



**INTLREG**  
INTERNATIONAL REGISTER OF SHIPPING

# RULES AND REGULATIONS FOR CLASSIFICATION OF STEEL VESSELS

## Part 1 Classification Regulations

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**CHANGES HISTORY**

| Date           | Revision No.: | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| January 2020   | 0             | Initial Issue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| September 2021 | 1             | Additional Class notations Introduced in the Part 1, Chapter 1, Section 4.6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| March 2022     | 2             | <ol style="list-style-type: none"> <li>1. Amended additional class notations in the Part 1, Chapter 1, Section 4.6 to include more special types of vessels.</li> <li>2. Amended notations in the Part 1, Chapter 1, Section 4.7 of Service area restrictions.</li> <li>3. Part 7B for special ship types, Chapters from 8 to 18 amended to include more special types of vessels.</li> <li>4. Amended Part 1, Chapter 1, Section 10, Liability clauses and statements added.</li> <li>5. Copyright Description amended on the index page.</li> </ol>                                                                                                                                                                                 |
| January 2024   | 3             | <ol style="list-style-type: none"> <li>1. Amended Part 1, Chapter 1, Section 10 [10.3], Force Majeure added.</li> <li>2. Amended Part 1, Chapter 1, Section 5 [5.2], documentation requirement amended.</li> <li>3. Additional Class notations added in Part 1, Chapter 1, Section 4 Table 4.11.2- related to special equipment and system and descriptive notations.</li> <li>4. Part 5A, Machinery Installation and Piping and Fire Safety amended</li> <li>5. Part 7A, Formalizing the changes on the “Common Structural Rules for Bulk Carriers and Oil Tankers” with respect to the latest Rule Change notices.</li> <li>6. Part 7B, Special ship types, Chapters from 19 to 23, Special equipment and systems added.</li> </ol> |
| January 2025   | 4             | <p>1.Part 1/Chapter 2/Section 5– Hull Surveyable items-New Building Rules added</p> <p><i>The amendments are applicable to ships contracted for construction on or after 1 April 2025.</i></p> <p><i>For amendments which apply to Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10, application date will be same as entry in to force date of SOLAS Chapter II-1 Part A-1 Regulation 3-10</i></p>                                                                                                                                                                                                                                                                                                   |

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**Vessels**

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|------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| April 2026 | 5 | <ol style="list-style-type: none"><li>1. Added Part 7B, Chapter 24 for special ship types to include Live Stock Carrier</li><li>2. Amended Part 1, Chapter 6, Section 4, In-Water Survey Requirements</li><li>3. Added Part 6, Chapter 9 to introduce requirements of Cyber Security and Resilience</li></ol> |
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International Register of Shipping (INTLREG) (hereafter referred as the Society) has copyrights of these rules and they fall under its ownership rights. Consequently, only the Society is entitled to offer and/or perform classification or other services on the basis of and/or pursuant to these rules without Society prior written consent, which can include issuance of certificates and/or declarations of conformity, wholly or partly. Also Society cannot be held accountable for the resultant consequences of using rules other than those specified by Society.

# CHAPTER 1 CLASSIFICATION PRINCIPLES

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## SECTION 1 SCOPE OF CLASSIFICATION

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**1.1. GENERAL**

The Classification concept comprises the development of independent technical standards for ships, and the verification of compliance with these standards throughout the ship's life. The Rules and Regulations are aimed at ensuring safety against hazards to the ship, personnel, passengers and cargo, and against hazards to the environment as a consequence of sea transport.

The classification of ships is performed in accordance with the requirements of the Rules and Regulations & by other standards to which reference is made.

Having assigned class, the Society will issue a classification certificate and enter the main particulars and details of class for the ship in the Society's Register Book.

Additional requirements as determined by the Society may be applicable for particular ship types based on the vessel type assigned in the Class Notation.

**1.2. CLASSIFICATION PROCESS**

Classification process comprises of the following

- Development of the criteria for classification, which is contained in the societies Rules and Regulations based on
  - (1) Independent research and development activities of the Society,
  - (2) Applicable international codes, conventions and
  - (3) Recognized national or international standards and
  - (4) Developments in the ancillary industries.
- Appraisal of the design during and after construction and surveys at the time of construction, entry in to class and modifications to ensure that the vessel meets the criteria stipulated by the Rules and Regulations.
- Issuance of a 'Certificate of Classification' and entering of the vessel's particulars in to the societies Register of Ships.
- Periodical surveys as stipulated by the Rules and Regulations to ensure continued maintenance of conditions of classification.
- Additional surveys as deemed necessary by the Technical Committee in view of damages, reported poor condition of the vessel by port state control authorities, etc.

**1.3. RULE DEVELOPMENT**

- 1.3.1. Society's Rules and Regulations are formulated based on the experience gained by the Society through the survey reports and feedbacks, independent research and development activities carried out by the Society or any other means acceptable under the quality system of the Society.

- 1.3.2. With a view to participate all interests involved in the process of classification the Rules and Regulations and proposed amendments to the rules are circulated to various sections of the maritime industry including the flag states who have authorized International Register of Shipping (INTLREG) to perform statutory surveys under various national and international regulations, associations of ship owners, shipbuilders, Underwriters, etc. and their comments or suggestions are invited, either through correspondence or through the formation of Technical Committees for various regions.
- 1.3.3. The Rules and Regulations are approved by the Technical Committee of International Register of Shipping (INTLREG) and based on submission for suggestions/ comments from the sections of maritime industry as described in Section 1 [1.3.2].
- 1.3.4. The Technical Committee reserves the right to amend or alter the Rules and Regulations without providing any kind of advance notice to its clients except as provided in Section 1 [1.3.2] Rules and Regulations or amendments thereto approved by the Technical Committee enters in to force after six months from the date of approval of the same by the Technical Committee, unless specifically decided otherwise by the Technical Committee.
- 1.3.5. Unless specifically mentioned otherwise the Rules and Regulations contained in this part and amendments thereto shall be applicable to all ships classed by the Society from the date of entry into force. However, unless specifically mentioned otherwise, the Rules and Regulations and the amendments thereto contained in Part I onwards shall not be applicable to a ship whose keel has been laid or the mid-ship section plan has been approved prior to the date of entry in to force of the Rules and Regulations or its amendment.
- 1.3.6. Technical Committee may at its discretion make applicable any Rules and Regulations which have entered in to force for ships for which keel was laid or the mid ship section plan was approved, prior to entering in to force of such rules, regulations or amendments thereto, in case of vessels where no substantial construction has been progressed for a long duration after the date of entering force of such rules, regulations or amendments thereto.

#### **1.4. CONDITIONS OF CLASSIFICATION**

- 1.4.1. Classification of a vessel means that the vessel based on the appraisal of designs and surveys carried out by the surveyors and staff of the Society meets the criteria laid down by the Rules and Regulations. Under no circumstances, the classification of a vessel shall be considered as the attestation of the absolute safety of the vessel.
- 1.4.2. Classification of a vessel does not relieve the designers, ship, component and machinery builders, suppliers of raw materials, sellers, owners, operators, masters, crews, consultants and repairers of their responsibility for having performed their duty with due diligence and classification is not a substitute for their independent professional judgment.

- 1.4.3. The Rules and Regulations are formulated on the understanding that vessels will not be operated in environmental conditions more severe than those agreed for the design basis and approval, without prior agreement of the Society.
- 1.4.4. Ensuring that vessel is always operated within the limitations or criteria laid down by the Rules and Regulations, and avoidance of loads, their distribution and stresses beyond the limits stipulated by the rules, codes, conventions and those agreed for the design basis and approval are the exclusive responsibility of the Master.
- 1.4.5. To facilitate innovations and technological developments in the shipbuilding and shipping industry the Society is prepared to use rules or standards as proposed by the client for the purpose of classification provided, if in the opinion of the Technical Committee the proposed rules or standards provide reasonable equivalence with the Society's Rules and Regulations.
- 1.4.6. The Society is also, at all times, prepared consider and accept alternative arrangements and scantlings, which can be shown to the satisfaction of the Society by way of procedures approved by the Technical Committee or through satisfactory service experience of similar installations to be equivalent to the reliability achieved by those arrangements as per the Rules and Regulations.
- 1.4.7. Vessels which contain novel features of design for which provisions of the Rules and Regulations are not directly applicable shall be classed if it can be shown to the satisfaction of the Technical Committee that the overall reliability of the vessel is at least equivalent to those envisaged by the Rules and Regulations.
- 1.4.8. Any damage, defect, breakdown, grounding, serious deficiency, detention or, arrest or refusal of access, which could invalidate the conditions for which a class has been assigned, is to be reported to International Register of Shipping (INTLREG) without delay.
- 1.4.9. In addition to complying with the criteria laid down by the Society's Rules and Regulations, vessels are required to comply with all the international conventions and codes in force as applicable to the vessel and any national regulations of the vessel's flag state. Certificates or statements issued by the flag administration or an organization recognized by the administration to do so may be considered as satisfactory evidence for compliance with the above.
- 1.4.10. The Technical Committee, in addition to requiring compliance with the Rules and Regulations, may require to be satisfied those ships are suitable for the geographical or other limits or conditions of the service contemplated.

1.4.11. The Technical Committee requires that ships comply with all requirements of the National Administration and all applicable mandatory international IMO and ILO Conventions and Codes (including Amendments thereto), including the following:

- *Load Lines, 1966/1988 - International Convention on Load Lines, 1966, as Amended by the Protocol of 1988*
- *SOLAS - International Convention for the Safety of Life at Sea*
- *MARPOL - International Convention for the Prevention of Pollution from Ships*
- *AFS - International Convention on the Control of Harmful Anti-Fouling Systems on Ships, 2001*
- *Tonnage - International Convention on Tonnage Measurement of Ships, 1969*
- *IBC Code - International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk Amended by Resolution MEPC.225(64)*
- *2014 IGC Code - International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk*
- *IMSBC Code – International Maritime Solid Bulk Cargoes Code – Resolution MSC.268(85)*
- *Maritime Labour Convention.*

The Technical Committee requires the applicable Convention and Code Certificates to be issued by authorities as follows:

- Cargo Ship Radio Certificates, Safety Management Certificates, International Ship Security Certificates and Maritime Labour Certificates, if required, must have been issued by a recognised organisation authorised by the National Administration with which the ship is registered.
- All other statutory certificates must have been issued by International Register of Shipping (INTLREG) or by a National Administration or a Recognised Society or by an IACS Member when so authorised by the National Administration with which the ship is registered.

In the case of dual-classed ships, Convention Certificates may be issued by the other Classification Society with which the ship is classed, provided this is recognised in a formal Dual Class Agreement with International Register of Shipping (INTLREG) and provided the other Classification Society is also authorised by the National Administration.

In the event of a National Administration withdrawing any ship's Convention Certificate, then the Technical Committee may suspend the ship's class. If a ship is removed from the National Administration's Registry for the non-compliance with the Conventions or Classification Requirements referred to herein, then the Technical Committee will suspend the ship's class. In the event of ISM Code - International Management Code and Revised Guidelines on Implementation of the ISM Code certification being withdrawn from a ship or Operator, then the Technical Committee will suspend the ship's class.

- 1.4.12. Where an onboard computer system having longitudinal strength computation and /or stability capability, which is required by the Rules and Regulations or any Statutory Requirement, is provided on a new ship, or newly installed on an existing ship, then the system is to be certified in respect of longitudinal strength *and Stability Calculation Programs* as per the requirements specified in Part 1, Chapter 1, Section 5 [5.2.5.7],[5.2.5.8]
- 1.4.13. Where an onboard computer system having stability computation capability is provided on a new ship, then the system is to be certified in respect of stability aspects. When provided, an on-board computer system having stability computation capability is to carry out the calculations and checks necessary to assess compliance with all the stability requirements applicable to the ship on which it is installed.
- 1.4.14. Where a ship has been detained by Port State Control the Owner is to advise International Register of Shipping (INTLREG) immediately in order to arrange the attendance of a Surveyor.

**1.5. TECHNICAL COMMITTEE:**

- 1.5.1. Technical Committee consists of the following members:
- (a) Marine Director and/or Members of Management Team
  - (b) Head of Quality Department
  - (c) Experts from various departments of INTLREG.
  - (d) Professionals representing technical disciplines relevant to the industry when a specialised skill is deemed necessary.
  - (e) Experts from the industry having specialised knowledge may be co-opted to serve on the Technical Committee.
- 1.5.2. The function of the Technical Committees is to consider and review:
- (a) any technical issues connected with International Register of Shipping (INTLREG) business
  - (b) any proposed alterations in the existing Rules and Regulations;
  - (c) any new Rules and Regulations for Classification

In cases where the mandatory implementation of international conventions and codes, common rules and regulations, unified requirements and interpretations adopted by the International Association of Classification Societies, or other requirements call for changes to the Rules and Regulations, these may be implemented by the International Register of Shipping (INTLREG) without the relevant Technical Committee's input, though any such changes may be sent to the Technical Committees for information.

The International Register of Shipping (INTLREG) may implement changes to the Rules and Regulations without consulting the relevant Technical Committee if doing so is necessary to allow the Rules and Regulations to recognize existing technical requirements as Class Notations or Descriptive Notes. However, notice of these changes will be sent to the relevant Technical Committee for information.

## SECTION 2 DEFINITIONS

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**2.1. GENERAL**

- i) **The Society:** Means International Register of Shipping (INTLREG), with its corporate office at 4770 Biscayne Blvd, Suite 800, Miami, Florida 33137, United States of America.
- ii) **The Committee:** Means the Technical Committee of International Register of Shipping (INTLREG) as described in Part 1, Chapter 1, Section 1 [1.5].
- iii) **The Board:** Means the Board of Directors of the Society as defined in the articles of association of the Society.
- iv) **The Rules:** Means the prescriptive and performance based technical requirements stipulated by the Part II onwards of the “INTLREG Rules and Regulations for Classification of Steel Vessels” of the Society in force or as applicable.
- v) **The Regulations:** Means the classification principles and the survey requirements stipulated in the Part I of the “INTLREG Rules and Regulations for Classification of Steel Vessels” of the Society in force or as applicable.
- vi) **Client:** Means the owner or builder of the vessel who has requested for the classification and is liable for payment of the Society’s fees.
- vii) **Recognized Society:** Means a Classification Society recognized by the Technical Committee as having adequate competence for providing classification services equivalent to those provided by the International Register of Shipping (INTLREG).
- viii) **Register of Ships:** Means a register maintained at the Head office of the Society giving the main particulars and details of its classification of vessels serviced by the Society. Register of Ships may be maintained in electronic or other means as considered appropriate by the Technical Committee. The Register of Ships may be published by the Society through online publication on the World Wide Web or other means as decided by the Technical Committee.
- ix) **Survey:** Signifies a systematic and independent examination of a vessel, materials, components or systems in order to verify compliance with the rules and/or statutory requirements. Surveys will be carried out on the vessel, at the construction or repair site as well as at sub-suppliers and other locations at the discretion of the Society, which also decides the extent and method of control.
- x) **Alteration:** Change that does not affect the basic character or structure of the ship it is applied to.
- xi) **Conversion:** Change that substantially alters the dimensions, carrying capacity, engine power or the type

- xii) **Certification:** A service confirming compliance with applicable requirements on the date that the survey was completed
- xiii) **Condition of Class**  
To report deficiencies which are temporally repaired and has to be dealt with permanent means in a stipulated time in so far as classification requirements are concerned.
- xiv) **Statutory Condition**  
To report deficiencies regarding statutory surveys and findings imposed by Flag States/ Port States.
- xv) **Record Information**  
Records to be added to the vessel's survey status when an additional item/work is introduced. This information does not propose any action.  
Eg. Installation of a New Equipment (Crane, BWTS, Winch etc.), Loading Instrument, Modification of Hull, Upgrading of Loading Instrument etc.
- xvi) **Memoranda**  
To report deficiencies related to Documentation, Drawings, certificates etc.  
This may be introduced both by attending Surveyors and Ship Survey Assurance Officers.
- xvii) **Flag Administration:** The maritime administration of a vessel's country of registry.
- xviii) **Plan Approval:** Signifies a systematic and independent examination of drawings, design documents or records in order to verify compliance with the rules or statutory requirements. Plan approval will be carried out at the discretion of the Society, which also decides the extent and method of examination
- xix) **Port State Authority:** The maritime authority in the country of the vessel's port of call
- xx) **Retroactive Requirement (RR):** Constitutes a class or statutory requirement that will enter into force for certain ships in operation and under construction at a given date or an upcoming survey. The RR will specify the required actions to be taken in order to retain class or statutory certification. RR related to statutory certification will be issued only if the Society has been authorised to carry out statutory certification on behalf of the flag administration.
- xxi) **Statement of Compliance:** A document confirming compliance with specified requirements. Such documents may be issued by the Society in cases where it has not been authorized to certify compliance



## SECTION 3 ASSIGNMENT OF CLASS

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**3.1. REQUEST FOR CLASSIFICATION**

- 3.1.1. The request for classification is to be received in writing from the owner, builder, or an authorized representative. By requesting for classification, the client agree to comply by the Rules and Regulations of the Society as applicable and to pay the fees applicable from time to time for the surveys and review of the plans as per the societies tariff approved by the Board.
- 3.1.2. When classification is sought for a vessel to be constructed the request shall be received either from the owners or the builders of the vessel.
- 3.1.3. When classification is sought for an existing vessel, the request shall be received either from the owner or the operator of the vessel.
- 3.1.4. The Technical Committee, if satisfied based on approval of plans and surveys carried out for other purposes, that the vessel complies with Society's Rules and Regulations, may assign class for a vessel on a voluntary basis also.
- 3.1.5. By accepting the classification of the vessel, the owner agrees to comply with the requirements for maintenance of classification of the vessel. If the owners do not request for withdrawal of classification within one month from the date of receipt of certificate of classification the same shall be deemed to be the acceptance of classification by the owners.

**3.2. CLIENT'S RESPONSIBILITY**

- 3.2.1. Client is responsible to bring to the notice of the Society all information that would be detrimental in the decision by the Technical Committee to class the vessel, in a timely manner. This includes any pending recommendations imposed by the previous Classification Society.
- 3.2.2. The client is also responsible for the authenticity of the information supplied to the Society. Where unauthenticated information is supplied, it is the responsibility of the client to qualify the same as such.
- 3.2.3. All the measuring equipment's used for the construction, operation and surveys of the vessel shall be duly calibrated or the accuracy shall be to the satisfaction of the surveyor.
- 3.2.4. It shall be responsibility of the client to coordinate the submission of plans and documentation as required by the rules.
- 3.2.5. The client shall be responsible for maintaining records as deemed necessary by the surveyor for the efficient conduct of the survey, and monitoring of the builder's quality system.
- 3.2.6. The surveyor to the Society shall be offered access to the vessel, and any pertinent documentation relevant for the survey at all reasonable times.

- 3.2.7. When recommendations are given by the surveyor the client shall be responsible for dealing with the recommendations within the stipulated period and payment of any additional fees as applicable for the verification by the surveyor, of having dealt with the recommendations.

### **3.3. CLASS ENTRY SURVEY**

- 3.3.1. Prior to entering into Society's class all vessels are required to undergo a special survey as appropriate for the age and type of the vessel. The scope of survey will in each separate case be decided by the Society.
- 3.3.2. The Society may accept a modified survey in respect of vessels, which have been maintained under the survey of a recognized Society. Survey requirements could be waived to the extent documentary evidence is provided to the satisfaction of the Technical Committee to show that requisite surveys have been done satisfactorily by a recognized Society by modifying the validity of the Certificate of Class, provided such survey is not overdue at the time of entry in to Society's class based on the new survey cycle. For vessels to be built under survey, the requirements are specified in Chapter 2, New Construction Survey Requirements.
- 3.3.3. On satisfactory completion of the class entry survey the surveyor will issue an 'Interim Certificate of Class' recommending to the Technical Committee the assignment of class to the vessel, valid for 5 months

### **3.4. CERTIFICATION**

- 3.4.1. Upon confirmation from the plan appraisal department of having approved all the relevant plans and receipt of reports from the surveyor attesting the vessels compliance with the rules and approved plans as applicable and recommending to the Technical Committee to do so, the Technical Committee, if satisfied, will assign appropriate class notations to the vessel and same will be entered in the Society's Register of Ships.
- 3.4.2. A Certificate of class will be issued to the vessel indicating the class notations assigned to the vessel once the vessel has been entered into the Society's Register of Ships
- 3.4.3. The interim certificate will be replaced by a full term class certificate valid for a period of five years from the date of completion of class entry surveys and shall be subject to periodical surveys and additional surveys as required by the regulations

### **3.5. DATE OF BUILD**

- 3.5.1. The date of completion of the special survey inspection shall be entered as the "**date of build**". In case there is considerable delay between completion of construction survey and the ship commencing service, the date of commissioning may be specified on the classification certificate. Irrespective of any modifications are done on a ship, the initial "**date of build**" remains assigned to the ship.

