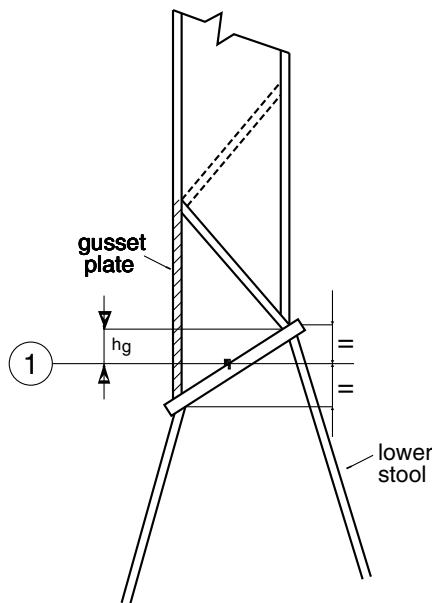
$$\sigma_a = \sigma_F$$

$$\tau_a = 0,5 \sigma_F$$

where:

σ_F : Minimum upper yield stress, in N/mm², of the material.

Figure 8 : Asymmetrical gusset/shedder plates Sloping stool top plate



2.4.6 Effective width of the compression flange of corrugations

The effective width b_{ef} , in m, of the corrugation flange is given by:

$$b_{ef} = C_e a$$

where:

$$C_e = \frac{2,25}{\beta} - \frac{1,25}{\beta^2} \quad \text{for } \beta > 1,25$$

$$C_e = 1 \quad \text{for } \beta \leq 1,25$$

$$\beta = 10^3 \frac{a}{t_f} \sqrt{\frac{\sigma_F}{E}}$$

t_f : Net flange thickness, in mm

a : As given in [2.4.3]

σ_F : Minimum upper yield stress, in N/mm², of the material

E : Modulus of elasticity, in N/mm², to be assumed equal to 206000 N/mm² for steel.

2.4.7 Shear buckling check

The buckling check is to be performed for the web plates at the corrugation ends.

The shear stress τ is not to exceed the critical value τ_C , in N/mm², obtained as follows:

$$\tau_C = \tau_E \quad \text{for } \tau_E \leq \frac{\tau_F}{2}$$

$$\tau_C = \tau_F \left(1 - \frac{\tau_E}{4\tau_F}\right) \quad \text{for } \tau_E > \frac{\tau_F}{2}$$

$$\tau_F = \frac{\sigma_F}{\sqrt{3}}$$

where:

σ_F : Minimum upper yield stress, in N/mm², of the material

$$\tau_E = 0,9 k_t E \left(\frac{t}{1000c}\right)^2$$

$$k_t = 6,34$$

E : Modulus of elasticity, in N/mm², as given in [2.4.6]

t : Net thickness, in mm, of corrugation web

c : Width, in m, of corrugation web (see Fig 2).

2.4.8 Local net plate thickness

The bulkhead local net plate thickness t , in mm, is given by:

$$t = 14,9 s_w \sqrt{\frac{p}{\sigma_F}}$$

where:

s_w : Plate width, in m, to be taken equal to the width of the corrugation flange or web, whichever is the greater (see Fig 2)

p : Resultant pressure, in kN/m², as defined in [2.2.6] and [2.2.7], at the bottom of each strake of plating; in all cases, the net thickness of the lowest strake is to be determined using the resultant pressure at the top of the lower stool or at the inner bottom, if no lower stool is fitted, or at the top of shedders, if shedder or gusset/shedder plates are fitted

σ_F : Minimum upper yield stress, in N/mm², of the material.

For built-up corrugation bulkheads, when the thicknesses of the flange and web are different, the net thickness of the narrower plating is to be not less than t_n , in mm, given by:

$$t_n = 14,9 s_n \sqrt{\frac{p}{\sigma_F}}$$

where:

s_n : Width, in m, of the narrower plating.

The net thickness of the wider plating, in mm, is not to be taken less than the maximum of the following values:

$$t_w = 14,9 s_w \sqrt{\frac{p}{\sigma_F}}$$

$$t_w = \sqrt{\frac{440 s_w^2 p}{\sigma_F} - t_{np}^2}$$

where:

t_{np} : thickness, in mm, less than or equal to the actual net thickness of the narrower plating and not to be greater than:

$$14,9 s_w \sqrt{\frac{p}{\sigma_F}}$$

2.5 Local details

2.5.1 General

As applicable, the design of local details is to comply with the Society's requirements for the purpose of transferring the corrugated bulkhead forces and moments to the boundary structures, especially to the double bottom and cross-deck structures.

In particular, the thickness and stiffness of gusset and shedder plates, as defined in [2.4.2], installed for strengthening purposes, are to comply with the Society's requirements on the basis of the load model in [2.2].

Unless otherwise stated, weld connections and materials are to be dimensioned and selected in accordance with the Society's requirements.

2.6 Steel renewal

2.6.1 General

Renewal/reinforcement is to be carried out in accordance with the following requirements and the guidelines contained in [3].