3.5.2. When complete replacement or addition of a main portion of the ship or major modification (e.g. modification of propulsion system, forward section, midship section or aft section , etc.) is involved, the following applies:

3.5.2.1. On the classification certificate, “**date of build**” assigned to each portion of the ship will be indicated in the Register Book; the “**date of modification/ rebuild**” will also be indicated.

3.5.2.2. Survey requirements shall be based on the “**date of build or rebuild**” related to each main portion of the ship

### **3.6. ACCESS**

3.6.1. For the purpose of verifying compliance with the rules, the customer shall whenever necessary provide the Society's surveyors with safe access to the vessel and/or to their premises. The premises and objects to be inspected shall as agreed be cleaned and prepared for inspection.

3.6.2. The customer shall provide flag authorities and authorised audit teams with safe access to the vessel and / or to their premises in order to audit the Society's compliance with applicable rules, regulations and quality standards.

3.6.3. The Society reserves the right to decline to perform a requested service when inadequate access is provided or the safety of its surveyors may be compromised.

### **3.7. LATE COMMISSIONING**

3.7.1. If the vessel is not immediately commissioned upon completion of the construction, but is laid up for a period, the vessel may be accepted for entry into service upon application by the owner. The vessel may be subject to a condition survey before entering into service.

The extent and scope of survey will depend on the time period laid up and conservatory measures taken.

A survey in dry dock may be required.

Provided the hull and machinery is observed in all respects free from deterioration, subsequent periodical surveys will date from the time of the condition survey.

## SECTION 4 CLASS CHARACTERS AND NOTATIONS

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**4.1. CHARACTERS OF CLASSIFICATION**

- 4.1.1. All vessels, when classed with the Society, shall be assigned, one or more of the characters of classification followed by hull, machinery and additional class notations.
- 4.1.2. For Classification notations of vessels Classed for inland waterways, kindly refer Part 1 of International Register of Shipping (INTLREG) Rules and Regulations for Classification of Inland Navigation Vessels.

**4.2. STRUCTURE OF CLASS NOTATION**

- 4.2.1. The complete Class notation of a vessel may have the following parts:

- i. Mandatory Class notation
- ii. Optional Class notation

- 4.2.2. Mandatory Class notation

Mandatory Class notation shall consist of:

- i. Construction symbols, as per Table 4.2.1
- ii. Main character of class, refer Table 4.2.2
- iii. Main Ship Type (as per Table 4.3.1 and 4.3.2), survey scheme (as per Table 4.4.1) and Class notation for additional strengthening (as per Table 4.5.1)
- iv. Other ship types (as per Table 4.6.1)

- 4.2.3. Optional Class notation may consist of notations related to:

- i. Service area restriction (as per Table 4.7.1)
- ii. Cargo (as per Table 4.8.1)
- iii. Machinery and systems (as per Table 4.9.1)
- iv. Design features (as per Table 4.10.1)
- v. Ships classed for navigation in ice (as per Table 4.11.1)
- vi. Optional Class notation related to special equipment and systems (as per Table 4.11.2)

Few examples of complete Class notation of vessels Classed with International Register of Shipping (INTLREG) are as below:

**\* IS, E, General Cargo Ship; \* IM, UM, TS (OG)** - Assigned for a general cargo vessel built under the special survey of a recognized Society having Unmanned machinery space. The Anchoring and mooring equipment meets the rules. The vessel has a tail shaft fitted with an approved oil gland.

**\* IS, E, Oil Tanker, ESP; \* IM, TS (CL)** – Assigned to an Oil Tanker built under Special Survey of International Register of Shipping (INTLREG). Major machinery installations are done under the Society's supervision. Anchoring and mooring equipment of the vessel meets the rules. The vessel is subject to the Enhanced Survey Program.

Table 4.2.1 Construction symbols

| Symbol                                                                            | Description                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | This symbol is assigned to vessels for which the hull construction and/or the manufacture of its machinery and components and any associated required testing, as applicable, is carried out under International Register of Shipping (INTLREG) survey. This symbol shall be prefixed to both hull and machinery notations as applicable.                                       |
| *                                                                                 | This mark when prefixed to characters of classification would mean that the vessel was built under the supervision of a recognized classification Society other than International Register of Shipping (INTLREG) and later assigned class with International Register of Shipping (INTLREG). This symbol shall be prefixed to both hull and machinery notations as applicable. |

Table 4.2.2 Main character of Class

| Symbol                | Description                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>IS</b>             | This character denotes that the hull of the vessel has been designed and constructed in accordance with the applicable requirements of the Rules and Regulations.                                                                                                                                                                                                                                                               |
| <b>E</b>              | This character signifies that the vessel's anchoring and mooring equipment complies with the applicable Rules and Regulations of the Society.                                                                                                                                                                                                                                                                                   |
| <b>e</b>              | This character signifies that the anchoring and mooring equipment provided on board has been accepted by the Technical Committee as adequate for the intended operation of the vessel.                                                                                                                                                                                                                                          |
| <b>N</b>              | This character signifies that the Technical Committee has agreed that anchoring and mooring equipment need not be fitted for the intended operation of the vessel.                                                                                                                                                                                                                                                              |
| <b>IWS</b>            | This notation (In-water Survey) may be assigned to a ship which has been surveyed satisfactorily as per Part 1, Chapter 3 Section 4.3 of the Rules and Regulations.                                                                                                                                                                                                                                                             |
| <b>IM</b>             | This notation signifies that machinery, boilers and systems of the vessel have been constructed and installed in accordance with the applicable requirements of the Rules and Regulations.                                                                                                                                                                                                                                      |
| <b>IW</b>             | This character denotes that the vessel has been classified for navigation in inland waters as per International Register of Shipping (INTLREG) Rules and Regulations for Classification of Inland Navigation Vessels, Part 1, Chapter 2, and Section 2 [2.3]. Vessels for inland navigation shall be classified under four categories, viz., <b>IW (0)</b> , <b>IW (0.6)</b> , <b>IW (1.2)</b> and <b>IW (2)</b> as applicable. |
| <b>RL</b>             | The notation " RL (Number of Years), YEAR "shall be assigned to a vessel requiring to operate beyond her normal fatigue life (20-25 years) if the vessel comply with the requirements specified in the Part 1, Chapter 7 Guidelines To Perform Residual Life Assessment Of Steel Ships                                                                                                                                          |
| <b>RB</b><br>Note 1 * | This notation shall be assigned to vessels those have carried out the inspection and analysis as per Part 1, Chapter 7 of earlier versions of <b>the Rules</b> .                                                                                                                                                                                                                                                                |

**\* Note 1**

The class notation "RB" will no longer be used for any vessel requesting a residual life assessment as of the date of publication of Rev. 03, 2024, of the "Rules." However, vessels already have been assigned, or have been contracted to be assigned, can continue according to the "RB" class notation.

#### **4.3. MAIN SHIP TYPES**

4.3.1. Main ship types consist of passenger ship and cargo ships

4.3.2. A passenger ship is a ship which carries more than twelve passengers. A cargo ship is any ship which is not a passenger ship.

4.3.3. A passenger ship which satisfies the relevant Rules and Regulations requirements shall be assigned one of the main ship types specified in Table 4.3.1

A cargo ship, which satisfies the relevant Rule requirements, shall be assigned one of the main ship types specified in Table 4.3.2

| <b>Table 4.3.1 Main ship types – Passenger ships</b> |                                                                                    |                             |                         |
|------------------------------------------------------|------------------------------------------------------------------------------------|-----------------------------|-------------------------|
| <b>Class notation</b>                                | <b>Description</b>                                                                 | <b>Applicable ship type</b> | <b>Applicable Rules</b> |
| <b>Passenger Ship</b>                                | Ship designed primarily for transport of more than 12 passengers                   | Passenger ships             | Part 7B Ch 2 Sec 2      |
| <b>Passenger/Vehicle Ferry</b>                       | Ro/Ro ship designed for regular transport of more than 12 passengers and vehicles. | Ferries                     | Part 7B Ch 2 Sec 3      |

| <b>Table 4.3.2 Main ship types – Cargo Ships</b> |                                                                                                                     |                             |                         |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------|
| <b>Class notation</b>                            | <b>Description</b>                                                                                                  | <b>Applicable ship type</b> | <b>Applicable Rules</b> |
| <b>Bulk Carrier</b>                              | Ships designed for carriage of solid bulk cargoes                                                                   | Bulk carriers               | Part 7B Ch 2 Sec 5      |
| <b>Oil or Bulk Carrier</b>                       | Ships intended for separate carriage of oil and dry cargoes in bulk                                                 | Combination carriers        | Part 7B Ch 3 Sec 10     |
| <b>Container Carrier</b>                         | Ships specifically intended for the carriage of containers                                                          | Container carriers          | Part 7B Ch 2 Sec 6      |
| <b>Ore Carrier</b>                               | Ships designed for carriage of ore cargoes in centre holds                                                          | Ore carriers                | Part 7B Ch 2 Sec 12     |
| <b>Ore or Oil Carrier</b>                        | Ships intended for carriage of ore cargoes in the centre holds or of oil cargoes in the centre holds and wing tanks | Combination carriers        | Part 7B Ch 3 Sec 1      |
| <b>Oil Tanker</b>                                | Ships intended for transport of oil in bulk                                                                         | Oil carriers                | Part 7B Ch 3 Sec 1      |
| <b>Oil Product Tanker</b>                        | Ships intended for transport of all types of oil products except crude oil                                          | Oil product carriers        | Part 7B Ch 3 Sec 1      |
| <b>Oil Product Tanker (FP above 60°C)</b>        | Ships intended for transport of oil products with flashpoint above 60°C                                             | Oil product carriers        | Part 7B Ch 3 Sec 1      |



|                                        |                                                                                                                                                                           |                                                                                                                                          |                          |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>Chemical Tanker</b>                 | Ships intended for transport of all types of liquid chemicals                                                                                                             | Chemical carriers. Cargoes listed in IBC Code Ch. 17 and 18 with additions given in IMO MEPC.2/Circular                                  | Part 7B Ch 6 Sec 1       |
| <b>Chemical Tanker (FP above 60°C)</b> | Ships intended for transport of liquid chemicals with flashpoint above 60°C                                                                                               | Chemical carrier                                                                                                                         | Part 7B Ch 6 Sec 1       |
| <b>(Z) Tanker</b>                      | Tanker carrying specific types of liquid chemicals. Z denotes type of cargo for which the vessel is classed. Note that the final notation should be without the brackets. | Chemical carriers carrying cargo not requiring full compliance with Part 7B Ch 6 Sec 1 to 14. These carriers comply with IBC or BHC code | Part 7B Ch 6 Sec 1 to 14 |

#### 4.4. MANDATORY SURVEY SCHEME FOR MAIN SHIP TYPES

4.4.1. Main ship types shall be assigned the mandatory survey scheme as per Table 4.4.1

| Table 4.4.1 Mandatory Survey scheme Class notation |                           |                                                                                                                                                                                                                                                                              |                                                                                                                                                                            |
|----------------------------------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Class notation                                     | Description               | Applicable ship type                                                                                                                                                                                                                                                         | Applicable rules                                                                                                                                                           |
| <b>ESP</b>                                         | Enhanced Survey Programme | Mandatory for ships with class notations:<br>Oil tanker,<br>Bulk Carrier,<br>Oil or bulk carrier,<br>Ore Carrier,<br>Ore or oil carrier,<br>Chemical tanker,<br>(Z) tanker,<br>Oil product tanker,<br>Oil product tanker (FP above 60°C),<br>Chemical tanker (FP above 60°C) | Part 1 Ch 3 Sec 5<br><br>Bulk carrier:<br>Part 7B Ch 2 Sec 5<br><br>Oil tanker and Oil product tanker:<br>Part 7B Ch 3 Sec 1<br><br>Chemical tanker:<br>Part 7B Ch 6 Sec 1 |

#### 4.5. ADDITIONAL MANDATORY CLASS NOTATIONS FOR MAIN SHIP TYPES

4.5.1. Main ship types when provided with additional arrangements or strengthening shall be provided with notations as per Table 4.5.1

| Table 4.5.1 Additional mandatory class notation for main ship types |                                       |                                                                                                                                                 |                                                                                                                               |                    |
|---------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Class notation                                                      |                                       | Description                                                                                                                                     | Applicable ship type                                                                                                          | Applicable rules   |
| <b>BC</b>                                                           | <b>A (holds a, b... may be empty)</b> | Bulk carriers designed to carry dry bulk cargoes of cargo density 1.0 t/m <sup>3</sup> and above with specified holds empty at maximum draught. | Mandatory for ships with class notation <b>Bulk Carrier ESP</b> with L ≥ 150 m unless <b>BC-B</b> or <b>BC-C</b> is assigned. | Part 7B Ch 2 Sec 5 |

|  |          |                                                                                                                                  |                                                                                                                              |  |
|--|----------|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--|
|  | <b>B</b> | Strengthened to carry dry bulk cargoes with cargoes of cargo density 1.0 t/m <sup>3</sup> and above with all cargo holds loaded. | Mandatory for ships with class notation <b>Bulk Carrier ESP</b> with L ≥150 m unless <b>BC-A</b> or <b>BC-C</b> is assigned. |  |
|  | <b>C</b> | Strengthened to carry dry bulk cargoes with cargoes of cargo density less than 1.0 t/m <sup>3</sup>                              | Mandatory for ships with class notation <b>Bulk Carrier ESP</b> with L ≥150 m unless <b>BC-A</b> or <b>BC-B</b> is assigned. |  |

| Class notation                     |                                                  | Description                                                                                                                                                                                  | Applicable ship types                                                                                        | Applicable rules                                    |
|------------------------------------|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| <b>BOW LOADING</b>                 |                                                  | Bow Loading System. Assigned to tankers equipped with bow loading arrangements to facilitate the transfer of cargo oil from offshore loading terminals                                       | Mandatory for the notation <b>Oil tanker</b> when installed                                                  | Part 7B Ch 3 Sec 14                                 |
| <b>CSR</b>                         |                                                  | Assigned to bulk carriers $L \geq 90\text{m}$ and double hull oil tankers $L \geq 150\text{m}$ compliant with the IACS Common Structural Rules for Bulk Carriers and Oil Tankers (CSR Rules) | Oil tanker and Bulk Carrier                                                                                  | Part 7B Ch 2 Sec 5<br>CSR Part.1 and<br>CSR Part. 2 |
| <b>Holds a,b,c... may be empty</b> |                                                  | Holds may be empty at full draught where a, b, c ... is the identification number for each hold that may be empty                                                                            | Mandatory for ships with class notation <b>BC-A</b>                                                          | Part 7B Ch 2 Sec 5                                  |
| <b>INERT</b>                       |                                                  | Systems for inerting of tanks and void spaces within the cargo area                                                                                                                          | Mandatory if installed on <b>Oil tanker</b> with DWT > 20 000 ton                                            | Part 7B Ch 3 Sec 1                                  |
| <b>SPM</b>                         |                                                  | Single point mooring                                                                                                                                                                         | Mandatory for <b>Oil tanker</b> when installed                                                               | Part 7B Ch 3 Sec 15                                 |
| <b>STL</b>                         |                                                  | Submerged turret loading                                                                                                                                                                     | Mandatory for <b>Oil tanker</b> when installed                                                               | Part 7B Ch 3 Sec 14                                 |
| <b>BC-A<br/>BC-B<br/>BC-C</b>      | <b>Maximum Cargo Density x.y t/m<sup>3</sup></b> | Designed for a maximum cargo density x.y in t/m <sup>3</sup>                                                                                                                                 | Mandatory for <b>Bulk Carrier BC-A, BC-B, BC-C</b> designed for a maximum cargo density x,y t/m <sup>3</sup> | Part 7B Ch 2 Sec 5                                  |
| <b>No MP</b>                       |                                                  | Ships not designed for loading and unloading in multiple ports                                                                                                                               | Bulk Carrier                                                                                                 | Part 7B Ch 2 Sec 5                                  |

#### 4.6. NOTATIONS FOR OTHER SHIP TYPES

4.6.1. Other ship types are those that do not fall under the category of main ship types given in tables 4.3.1 and 4.3.2.

4.6.2. If these vessels satisfy the relevant Rule requirements, they may be assigned a corresponding Other ship type class notation as given in Table 4.6.1

| Table 4.6.1 Notations for other ship types |                                                                                                                                                                                            |                                        |                     |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|---------------------|
| Class notation                             | Description                                                                                                                                                                                | Applicable ship types                  | Applicable Rules    |
| <b>Non-propelled</b>                       | Vessels without propulsion engines and are required to be pushed or pulled into its position of operation.                                                                                 | Barges for various specific operations | Part 7B Ch 5 Sec 10 |
| <b>Barge</b>                               | Barge or pontoons without self-propulsion for their service area                                                                                                                           | Barges or pontoons                     | Part 7B Ch 5 Sec 10 |
| <b>Deck Cargo Barge</b>                    | Barges intended to carry deck cargo only                                                                                                                                                   | Barges or pontoons                     | Part 7B Ch 5 Sec 10 |
| <b>Oil Barge</b>                           | Intended for storage and carriage of oil                                                                                                                                                   |                                        |                     |
| <b>(Z) Barge</b>                           | Intended for storage and carriage of chemical liquids, where 'Z' denotes the type of cargo for which the barge is classified. Note that the final notation will be without the parenthesis |                                        |                     |
| <b>Crane Barge</b>                         | Barges equipped with a crane on-board                                                                                                                                                      | Barges or pontoons                     | Part 7B Ch 5 Sec 10 |
| <b>Car Carrier</b>                         | Intended for carriage of cars and other vehicles                                                                                                                                           | Vehicle carriers                       | Part 7B Ch 2 Sec 7  |
| <b>Fishing Vessel</b>                      | Intended for fishing as the main purpose                                                                                                                                                   | Fishing Vessels                        | Part 7B Ch 4 Sec 1  |
| <b>General Cargo Ship</b>                  | Arranged for lift on/lift off cargo handling and intended for carriage of general dry cargoes                                                                                              | General Dry Cargo Carriers             | Part 7B Ch 2 Sec 4  |
| <b>Great Lakes Bulk Carrier</b>            | Bulk carrier designed to operate within the limits of the Great Lakes and St. Lawrence river to the seaward limits defined by the Anticosti Island.                                        | Bulk Carriers                          | Part 7B Ch 2 Sec 11 |
| <b>Sealer</b>                              | Designed for catching seals                                                                                                                                                                | Fishing Vessels                        | Part 7B Ch 1 Sec 5  |
| <b>Standby Vessel</b>                      | Designed to carry out rescue and standby services to offshore installations                                                                                                                | Offshore Support / Service Vessels     | Part 7B Ch 5 Sec 6  |
| <b>Stern Trawler</b>                       | Arranged for fishing as main purpose                                                                                                                                                       | Fishing Vessels                        | Part 7B Ch 4 Sec 2  |
| <b>Offshore Service Vessel</b>             | Designed specifically for services to offshore facilities and installations                                                                                                                | Offshore Service Vessels               | Part 7B Ch 5 Sec 2  |

Table 4.6.1 Notations for other ship types cont. ...