2.6.2 Steel renewal is required where the gauged thickness is less than $(t_{net}+0,5)$ mm, t_{net} being the thickness used for the calculation of bending capacity and shear stresses as given in [2.4.2] or the local net plate thickness as given in [2.4.8]. Alternatively, reinforcing doubling strips may be used providing the net thickness is not dictated by shear strength requirements for web plates (see [2.4.5] and [2.4.7]) or by local pressure requirements for web and flange plates (see [2.4.8]).

Where steel renewal is required, the bulkhead connections to the lower stool shelf plate (or inner bottom, if no stool is fitted

fitted) are to be made at least by deep penetration welds (see Fig 9).

Where the gauged thickness is within the range $(t_{net}+0,5)$ mm and $(t_{net}+1,0)$ mm, coating (applied in accordance with the coating Manufacturer's specifications) or annual gauging may be adopted as an alternative to steel renewal.

2.6.3 Where steel renewal or reinforcement is required, a minimum thickness of $(t_{net}+2,5)$ mm is to be replenished for the renewed or reinforced parts.

2.6.4 Gussets with shedder plates, extending from the lower end of corrugations up to $0,1\ell$, or reinforcing doubling strips (on bulkhead corrugations and stool side plating) are to be fitted when:

$$\frac{\sigma_{Fs} t_{st}}{\sigma_{Ffl} t_{fl}} \leq 0,8$$

where:

σ_{Ffl} : Minimum upper yield stress, in N/mm², of the material used for the corrugation flanges

σ_{Fs} : Minimum upper yield stress, in N/mm², of the material used for the lower stool side plating (or floors, if no stool is fitted)

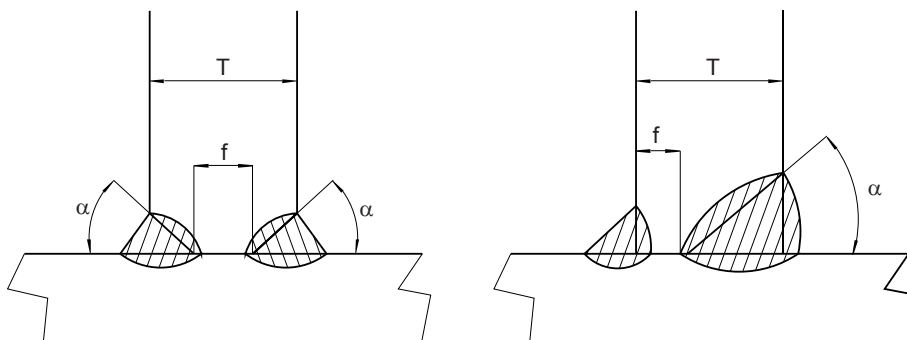
t_{fl} : Flange thickness, in mm, which is found to be acceptable on the basis of the criteria specified in [2.6.2] or, when steel renewal is required, the replenished thickness according to the criteria specified in [2.6.3]. The above flange thickness dictated by local pressure requirements (see [2.4.8]) need not be considered for this purpose

t_{st} : As-built thickness, in mm, of the lower stool side plating (or floors, if no stool is fitted).

If gusset plates are fitted, their material is to be the same as that of the corrugation flanges. The gusset plates are to be connected to the lower stool shelf plate (or inner bottom, if no lower stool is fitted) by deep penetration welds (see Fig 9).

Where gusset plates are to be fitted or renewed, their connections with the corrugations and the lower stool shelf plate (or inner bottom, if no stool is fitted) are to be made at least by deep penetration welds (see Fig 9).

Figure 9 : Deep penetration welds of shedder and gusset plates



Root face (f): 3 mm to T/3 mm

Groove angle (α): 40° to 60°

3 Guidance on renewal/reinforcement of the transverse watertight vertically corrugated bulkhead between the two foremost cargo holds

3.1

3.1.1 The need for renewal or reinforcement of the transverse watertight vertically corrugated bulkhead between the two foremost cargo holds will be determined by the Society on a case-by-case basis using the criteria given in [2] in association with the most recent gaugings and survey findings.

3.1.2 In addition to Rule requirements, the assessment of the transverse corrugated bulkhead based on the criteria given in [2] will take into account the following:

- scantlings of individual vertical corrugations will be assessed for reinforcement/renewal based on thickness measurements obtained in accordance with Sec 2, [1.3] at their lower end, at mid-depth and in way of plate thickness changes in the lower 70%. These considerations will take into account the provision of gussets and shedder plates and the benefits they offer, provided that they comply with [2.4.2] and [2.6].
- taking into account the scantlings and arrangements for each case, permissible levels of diminution will be determined and appropriate measures taken in accordance with [2.6].

3.1.3 Where renewal is required, its extent is to be shown clearly in plans. The vertical distance of each renewal zone is to be determined by considering the criteria given in [2] and is generally to be not less than 15% of the vertical distance between the upper and lower end of the corrugation measured at the ship's centreline.