| Class notation                | Description                                                                                                                                                                                                                                                  | Applicable ship types                                                                                                | Applicable Rules                    |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>Anchor Handling</b>        | Designed specifically for towing of floating objects in open waters and objects on seabed in addition to subsurface deployment and lifting of anchoring equipment                                                                                            | Vessels equipped with lifting of anchoring equipment                                                                 | Part 7B Ch 5 Sec 3                  |
| <b>Towing</b>                 | Designed specifically for towing of floating objects in open waters. Mainly intended for offshore duty.                                                                                                                                                      | Offshore Service Vessel, Tugs                                                                                        | Part 7B Ch 5 Sec 3                  |
| <b>AHTS</b>                   | Designed specifically for towing of floating objects in open waters and objects on seabed, subsurface deployment and lifting of anchoring equipment and platform supply services along with towing operations                                                | Compliance with notation <b>Anchor handling</b> and <b>Offshore supply vessel</b> qualifies for notation <b>AHTS</b> | Part 7B Ch 5 Sec 2, Sec 3 and Sec 4 |
| <b>Offshore Supply Vessel</b> | Designed specifically for supply services to offshore installations as per IMO. Res. MSC.235(82) - Amended by Res. MSC.335(90)                                                                                                                               | Offshore Supply Vessels                                                                                              | Part 7B Ch 5 Sec 4                  |
| <b>Tug</b>                    | Specially intended for towing                                                                                                                                                                                                                                | Tugs                                                                                                                 | Part 7B Ch 5 Sec 9                  |
| <b>Tanker for Asphalt</b>     | Apply to ships intended to carry asphalt at a temperature higher than 80°C at atmospheric pressure                                                                                                                                                           | Tankers                                                                                                              | Part 3 Ch 12 Sec 5                  |
| <b>(Z) Carrier</b>            | Bulk Carrier specialised for the carriage of a single type of dry bulk cargo. (Z) denotes the type of bulk cargo to be carried, e.g. <b>Alumina Carrier, Cement Carrier, Sugar Carrier</b> etc. Note that the final notation will be without the parenthesis | Bulk Carriers                                                                                                        | Part 7B Ch 2 Sec 9                  |

| Table 4.6.1 Notations for other ship types cont. ... |                                                                                                                                   |                                                                                       |                     |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------|
| Class notation                                       | Description                                                                                                                       | Applicable ship types                                                                 | Applicable Rules    |
| <b>Reefer</b>                                        | Vessel built mainly for the carriage of refrigerated dry cargo.                                                                   | Refrigerated Cargo Carrying Ships                                                     | Part 7B Ch 7 Sec 1  |
| <b>RF</b>                                            | Vessels permanently equipped for carriage of fruit needing controlled atmosphere in cargo chambers.                               | Reefer Fruit Carriers                                                                 | Part 7B Ch 7 Sec 1  |
| <b>RF (port)</b>                                     | Vessels permanently equipped for carriage of fruit needing controlled atmosphere in cargo chambers with partly portable equipment | Reefer Fruit Carriers with portable equipment                                         | Part 7B Ch 7 Sec 1  |
| <b>Fruit Juice Tanker</b>                            | Vessels built for transport of fruit juices and similar cargoes in refrigerated tanks                                             | Tankers                                                                               | Part 7B Ch 7 Sec 1  |
| <b>Potable Water Tanker</b>                          | Vessel intended for transport of potable water in bulk                                                                            | Tankers                                                                               | Part 7B Ch 8 Sec 1  |
| <b>Fresh Water Tanker</b>                            | For the carriage of Non-potable Fresh Water which in bulk                                                                         | Tankers                                                                               | Part 7B Ch 8 Sec 1  |
| <b>Pipe Laying Vessel</b>                            | Vessel intended for laying pipelines on the sea bottom                                                                            | Offshore Support Vessels                                                              | Part 7B Ch 9 Sec 1  |
| <b>Pipe Laying Barge</b>                             | Vessel with barge notation, intended for laying pipelines on the sea bottom                                                       | Barges                                                                                | Part 7B Ch 9 Sec 1  |
| <b>DG-Bulk</b>                                       | Vessels arranged for carriage of dangerous goods as solid bulk cargoes                                                            | Bulk Carriers                                                                         | Part 7B Ch 10 Sec 1 |
| <b>DG-Pack</b>                                       | Vessels arranged for carriage of dangerous goods in packaged form                                                                 | Bulk Carriers                                                                         | Part 7B Ch 10 Sec 1 |
| <b>CNG Tanker</b>                                    | Ships intended for transportation of compressed natural gas                                                                       | Compressed natural gas carrier                                                        | Part 7B Ch 11 Sec 1 |
| <b>SPS</b>                                           | Ship intended to Carry Special Personnel as per IMO. SPS Code (Res. MSC.266(84)/Res. A.534(13) as applicable)                     | Ships complying with SPS code, generally Offshore Support /Service / Research Vessels | Part 7B Ch 12 Sec 1 |

Table 4.6.1 Notations for other ship types cont. ...

| Class notation             | Description                                                                                                    | Applicable ship types                                                        | Applicable Rules                         |
|----------------------------|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------|
| <b>Escort Vessel</b>       | Vessels specially provided for escort service                                                                  | Offshore Support / Service Vessels with Escort service                       | Part 7B Ch 13 Sec 1                      |
| <b>Escort Tug</b>          | Vessels with Tug Notation, specially provided for escort service                                               | Offshore Support / Service Vessels with Escort service and Towing operations | Part 7B Ch 13 Sec 1 & Part 7B Ch 5 Sec 9 |
| <b>Dredger</b>             | Vessels designed for dredging operations                                                                       | Dredgers                                                                     | Part 7B Ch 14 Sec 1                      |
| <b>Cable Laying Vessel</b> | Vessel designed for laying cables on the sea bottom                                                            | Offshore Support / Service Vessels                                           | Part 7B Ch 15 Sec 1                      |
| <b>Cable Laying Barge</b>  | Vessel designed for laying cables on the sea bottom, with Barge Notation                                       | Barges                                                                       | Part 7B Ch 15 Sec 1                      |
| <b>SRP Vessel</b>          | Vessel to use as floating facilities for reception and processing of oily water and oil residues               | Offshore Support Vessels                                                     | Part 7B Ch 16 Sec 1                      |
| <b>DSV-SD</b>              | Diving support vessels arranged for support of diving operations with Shallow/Surface Diving system.           | Diving / Offshore Support Vessels                                            | Part 7B Ch 17 Sec 1                      |
| <b>DSV-DD</b>              | Diving support vessels arranged for support of diving operations with Deep/Saturated Diving system             | Diving / Offshore Support Vessels                                            | Part 7B Ch 17 Sec 1                      |
| <b>SF</b>                  | Offshore Support/ Supply/ Service Vessels designed to comply with the requirements of Stability and Floatation | Offshore Support/ Supply/ Service Vessels                                    | Part 7B Ch 17 Sec 1                      |

| Table 4.6.1 Notations for other ship types (cont. ...) |                                                                                                                                                                                                                        |                                   |                     |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------------|
| Class notation                                         | Description                                                                                                                                                                                                            | Applicable ship types             | Applicable Rules    |
| <b>DP-0</b>                                            | Vessels equipped with a dynamic positioning system with centralized manual position control and automatic heading control to maintain the position and heading.                                                        | Diving / Offshore Support Vessels | Part 5A Ch 7 Sec 8  |
| <b>DP-1</b>                                            | Vessel equipped with a dynamic positioning system that automatically maintains its position and heading under specified maximum environmental conditions with an independent manual positioning and heading control.   | Diving / Offshore Support Vessels | Part 5A Ch 7 Sec 8  |
| <b>DP-2</b>                                            | Vessel equipped with a dynamic positioning system that maintains the vessel's position and heading within specified operating envelopes under specified maximum environmental conditions, except for compartment loss. | Diving / Offshore Support Vessels | Part 5A Ch 7 Sec 8  |
| <b>DP-3</b>                                            | The vessel must be equipped with a dynamic positioning system to keep its position and heading within a specified operating envelope when experiencing any single fault, including complete loss of compartments.      | Diving / Offshore Support Vessels | Part 5A Ch 7 Sec 8  |
| <b>MOOR</b>                                            | Diving support vessels, equipped with a mooring system with anchors                                                                                                                                                    | Diving / Offshore Support Vessels | Part 7B Ch 17 Sec 1 |
| <b>Liquefied Gas Carrier</b>                           | Ship intended for carrying the liquefied gases                                                                                                                                                                         | LNG Tankers                       | Part 7B Ch 18 Sec 1 |
| <b>REGAS</b>                                           | Ship fitted with system for on-board regasification of LNG                                                                                                                                                             | LNG Tankers                       | Part 7B Ch 18 Sec 1 |
| <b>STL</b>                                             | Vessel intended for regasification operation with arrangement for export of natural gas through a submerged turret system                                                                                              | LNG Tankers                       | Part 7B Ch 18 Sec 1 |



**4.7. NOTATION FOR SERVICE AREA RESTRICTION**

- 4.7.1. The service area notation R followed by a number or a letter will be assigned to ships with certain modifications to arrangement, equipment, or scantlings, in relation to ships built for unrestricted trade.
- 4.7.2. The service area restrictions, given in nautical miles and representing the maximum distance from nearest port or safe anchorage, are given in Table 4.7.1

| <b>Table 4.7.1 Service area restrictions</b> |                                                                             |
|----------------------------------------------|-----------------------------------------------------------------------------|
| <b>Service area notation</b>                 | <b>Distance from nearest Port of Refuge or Anchorage (nautical miles) *</b> |
| <b>R300</b>                                  | 300                                                                         |
| <b>R200</b>                                  | 200                                                                         |
| <b>R100</b>                                  | 100                                                                         |
| <b>R50</b>                                   | 50                                                                          |
| <b>R20</b>                                   | 20                                                                          |

- 4.7.3. Where particular cases of navigation are to be assigned which are not included among those so defined in the Table 4.7.1, 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 unfavorable sea conditions considered).

Example: Where a permissible distance is less than 40 nautical miles from nearest port or safe anchorage, the relevant distance will be indicated in the Class Certificate, e.g. **R40**.

\* An area that provides shelter for a craft during hazardous conditions is referred to as the "**Port of Refuge**".

- 4.7.4. Notation **RC**, under this notation, vessels must operate within 20 nautical miles of **nearest land** at all times, generally for Coastal Vessels.
- 4.7.5. Notation **RSA**, this notation is assigned to vessels intended to operate in sheltered area, Eg. Harbors, estuaries, roadsteads, bays, lagoons and calm stretches of water

**4.8. OPTIONAL CLASS NOTATIONS RELATED TO CARGO**

- 4.8.1. Ships capable for carriage of specific cargoes in addition to main cargo type specified by the ship type notations and satisfying relevant rule requirements may be assigned a corresponding optional class notation given in Table 4.8.1

| <b>Table 4.8.1 Optional Class notation related to cargo</b> |                                                                            |                              |                         |
|-------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------|-------------------------|
| <b>Class notation</b>                                       | <b>Description</b>                                                         | <b>Applicable ship types</b> | <b>Applicable Rules</b> |
| <b>[.] TEU</b>                                              | Number of twenty-foot equivalent container units (TEU) that may be carried | Container Carrier            | Part 7B Ch 2 Sec 6      |

|                  |                           |                                                                                                                                                     |                                                             |                     |
|------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|---------------------|
| <b>CONTAINER</b> |                           | Arranged for carriage of containers                                                                                                                 | Container Carrier                                           | Part 7B Ch 2 Sec 6  |
| <b>SHB</b>       |                           | Arranged for carriage of fish in bulk, provided with shifting boards in cargo holds                                                                 | Fishing vessel and Stern Trawler                            | Part 7B Ch 5 Sec 4  |
| <b>COW</b>       |                           | Fitted with crude oil washing system                                                                                                                | Oil Tankers                                                 | Part 7B Ch 3 Sec 13 |
| <b>EC</b>        |                           | Ships built for easy cleaning of cargo holds                                                                                                        | Bulk Carrier                                                | Part 7B Ch 2 Sec 5  |
| <b>EL-2</b>      |                           | Ships built for easy loading of cargo holds, loading each cargo hold in one step                                                                    | Ore Carriers                                                | Part 7B Ch 2 Sec 12 |
| <b>HTC</b>       | (...°C cargo tank #....). | Structures designed for carriage of liquid cargoes at temperatures higher than 80°C. Maximum cargo temperature in °C, applicable for cargo tank # n | Asphalt Tankers                                             | Part 3 Ch 12 Sec 1  |
| <b>LowFP</b>     |                           | Designed for carriage of liquid with flashpoint lower than 60°C                                                                                     | Offshore Service/ Support/ Supply Vessels                   | Part 7B Ch 5 Sec 8  |
| <b>LowFP</b>     | *                         | Flashpoint lower than 43°C                                                                                                                          |                                                             |                     |
| <b>NLS</b>       |                           | Vessels complying with MARPOL Annex II requirements for Noxious Liquid Substances                                                                   | Chemical Carriers                                           | Part 7B Ch 3 Sec 1  |
| <b>PET</b>       |                           | Arranged for carriage of vehicles with fuel in their tanks                                                                                          | Mandatory for ships arranged for lift on/off cargo handling | Part 7B Ch 2 Sec 4  |

## 4.9. OPTIONAL CLASS NOTATIONS RELATED TO MACHINERY AND SYSTEMS

| Table 4.9.1 Optional class notation related to machinery and systems |    |                                                                                                                                                                                                                                                                                                         |                       |                    |
|----------------------------------------------------------------------|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------|
| Class notation                                                       |    | Description                                                                                                                                                                                                                                                                                             | Applicable ship types | Applicable rules   |
| UM                                                                   |    | This notation indicates that a self-propelled vessel is fitted with various degrees of automation and with remote monitoring and control systems to enable the propulsion machinery space to be periodically unattended and the propulsion control to be effected primarily from the navigation bridge. | All vessels           | Part 5A Ch 1 Sec 1 |
| TS                                                                   | OG | Denotes that the tail shaft of the vessel is fitted with an approved oil gland                                                                                                                                                                                                                          |                       |                    |
|                                                                      | CL | Denotes that the tail shaft of the vessel is fitted with continuous shaft liner                                                                                                                                                                                                                         |                       |                    |
|                                                                      | ES | Denotes that the tail shaft of the vessel is of exposed type                                                                                                                                                                                                                                            |                       |                    |
|                                                                      | NC | Denotes that the tail shaft of the vessel is noncorrosive                                                                                                                                                                                                                                               |                       |                    |
|                                                                      | CM | The vessel has been fitted with an approved oil gland and has extended tail-shaft survey based on Condition Monitoring.                                                                                                                                                                                 |                       |                    |

| Table 4.9.1 Optional class notation related to machinery and systems (Cont..) |                                                                                                                                                                                                                                                                               |                       |                     |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------|
| Class notation                                                                | Description                                                                                                                                                                                                                                                                   | Applicable ship types | Applicable Rules    |
| <b>APS</b>                                                                    | Indicates that a self-propelled vessel is fitted with athwart-ship thrusters. APS is optional for all self-propelled vessels fitted with such thrusters and signifies compliance with applicable requirements Rules                                                           | All vessels           | Part 5A Ch 7 Sec 1  |
| <b>PAS</b>                                                                    | Indicates that a non-self-propelled vessel is fitted with thrusters for the purpose of assisting other ships or manoeuvring. Such notation shall comply with applicable requirements of the Rules                                                                             |                       | Part 5A Ch 7 Sec 1  |
| <b>POT</b>                                                                    | Assigned to vessels that satisfy measures for oil pollution prevention by providing additional protection for fuel and lube oil tanks in accordance with Part 5A,Ch 9,Sec 9 of the Rules                                                                                      |                       | Part 5A Ch 9 Sec 9  |
| <b>IR<sub>1</sub></b>                                                         | A ship fitted with multiple propulsion machines but one propulsor and steering system will be assigned the class notation IR <sub>1</sub> .                                                                                                                                   |                       | Part 5A Ch 11 Sec 2 |
| <b>IR<sub>2</sub></b>                                                         | A ship fitted with multiple propulsion machines and also multiple propulsors and steering systems (hence, multiple propulsion systems) will be assigned the class notation IR <sub>2</sub> .                                                                                  |                       |                     |
| <b>IR<sub>1</sub>-S</b>                                                       | A ship fitted with only a single propulsor but having the propulsion machines arranged in two distinct spaces such that a fire or flood in one space would not affect the propulsion machine(s) in the other space(s) will be assigned the class notation IR <sub>1</sub> -S. |                       |                     |

| Table 4.9.1 Optional class notation related to machinery and systems (Cont..) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |                     |
|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------|
| Class notation                                                                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Applicable ship types | Applicable Rules    |
| <b>IR<sub>2</sub>-S</b>                                                       | A ship fitted with multiple propulsors (hence, multiple propulsion systems) which has the propulsion machines and propulsors, and associated steering systems arranged in two distinct spaces (propulsion machinery space and steering gear flat) such that a fire or flood in one space would not affect the propulsion machine(s) and propulsor(s), and associated steering systems in the other space(s) will be assigned the class notation IR <sub>2</sub> -S. | All vessels           | Part 5A Ch 11 Sec 2 |
| <b>(+)</b>                                                                    | The <b>+ mark</b> will be suffixed to any of the above class notations (e.g., <b>IR<sub>1</sub>+</b> , <b>IR<sub>2</sub>-S+</b> ) to denote that ship's propulsion capability is such that, upon a single failure, propulsive power can be maintained or instantly restored to the extent required to bear unfavourable weather conditions without drifting                                                                                                         |                       |                     |
| <b>CCS</b>                                                                    | This notation denotes that in a self-propelled vessel, in lieu of manning the propulsion machinery space locally, it is intended to monitor the propulsion machinery space and to control and monitor the propulsion and auxiliary machinery from a continuously manned Centralized Control Station.                                                                                                                                                                |                       | Part 5A Ch 1 Sec 1  |

| Table 4.9.1 Optional class notation related to machinery and systems (Cont..) |              |                                                                                                                                                                                                                                                                             |                                                                                           |                    |
|-------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|--------------------|
| Class notation                                                                |              | Description                                                                                                                                                                                                                                                                 | Applicable ship types                                                                     | Applicable Rules   |
| <b>ICC</b>                                                                    |              | This notation may be assigned when the arrangements are such that the control and supervision of ship operational functions is computer based. It denotes that the control engineering equipment has been arranged, installed, and tested in accordance with the Rules.     | All vessels                                                                               | Part 5B Ch 7 Sec 1 |
| <b>BWM-E ()</b>                                                               | <b>d/s/f</b> | Applied to ships complying with the requirements of IMO BWM convention, 2004 for ballast water exchange                                                                                                                                                                     | All vessels                                                                               | Part 5A Ch 9 Sec 4 |
| <b>BWM-EP ()</b>                                                              | <b>d/s/f</b> | Applied to ships complying with the requirements of IMO BWM convention, 2004 for ballast water enhanced exchange performance                                                                                                                                                |                                                                                           |                    |
| <b>BWM-T</b>                                                                  |              | Applied to ships complying with the requirements of IMO BWM convention, 2004 for ballast water treatment                                                                                                                                                                    |                                                                                           |                    |
| <b>Fire Fighter</b>                                                           | <b>I</b>     | A vessel with Fire Fighter I notation shall be designed with active protection, giving it the capability to withstand higher heat radiation loads from external fires, to meet its objectives. In addition, the vessel includes a sufficient set of firefighting equipment. | All vessels intended to fight fires on board ships and on offshore and onshore structures | Part 7B Ch 5 Sec 7 |
|                                                                               | <b>I+</b>    | The notation differentiates itself from I with a higher reliability and capability. In addition to active protection as named in Sec 7.1.2.2                                                                                                                                |                                                                                           |                    |
|                                                                               | <b>II</b>    | The vessel has been built for continuous fighting of large fires from a safe distance and for the cooling of structures on fire.                                                                                                                                            |                                                                                           |                    |
|                                                                               | <b>III</b>   | The notation III requires a significant water pumping capacity and more comprehensive firefighting equipment when compared to the vessel with notation II.                                                                                                                  |                                                                                           |                    |

| Table 4.9.1 Optional class notation related to machinery and systems (Cont..) |   |                                                                                                                                                                  |                       |                     |
|-------------------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------|
| Class notation                                                                |   | Description                                                                                                                                                      | Applicable ship types | Applicable rules    |
| RC                                                                            | 1 | Ships equipped for carriage of refrigerated containers, with self-contained refrigeration systems requiring electrical power supply; 80-100% chilled cargo       | Dry cargo ships       | Part 7B Ch 2 Sec 10 |
|                                                                               | 2 | Ships equipped for carriage of refrigerated containers, with self-contained refrigeration systems requiring electrical power supply; 50-80% chilled cargo        |                       |                     |
|                                                                               | 3 | Ships equipped for carriage of refrigerated containers, with self-contained refrigeration systems requiring electrical power supply; less than 50% chilled cargo |                       |                     |

## 4.10. OPTIONAL CLASS NOTATIONS RELATED TO DESIGN FEATURES

| Table 4.10.1 Optional Class notations for design features |   |                                                                                                                                 |                                                                          |                    |
|-----------------------------------------------------------|---|---------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------|
| Class notation                                            |   | Description                                                                                                                     | Applicable ship types                                                    | Applicable Rules   |
| DK                                                        | + | Decks strengthened for heavy cargo                                                                                              | Dry cargo ships                                                          | Part 3 Ch 4 Sec 3  |
| ETC                                                       |   | Arranged for effective tank cleaning                                                                                            | Oil tanker, Oil Product tanker, Chemical tanker                          | Part 7B Ch 3 Sec 1 |
| HA                                                        | + | Hatches strengthened for heavy cargo                                                                                            | Dry cargo ships                                                          | Part 3 Ch 4 Sec 3  |
| HLC                                                       | ρ | Tanks or holds strengthened for heavy liquid, where ρ denotes the maximum density in t/m <sup>3</sup> in any of the cargo tanks | Oil tanker, Oil Product tanker, Chemical tanker, Offshore service vessel | Part 3 Ch 4 Sec 3  |
| INB                                                       | Z | Inner bottom strengthened for grab loading and discharging where Z denotes which areas (area 1, 2, or 3) are to be strengthened | Bulk carriers                                                            | Part 3 Ch 6 Sec 8  |

**Table 4.10.1 Optional Class notations for design features (Cont..)**

| Class notation |            | Description                                                                                                                                               | Applicable ship types                     | Applicable Rules   |
|----------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|--------------------|
| <b>ECA</b>     | <b>WB</b>  | Increased corrosion margin in ballast tanks                                                                                                               | All ships                                 | Part 3 Ch 2 Sec 4  |
|                | <b>WBU</b> | Ballast tanks, upper part of the ship (above D/2)                                                                                                         |                                           |                    |
|                | <b>WBS</b> | Increased corrosion margin in ballast tanks, strength deck of the ship and 1.5 m below                                                                    |                                           |                    |
|                | <b>CO</b>  | Increased corrosion margin in cargo oil tanks                                                                                                             |                                           |                    |
|                | <b>COu</b> | Increased corrosion margin in cargo oil tanks, upper part of the ship (above D/2)                                                                         |                                           |                    |
|                | <b>COs</b> | Increased corrosion margin in cargo oil tanks, strength deck of the ship and 1.5 m below                                                                  |                                           |                    |
|                | <b>HC</b>  | Increased corrosion margin in cargo holds                                                                                                                 |                                           |                    |
|                | <b>HCu</b> | Increased corrosion margin in cargo holds, upper part of the ship (above D/2)                                                                             |                                           |                    |
|                | <b>HCS</b> | Increased corrosion margin in cargo holds, strength deck of the ship and 1.5 m below                                                                      |                                           |                    |
| <b>PWDK</b>    |            | Decks strengthened for wheel loading                                                                                                                      | Dry cargo ships                           | Part 7B Ch 2 Sec 4 |
| <b>RO/RO</b>   |            | Arranged for roll-on roll-off cargo handling                                                                                                              | General cargo carriers                    | Part 7B Ch 2 Sec 4 |
| <b>SF</b>      |            | Offshore Support/ Supply/ Service Vessels designed to comply with the requirements of Intact and Damage Stability in accordance with IMO Res.MSC.235(82)) | Offshore Support/ Supply/ Service Vessels | Part 7B Ch 5 Sec 5 |



Table 4.10.1 Optional Class notations for design features (Cont..)

| Class notation |    | Description                                                                                                   | Applicable ship types | Applicable Rules   |
|----------------|----|---------------------------------------------------------------------------------------------------------------|-----------------------|--------------------|
| ACCOM          |    | Meets requirements for accommodation standards, noise, vibration, and lighting for crew habitability          | All ships             | Part 10 Ch 1 Sec 1 |
|                | +  | Additional criteria along with ACCOM requirement                                                              |                       | Part 10 Ch 1 Sec 1 |
|                | ++ | Additional criteria along with ACCOM + requirement                                                            |                       |                    |
| CG             | H  | Certified lifting appliances for use at harbour conditions                                                    | Lifting appliances    | Part 9 Ch 1 Sec 4  |
|                | H1 | Certified lifting appliances for use at harbour conditions and complying with specified National regulations  |                       |                    |
|                | O  | Certified lifting appliances for use at Offshore conditions                                                   |                       |                    |
|                | O1 | Certified lifting appliances for use at Offshore conditions and complying with specified National regulations |                       |                    |

**4.11. OPTIONAL CLASS NOTATIONS FOR SHIPS CLASSED FOR NAVIGATION IN ICE**

4.11.1. Ships designed for operation in ice/winter conditions and satisfying relevant rule requirements may be assigned a corresponding optional class notation given in Table 4.10.1

Table 4.11.1 Optional class notation for ships navigating in ice

| Class notation |    | Description                                                                                       | Applicable ship types | Applicable Rules   |
|----------------|----|---------------------------------------------------------------------------------------------------|-----------------------|--------------------|
| ICE            | E  | Ships with ice strengthening for light localized drift ice in mouths of rivers and coastal areas. | All ships             | Part 7B Ch 1 Sec 2 |
|                | C  | Ships with basic ice strengthening                                                                |                       |                    |
|                | 1C | Ships constructed according to Baltic ice rules. Ice thickness 0.4 m                              |                       | Part 7B Ch 1 Sec 3 |
|                | 1B | Ships constructed according to Baltic ice rules. Ice thickness 0.6 m                              |                       |                    |

Table 4.11.1 Optional class notation for ships navigating in ice (Cont..)

| Class notation |                             | Description                                                                                                  | Applicable ship types                                                                           | Applicable Rules   |
|----------------|-----------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------|
| ICE            | 1A                          | Ships constructed according to Baltic ice rules. Ice thickness 0.8 m                                         | All ships                                                                                       | Part 7B Ch 1 Sec 3 |
|                | 1A*                         | Ships constructed according to Baltic ice rules. Ice thickness 1.0 m                                         |                                                                                                 |                    |
|                | 1A*F                        | Ships constructed according to Baltic ice rules. High powered ships for regular traffic in heavy Baltic ice. |                                                                                                 |                    |
|                | 05                          | Ships constructed according to arctic ice rules. Ice thickness 0.5 m, no ramming anticipated                 |                                                                                                 | Part 7B Ch 1 Sec 4 |
|                | 10                          | Ships constructed according to arctic ice rules. Ice thickness 1.0 m, no ramming anticipated                 |                                                                                                 |                    |
|                | 15                          | Ships constructed according to arctic ice rules. Ice thickness 1.5 m, no ramming anticipated                 |                                                                                                 | Part 7B Ch 1 Sec 4 |
|                | (for maximum draught x.x m) | Designed for a maximum draught x.x metres in ice                                                             | For class notation ICE when maximum draught in ice is less than summer load line in fresh water | Part 7B Ch 1 Sec 1 |
| Icebreaker     |                             | Designed for icebreaking as main purpose                                                                     | All ships                                                                                       | Part 7B Ch 1 Sec 4 |

Table 4.11.1 Optional class notation for ships navigating in ice (Cont..)

| Class notation |           | Description                                                                                  | Applicable ship types                                                                                                                                                                                    | Applicable Rules   |
|----------------|-----------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>POLAR</b>   | <b>10</b> | Ships constructed according to arctic ice rules with ice thickness 1.0 m, accidental ramming | All ships                                                                                                                                                                                                | Part 7B Ch 1 Sec 4 |
|                | <b>20</b> | Ships constructed according to arctic ice rules with ice thickness 2.0 m, accidental ramming |                                                                                                                                                                                                          |                    |
|                | <b>30</b> | Ships constructed according to arctic ice rules with ice thickness 3.0 m, accidental ramming |                                                                                                                                                                                                          |                    |
| <b>PC</b>      | <b>1</b>  | Year-round operation in all Polar waters                                                     | Ships designed for ice breaking for the purpose of escort and ice management, and which are assigned a polar class notation <b>PC-1 to PC-6</b> , may be given the additional notation <b>Icebreaker</b> | Part 7B Ch 1 Sec 8 |
|                | <b>2</b>  | Year-round operation in moderate multi-year ice conditions                                   |                                                                                                                                                                                                          |                    |
|                | <b>3</b>  | Year-round operation in second-year ice which may include multi-year ice inclusions          |                                                                                                                                                                                                          |                    |
|                | <b>4</b>  | Year-round operation in thick first-year ice which may include old ice inclusions            |                                                                                                                                                                                                          |                    |
|                | <b>5</b>  | Year-round operation in medium first-year ice which may include old ice inclusions           |                                                                                                                                                                                                          |                    |
|                | <b>6</b>  | Summer/autumn operation in medium first-year ice which may include old ice inclusions        |                                                                                                                                                                                                          |                    |
|                | <b>7</b>  | Summer/autumn operation in thin first-year ice which may include old ice inclusions          | All ships                                                                                                                                                                                                | Part 7B Ch 1 Sec 8 |

Table 4.11.1 Optional class notation for ships navigating in ice (Cont..)

| Class notation    |              | Description                                                                                                  | Applicable ship types | Applicable Rules   |
|-------------------|--------------|--------------------------------------------------------------------------------------------------------------|-----------------------|--------------------|
| <b>Winterized</b> | <b>Basic</b> | Operation occasionally in cold climate for short periods                                                     | All Ships             | Part 7B Ch 1 Sec 6 |
|                   | <b>Cold</b>  | Operation in cold climate regularly or for an extended period, though not necessarily in ice-infested waters |                       |                    |
|                   | <b>Polar</b> | Operation in extreme cold climate of the polar regions year-round, in ice-infested waters                    |                       |                    |

Table 4.11.2 Optional Class notation related to special equipment and systems

| Class notation  |                    | Description                                                                                                      | Applicable ship types                                                                      | Applicable Rules    |
|-----------------|--------------------|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------|
| <b>ECA(SOx)</b> |                    | ECA -denotes vessel operate within Emission Control Area. SOx denotes (SOx) regulations                          | ECA -denotes vessel operate within Emission Control Area. SOx denotes (SOx) regulations    | Part 7B Ch19 Sec 1  |
|                 | <b>ECA(SOx)-A</b>  | Vessel designed to only operate on distillate marine fuel                                                        | Vessels operating within Emission Control Areas comply with SOx regulations                | Part 7B Ch19 Sec 1  |
|                 | <b>ECA(SOx)-P</b>  | Operate in port on distillate marine fuel                                                                        | For vessels calling EU ports comply with the EU low sulphur directive 2005/33/EC           | Part 7B Ch 19 Sec 1 |
| <b>CLEAN-</b>   |                    | <b>CLEAN</b> identifies the basic requirements for controlling and limiting operational emissions and discharges | Ships designed, built and operated to give additional protection to environment            | Part 7B Ch 19 Sec 1 |
|                 | <b>CLEAN-DSIGN</b> | Additional requirements for controlling and limiting operational emissions and discharges.                       | Additional requirements for controlling and limiting operational emissions and discharges. | Part 7B Ch 19 Sec 1 |

Table 4.11.2 Optional Class notation related to special equipment and systems (Cont..)

| Class notation |        | Description                                                                                                                  | Applicable ship types                                                                                                                                                                | Applicable Rules    |
|----------------|--------|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| VCS            | I      | Ships fitted with systems for control of vapour emission from cargo tanks may be given one of the additional class notations | Tanker for Chemicals<br>Tanker for Oil Products<br>Tanker for Oil                                                                                                                    | Part 7B Ch 20 Sec 1 |
|                | II     |                                                                                                                              |                                                                                                                                                                                      |                     |
|                | III    |                                                                                                                              |                                                                                                                                                                                      |                     |
|                | OC     | Requirements within bridge design, bridge instrumentation and workstation arrangement                                        | Ocean Going Vessels largely operating in high seas                                                                                                                                   | Part 7B Ch 22 Sec 1 |
| NAUTIC -       | AW     | augmented requirements for bridge configuration, instrumentation and automation                                              | ships largely operating in coastal and narrow waters                                                                                                                                 | Part 7B Ch 22 Sec 1 |
|                | OSV    | Nautical safety to reduce the risk of failure in bridge function Requirements to specified bridge system elements            | ships largely operating as support vessel for various offshore operations                                                                                                            | Part 7B Ch 23 Sec 1 |
|                | (ICS)  | Network based Integration of Navigation Systems                                                                              | Nautical safety-Bridge equipment and layout for Ocean Going Vessels                                                                                                                  | Part 7B Ch 22 Sec 7 |
|                | OSV(A) | Fundamental requirements targeting ships operating as service vessels for offshore industry in harsh environment             | OSV, Basic requirements for bridge design and instrumentation for safe operation in all waters including areas with harsh operational and environmental conditions such as North Sea | Part 7B Ch 22 Sec 1 |
|                | OSV(T) | Basic requirements within Bridge design, instrumentation and location of equipment                                           | Offshore Service Vessels trading in tropical waters                                                                                                                                  | Part 7B Ch 1 Sec 1  |

| <b>Table 4.11.2 Optional Class notation related to special equipment and systems (Cont..)</b> |                                                                                                                                                                                                                                                                                                                                                       |                              |                                        |
|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|----------------------------------------|
| <b>Class notation</b>                                                                         | <b>Description</b>                                                                                                                                                                                                                                                                                                                                    | <b>Applicable ship types</b> | <b>Applicable Rules</b>                |
| <b>LC1</b>                                                                                    | Vessel installed with a loading instrument software.<br><br>The Instrument can perform the hull girder loads in still water under any loading condition and compare the results to the allowable limits in intact conditions only.                                                                                                                    | All Vessels                  | Part 1 Ch 1 Sec 5<br>Part 3 Ch 5 Sec 1 |
| <b>LC2</b>                                                                                    | Vessel installed with a loading instrument software.<br><br>The Instrument can perform the hull girder loads in still water under any loading condition and compare the results to the allowable limits both in intact and damaged conditions                                                                                                         | All Vessels                  | Part 1 Ch 1 Sec 5<br>Part 3 Ch 5 Sec 1 |
| <b>Type 1</b>                                                                                 | Vessel Installed with a loading instrument software.<br><br>Software calculating intact stability only (for vessels not required to meet a damage stability criterion).                                                                                                                                                                               | All Vessels                  | Part 1 Ch 1 Sec 5<br>Part 8 Ch 1 Sec 3 |
| <b>Type 2</b>                                                                                 | Vessel Installed with a loading instrument software.<br><br>Software calculating intact stability and checking damage stability on basis of a limit curve (e.g. for vessels applicable to SOLAS Part B-1 damage stability calculations, etc.) or checking all the stability requirements (intact and damage stability) on the basis of a limit curve. | All Vessels                  | Part 1 Ch 1 Sec 5<br>Part 8 Ch 1 Sec 3 |
| <b>Type 3</b>                                                                                 | Vessel Installed with a loading instrument software.<br><br>Software calculating intact stability and damage stability by direct application of pre-programmed damage cases based on the relevant Conventions or Codes for each loading condition (for some tankers etc.).                                                                            | All Vessels                  | Part 1 Ch 1 Sec 5<br>Part 8 Ch 1 Sec 3 |
| <b>Type 4</b>                                                                                 | Vessel Installed with a loading instrument software.<br><br>Software calculating damage stability associated with an actual loading condition and actual flooding case, using direct application of user defined damage, for the purpose of providing operational information for safe return to port (SRtP).                                         | Passenger Vessels            | Part 1 Ch 1 Sec 5<br>Part 8 Ch 1 Sec 3 |

**4.12. DESCRIPTIVE NOTATIONS**

Descriptive notations as agreed by experts from Research and Development, Technical Appraisal Department, Ship Survey Assurance Officers and Quality Assurance as applicable to signify the special features or limitations of the vessel will be assigned at the request of the owners or as deemed necessary.

**Examples**

- For Service within (specified Route or location)
- For the carriage of (a specific cargo)
- Computer Controlled Machinery System
- “Altered (1999)”, “Modified Survey System” (where the vessel has a modified survey system in view of the notation ‘SC’)
- Vessel equipped with (certain features or equipment)
- Vessel designed for (certain types of operations)
- Vessel not to operate beyond (certain Beaufort scale)

## **SECTION 5 APPROVAL OF PLANS**

### **Contents**

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**5.1 GENERAL**

- 5.1.1 The plans and documents to be submitted to the Society for review/approval of new build vessels are listed in [5.2]. Additional documentation may be required depending on the type and service notation and additional Class notations.
- 5.1.2 Plans are required to be submitted for any alterations or modifications to be carried out, in advance.
- 5.1.3 When direct calculations are carried out as per rule requirements, they shall be submitted to International Register of Shipping (INTLREG).
- 5.1.4 Outline specification for the vessel.
- 5.1.5 Any documents submitted for re-approval shall be especially marked to identify revised parts.
- 5.1.6 Where subcontractors and suppliers are involved, the customer shall co-ordinate the submission of required plans and documents, as well as co-ordinate any approval comments given by the Society.
- 5.1.7 Documents subject to approval will be examined by the Society. The results of the examination will be stated in Plan Approval Letter. Comments, conditions and limitations may be stated on the plans returned or in an accompanying letter.
- 5.1.8 The plan approval may be revoked at any time if subsequent information indicates that the solution was contrary to the rules.

**5.2 DOCUMENTATION REQUIREMENT FOR NEW BUILD VESSELS UNDER  
INTERNATIONAL REGISTER OF SHIPPING (INTLREG)**

- 5.2.1 The plans, corresponding technical descriptions, calculations, data, including material specifications and documents shall be submitted to International Register of Shipping (INTLREG) for review and approval. Hull and equipment plans demonstrating the essential scantlings and configurations of the actual ship, along with any suggested modifications, must be submitted for approval. Typically, these should include the following plans, documents and drawings (but not limited):

Main Plans:

- a. General arrangement
- b. Capacity plan
- c. Lines plan with offset table
- d. Hydrostatic curves
- e. Tonnage Calculations and Plans
- f. Lightship distribution
- g. Docking plan
- h. Intact Stability Booklet
- i. Inclining Test Procedure and Report (as applicable)
- j. Damage Stability Booklet (as applicable)

- k. Watertight and Weather-tight Integrity Plan (as applicable)
- l. Damage Control Documents (as applicable)
- m. Fire Control Plan
- n. Structural Fire Protection Plan
- o. Life-Saving Appliances and Arrangements Plan
- p. Evacuation Plan (as applicable)
- q. Calculations Related to MARPOL (as applicable)
- r. Loading Manual (as applicable)
- s. Grain Stability Manual (as applicable)
- t. Loading Instrument Software Details (as applicable)
- u. Cargo Securing Manual (as applicable)
- v. Maximum values of still water bending moments and shear forces
- w. Stowage factor and angle of repose of bulk cargoes to be carried
- x. Masses and unbalanced moments of heavy machinery components e.g. engines, cranes, winches etc.

**Hull Structural Plans: as per the below Table 1.5.1**

| <b>Table 1.5.1: Hull Structural Plans</b>                                                                 |                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Plan</b>                                                                                               | <b>Including Information On</b>                                                                                                                                                                                                                                                                                        |
| Loading manual/Longitudinal Strength Evaluation (as applicable) <sup>1)</sup>                             | details of loading in all contemplated loading conditions and resulting SWBM, SF and Torsional Moments (TM) design values of SWBM, SF & TM                                                                                                                                                                             |
| Midship section<br>Other transverse sections Longitudinal sections & decks Shell expansion & framing plan | main particulars (L, B, D, T, C <sub>b</sub> , V) equipment specification complete class notation applied for spacing of stiffeners deck loads, if other than those specified in the Rules openings on the deck minimum ballast draught(s) extent of flat part of bottom forward openings on the shell material grades |
| Double bottom                                                                                             | indication of access height and location of overflows loading on inner bottom                                                                                                                                                                                                                                          |
| Watertight subdivision bulkheads & watertight tunnels                                                     | openings and their closing appliances                                                                                                                                                                                                                                                                                  |
| Aft-end structure<br>Stern frame or sternpost Propeller shaft brackets<br>Aft peak tank                   | propeller outline propeller thrust structural details in way of rudder and propeller bearings height and location of overflow                                                                                                                                                                                          |
| Engine room structure<br>Engine and thrust block seating                                                  | type, power and r.p.m. of propulsion machinery weight of machinery, boilers, etc.                                                                                                                                                                                                                                      |
| Fore-end construction Fore peak tank                                                                      | openings on non-watertight bulkheads and diaphragm plates height and location of overflows                                                                                                                                                                                                                             |
| Oil tight/water tight and partition bulkheads in cargo tanks, ballast tanks and deep tanks                | intended tank contents & their densities height and location of overflow/air pipes tanks intended to be partially filled corrosion protection; if any                                                                                                                                                                  |
| Superstructures, deckhouses and machinery castings                                                        | height of sills from deck and closing appliances for companionways                                                                                                                                                                                                                                                     |

Table 1.5.1: Hull Structural Plans (Cont..)

| Plan                                                                                                                | Including Information On                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Hatchways Hatch covers<br>Bow & stern doors Side ports                                                              | position and type<br>loads if different from those specified in the rules<br>sealing and securing arrangement, spacing of bolts or wedges |
| Rudder, stock and tiller Steering gear arrangement                                                                  | speed of the ship (head & astern)<br>material of bearings, coupling bolts, stock and the locking device<br>rudder carrier                 |
| Masts & derrick posts Support structure for masts, derrick posts & cranes                                           | derrick length and loading<br>dimensions and positions of stays and shrouds quality of material                                           |
| Bilge keel                                                                                                          | material grade                                                                                                                            |
| Testing plan of tanks & bulkheads                                                                                   |                                                                                                                                           |
| Welding details                                                                                                     |                                                                                                                                           |
| Sanitary, scupper and discharge system                                                                              | sewage system                                                                                                                             |
| Anchoring and mooring arrangement with details of anchors, equipment number calculations ,bollards and mooring bits |                                                                                                                                           |

### 5.2.2 Machinery Plans and particulars

5.2.2.1 Before the work is commenced, plans in triplicate of all machinery items, as detailed in the Chapters giving the requirements for individual systems, are to be submitted for consideration. The particulars of the machinery, including power ratings, grade(s) of fuel and design calculations, where applicable, necessary to verify the design, are also to be submitted. Any subsequent modifications are subject to approval before being put into operation. It will not be necessary for plans and particulars to be submitted for each ship, provided the basis plans for the engine size and type have previously been approved as meeting the requirements of these Rules. Any alterations to basis design materials or manufacturing procedure are to be re-submitted for consideration.