3.1.4 Where the reinforcement is accepted by adding strips, the length of the reinforcing strips is to be sufficient to extend over the whole depth of the diminished plating. In general, the width and thickness of strips are to be sufficient to comply with the criteria given in [2]. The material of the

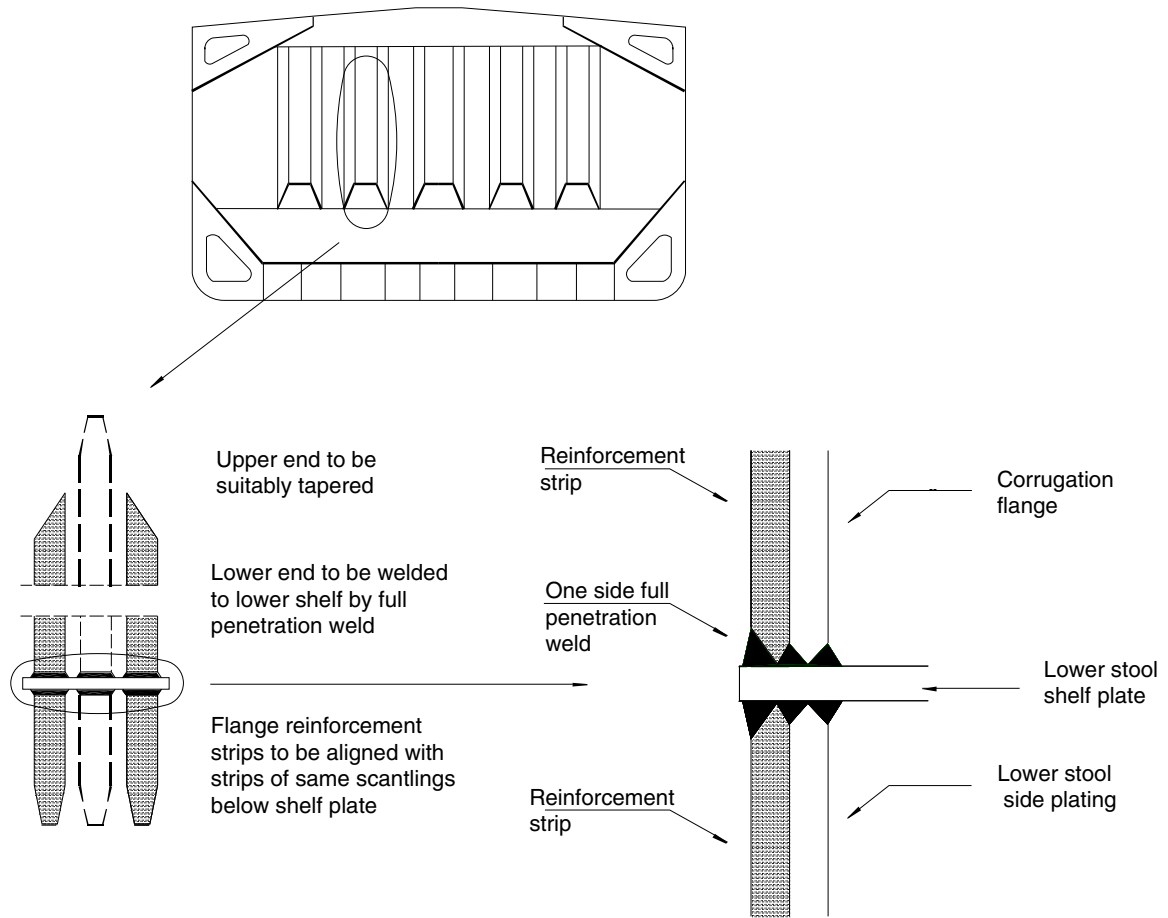
strips is to be the same as that of the corrugation plating. The strips are to be attached to the existing bulkhead plating by continuous fillet welds. The strips are to be suitably tapered or connected at ends in accordance with the usual welding practice to the Surveyor's satisfaction.

3.1.5 Where reinforcing strips are connected to the inner bottom or lower stool shelf plates, one side full penetration welding is to be used. When reinforcing strips are fitted to the corrugation flange and are connected to the lower stool shelf plate, they are normally to be aligned with strips of the same scantlings welded to the stool side plating and having a minimum length equal to the breadth of the corrugation flange.

3.1.6 Fig 10 gives a general arrangement of structural reinforcement. When such reinforcement is carried out, the following applies:

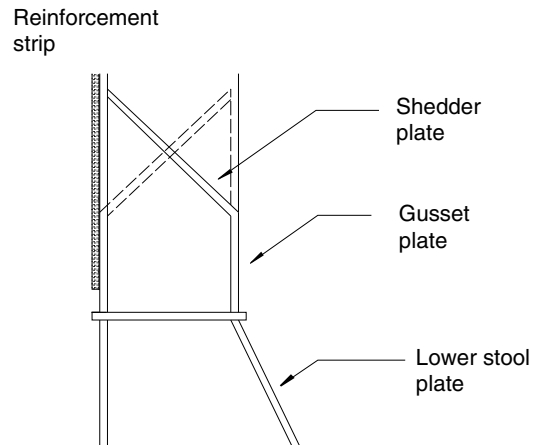
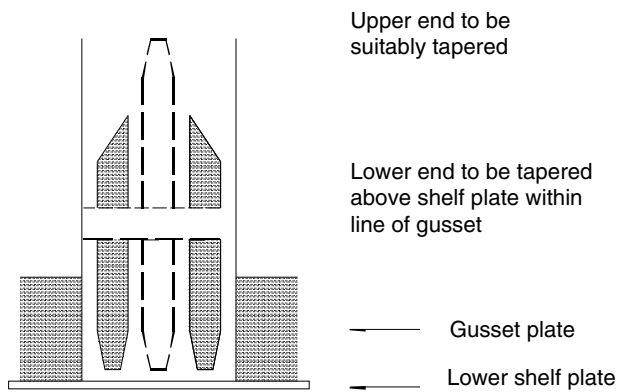
- square or trapezoidal corrugations are to be reinforced with plate strips fitted to each corrugation flange sufficient to meet the requirements given in [2]
- the number of strips fitted to each corrugation flange is to be sufficient to meet the requirements given in [2]
- the shedder plate may be fitted in one piece or prefabricated with a welded knuckle (gusset plate)
- gusset plates, where fitted, are to be welded to the shelf plate in line with the flange of the corrugation, to reduce the stress concentrations at the corrugation corners. Good alignment is to be ensured between gusset plates, corrugation flanges and lower stool sloping plates. Deep penetration welding is to be used at all connections. Start and stop of welding are to be as far away as possible from corners of corrugations
- shedder plates are to be attached by one side full penetration welds onto backing bars
- shedder and gusset plates are to have a thickness equal to or greater than the original bulkhead thickness. Gusset plates are to have a minimum height (on the vertical part) equal to half of the width of the corrugation flange. Sheddors and gussets are to be of the same material as that of the flange.

Figure 10 : Reinforcement of vertically corrugated bulkhead



Reinforcement strips with shedder plate

Weld of reinforcement strip to shelf plate



Reinforcement strips with shedder and gusset plates

4 Evaluation of allowable hold loading of the foremost cargo hold with the same cargo hold flooded

4.1 Application and definitions

4.1.1 These requirements apply to bulk carriers:

- of single side skin construction
- of 150 metres in length and above
- intended to carry solid bulk cargoes having a bulk density of 1,78 t/m³ or above
- contracted for construction prior to 1st July 1998, and not constructed in compliance with the applicable requirements for new buildings contracted after that date, and given in Pt E, Ch 4, Sec 3.

4.1.2 The loading in the foremost cargo hold is not to exceed the allowable hold loading in the flooded condition, calculated as per [4.4], using the loads given in [4.2] and the shear capacity of the double bottom given in [4.3].

In no case is the allowable hold loading in flooding condition to be taken greater than the design hold loading in intact condition.

4.2 Load model

4.2.1 General

The loads to be considered as acting on the double bottom of the foremost cargo hold are those given by the external sea pressures and the combination of the cargo loads with those induced by the flooding of the foremost cargo hold itself.

The most severe combinations of cargo induced loads and flooding loads are to be used, depending on the loading conditions included in the loading manual:

- homogeneous loading conditions
- non-homogeneous loading conditions
- packed cargo conditions, such as steel mill products.

For each loading condition, the maximum bulk cargo density to be carried is to be considered in calculating the allowable hold limit.

4.2.2 Inner bottom flooding head

The flooding head h_f (see Fig 11) is the distance, in m, measured vertically with the ship in the upright position, from the inner bottom to a level located at a distance d_f , in m, from the base line equal to:

- D in general
- $0,95D$ for ships less than 50000 tonnes deadweight with type B freeboard,

D being the distance, in m, from the base line to the freeboard deck at side amidships (see Fig 11).

4.3 Shear capacity of the double bottom of the foremost cargo hold

4.3.1 General

The shear capacity C of the double bottom of the foremost cargo hold is defined as the sum of the shear strength at each end of:

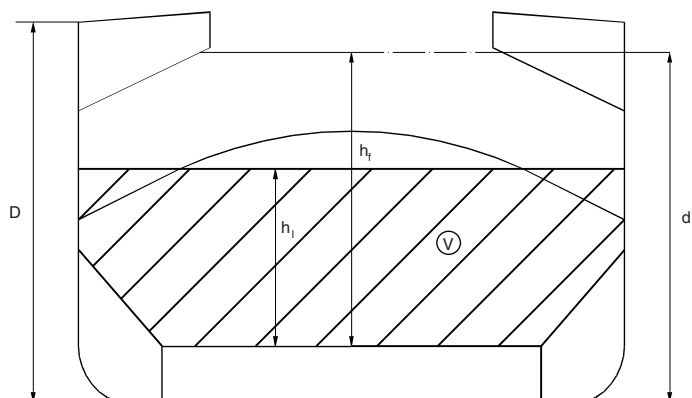
- all floors adjacent to both hoppers, less one half of the strength of the two floors adjacent to each stool, or transverse bulkhead if no stool is fitted (see Fig 12)
- all double bottom girders adjacent to both stools, or transverse bulkheads if no stool is fitted.

The strength of girders or floors which run out and are not directly attached to the boundary stool or hopper girder is to be evaluated for the one end only.

Note 1: The floors and girders to be considered are those inside the hold boundaries formed by the hoppers and stools (or transverse bulkheads if no stool is fitted). The hopper side girders and the floors directly below the connection of the bulkhead stools (or transverse bulkheads if no stool is fitted) to the inner bottom are not to be included.