**Machinery Plans and particulars to be submitted as per the below Table 1.5.2**

| Table 1.5.2                                                                                                                |                 |              |
|----------------------------------------------------------------------------------------------------------------------------|-----------------|--------------|
| Document                                                                                                                   | For information | For approval |
| Engine particulars with general engine and ancillaries information, Project Guide, Marine Installation Manual), see Note 1 | X               |              |
| Material specifications of principal components with information on non- destructive material tests and pressure tests     |                 | X            |
| Engine cross-section                                                                                                       | X               |              |
| Engine longitudinal section                                                                                                | X               |              |
| Engine frames, welding drawings, Refer Notes 2 and 3                                                                       |                 | X            |

| <b>Table 1.5.2 (Cont..)</b>                                                                                                                                                              |                        |                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------|
| <b>Document</b>                                                                                                                                                                          | <b>For information</b> | <b>For approval</b> |
| Main engine foundation and holding down and securing arrangements                                                                                                                        |                        | X                   |
| Bedplate and crankcase of cast design                                                                                                                                                    | X                      |                     |
| Bedplate and crankcase of welded design, with welding details and welding instructions<br>Refer Notes 2 and 3                                                                            |                        | X                   |
| Bedplate/oil sump welding drawings, see Note 2                                                                                                                                           |                        | X                   |
| Thrust bearing assembly, see Note 4                                                                                                                                                      | X                      |                     |
| Thrust shaft or intermediate shaft (if integral with engine)                                                                                                                             |                        | X                   |
| Thrust bearing bedplate of welded design, with welding details and welding instructions, Refer Note 2                                                                                    |                        | X                   |
| Frame (Refer Note 3), frame box see Note 3 and gear case of cast construction                                                                                                            | X                      |                     |
| Tie rod                                                                                                                                                                                  | X                      |                     |
| Connecting rod, assembly, Refer Note 5                                                                                                                                                   | X                      |                     |
| Crosshead, assembly, Refer Note 5                                                                                                                                                        | X                      |                     |
| Piston rod, assembly, Piston head Refer Note 5                                                                                                                                           | X                      |                     |
| Cylinder jacket/ block of cast construction, see Note 3                                                                                                                                  | X                      |                     |
| Cylinder cover, assembly, Refer Note 5                                                                                                                                                   | X                      |                     |
| Cylinder liner                                                                                                                                                                           | X                      |                     |
| Counterweights (if not integral with crankshaft), including fastening                                                                                                                    | X                      |                     |
| Crankshaft, details (for each crank throw) Crankshaft, assembly (for each crank throw)                                                                                                   | X                      |                     |
| Crankshaft calculations (Refer Part 5A Ch 2 Sec 1)                                                                                                                                       | X                      |                     |
| Camshaft drive, assembly, see Note 5                                                                                                                                                     | X                      |                     |
| Flywheel or turning-wheel                                                                                                                                                                | X                      |                     |
| Shaft coupling interface arrangement including dimensions and material details                                                                                                           |                        | X                   |
| Details of shielding and insulation of exhaust pipes and other parts operating at an elevated temperature, which might be impinged by flammable fluid(s) as a result of a system failure | X                      |                     |

| Table 1.5.2 (Cont..)                                                                                                                                                                                                                       |                 |              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------|
| Document                                                                                                                                                                                                                                   | For information | For approval |
| Schematic layout or other equivalent documents for the engine for the following systems, Refer Note 6:                                                                                                                                     |                 | X            |
| <ul style="list-style-type: none"> <li>Starting and control air systems</li> <li>Fuel system</li> <li>Lubricating oil system</li> <li>Cooling water system</li> <li>Hydraulic systems</li> <li>Engine control and safety system</li> </ul> |                 |              |
| High pressure fuel injection pump assembly                                                                                                                                                                                                 | X               |              |
| High pressure parts for fuel oil injection system, Refer Note 7                                                                                                                                                                            |                 | X            |
| Shielding arrangements for high pressure piping - fuel, hydraulic & flammable Oils (Fuel oil, hydraulic and high pressure oil systems)                                                                                                     |                 | X            |
| Fastening arrangements for main bearings                                                                                                                                                                                                   | X               |              |
| Fastening arrangements for cylinder heads and exhaust valve (two stroke design)                                                                                                                                                            | X               |              |
| Fastening arrangements for connecting rods                                                                                                                                                                                                 | X               |              |
| Construction and arrangement of vibration dampers                                                                                                                                                                                          | X               |              |
| Details of mechanical joints of piping systems                                                                                                                                                                                             |                 | X            |
| Oil mist detection and/or alternative arrangements                                                                                                                                                                                         |                 | X            |
| Construction of accumulators for electronically controlled engine                                                                                                                                                                          |                 | X            |
| Construction of common accumulators for electronically controlled engine                                                                                                                                                                   | X               |              |
| Construction of accumulators for hydraulic oil and fuel oil                                                                                                                                                                                |                 | X            |
| Arrangement and details of the crankcase explosion relief valve where applicable                                                                                                                                                           |                 | X            |
| Calculation results for crankcase explosion relief valves                                                                                                                                                                                  |                 | X            |
| Construction and arrangements of hydraulic systems for actuation of sub- systems:                                                                                                                                                          | X               |              |
| <ul style="list-style-type: none"> <li>Control valves, high-pressure pumps, pipes and accumulators</li> <li>Drive for high pressure pumps</li> <li>Valve bodies, if applicable</li> </ul>                                                  |                 |              |

| <b>Table 1.5.2 (Cont..)</b>                                                                                                       |                        |                     |
|-----------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------|
| <b>Document</b>                                                                                                                   | <b>For information</b> | <b>For approval</b> |
| For engine control, alarm monitoring and safety systems, the plans and information Refer Note 8                                   |                        | X                   |
| Generator test results that state the engine maximum load steps which satisfy the quality of power supply requirements            |                        | X                   |
| Planned operating profiles for the vessel at sea and during maneuvering as agreed with the Operators                              | X                      |                     |
| List of sub-contractors for main parts                                                                                            | X                      |                     |
| Operation and service manuals, Refer Note 9                                                                                       | X                      |                     |
| Risk-based analysis (for engine control system), Refer Note 10                                                                    | X                      |                     |
| Test program resulting from risk-based analysis (for engine control system), Refer Note 10                                        |                        | X                   |
| Production specifications for castings and welding procedures                                                                     | X                      |                     |
| Type approval certification for environmental tests of control components, Refer Note 12                                          | X                      |                     |
| Details of the engine type test program and the type test report, Refer Note 13                                                   |                        | X                   |
| Engine test schedule (FAT & shipboard trials)                                                                                     |                        | X                   |
| Documentation verifying compliance with inclination limits (Refer Part 5A, Ch 1, Sect 4.6 Inclination )                           |                        | X                   |
| Combustion pressure-displacement relationship                                                                                     |                        | X                   |
| Plans and details for dead ship condition starting arrangements, Refer Part 6,Chapter 2,[2.2.2] Starting from Dead ship condition |                        | X                   |

**Note 1.**

Note that the turbochargers, if required to be type approved, are to have plans and particulars submitted as detailed in Part 5A Ch 2 Sec 2

**Note 2.**

For approval of materials and weld procedure specifications. The weld procedure specification is to include details of pre- and post-weld heat treatment, weld consumables and fit-up conditions.

**Note 3.**

For each cylinder for which dimensions and details differ.

**Note 4.**

If integral with engine and not integrated in the bedplate.

**Note 5.**

Including identification of components to ensure traceability in accordance with the Rules for Materials.

**Note 6.**

Details of the system so far as supplied by the engine manufacturer such as: main dimensions, operating media and maximum working pressures.

**Note 7.**

The documentation to contain specifications for pressures, pipe dimensions and materials.

**Note 8.**

The submission is to include a general overview of the operating principles, supported by schematics explaining the functionality of individual systems and sub-systems. The information is to relate to the engine capability and functionality under defined operating and emergency conditions such as recovery from a failure or malfunction, with particular reference to the functioning of programmable electronic systems and any sub-systems. The information is also to indicate if the engine has different modes of operation, such as to limit exhaust gas emissions and/or to run under an economic fuel consumption mode or any other mode that is electronically controlled.

**Note 9.**

Operational manuals are to contain maintenance requirements (servicing and repair) including details of any special tools and gauges that are to be used with their fitting/settings together with any test requirements on completion of maintenance. They are to include a description of each system's particulars and include reference to the functioning of sub-systems.

**Note 10.**

Where engines rely on hydraulic, pneumatic or electronic control of fuel injection and/or valves, the risk-based analysis is to address the mechanical, pressure containing, electrical, electronic and programmable electronic systems and arrangements that support the operation of the engine. It is to demonstrate that failure of the control system will not result in the operation of the engine being degraded beyond acceptable performance criteria for the engine and that suitable risk mitigation has been achieved in accordance with Part 5A, Ch 11 Sec 1[1.4]b FMEA

**Note 11.**

Including quality plan for sourcing, traceability, design, installation and testing of all components used in the fuel and hydraulic oil systems installed with the engine.

**Note 12.**

Tests are to demonstrate the ability of the control, protection and safety equipment to function as intended under the specified testing conditions as per INTLREG Type Approval requirement.

**Note 13.**

The type test report may be submitted shortly after the conclusion of the type test. For electronically controlled engines evidence of type testing of the engine with the programmable electronic system, or a proposed factory acceptance test plan at the engine builders with the programmable electronic system functioning, is to be submitted to verify the functionality and behaviour under normal operating and fault conditions of the programmable electronic control system.



5.2.2.2 A schedule of testing at engine packager's or system integrator's facility, pre-sea trial commissioning and sea trials is to be submitted. The test schedules are to identify all modes of engine operation and the sea trials are to include typical port manoeuvres under the intended engine operating modes. The schedule is to include:

- (a) Testing and trials to demonstrate that the engine is capable of operating as described in Table 1.5.2 Plans and particulars to be submitted, Note 10;
- (b) Tests to verify that the response of the complete mechanical, hydraulic, electrical and electronic system is as predicted for the intended operational modes; and
- (c) Testing required to verify the conclusions of FMEA analysis.

5.2.2.3 For turbochargers, the following plans and particulars are to be submitted. The submission requirements vary depending on the category of the turbocharger; category A, B and C turbochargers are defined in Part 5A, Ch 2, Sec 2[2.1.2] of this Rules

5.2.2.4 Turbochargers are to be approved, either separately or as a part of an engine.

5.2.2.5 The requirements escalate with the size of the turbochargers. The parameter for size is the engine power (at MCR) supplied by a group of cylinders served by the actual turbocharger, e.g. for a V-engine with one turbocharger for each bank, the size is half of the total engine power. Turbochargers are categorised in three groups depending on served power by cylinder groups with:

- (a) Category A:  $\leq 1000$  kW
- (b) Category B:  $> 1000$  kW and  $\leq 2500$  kW
- (c) Category C:  $> 2500$  kW

**(a) Category A (on request):**

- (i) Turbocharger specification including type, compression ratio and operating condition.
- (ii) Cross-sectional drawing with principal dimensions and names of components.
- (iii) Containment test report.
- (iv) Test program.

**(b) Category B:**

- (i) Turbocharger specification including type of turbine and compressor, compression ratio, bearing and cooling method.
- (ii) Cross-sectional drawing with principal dimensions and materials of housing components for containment evaluation.

- (iii) Documentation of containment in the event of disc fracture.
- (iv) Operational data and limitations, i.e.:
  - Maximum permissible operating speed (rpm)
  - Alarm level for over-speed
  - Maximum permissible exhaust gas temperature before turbine
  - Alarm level for exhaust gas temperature before turbine
  - Minimum lubrication oil inlet pressure
  - Lubrication oil inlet pressure low alarm set point
  - Maximum lubrication oil outlet temperature
  - Lubrication oil outlet temperature high alarm set point
  - Maximum permissible vibration levels, i.e. self- and externally generated vibration (Alarm levels may be equal to permissible limits but are not to be reached when operating the engine at 110 per cent power or at any approved intermittent overload beyond 110 per cent.)
- (v) Arrangement of lubrication system, all variants within a range.
- (vi) A list of main current suppliers and subcontractors for rotating parts and an operation and maintenance manual.
- (vii) Type test reports.

**(c) Category C:**

- (i) Plans and particulars as for Category B.
- (ii) Drawings of the housing and rotating parts (shaft, wheels, blades and nozzle) including details of blade fixing for turbine and compressor.
- (iii) Material specifications (including density, Poisson's ratio, range of chemical composition and mechanical properties (at room temperature), and high-temperature strength characteristics as well as creep rate and rupture strength for the design service life (parts subject to 450 degrees Celsius or more)) of all parts mentioned above including details of the material and quality control system to be used for these parts.
- (iv) Welding details and welding procedure of above mentioned parts, if applicable.
- (v) Documentation\* of safe torque transmission when the disc is connected to the shaft by an interference fit.
- (vi) Information on expected lifespan, considering creep, low cycle fatigue and high cycle fatigue.
- (vii) Operation and maintenance manuals\*.
- (viii) Arrangements of cooling system.

**Note \***

Documentation is to be provided applicable to two representative sizes in a generic range of turbochargers.

5.2.2.6 Where considered necessary, INTLREG may require additional documentation to be submitted.

5.2.2.7 The following information is to be submitted to INTLREG for acceptance of oil mist detection equipment and alarm arrangements: Refer Part 5A Ch 2, Sec 1[1.4.2.2] of this Rules.

- a. Description of oil mist detection equipment and system including alarms.
- b. Schematic layout of engine oil mist detection arrangements showing location of detectors/sensors and piping arrangements and dimensions.
- c. Maintenance and test manual which is to include the following information:
- d. Intended use of equipment and its operation;
  - (i) Functionality tests to demonstrate that the equipment is operational and that any faults can be identified and corrective actions notified;
  - (ii) Maintenance routines and spare parts recommendations;
  - (iii) Limit setting and instructions for safe limit levels; and

5.2.3 Electrical Plans and data to be submitted for approval as per Part 6 Ch 1 Sec 3 of this Rules.

5.2.4 Electrical control systems documents to be submitted as per Part 6 Ch 8 Sec 1[1.4] of this Rules.

5.2.5 In case of certain ship types additional documentation may be required as per the relevant section of this Rules.

**5.2.5.1 Plans to be kept on board**

A set of Main Plans, Hull Structural Plans and Machinery/Electrical/System Plans and Information are to be kept onboard. Alterations are not permitted without prior approval and subsequent to satisfactory survey and testing.

Only updated and approved plans are to be kept onboard which shall include plans from para 5.2.1 and the below additional ones (as applicable):

- i) Essential certificates and records;
- ii) Manuals required for classification and statutory requirements;
- iii) Details of equipment forming part of the watertight and weather-tight integrity of the ship;
- iv) Tank testing plan including details of the test requirements;
- v) Corrosion protection specifications;
- vi) Details for the in-water survey, if applicable, information for divers, clearances measurements instructions etc. tank and compartment boundaries;
- vii) Docking plan and details of all penetrations normally examined at dry-docking;

- viii) Coating technical file, for ships subject to compliance with the IMO Coating Performance Standard (PSPC). Refer [5.2.5.3] below:

**5.2.5.2 Corrosion protection coatings for salt water ballast spaces and double side skin spaces**

- i) The following spaces are to be coated during construction in accordance with the Performance Standards for Protective Coatings (PSPC) adopted by the IMO by Resolution MSC.215(82), as per applicability indicated in [5.2.5.3].below.
- a) Dedicated salt water ballast tanks in all ships of 500 GT and above.
- b) Double side skin spaces in bulk carriers of LL  $\geq$  150 m.

The following tanks are not considered to be dedicated salt water ballast tanks and therefore need not comply with the requirement of IMO PSPC:

- ii) Salt water ballast tanks identified as "Spaces included in Net Tonnage" in the 1969 International Tonnage Convention Certificate;
- iii) Salt water ballast tanks in passenger vessels also designated for the carriage of grey water.

**5.2.5.3 The IMO Performance Standards for Protective Coatings (PSPC) are to be applied to ships as follows:**

- i) In case of bulk carriers and tankers that are subject to the IACS common structural rules:
- Which are contracted for construction on or after 8 December, 2006.
- ii) In case of all ships other than those mentioned in 5.2.5.3 [i] above:
- Which are contracted for construction on or after 1 July 2008, or
  - In the absence of a building contract, the keels of which are laid or which are at a similar stage of
  - construction on or after 1 January 2009, or
  - The delivery of which is on or after 1 July 2012.
- iii) For oil tankers and bulk carriers constructed on or after 1 July 1998 and for which 3.6.1 and 3.6.2 are not applicable, the following are to be complied with:
- a) All salt water ballast spaces are to have an efficient corrosion protection hard coating, epoxy or equivalent, applied in accordance with the manufacturer's requirements. The durability of the coatings could affect the frequency of survey of the spaces and light coloured coatings would assist in improving the effectiveness of subsequent surveys. It is therefore recommended that these aspects be taken into account by those agreeing to the specifications for the coatings and their application.
- b) The scheme for the selection, application and maintenance of the coating system to follow the requirements of IMO Resolution A.798(19) and contain, as a minimum the following documentation:
- Explicit agreement to the scheme for coating selection, application and maintenance by the Owners, manufacturers and shipyards (as applicable).
  - List of seawater ballast tanks identifying the coating system for each tank, including coating colour and whether coating system is a hard coating.

- Details of anodes, if used.
- Manufacturer's technical product data sheet for each product.
- Manufacturer's evidence of product quality and ability to meet owner's requirements.
- Evidence of shipyard's and/or its subcontractor's experience in coating application.
- Surface preparation procedures and standards, including inspection points and methods.
- Application procedures and standards, including inspection points and methods.
- Format for inspection reports on surface preparation and coating application.
- Manufacturer's product safety data sheets for each product and owner's, coating manufacturers and shipyards explicit agreement to take all precautions to reduce health and other safety risks which are required by the authorities.
- Maintenance requirements for the coating system.

#### 5.2.5.4 Loading Manuals and Loading Instruments

All classed seagoing vessels measuring 65 meters or longer that are contracted for construction on or after July 1, 1998, must comply with these criteria, which include minimal requirements for loading guidance data.

##### a) Definition of Loading Manual:

A Loading Manual is a document which describes:

- The loading conditions on which the design of the ship has been based, including permissible limits of still water bending moment and shear force
- The results of the calculations of still water bending moments, shear forces and where applicable, limitations due to torsional and lateral loads
- The allowable local loading for the structure (hatch covers, decks, double bottom, etc.)

##### b) Definition of Loading Instrument

A loading instrument is an instrument, which is either analogue or digital, by means of which it can be easily and quickly ascertained that, at specified read-out points, the still water bending moments, shear forces, and the still water torsional moments and lateral loads, where applicable, in any load or ballast condition will not exceed the specified permissible values.

An operational manual is always to be provided for the loading instrument.

Single point loading instruments are not acceptable.

##### c) Definition of Category I Ships

- Ships with large deck openings where combined stresses due to vertical and horizontal hull girder bending and torsional and lateral loads have to be considered;
- Ships liable to carry non-homogeneous loadings, where the cargo and/or ballast may be unevenly distributed. Ships less than 120 metres in length, when their design takes into account uneven distribution of cargo or ballast, belong to Category II;
- Chemical tankers and gas carriers.

d) Definition of Category II Ships

- Ships with arrangement giving small possibilities for variation in the distribution of cargo and ballast, and ships on regular and fixed trading pattern where the Loading Manual gives sufficient guidance, and in addition the exception given under Category I.

5.2.5.5 Requirements

a) Loading Manual

An approved loading manual is to be supplied for all ships except those of Category II with length less than 90m in which the deadweight does not exceed 30% of the displacement at the summer loadline draft.

b) Loading Instrument

In addition to the Loading Manual, an approved loading instrument is to be supplied for all ships of Category I of 100m in length and above.

**Notes**

Requirements regarding vessels which are subjected to Common Structural Rules (CSR) are to be treated in accordance with the relevant part of the Common Structural Rules (CSR)

5.2.5.6 Conditions of approval of loading manuals

- i) The approved Loading Manual is to be based on the final data of the ship. The Manual is to include the design loading and ballast conditions, sub divided into departure and arrival conditions, upon which the approval of the hull scantlings is based.
- ii) In case of modifications implying changes in the main data of the ship, a new Loading Manual is to be issued duly approved.
- iii) The Loading Manual must be prepared in a language understood by the users. If this language is not English, a translation into English is to be included.

5.2.5.7 Conditions of approval of Loading Instruments capable of carrying out hull girder strength computations

- i) The loading instrument and its operation manual are subject to approval. The approval includes:
  - Verification of type approval, if any
  - Verification that the final data of the ship has been used
  - Acceptance of number and position of read-out points
  - Acceptance of relevant limits for all read-out points
  - Checking of proper installation and operation of the instrument on board in accordance with the
  - Agreed test conditions; and that a copy of the approved operation manual is available.
- ii) In case of modifications implying changes in the main data of the ship, the loading instrument is to be modified accordingly and approved.