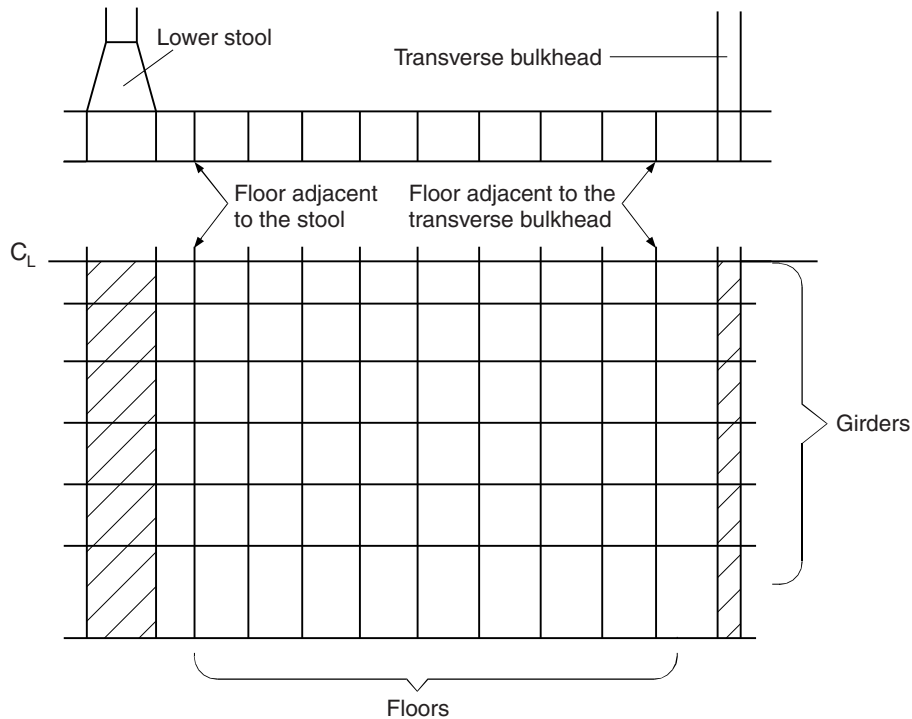
Note 2: When the geometry and/or the structural arrangement of the double bottom is such as to make the above assumptions inadequate, at the Society's discretion, the shear capacity C of the double bottom is to be calculated by means of direct calculations to be carried out according to Pt B, Ch 7, App 1, as far as applicable.

Figure 11 : Calculation of pressure on the inner bottom in the flooded cargo hold



V = Volume of cargo

Figure 12 : Double bottom structure



In calculating the shear strength, the net thicknesses of floors and girders are to be used. The net thickness t_{net} , in mm, is given by:

$$t_{net} = t - t_c$$

where:

- t : As-built thickness, in mm, of floors and girders
- t_c : Corrosion diminution, equal to 2 mm, in general; a lower value of t_c may be adopted, provided that measures are taken, to the Society's satisfaction, to justify the assumption made.

4.3.2 Floor shear strength

The floor shear strength in way of the floor panel adjacent to hoppers S_{f1} , in kN, and the floor shear strength in way of the openings in the outermost bay (i.e. that bay which is closest to the hopper) S_{f2} , in kN, are given by the following expressions:

$$S_{f1} = 10^{-3} A_f \frac{\tau_a}{\eta_1}$$

$$S_{f2} = 10^{-3} A_{f,h} \frac{\tau_a}{\eta_2}$$

where:

- A_f : Sectional area, in mm², of the floor panel adjacent to hoppers
- $A_{f,h}$: Net sectional area, in mm², of the floor panels in way of the openings in the outermost bay (i.e. that bay which is closest to the hopper)
- τ_a : Allowable shear stress, in N/mm², to be taken equal to :

$$\tau_a = \frac{\sigma_F}{\sqrt{3}}$$

σ_F : Minimum upper yield stress, in N/mm², of the material

η_1 : $\eta_1 = 1,10$

η_2 : $\eta_2 = 1,20$

η_2 may be reduced, at the Society's discretion, down to 1,10 where appropriate reinforcements are fitted to the Society's satisfaction.

4.3.3 Girder shear strength

The girder shear strength in way of the girder panel adjacent to stools (or transverse bulkheads, if no stool is fitted) S_{g1} , in kN, and the girder shear strength in way of the largest opening in the outermost bay (i.e. that bay which is closest to the stool, or transverse bulkhead, if no stool is fitted) S_{g2} , in kN, are given by the following expressions:

$$S_{g1} = 10^{-3} A_g \frac{\tau_a}{\eta_1}$$

$$S_{g2} = 10^{-3} A_{g,h} \frac{\tau_a}{\eta_2}$$

where:

A_g : Minimum sectional area, in mm², of the girder panel adjacent to stools (or transverse bulkheads if no stools are fitted)

$A_{g,h}$: Net sectional area, in mm², of the girder panel in way of the largest opening in the outermost bay (i.e. that bay which is closest to the stool, or transverse bulkhead, if no stool is fitted)

τ_a : Allowable shear stress, in N/mm², as given in [4.3.2]

η_1 : $\eta_1 = 1,10$

η_2 : $\eta_2 = 1,15$
 η_2 may be reduced, at the Society's discretion, down to 1,10 where appropriate reinforcements are fitted to the Society's satisfaction.