- iii) The operation manual and the instrument output must be prepared in a language understood by the users. If this language is not English, a translation into English is to be included.
- iv) For the assignment of Additional Class notation with respect to the capability of the Loading Instrument Software, the following criteria shall be applied:

|          |                                                                                                                                                                                   |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Notation | Capability of the Loading Instrument Software                                                                                                                                     |
| LC1      | The Instrument can perform the hull girder loads in still water under any loading condition and compare the results to the allowable limits in intact conditions only.            |
| LC2      | The Instrument can perform the hull girder loads in still water under any loading condition and compare the results to the allowable limits both in intact and damaged conditions |

#### 5.2.5.8 Conditions of approval of Computer Software for Onboard Stability Calculations

- a) The use of onboard computers for stability calculations is not a requirement of class
- b) On the other hand, in the event that Stability Computation Software is installed on board, regardless of its ability to perform Hull Girder Strength calculations, it must satisfy all mandatory class and statutory intact and damage stability requirements that are relevant to the ship.
- c) The scope of a stability calculation software shall be in accordance with the stability information as approved by the administration and shall at least include all information and perform all calculations or checks as necessary to ensure compliance with the applicable stability requirements.
- d) Approved stability software is not a substitute for the approved stability information, and is used as a supplement to the approved stability information to facilitate stability calculations.
- e) The input/output information shall be easily comparable with approved stability information so as to avoid confusion and possible misinterpretation by the operator relative to the approved stability information.
- f) An operation manual is to be provided for the onboard computer stability software.
- g) The language in which the stability information is displayed and printed out as well as the operation manual written shall be the same as used in the ship's approved stability information. The Society may require a translation into a language considered appropriate.

- h) The onboard computer software for stability calculations is to be ship specific and the results of the calculations are to be only applicable to the ship for which it has been approved.
- i) In case of modifications implying changes in the main data or internal arrangement of the ship, the specific approval of any original stability calculation software is no longer valid. The software is to be modified accordingly and reapproved.
- j) A Software may be capable of handling entries from sensors from tanks is termed as an 'Active System' and a 'Passive System' requires Manual Entry.
- k) General Requirements of Approval of the Computer Software for Onboard Stability Calculations shall be similar to the approval process of Loading Instrument Software as mentioned in the above paragraph with the focus on stability related data.
- l) For the assignment of Additional Class notation with respect to the capability of the Computer Software for Onboard Stability Calculations, the following criteria shall be applied:

|          |                                                                                                                                                                                                                                                                                           |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Notation | Capability of the Computer Software for Onboard Stability Calculations                                                                                                                                                                                                                    |
| Type 1   | Software calculating intact stability only (for vessels not required to meet a damage stability criterion).                                                                                                                                                                               |
| Type 2   | Software calculating intact stability and checking damage stability on basis of a limit curve (e.g. for vessels applicable to SOLAS Part B-1 damage stability calculations, etc.) or checking all the stability requirements (intact and damage stability) on the basis of a limit curve. |
| Type 3   | Software calculating intact stability and damage stability by direct application of pre-programmed damage cases based on the relevant Conventions or Codes for each loading condition (for some tankers etc.).                                                                            |
| Type 4   | Software calculating damage stability associated with an actual loading condition and actual flooding case, using direct application of user defined damage, for the purpose of providing operational information for safe return to port (SRtP).                                         |

### **5.3 DOCUMENTATION REQUIREMENT FOR EXISTING VESSELS**

- 5.3.1 Existing vessels applying for transfer of Class into International Register of Shipping (INTLREG), shall furnish documentation as per Section 5 [ 5.2]
- 5.3.2 In the event any particular plan or information is not available, it shall be considered by International Register of Shipping (INTLREG) on a case by case basis.



## SECTION 6 MAINTENANCE OF CLASS

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**6.1 GENERAL**

6.1.1 To maintain a ship's class with the Society, the owner is to:

- Submit complete and correct information on the ship and its use, which would be of significance to the Society for its assessment of the condition of the ship in relation to the Rules.
- Submit complete and correct information on the ownership and management of the ship, addresses and corresponding administrative information pertinent to the relations with the Society.
- Subject the ship to prescribed periodical and renewal surveys with frequency as stipulated by Chapter 3 of this part, surveys of damage, repairs, conversions and alterations.
- Subject the ship to unscheduled surveys when deemed necessary by the Society.
- Deal with the outstanding recommendations issued by the Society in accordance with the Rules within the given time limit.
- Pay all due fees and expenses.
- It is the duty of the owner to request surveys from the Society and to provide the assistance and safe access required to the extent necessary for completion of the surveys in accordance with the Rules. It is a prerequisite for maintenance of class that:
  - The statutory certificates of the applicable international conventions, are always valid
  - The surveys prescribed in the conventions are carried out within the time frames prescribed.

**6.2 SURVEY OF DAMAGE**

6.2.1 If the hull, machinery installations or equipment covered by classification sustain damage of such extent that it may be presumed to adversely affect the conditions under which the vessel has been classed, the Society is to be informed without delay. The ship is to be surveyed in the first port of call or according to further instructions from the Society.

6.2.2 The survey is to be of an extent, which the surveyor considers necessary for ascertaining the extent of damage recommending repairs necessary for maintaining vessel's class.

**6.3 SURVEY OF REPAIRS**

6.3.1 When hull, machinery installations or equipment, which are covered by classification, are to be subjected to repairs of any significance, the work is to be carried out under supervision of the surveyor, according to the applicable Rules.

6.3.2 If repairs stipulated in [6.3.1] are to be carried out during voyage, without the attendance of a surveyor, a repair plan is to be approved by the Society in advance. A Surveyor shall be called for acceptance of such repairs when completed

- 6.3.3 Repairs will only be accepted to an extent and by methods, which at any time do not seriously affect the main functions of the vessel and its watertight and structural integrity
- 6.3.4 In cases where repairs are carried out without attendance of a surveyor, documentations of personnel having carried out the repairs are to be available when the surveyor is called for acceptance.
- 6.3.5 In any emergency circumstance, emergency repairs are to be effected immediately, the repairs should be documented in the ship's log and submitted thereafter to the Society for use in determining further survey requirements
- 6.3.6 When, at any survey, the Surveyors consider repairs to be immediately necessary, either as a result of damage, or wear and tear, they are to communicate their recommendations at once to the Owner, or his representative. When such recommendations are not complied with, immediate notification is to be given to the Classification Committee by the Surveyors.
- 6.3.7 Where repairs are to be carried out by a riding crew during a voyage then these must be planned in advance. A complete repair procedure, including the extent of proposed repair and the need for Surveyor's attendance during the voyage, is to be submitted reasonably in advance to the Surveyor for agreement. Failure to notify INTLREG in advance of the repairs may result in the class of the ship being specially considered by the Classification Committee. Where emergency repairs are effected immediately due to an extreme emergency circumstance, the repairs should be documented in the ship's log and submitted thereafter to INTLREG for use in determining further survey requirements.

#### **6.4 CONVERSIONS AND ALTERATIONS**

- 6.4.1 If hull, machinery installations, equipment or systems covered by classification are to be converted or altered, the changes are to be documented and are to be approved by the Society in advance.
- 6.4.2 Alterations to hull, machinery and equipment made possible by amendments of the applicable Rules may be undertaken, provided the general safety and performance standard required for retention of class will be maintained.
- 6.4.3 The conversion or the alteration is to take place under the surveyor's supervision in the same manner as for new constructions.
- 6.4.4 All ships, which undergo repairs, alterations, modifications and outfitting related thereto, shall continue to comply with at least the requirements previously applicable to these ships. Such ships if constructed before the date the present Rules came into force shall, as a rule, comply with the requirements for ships constructed on or after that date to at least the same extent as they did before undergoing such repairs, alterations, modifications or outfitting, Repairs,

alterations and modifications of a major character and out-fitting related thereto shall meet the requirements for ships constructed on or after that date to at least the same extent as they did before undergoing such repairs, alterations modifications or outfitting. Repairs, alterations and modifications of a major character and out-fitting related thereto shall meet the requirements for ships constructed on or after the date the present Rule standard came into force in so far as the Society deems reasonable and practicable.

Modifications of a major character means

- Which substantially alters the dimensions or carrying capacity of the ship;
- Which changes the type of the ship, or;
- The intent of which in the opinion of the Society is substantially to prolong its life

Repairs, alternations and modifications are not to impair the safety standard of the ship.

## **6.5 CHANGE OF OWNERSHIP**

6.5.1 A Ship retains class when transferred to another owner, with the exception of class notations based on certification of management of operations, which will be deleted automatically.

6.5.2 In the case of such transfer the previous owner is to give the Society a written notice immediately. Until this has been done communication with binding effect will be sent to the previous owner.

## **6.6 RECOMMENDATIONS**

6.6.1 If it is found that rule requirements implied by classification are not satisfied, the Society will issue a Recommendation for any improvements, new surveys or other measures found necessary in order to retain the class with the Society, regardless of whether the matter referred to has previously been approved and have to comply within specified time frame.

6.6.2 Recommendations constitute requests by the Society in order to ensure compliance with the Rules. They are not to be considered as advice.

6.6.3 If the Society deems it necessary to have technical measurements or other examinations carried out to ascertain whether damage has been sustained or is imminent, a Recommendation will be issued.

6.6.4 Deficiencies recorded by port state control and flag state authorities, shall be treated in the same manner as recommendations issued by the Society, as far they are applicable to vessel's classification or statutory certificates issued by the Society and shall be deal with to the satisfaction of the Society.

6.6.5 Recommendations for immediate fulfillment can be made verbally, provided the representative of the owners accepts the Recommendation and the surveyor ensured that the Recommendation has been dealt with before the ship leaves port.

- 6.6.6 Where in the opinion of the Society a damage that has been sustained or imminent is not likely to affect the efficient condition of the vessel for an agreed duration then a Recommendation will be issued in writing specifying the date by which the recommendation has to be dealt with.
- 6.6.7 An Outstanding Recommendation apart from the request stated in [6.6.2], also constitutes a confirmation by the Society that, in the opinion of the Society, the ship is considered to remain efficient during the mean time.
- 6.6.8 A Recommendation will be deleted when by survey or other means the Society has established that the requirements have been fulfilled.

## **6.7 RENEWAL OF CLASSIFICATION**

- 6.7.1 For special surveys completed within 3 months before the expiry date of the existing certificate, the new certificate will be valid to a date not exceeding 5 years from the expiry date of the existing certificate.
- 6.7.2 For special surveys completed after the expiry date of the existing certificate, the new certificate will be valid to a date not exceeding 5 years from the expiry date of the existing certificate.
- 6.7.3 For special surveys completed more than 3 months before the expiry date of the existing certificate, the new certificate will be valid to a date not exceeding 5 years from the completion date of the renewal survey.
- 6.7.4 In cases where postponement has been granted the new certificate will be valid to a date not exceeding 5 years from the expiry date of the existing certificate before postponement was granted.
- 6.7.5 In cases where the special surveys are carried out concurrently with major conversions and/or alterations requiring a long conversion time, the validity of the new certificate will normally be 5 years from the date of the conversion and/or alteration.

## SECTION 7 SUSPENSION AND WITHDRAWAL OF CLASS

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**7.1. GENERAL**

- 7.1.1. The Society may suspend or withdraw a ship's class in cases where the assumptions regarding the maintenance and handling of the ship or the provisions for maintenance of class have been violated.
- 7.1.2. The decision to suspend or withdraw a ship's class is made by the Technical Committee. However, in cases of automatic suspension, no individual decision is made. Suspension or withdrawal of class may take effect immediately or after a specified period of time.
- 7.1.3. Where the decision to suspend or withdraw class has been made by the Technical Committee the owner's will be notified of the same in writing.

**7.2. SUSPENSION OF CLASS**

- 7.2.1. If the special surveys for hull, machinery installations and equipment related to main character of class are not carried out before the expiry date of the classification certificate, and if no postponement has been granted the class will be automatically suspended with immediate effect unless the surveys are under completion at a yard or in port.
- 7.2.2. If the annual or intermediate surveys are not carried out within 3 months from the anniversary date of the classification certificate the class is automatically suspended with immediate effect.
- 7.2.3. The Society may further decide to suspend a ship's class if the ship cannot be submitted to the required surveys including those required for dealing with outstanding recommendations, damages, etc. within stipulated time.
- 7.2.4. The Society may decide to suspend a vessel's class if the vessel is deemed to be unable to continue safe and reliable operation, e.g. as a result of a major casualty.

**7.3. WITHDRAWAL OF CLASS**

The following situations may prompt the Society to consider class withdrawal:

- 7.3.1 If the outstanding surveys are not carried out within a specified time after the class suspension, the Society will decide to withdraw the ship's class.
- 7.3.2 When any ship proceeds to sea without having rectified a condition of class, which was required to be dealt with before leaving port, the class will be withdrawn with immediate effect.
- 7.3.3 If the outstanding debt owed to the Society is not paid within a fixed date, the Society may withdraw the ship's class with one month's written notice. This also applies to payment received by local representative & not remitted to head office.

- 7.3.4 If the Society becomes aware that a vessel continues operation with serious damage or defects in violation of class requirements, the class may be withdrawn with effect from the time this became known to the Society. The class withdrawal may be made retroactive.
- 7.3.5 When it is considered that a customer's failure to comply with rule requirements is sufficiently serious or fraudulent the withdrawal of class may, at the discretion of the Society, be extended to include other vessels controlled or operated by the same customer.
- 7.3.6 If the customer makes a general assignment for the benefit of his creditors or if any proceedings are commenced in court or any order or judgement is given by any court for liquidation, winding up of the customer, the Society may withdraw the class with immediate effect.
- 7.3.7 The owner may withdraw the class by submitting a formal request if they so choose for any reason.
- 7.3.8 When a ship is intended for a demolition voyage with any Periodical Survey overdue, the ship's class suspension may be held in abeyance and consideration may be given to allow the ship to proceed on a single direct ballast voyage from the lay up or final discharge port to the demolition yard, provided the attending Surveyor finds the ship in a satisfactory condition to proceed for the intended voyage, at the discretion of the Technical Committee.
- 7.3.9 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 allow 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, at the discretion of the Technical Committee. This is provided the ship is found in a satisfactory condition by surveys, the extent of which are to be based on surveys overdue and duration of lay-up.
- 7.3.10 Where a withdrawal of class has come into effect the Society will make amendments in the Register book or its supplement.

#### **7.4. RECLASSIFICATION**

- 7.4.1 If the outstanding surveys leading to class suspension are carried out within a specified time, the class will be reinstated and the existing classification certificate retains its validity, provided the following is compiled:
- a) The result of the survey is such that all observed deficiencies are satisfactory rectified. The Society may after consideration accept that minor deficiencies are pending to be carried out.
  - b) No overdue periodical surveys or overdue Conditions of Class at that time.



- 7.4.2 In all other cases a ship's class may only be reinstated based upon a written request from the owner. The survey extent will in such instances be dependent upon the ship's classification status at the time of suspension or withdrawal
- 7.4.3 The Society reserves the right to decline an application for reinstatement of class.
- 7.4.4 When the class is reinstated, the Society will confirm this in writing to the customer and to the flag administration.
- 7.4.5 If the class has been suspended due to outstanding debt, the class will automatically be reinstated when all outstanding debt has been paid, provided that there are no other reasons for suspension

## SECTION 8 STATUTORY CERTIFICATION

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**8.1. GENERAL**

- 8.1.1. When so authorized by the vessel's flag state to do so Society may provide statutory certification services, at the request of the owners, under various international codes and conventions.
- 8.1.2. It shall be the responsibility of the owners to request for the surveys under the statutory conventions and codes, at the frequencies as specified by these instruments.
- 8.1.3. When statutory certificates are also issued by the Society for a vessel classed by the Society, the outstanding recommendations shall be considered to be a condition for the validity of the relevant statutory certificate also.
- 8.1.4. In case the class of the vessel has been suspended or withdrawn the statutory certificates issued to the vessel shall be deemed to be invalid. Validity of the statutory certificate will be automatically reinstated when the class is re-instated.
- 8.1.5. The Society undertakes statutory certification on behalf of flag administrations when and to the extent the Society has been authorised to do so by the individual flag administration.  
Statutory certification includes inter alia approval, survey and the issuance of statutory certificates.
- When the Society acts on behalf of a flag administration, the Society follows international statutory instruments, IACS Unified Interpretations and International Register of Shipping (INTLREG) Statutory Interpretations, and generally follows guidance issued by IMO in Circulars etc. unless the flag administration has instructed the Society otherwise.
- 8.1.6. For a dually classed vessel, where the Society has not been authorized by the flag administration to issue statutory certificates, the Society may accept that such certificates are issued by the dual class Society provided the other class Society is authorized by the flag administration

## SECTION 9 QUALITY SYSTEM REQUIREMENTS

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**9.1. APPEALS**

- 9.1.1. The client may request that a decision by the Society be taken up for reconsideration by one or more surveyors specially appointed by the Society. The expenses incurred are to be paid by the party making the appeal. However, if the earlier decision is revoked, the expenses will be covered by the Society.

**9.2. AUDITS AND MONITORING**

- 9.2.1. Surveys and other activities related to the services provided by the Society are subject to Audits and monitoring under the quality system of the Society by internal and external agencies. The client shall be responsible to provide all necessary assistance for the facilitation of the same.
- 9.2.2. In case the audits or monitoring reveals any deficiencies in the services provided in the past requiring any rectification to be carried out for the vessel, the client shall be responsible for rectifying such deficiencies.

**9.3. CONFIDENTIALITY**

- 9.3.1. Except as provided in 9.3.2 and 9.3.3, the plans, documents, data and information which come in to the possession of the Society for the purpose of the services provided by it will not be disclosed to any third party, without advance permission from the client.
- 9.3.2. In case of dually classed vessels information regarding surveys, technical particulars of the vessel, etc. as provided in the agreement with the corresponding Society will be exchanged with that Society, without seeking permission from the client.
- 9.3.3. Information requested by flag states, port states, underwriters and P&I clubs, with respect to the status of surveys and certificates issued to the vessel, as well as the details of outstanding recommendations will be given to such bodies without seeking the permission of the client.

## SECTION 10 LIABILITY

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**10.1. GENERAL**

- 10.1.1. It is agreed that save as provided below the Society, its subsidiaries, bodies, officers, directors, employees and agents shall have no liability for any loss, damage or expense allegedly caused directly or indirectly by their mistake or negligence, breach of warranty, or any other act, omission or error by them including gross negligence or Willful misconduct by any such person with the exception of gross negligence or Willful misconduct by the governing bodies or senior executive officers of the Society.
- 10.1.2. If any person used the services of the Society or its subsidiaries or relies on any decision made or information given by or on behalf of them and in consequence suffers a loss, damage or expense proved to be due to their negligence, omission or default, then the Society will pay by way of compensation to such person a sum limited to the value of fees paid to the Society.
- 10.1.3. Under no circumstances whatsoever shall the individual or individuals who have personally caused the loss, damage or expense be held liable.

**10.2. JURISDICTION**

- 10.2.1. This means all bodies under the International Register of Shipping (INTLREG) which would include its subsidiaries, directors, office bearers, agents and any other body or member authorized by International Register of Shipping (INTLREG) or acting on behalf of International Register of Shipping (INTLREG).

**10.2.2. Use by other parties**

International Register of Shipping (hereafter referred as the Society) has copyrights of these Rules and Regulations and they fall under its ownership rights. Consequently, only the International Register of Shipping (INTLREG) is entitled to offer and/or perform classification or other services on the basis of and/or pursuant to these Rules and Regulations without International Register of Shipping (INTLREG) prior written consent, which can include issuance of certificates and/or declarations of conformity, wholly or partly. Also International Register of Shipping (INTLREG) cannot be held accountable for the resultant consequences of using Rules and Regulations other than those specified by International Register of Shipping (INTLREG).

**10.2.3. Governing Law**

The Panama's law shall govern the relationship between International Register of Shipping (INTLREG) and other parties, these Rules and Regulations are used for the classification of the vessels.

**10.3. FORCE MAJEURE**

10.3.1. If due to circumstances reasonably beyond the Owner's or INTLREG's control, as defined below, the ship is not in a port when surveys become overdue the Classification Committee may allow the ship to sail, in class, directly to an agreed discharge port and then, if necessary, in ballast to an agreed repair facility at which the survey can be completed. In this context, 'Force Majeure' means damage to the ship, unforeseen inability of Surveyors to attend the ship due to governmental restrictions on right of access or movement of personnel, unforeseen delays in port or inability to discharge cargo due to unusually lengthy periods of severe weather, strikes, civil strike, acts of war or other force majeure.