4.4 Allowable hold loading

4.4.1 The allowable hold loading W , in t, is given by:

$$W = \rho_c V \frac{1}{F}$$

where:

F : equal to 1,05 in general (for steel mill products, $F = 1$)

ρ_c : Cargo density, in t/m³; for bulk cargoes see [4.2.1]; for steel products, ρ_c is to be taken as the density of steel

V : Volume, in m³, occupied by cargo at a level h_1 given by:

$$h_1 = \frac{X}{\rho_c g}$$

where:

X : for bulk cargoes, is the lesser of X_1 and X_2 given by:

$$X_1 = \frac{Z + \rho g(E - h_f)}{1 + \frac{\rho}{\rho_c}(\text{perm} - 1)}$$

$$X_2 = Z + \rho g(E - h_f \text{perm})$$

Note 1: For steel products, X may be taken equal to X_1 , using perm=0.

ρ : Sea water density, in t/m³

g : 9,81 m/s², gravity acceleration

E : $E = d_f - 0,1 D$

with d_f and D as given in [4.2.2]

h_f : Flooding head, in m, as defined in [4.2.2]

perm : Permeability of cargo, to be taken as 0,3 for ore (corresponding bulk cargo density for iron ore may generally be taken as 3,0 t/m³)

Z : The lesser of Z_1 and Z_2 given by:

$$Z_1 = \frac{C_h}{A_{DB,h}}$$

$$Z_2 = \frac{C_e}{A_{DB,e}}$$

with:

C_h : Shear capacity of the double bottom, in kN, as defined in [4.3], considering, for each floor, the lesser of the shear strengths S_{f1} and S_{f2} (see [4.3.2]) and, for each girder, the lesser of the shear strengths S_{g1} and S_{g2} (see [4.3.3])

C_e : Shear capacity of the double bottom, in kN, as defined in [4.3], considering, for each floor, the shear strength S_{f1} (see [4.3.2]) and, for each girder, the lesser of the shear strengths S_{g1} and S_{g2} (see [4.3.3])

$$A_{DB,h} : A_{DB,h} = \sum_{i=1}^{i=n} S_i B_{DB,i}$$

$$A_{DB,e} : A_{DB,e} = \sum_{i=1}^{i=n} S_i (B_{DB} - s)$$

where:

n : number of floors between stools (or transverse bulkheads, if no stools are fitted)

S_i : Space of i th-floor, in m

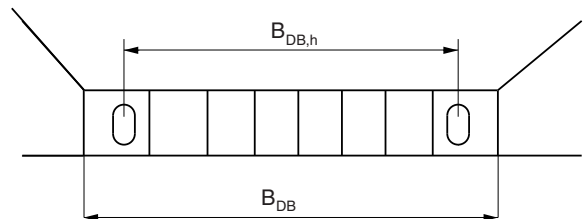
$B_{DB,i}$: • for floors whose shear strength is given by S_{f1} (see [4.3.2]) : $B_{DB,i} = B_{DB} - s$
 • for floors whose shear strength is given by S_{f2} (see [4.3.2]) : $B_{DB,i} = B_{DB,h}$

where $B_{DB,h}$ is the distance, in m, between the two openings considered (see Fig 13)

B_{DB} : Breadth of double bottom, in m, between hoppers (see Fig 13)

s : Spacing, in m, of double bottom longitudinals adjacent to hoppers.

Figure 13 : Dimensions B_{DB} and $B_{DB,h}$



APPENDIX 2

GUIDELINES FOR THE THICKNESS MEASUREMENTS OF SIDE SHELL FRAMES AND BRACKETS IN SINGLE SIDE SKIN BULK CARRIERS SUBJECT TO COMPLIANCE WITH THE REQUIREMENTS OF SECTION 2, [7]

1 General

1.1

1.1.1 (2/4/2004)

Thickness measurements are necessary to determine the general condition of the structure and to define the extent of possible steel renewals or other measures for the webs and flanges of side shell frames and brackets for verification of compliance with the requirements of Sec 2, [7].

2 Zones of side shell frames and brackets

2.1

2.1.1 (2/4/2004)

For the purpose of steel renewal, sandblasting and coating, four zones A, B, C and D are defined, as shown in Fig 1. Zones A and B are considered to be the most critical zones.

3 Pitting and grooving

3.1 General

3.1.1 (2/4/2004)

Pits can grow in a variety of shapes, some of which would need to be ground before assessment. Pitting corrosion may be found under coating blisters, which are to be removed before inspection. To measure the remaining thickness of pits or grooving the normal ultrasonic transducer (generally 10mm diameter) will not suffice. A miniature transducer (3 to 5 mm diameter) is to be used. Alternatively the gauging firm is to use a pit gauge to measure the depth of the pits and grooving and calculate the remaining thickness.

3.2 Assessment based upon area

3.2.1 (1/7/2006)

This is the method specified in Sec 2, [7.5.7] and is based upon the intensity determined from Figure 2.

If pitting intensity is higher than 15% in an area (see Fig 2), then thickness measurements are to be taken to check the extent of the pitting corrosion. The 15% is based upon pitting or grooving on only one side of the plate.

In cases where pitting is evident as defined above (exceeding 15%), then an area of 300mm diameter or more (or an equivalent rectangular area, where this is impracticable on the frame flange or the side shell, hopper tank plating or topside tank plating attached to the side frame), at the most pitted part, is to be cleaned to bare metal, and the thickness measured in way of the five deepest pits within the cleaned area. The least thickness measured in way of any of these pits is to be taken as the thickness to be recorded.

The minimum acceptable remaining thickness in any pit or groove is equal to:

- 75% of the as-built thickness, for pitting or grooving in the cargo hold side frame webs and flanges
- 70% of the as-built thickness, for pitting or grooving in the side shell, hopper tank and topside tank plating attached to the cargo hold side frame, over a width up to 30 mm from each side of it.

Figure 1 : Zones of side shell frames and brackets (2/4/2004)

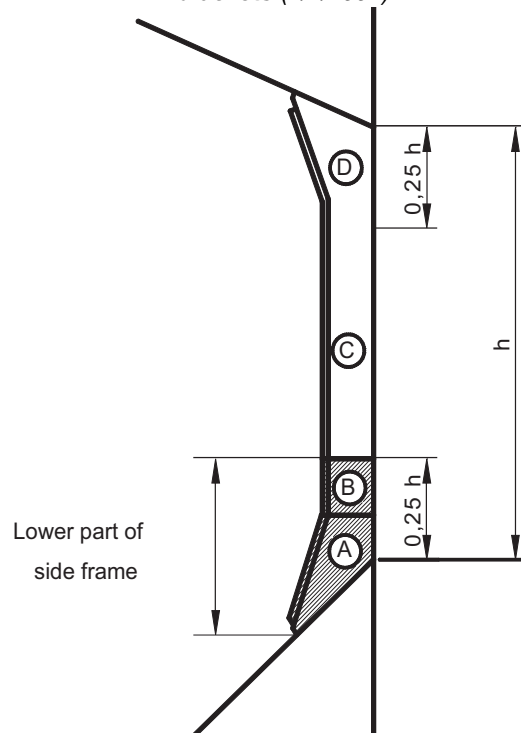
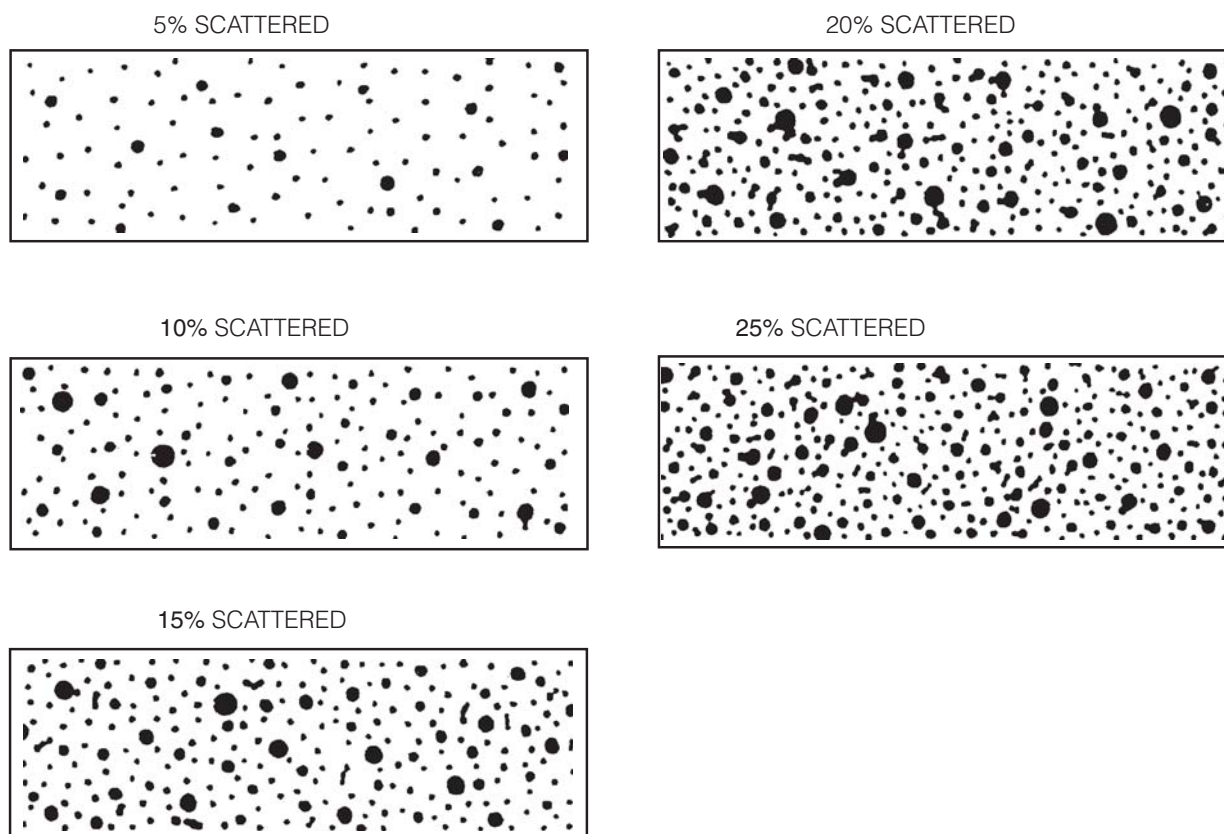


Figure 2 : Pitting intensity diagrams (from 5% to 25% intensity) (2/4/2004)

4 Gauging methodology

4.1 General

4.1.1 (2/4/2004)

The numbers of side frames to be measured are equivalent to those of class renewal survey or intermediate survey corresponding to the ship's age. Representative thickness measurements are to be taken for each zone as specified below.