10.3.2. In circumstances of global disruption to normal maritime operations, such as experienced during the global COVID-19 pandemic, where Flag Administrations adopt extraordinary measures permitting postponements to scheduled statutory surveys beyond the due dates, the Classification Committee may allow corresponding postponements to scheduled class surveys provided the following measures to confirm the continued compliance of the vessel with INTLREG classification requirements are undertaken:

- (a) a confirmatory INTLREG examination of the ship's records; and,
- (b) an INTLREG review of evidence submitted by the Owner that confirms that the vessel is in a condition to satisfactorily continue in class for the agreed period of postponement; this may include an INTLREG remote survey, and provision to INTLREG of acceptable photographic, video or other evidence of condition of structure or equipment; and,
- (c) receipt of a confirmatory statement from the Master advising that the ship is, in their opinion, in compliance with INTLREG Rules and Regulations and in a condition to satisfactorily continue in service for the agreed period; and,
- (d) any due and/or overdue surveys and examination of Conditions of Class, Actionable Items and Statutory Findings are to be carried out at the first port of call with available facilities where INTLREG Surveyors can reasonably attend to complete the overdue surveys.



## **SECTION 11 TYPE APPROVAL**

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**11.1. INTERNATIONAL REGISTER OF SHIPPING (INTLREG) TYPE APPROVAL PROGRAM**

**11.1.1. General**

Applicants are required to submit a signed request for Product Type Approval, indicating all adopted standards by the year of their last issuance. The Type Approval Program is made up of two components, Design Assessment and Manufacturing Assessment:

1. Design Assessment, which is approval of the standard product design, consists of:
  - a) Design evaluation, and
  - b) Survey and/or testing of a prototype or a production unit (as appropriate)
2. Manufacturing Assessment, which is approval of the manufacturing process, consists of:
  - a) Management Assessment. Evaluating the quality assurance and quality control system of the manufacturing facilities to assess and verify their capability to meet the manufacturer's specified level of product quality consistently and satisfying the requirements of the Rules, as applicable. Three categories of quality assurance and quality control are in the Program:
    - i) Acceptable Quality System (AQS) is a system in substantial agreement with a standard such as ISO 9000 series or equivalent and found acceptable by International Register of Shipping (INTLREG).
    - ii) Recognized Quality Standard (RQS) is a system that is in compliance with a recognized standard at least to ISO 9000 series or equivalent and so certified by a recognized certification body.
    - iii) Product Quality Assurance (PQA) is a system meeting the requirements for RQS and having additional approved procedures to carry out tests and surveys as required by the Rules.
  - b) Production Assessment. Evaluating the product specific manufacturing process of the manufacturer in order to assess and verify that manufacture and inspections of the products are established to provide the manufacturer's specified level of quality control, and to satisfying the requirements of the Rules.

The Design Assessment portion of the Type Approval Program may be applied individually for products submitted without a request for Product Type Approval. It is normally to be done with a signed request for Type Approval, and in conjunction with the Manufacturing Assessment portion of the Type Approval Program. The application of the Manufacturing Assessment portion can be done only in conjunction with Design Assessment. When a manufacturer has already been granted Manufacturing Assessment, further submission of new products or drawing updates do not need to be accompanied by a new request for Type Approval. The purposes of the Type Approval Program are:

- a) To avoid repeated evaluation of identical designs,

- b) To allow acceptance of the product based on periodic surveillance of the manufacturer's quality assurance program and, where applicable, selective inspection and tests in lieu of surveying and testing individual units at the manufacturer's facility, [see 11.1.3.2 and 11.1.3.3].

#### 11.1.2. Limitations

The application of the Type Approval Program to a specific product is at the discretion of International Register of Shipping (INTLREG). Those products that may not be type approved under The Type Approval Program are identified in the appropriate Sections of the Rules. Products for which the Rules require witnessed testing by a Surveyor as part of their certification for use on a vessel, MODU, or facility classed by International Register of Shipping (INTLREG) will require witnessed testing where the option for Acceptable Quality System (AQS) or Recognized Quality Standard (RQS) system is exercised. Where Product Quality Assurance Certificate (PQA) is granted, witnessed testing during the manufacture of the product, which otherwise would be required by the Rules, may be waived at the discretion of the Surveyor in Charge. Where the product is manufactured to an Administration standard, any request to waive witnessed testing must be approved by the Administration.

#### 11.1.3. Process

The process of the Type Approval Program is shown schematically in Figure 1.2.1. Each step in the process will be described in the following.

##### 11.1.3.1. Design Assessment (DA)

###### a) Design Evaluation

Plans showing details of construction, and documentation such as product specifications, performance data, standard of compliance, engineering analyses, etc., as applicable, are to be submitted for review. The design review must first show compliance with applicable requirements of the Rules or to standard as may be permitted by the Rules, prior to further consideration for International Register of Shipping (INTLREG) Type Approval. Products for which there are no specific standards in the Rules may be evaluated based on applicable industry standards or, in the absence of applicable Rules or industry criteria, the manufacturer's standard or specifications and/or engineering analyses. The basis of design evaluation will be commenced in International Register of Shipping (INTLREG)'s documentation concerning the product. The design assessment is intended to fulfill the requirements of the first element of the Type Approval Program, as described in [11.1.1]. Design assessment is the first step in determining that, provided that all other Rule requirements are complied with and subject to completion of manufacture and testing to the satisfaction of the attending Surveyor, the product may be used onboard a vessel, MODU or a facility classed by International Register of Shipping (INTLREG).

**b) Survey and/or Testing of Prototype or Production Units**

Where applicable, and as deemed necessary for the evaluation process, the manufacturer is to carry out performance, nondestructive, destructive, environmental, or other tests on the product as may be specified in the Rules, in the applicable standard, or in the manufacturer's specifications in the presence of a Surveyor. If the required testing has been or is done in a recognized independent testing facility or in the manufacturer's facility that is certified to ISO 9000 and Recognized Quality Standard [RQS] as described in [11.1.3.2] of these Rules, that is acceptable to International Register of Shipping (INTLREG), consideration will be given to acceptance of test results obtained without a Surveyor present. Each International Register of Shipping (INTLREG) Technical Office will maintain a list of recognized testing facilities.

**c) Design Assessment Certificate**

Products evaluated in accordance with [Design evaluation and Survey and/or Testing of Prototype or Production Units of 11.1.3.1] and found to be in conformance with the applicable provisions of the Rules, standards, or specifications will be issued a Design Assessment Certificate. Designs so approved will be eligible for listing on the International Register of Shipping (INTLREG) website under the Design Approved Products (PDA) index. They will remain in this index until a Manufacturing Assessment Certificate (MA) is issued at which point the listing will be relocated to the Type Approved Product (PTA) index with the MA certificate data added. Design Assessment Certificate, by itself, does not reflect that the product is type approved. For that purpose, manufacturing assessment is to be carried out in accordance with [11.1.3.2] or [11.1.3.5].

**d) Product Design Assessment, Limited**

When a Product Design Assessment Certificate expires or is superseded by a Rule or specification change, the option of maintaining the listing in the category of Product Design Assessment, Limited (PDA Ltd.) is available. There will be two categories in this PDA Ltd:

- i) A product that has expired is pending renewal and requires technical revalidation prior to being used. The term of validity will be one year from the date of expiration of the PDA.
- ii) A product that will be listed as in compliance with a previous Rule and remains valid only for vessels contracted on or before the effective date of the Rule. The effective date will be included in the service restrictions of the product. The term of validity will be five years subject to continued compliance with the applicable Rule.

**11.1.3.2. Manufacturing Assessment (MA)****a) Quality Assurance Standard**

- i) Acceptable Quality Standard (AQS). The manufacturer is required to have in place an effective quality assurance system that will be evaluated by Surveyors for essential compliance with a recognized quality standard, such as the ISO 9000 series, or equivalent. The system, as implemented, is to be acceptable to International Register of Shipping (INTLREG). The evaluation will involve initial, regular and renewal audits of the quality system, in accordance with the provisions of the applicable quality assurance standard. Where considered necessary by the attending Surveyor, more frequent surveillance may be required to maintain the certification.
- ii) Recognized Quality Standard (RQS). The requirements are the same as those for AQS except that the manufacturer is required to have in place an effective quality assurance system certified by an internationally recognized certification body as complying with a recognized quality standard at least equivalent to the ISO 9000 series. Such certification is to be valid at least during the validity of Manufacturing Assessment Certificate. In addition, the system as implemented by the manufacturer is to be acceptable to International Register of Shipping (INTLREG). For that purpose, a confirmatory evaluation will be conducted by the Surveyor, which will involve initial, regular and renewal audits of the quality system, in accordance with the provisions of the applicable quality assurance standard. Where considered necessary by the attending Surveyor, more frequent surveillance may be required to maintain the certification.
- iii) Quality Manual. The manufacturer is also required to maintain a quality manual as may be required by the standard. Where a recognized certification body has approved the Quality Manual, International Register of Shipping (INTLREG) will not require them to be submitted for International Register of Shipping (INTLREG)'s approval.

**b) Quality Control**

Typical quality plans describing methods of assuring and controlling quality during production as may be required by the product specifications or standard will be subject to evaluation by International Register of Shipping (INTLREG). In particular, quality plans are to indicate specific surveys, tests, etc. wherever required by the Rules.

The manufacturer is to present a sample or specimen of the product, representative of the "type" to be approved, to the Surveyor for the purpose of verifying that the "type" has been manufactured in conformance with the design documents.

**c) Manufacturing Assessment Certificate (MA)**

Manufacturing facilities that are successfully audited in accordance with Quality Assurance Standard and Quality Control of [11.1.3.2] and are found to:

- i) Have undergone a satisfactory product design evaluation, and
- ii) Comply with a quality assurance standard, and
- iii) Have manufacturing quality control that meets the applicable provisions of the Rules, or of the applicable product standard, or the manufacturer's specifications, will be issued a Manufacturing Assessment Certificate (MA) by the attending Surveyors.

Manufacturers so assessed will be eligible for listing on the International Register of Shipping (INTLREG) website under the Type Approved Product (PTA) index together with the PDA Certificate data, as appropriate.

**d) Confirmation of Type Approval (CTA)**

Those products with both a valid Design Assessment Certificate [see Design Assessment Certificate (DAC) under 11.1.3.1] and a valid Manufacturing Assessment Certificate [see Manufacturing Assessment Certificate (MAC) under 11.1.3.2] is eligible for a Confirmation of Type Approval. This certificate may be printed from the International Register of Shipping (INTLREG) website only when all parts of the Type Approval Program remain current. [See also Acceptability of Type Approved Products under 11.1.3.4]. The Confirmation of Type Approval represents the information recorded by International Register of Shipping (INTLREG) on the product as of the date and time the certificate is printed.

**11.1.3.3. Product Quality Assurance Certification (PQA)**

A Product Quality Assurance Certificate (PQA) will be issued to a manufacturer who has requested that Rule-required surveys and tests be conducted without an International Register of Shipping (INTLREG) Surveyor in attendance. For that purpose, the manufacturer is to meet the requirements for Type Approval as described in [(b) under Quality Assurance Standard of 11.1.3.2] and, in addition, is to have a quality assurance system in operation that is at least as effective as the Surveyor's attendance at those surveys and tests. The scope of manufacturing assessment will be expanded to include a confirmatory evaluation, including at least initial, semi-annual, annual, and renewal audits of the quality system, in accordance with the provisions of the applicable quality assurance standard and International Register of Shipping (INTLREG) own criteria. When requested by the manufacturer, consideration will be given to crediting a semi-annual audit based on a Surveyor's recommendation after attendance for Unit Certification or a surveillance visit on or about the due date of the semi-annual audit. The semi-annual audit will have a window of 30 days before and 30 days after the midpoint between annual audits.

The issuance of a Product Quality Assurance Certificate is contingent upon the recommendation by the attending Surveyor, seconded by the Surveyor in Charge and final approval by the Manager of the Type Approval Program. During the manufacture of the product, the Product Quality Assurance certification will provide an alternative to the

requirements for witnessed testing by a Surveyor. This is not a relaxation of the Rule requirement for production testing, but rather allows such testing to be conducted without a Surveyor being present.

Where conditions justify the need for increased surveillance, the PQA does not preclude the Surveyor in Charge from expanding the scope of surveillance. Where the situation (e.g., frequency of International Register of Shipping (INTLREG) Unit Certification, batch test results, etc.) warrants such action, International Register of Shipping (INTLREG) may require a closer interval of surveillance surveys. In such instances, the requirement for a renewal audit will be specially considered. See, [Renewal under 11.1.3.4].

International Register of Shipping (INTLREG) also reserves the right to conduct unscheduled surveillance surveys.

Manufacturers receiving a Product Quality Assurance Certificate will be distinguished on the International Register of Shipping (INTLREG) website by an added notation (PQA).

#### 11.1.3.4. Certificates

##### a) **Unit-Certification**

When a Type Approved Product is proposed for use onboard a vessel or a marine structure, it is to fulfill all applicable requirements in the Rules, including [Acceptability of Type Approved Products under 11.1.3.4] given hereunder. Where required by the Rules and Regulations, Unit Certification is also to be completed as follows:

- i) Products Covered by Product Quality Assurance [11.1.3]. Products requiring unit certification for use on a vessel, MODU, or facility classed with International Register of Shipping (INTLREG) will be unit-certified by the International Register of Shipping (INTLREG) office having jurisdiction over the manufacturer. The manufacturer will be responsible to advise the International Register of Shipping (INTLREG) office of deliveries of products and to supply the International Register of Shipping (INTLREG) office with all documentation required for unit-certification of the product.
- ii) Products Covered by Manufacturing Assessment [11.1.3.]. Where the Rules require attendance of the International Register of Shipping (INTLREG) Surveyor during any stage of manufacturing, including but not limited to any testing, the unit certification will be issued by the attending Surveyor upon completion of all required surveys and tests. Where the attendance of the Surveyor is not required by the Rules, no unit certification is required. At the discretion of the Surveyor, a unit-certification of this category may be credited to the annual audit, when conducted on or about its due date.

##### b) **Issuance and Updating of Certificates**

Issuance of Certificates. The certificates indicated in Design Assessment Certificate under [11.1.3.1], Manufacturing Assessment Certificate (MA) under [11.1.3.2 and

11.1.3.3] will be issued initially for five years. These certificates are renewable for another five-year period (from the expiry date of the previous certificate), subject to assessment of design and manufacturing in accordance with [Renewal of 11.1.3.4]. Failure for renewal of the manufacturing assessment certificate will cease validation of type approval certification at the end of the five-year period. Where for a practical reason the renewal process of any certificate cannot be completed before expiry of the period, a short-term extension may be considered upon application. When the certificate is renewed within 90 days of its expiration date, the new certificate is to be valid from the expiration of the previous certificate.

These certificates will be updated in accordance with [see (b) of Issuance and Updating of Certificates under 11.1.3.4] or [see (c) of Issuance and Updating of Certificates under 11.1.3.4], where the design, Rules or Regulations used for certification is changed during the five years period. The updated certificate will be issued for five years from the date of the updating. In addition, the following requirements will apply.

- i) Changes to Design, Procedures and Regulations other than the Rules and Regulations. At any time, where there is a change in the design, procedures or the applicable standards (other than International Register of Shipping (INTLREG) Rules and Regulations), as listed in [a) to d) of 11.1.3.5], the manufacturer is to endeavor to notify International Register of Shipping (INTLREG) of those changes with an application either for incorporation of the change for record purposes, or for re-assessment of the product, procedures and/or regulations, as the case may be. Failure to notify International Register of Shipping (INTLREG) about those changes may invalidate the certificate.

Where a specific implementation date is indicated in the change(s) to the regulation adopted for the product, the certification will become invalid effective on the implementation date of the new regulation or the end of the five-year period whichever comes first, unless the product is found or placed in compliance with the new requirement as a result of reassessment.

- ii) Changes to the Rules and Regulations. The foregoing requirements on changes to other regulations will generally apply to the changes to the Rules and Regulations shown on the Design Assessment Certificate. In this case, International Register of Shipping (INTLREG) is to endeavor to notify the manufacturer of the Rule changes, to call the attention of the manufacturer to the need for reassessment of the product design and manufacture and eventual updating as may be found necessary.

The listing on the International Register of Shipping (INTLREG) website will be replaced by the new listing upon completion of the updating, which is to be affected within the five year period shown on the certificate.



Where a retroactive application of the change(s) to the Rules and Regulations is required and their implementation date is specified, the certification will become invalid effective on the specified implementation date or the end of the five year period whichever comes first, unless the product is found or placed in compliance with the new requirement as a result of reassessment.

- iii) Website Entry. When the Product Type Approval becomes invalid due to overdue manufacturing audits, the products on the International Register of Shipping (INTLREG) website will be relocated from the PTA index to the PDA index provided that the design assessment certification is still valid. When the design assessment certification is withdrawn or expired, all related entries on the International Register of Shipping (INTLREG) website will be deleted at that point.

c) **Acceptability of Type Approved Products**

Unless a specific implementation date is indicated in the adopted Regulation [see (b) of Issuance and Updating of Certificates under 11.1.3.4] or a retroactive application of the Rule change is required [see (c) of Issuance and Updating of Certificates under 11.1.3.4], a type approved product may be accepted for use on a vessel, MODU or facility classed or to be classed with International Register of Shipping (INTLREG) provided its type approval is valid at the time of the new construction contract of the vessel, MODU or facility.

If the implementation of change to Rules or Regulation is based on the keel laying date, then a type approved product with type approval valid at the time of keel laying of the vessel, MODU or facility will be acceptable.

d) **Renewal**

For renewal of certificates, the manufacturer is to inform International Register of Shipping (INTLREG) of any change to the product design, and the following are to be conducted, as appropriate:

- i) Re-evaluate the product design in accordance with [11.1.3.1], to update and verify if there is a design or specification change or a change to the applicable Rules or standards; and
- ii) Re-audit the quality plan in accordance with [Quality Control of 11.1.3.2 or 2.17.3.3]; and
- iii) Verify by survey that a valid quality assurance system has been maintained in accordance with [Quality Assurance Standard of 11.1.3.2 or 11.1.3.3].

Where the manufacturer is on semi-annual or closer audit, the renewal audit for Manufacturing Assessment Certificate may be specially considered.

e) **Overdue Audit**

When a periodic (renewal, annual or closer) audit is not completed within 90 days after the anniversary date of the Manufacturing Assessment Certificate (for renewal or annual audit) or within 90 days after the due date (where a closer interval is specified), the entry in the International Register of Shipping (INTLREG) website will be relocated from the PTA index to the PDA index if the PDA is still valid and, therefore, the Confirmation of Type Approval is deemed suspended.

**11.1.3.5. Terms and Conditions of the Request for Product Type Approval and Agreement**

**a) Agreement**

Unless otherwise agreed in writing, all services rendered and certificates issued are governed by the terms and conditions of the “Request for Product Type Approval and Agreement” (the “Agreement”) which are incorporated by reference. The Product Design Assessment of record will be the English version published on the International Register of Shipping (INTLREG) website [www.typeapproval.org](http://www.typeapproval.org). By requesting for Product Type Approval, the Customer gives his consent to be bound by terms and conditions and accepts that the details of the product, which may have commercial relevance will be published on the International Register of Shipping (INTLREG) website and understands and agrees to the publishing.

**b) Representation as to Product Type Approval**

A Confirmation of Product Type Approval represents that the product design meets the Rules and Regulations or Guides, statutory, industrial or manufacturer's standard described on the Design Assessment Certificate and that the manufacturer has established a systematic Quality Monitoring System to illustrate its capacity to constantly manufacture a product which meets the requisite standards. International Register of Shipping (INTLREG) is neither a substitute for the independent judgment of professional designers or engineers nor a substitute for the quality control procedures of constructors, makers, suppliers, manufacturers and vendors of marine structures, materials, machinery or equipment. International Register of Shipping (INTLREG) solely represents to the manufacturer or other Customer of International Register of Shipping (INTLREG) that it will use due diligence in developing Rules, Guides and standards in surveying the manufacturing facility or construction site as called for by International Register of Shipping (INTLREG) criteria for type approval.

**c) Suspension of Certification**

Any of the below mentioned events will cause instant suspension of the certificate of Product Type Approval unless the changes made are submitted to International Register of Shipping (INTLREG) for new review and audit.