Special consideration may be given to the extent of the thickness measurements if the structural members show no thickness diminution with respect to the as-built thicknesses and the coating is found in "as-new" condition (i.e. without breakdown or rusting).

Where gauging readings close to the criteria are found, the number of hold frames to be measured is to be increased.

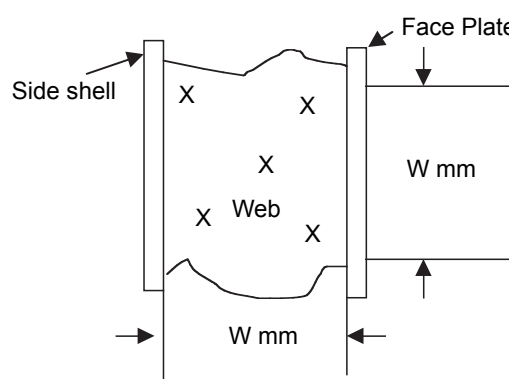
If renewal or other measures according to Sec 2, [7] are to be applied on individual frames in a hold, then all frames in that hold are to be gauged.

There are a variety of construction methods used for side shell frames in bulk carriers. Some have faceplates (T sections) on the side shell frames, some have flanged plates and some have bulb plates. The use of faceplates and flanged sections is considered similar for gauging purposes in that both the web and faceplate or web and flange plate are to be gauged. If a bulb plate has been used, then the web of the bulb plate is to be gauged in the normal manner and the sectional modulus is to be specially considered, if required.

4.2 Gauging for Zones A, B and D - Web plating

4.2.1 (2/4/2004)

The gauging pattern for Zones A, B and D is to be a five-point pattern (see Fig 3). The five-point pattern is to be over the depth of the web and the same area vertically. The gauging report is to reflect the average reading.

Figure 3 : Typical five-point pattern on the web plate (2/4/2004)

4.3 Gauging for Zone C - Web plating

4.3.1 (2/4/2004)

Depending upon the condition of the web in way of Zone C, the web may be measured by taking 3 readings over the length of Zone C and averaging them. The average reading

is to be compared with the allowable thickness. If the web plating has general corrosion then this pattern should be expanded to a five-point pattern as noted above.

4.4 Gauging for sections a) and b) (flanges and side shell plating)

4.4.1 (2/4/2004)

Where the lower bracket length or depth does not meet the requirements in Pt E, Ch 4, Sec 3, [6.2], gauging readings are to be taken at sections a) and b) to calculate the actual section modulus required in Sec 2, [7.6.7] (see Fig 4). At least 2 readings on the flange/faceplate are to be taken in way of each section. At least one reading of the attached

shell plating is to be taken on each side of the frame (i.e. fore and aft) in way of section a) and section b).

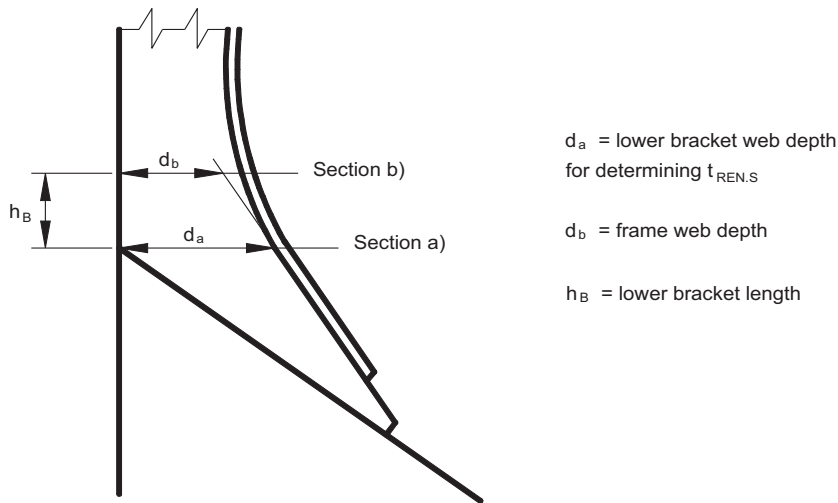
5 Report on thickness measurements of cargo hold frames

5.1

5.1.1 (2/4/2004)

The thickness measurements of the cargo hold frames taken as required above for verification of compliance with the requirements of Sec 2, [7] are recorded in the appropriate form where the four zones A, B, C and D are indicated.

Figure 4 : Sections a) and b) (2/4/2004)



d_a = lower bracket web depth for determining $t_{REN,S}$

d_b = frame web depth

h_B = lower bracket length