Redesign of the product or products covered by a Design Assessment certificate;

- i) change in production methods;

- ii) considerable change in management of the organization;
- iii) considerable change in frequency or curriculum for personnel training;
- iv) refusing access to International Register of Shipping (INTLREG) personnel for periodic or annual audits;
- v) failure to take corrective measures against a non-compliance identified during an audit or in service;
- vi) failure to pay International Register of Shipping (INTLREG) fees

d) **Validity**

The validity, applicability and interpretation of a certificate issued under the terms of or in contemplation of International Register of Shipping (INTLREG) Type Approval are governed by the Rules, Guides and standards of International Register of Shipping which shall remain the sole judge thereof. Nothing contained in a Design Assessment or Manufacturing Assessment Certificate or in any report issued in contemplation of these certificates shall be deemed to relieve any designer, builder, owner, manufacturer, seller, supplier, repairer, operator or other entity of any warranty express or implied, nor create any interest, right, claim or benefit in any third party. It is understood and agreed that nothing expressed herein is intended or shall be construed to give any person, firm or corporation other than the parties hereto, any right, remedy, or claim hereunder or under any of the provisions herein contained; all of the provisions hereof are for the sole and exclusive benefit of the parties hereto.

e) **Disagreement**

For resolving any disagreement regarding either the proper interpretation of the Rules or translation of the Rules from the English language edition, they are to be referred to International Register of Shipping (INTLREG).

f) **Limitation**

International Register of Shipping (INTLREG) makes no representations beyond those contained herein and in the provisions of the agreement regarding its reports, statements, plan review, surveys, certificates or other services.

g) **Hold Harmless**

The party to whom certificates are issued, and his assignee and successor in interest, agree to indemnify and hold harmless International Register of Shipping (INTLREG) from and against any and all claims, demands, lawsuits, or actions for damages, including legal fees, to persons or other legal entities and property, tangible, intangible, or otherwise which may be brought against International Register of Shipping (INTLREG)

incidental to, arising out of or in connection with the work done, services performed or material to be furnished under International Register of Shipping (INTLREG) certificates, except for those claims caused solely and completely by the negligence of International Register of Shipping (INTLREG), its agents, employees, officers, directors or subcontractors. Any other individual, corporation, partnership or other entity who is a party hereto or who in any way participates in, is engaged in connection with or is a beneficiary of, any portion of the services described herein shall also release International Register of Shipping (INTLREG) and shall indemnify and hold International Register of Shipping (INTLREG) harmless from and against all claims, demands, lawsuits or actions for damages, including legal fees, to persons and/or property, tangible, intangible or otherwise, which may be brought against International Register of Shipping (INTLREG) by any person or entity as a result of the services performed pursuant to this Agreement, except for those claims caused solely and completely by the negligence of International Register of Shipping (INTLREG), its agents, employees, officers, directors or subcontractors.

**h) Arbitration**

Any and all differences and disputes of whatsoever nature arising out of this agreement shall be put to arbitration in the City of New York pursuant to the laws relating to the arbitration there in force, before a board of three persons, consisting of one arbitrator to be appointed by International Register of Shipping (INTLREG), one by Customer, and one by the two so chosen. The decision of any two of the three on any point or points shall be final. Until such time as the arbitrators finally close the hearings either party shall have the right by written notice served on the arbitrators and on an officer of the other party to specify further disputes or difference under this Agreement for hearing and determination. The arbitration is to be conducted in accordance with the rules of the Society of Maritime Arbitrators, Inc. in the English language. The governing law shall be the law of the State of New York, U.S.A. The arbitrators may grant any relief which they, or a majority of them, deem just and equitable and within the scope of the agreement of the parties, including, but not limited to, specific performance. Awards made in pursuance to this clause may include costs including a reasonable allowance for attorney's fees and judgment may be entered upon any award made hereunder in any court having jurisdiction.

Customer shall be required to notify International Register of Shipping (INTLREG) within thirty (30) days of the commencement of any arbitration between it and third parties which may concern International Register of Shipping (INTLREG)'s work in connection with this Agreement and shall afford International Register of Shipping (INTLREG) an opportunity, at International Register of Shipping (INTLREG)'s sole option, to participate in the arbitration.

**i) Time Bar to Legal Action**

Any statutes of limitation notwithstanding, Customer expressly agrees for itself and its affiliated companies that its right to bring or to assert against International Register of Shipping (INTLREG) any and all claims, demands or proceedings whether in arbitration or otherwise shall be waived unless (a) notice is received by International Register of Shipping (INTLREG) within ninety (90) days after Customer or its affiliates had notice of or shall reasonably have been expected to have had notice of the basis for such claims; and (b) arbitration or legal proceedings, if any, based on such claims or demands of whatever nature are commenced within one (1) year of the date of such notice to International Register of Shipping (INTLREG).

**j) Limitation of Liability**

The combined liability of International Register of Shipping, its officers, employees, agents or subcontractors for any loss, claim, or damage arising from negligent performance or non-performance of any services, or from breach of any implied or express warranty of workmanlike performance in connection with the services, or from any other reason, to any person, corporation, partnership, business entity, sovereign, country or nation, will be limited to the greater of a) \$100,000 or b) an amount equal to ten (10) times the sum actually paid for the services alleged to be deficient. The limitation of liability may be increased up to an amount twenty-five (25) times that sum paid for services upon receipt of Customer's written request at or before the time of performance of service and upon payment by Customer of an additional fee of \$10 for every \$1,000 increase in the limitation.

Under no circumstances shall International Register of Shipping be liable for indirect or consequential loss or damage (including, but without limitation, loss of profit, loss of contract, or loss of use) suffered by any person as a result of any failure by International Register of Shipping (INTLREG) in the performance of its obligations under these Rules. Under no circumstances whatsoever shall any individual who may have personally caused the loss, damage or expense be held personally liable.

**k) Scope of Certification**

Nothing contained in any certificate, design assessment, manufacturing assessment, confirmation of type approval, or report is to be deemed to relieve any designer, builder, owner, manufacturer, seller, supplier, repairer, operator, insurer or other entity or person of any duty to inspect or any other duty or warranty expressed or implied.

Any certificate, design assessment, manufacturing assessment, confirmation of type approval or report evidences only that at the time of the review or audit the material,

component, product or system, or any other item covered by a certificate, design assessment, manufacturing assessment, or report complied with one or more of the Rules, Guides, standards or other criteria of International Register of Shipping, or, where there is no International Register of Shipping (INTLREG) standard, complied with the industry or manufacturer's standard specified in the Type Approval listing on the International Register of Shipping (INTLREG) Type Approval website.

Any listing or certificate is issued solely for the use of International Register of Shipping (INTLREG), its Technical Committee, its Customers or other authorized entities.

Nothing contained in any listing, certificate, design assessment, manufacturing assessment, confirmation of type approval or report is to be deemed in any way a representation or statement beyond those contained in Representation as to Product Type Approval of [11.1.3.5] above. International Register of Shipping (INTLREG) is not an insurer or guarantor of the integrity, safety or suitability of a vessel or of the material, components, products, systems, equipment, machinery and other items incorporated in it. The validity, applicability and interpretation of any certificate, report, plan or document review or approval are governed by the Rules, Guides, standards or other criteria of International Register of Shipping who shall remain the sole judge thereof. International Register of Shipping (INTLREG) is not responsible for the consequences arising from the use by other parties of the Rules, Guides, standards or other criteria of International Register of Shipping, without review, plan approval and survey by International Register of Shipping (INTLREG). The term "approved" shall be interpreted to mean that the plans, reports or documents have been reviewed for compliance with one or more of the Rules, Guides, standards or other criteria acceptable to International Register of Shipping (INTLREG).

**Figure 1.2.1**  
**Process of the Type Approval Program**

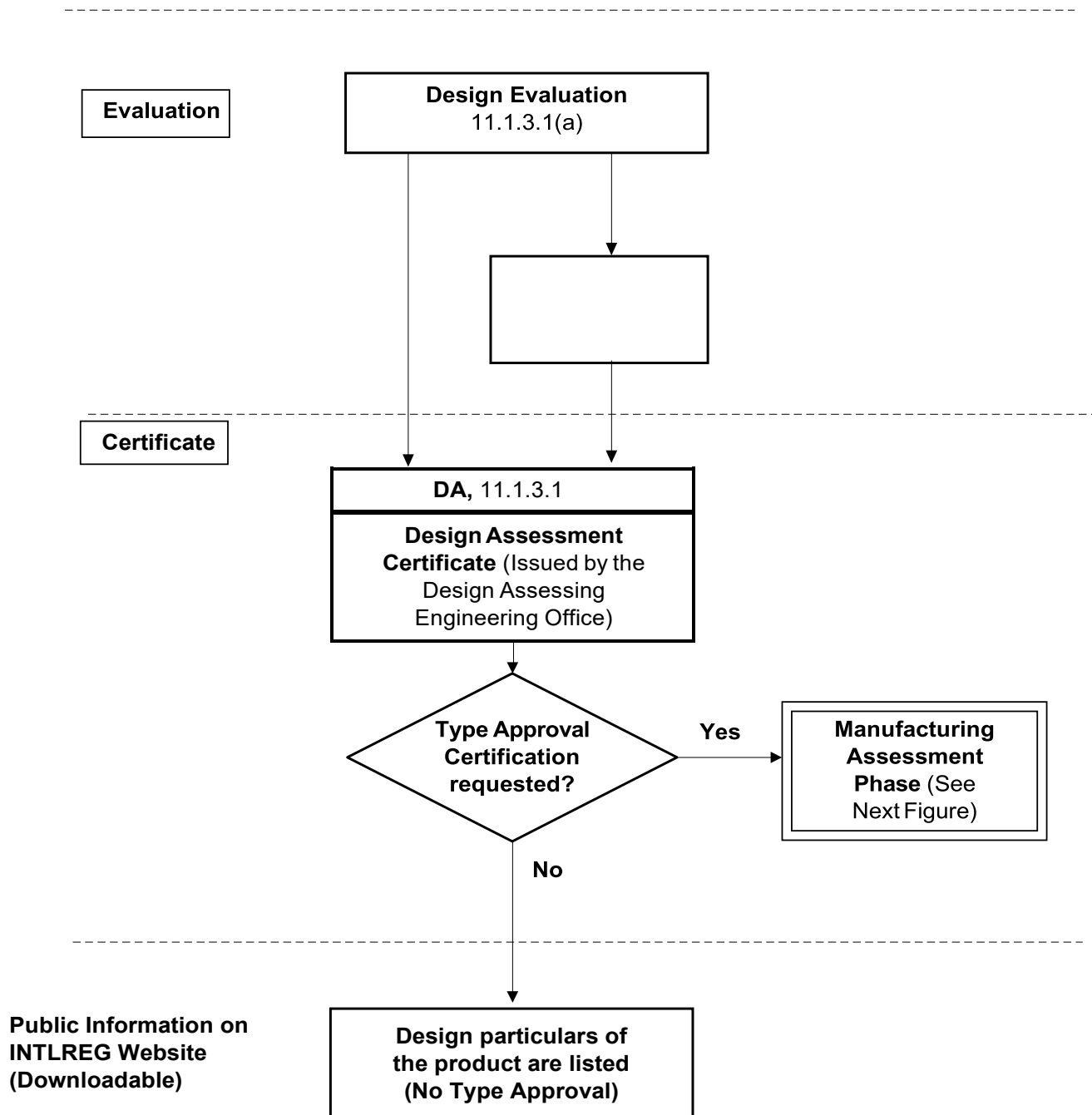
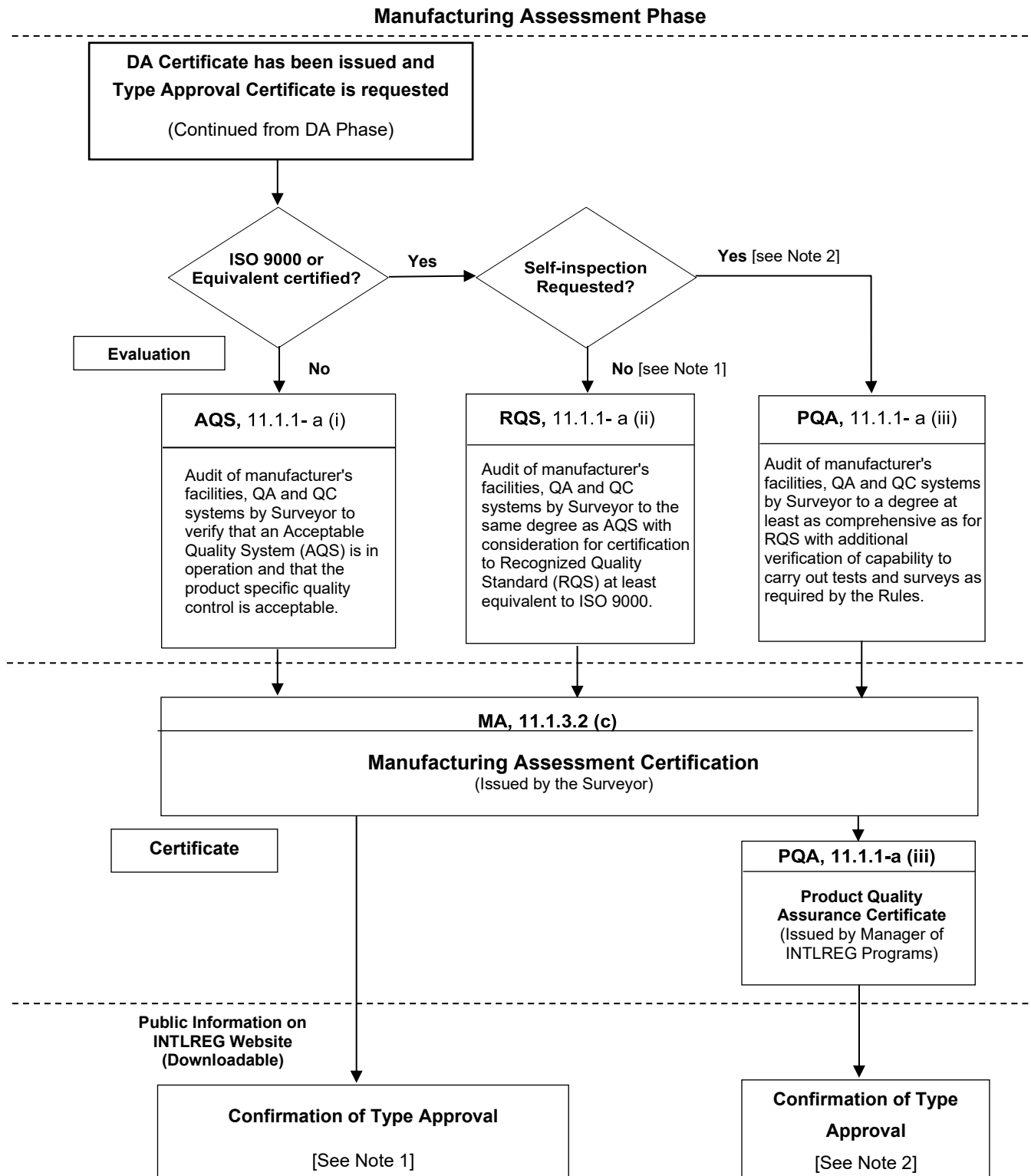


Figure 1.2.1 (continued)  
Process of the Type Approval Program



**Note 1:** If the Surveyor's witness is required by the Rules, the Surveyor is responsible to witness the manufacture of product and issue the unit certification.

**Note 2:** The manufacturer will be responsible to advise the INTLREG office of deliveries of products and to supply the INTLREG office with all documentation required for certification of the product.



## SECTION 12

### LIST OF PUBLICATIONS AND REFERENCES

| Sl. No. | Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Confidential/proprietary information |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| 1.      | 18th International Ship and Offshore Structures Congress, 2012 September 9-13 Rostock, Germany. Volume 2, Committee V.3, Materials and Fabrication Technology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Used as Reference                    |
| 2.      | ASM International, Elements of Metallurgy and Engineering Alloys, Chapter 14, Fatigue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Used as Reference                    |
| 3.      | Benchmark Requirements -International Register of Shipping (INTLREG) Procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Internal Procedure                   |
| 4.      | Using Dependability Benchmarks to support ISO/IEC SQuaRE - Jesús Frigal, David de Andres, Juan-Carlos Ruiz STF-ITACA, Universitat Politècnica de Valencia, Campus de Vera s/n, 46022, Spain<br><br>Email: {jfejrilo, ddandres, jcruizgg}@disca.upv.es<br>Regina Moraes School of Technology, University of Campinas - UNICAMP<br>Campus I Limeira, Brazil Email: regina@ft.unicamp.br                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Used as Reference                    |
| 5.      | Benchmarking Definition. Quality Assurance Solutions Robert Broughton USA (805) 419-3344 USA email                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Used as Reference                    |
| 6.      | Combination of Primary Load Effects in Ship Structures – C. Guedes Soares. Department of Naval Architecture and Marine Engineering. Technical University of Lisbon, 1991                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Used as Reference                    |
| 7.      | Comparative Fatigue Strength Assessment of a Structural Detail in a Containership Using various Approaches of Classification Societies - W.Fricke*, W.Cuib, H.Kierkegaard, D.Kihl, M.Kovale, T.Mikkola, G.Parmentier, M.Toyosadah, J.-H. Yooni<br><br>a. TU Hamburg-Harburg, AB 3-06, L. Ammersiehl 90, D-22305 Hamburg, Germany;<br>b. School for Naval Architecture & Ocean Engineering, Shanghai Jiao Tong University, Shanghai 200030, China;<br>c. Odense Steel Shipyard Ltd., P.O. Box 176, DK-5100 Odense C., Denmark;<br>d. Naval Surface Warfare Center, Carderock Division, West Bethesda, MD 20817, USA;<br>e. Kvaerner Krylov Maritime Ltd., 196158 Moskovskoye shosse, 44 St. Petersburg, Russia;<br>f. VTT Manufacturing Technology, P.O. Box 1705, 02044 VTT, Finland;<br>g. Bureau Veritas, 17 Bis Place de la Defense 2, Paris la Defense 92077 Cedex, France;<br>h. Department of Marine Engineering, Kyushu University, 6-10-1 Hakozaki, Higashi-ku, Fukuoka 812-8581, Japan;<br>i. Samsung Heavy Industries, 530 Jangyung-ri, Shinhyun-up, Koje-City, Kyungnam 656-710, South Korea;<br><br>Received 18 October 2000; received in revised form 23 March 2001; accepted 13 May 2001 | Copyright acquired                   |
| 8.      | DTU Management Engineering – Report 19, 2010                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Used as Reference                    |

| <b>List of Publications and References (Cont..)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                             |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| <b>Sl. No.</b>                                      | <b>Reference</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Confidential/proprietary information</b> |
| 9.                                                  | Effect of environmental factors on steel plate corrosion under marine immersion conditions by C. Guedes Soares*, Y. Garbatov and A. Zayed                                                                                                                                                                                                                                                                                                                                 | Used as Reference                           |
| 10.                                                 | First Marine International Findings for the Global Shipbuilding Industrial Benchmarking Study – Mid-tier Yards Report-Part 2-Feb2007                                                                                                                                                                                                                                                                                                                                      | Used as Reference                           |
| 11.                                                 | First Marine International Findings for the Global Shipbuilding Industrial Benchmarking Study – Major Yards-navy Report May 2005.                                                                                                                                                                                                                                                                                                                                         | Used as Reference                           |
| 12.                                                 | Hørte, T., Wang, G., White, N.; Calibration of the Hull Girder Ultimate Capacity Criterion for Double Hull Tankers; proceedings of the 10th PRADS conference, Houston, 2007                                                                                                                                                                                                                                                                                               | Used as Reference                           |
| 13.                                                 | IACS Common Structural Rules for Bulk Carriers and Oil Tankers, external release April 2013,                                                                                                                                                                                                                                                                                                                                                                              | Used as Reference                           |
| 14.                                                 | IACS Common Structural Rules for Oil Tanker, July 2010                                                                                                                                                                                                                                                                                                                                                                                                                    | Used as Reference                           |
| 15.                                                 | Redundancy requirements of SOLAS regulation XII/6.5.1 and 6.5.3 in CSR for Bulk Carriers, December 2005.                                                                                                                                                                                                                                                                                                                                                                  | Used as Reference                           |
| 16.                                                 | India IS/ISO/IEC17025 (2005): General Requirements for the Competence of Testing and Calibration Laboratories                                                                                                                                                                                                                                                                                                                                                             | Used as Reference                           |
| 17.                                                 | International Journal of Recent advances in Mechanical Engineering (IJMECH) Vol.2, No.2, May 2013                                                                                                                                                                                                                                                                                                                                                                         | Used as Reference                           |
| 18.                                                 | 2013; Ultimate limit state assessment of stiffened panel structures for Very Large Ore Carrier via Nonlinear Finite Element method by Hung-Chien Do, Wei Jiang, Jianxin Jin, Xuedong Chen                                                                                                                                                                                                                                                                                 | Used as Reference                           |
| 19.                                                 | International Software Benchmarking Standard Group (ISBSG) Draft Standard V1.0 by Anthony L. Rollo,Pam Morris, Ewa Wasylkowski, Carol Dekkers, Pekka Forselius, 2008                                                                                                                                                                                                                                                                                                      | Used as Reference                           |
| 20.                                                 | ISO 14000 as a Strategic Tool for Shipping and Shipbuilding – Dr. Annik Magerholm Fet at Møre Research/Ålesund College, Norway.                                                                                                                                                                                                                                                                                                                                           | Used as Reference                           |
| 21.                                                 | ISO-17025-In-A-Nutshell – Lakshy Management Consultant Pvt. Ltd.                                                                                                                                                                                                                                                                                                                                                                                                          | Used as Reference                           |
| 22.                                                 | ISO-IEC-17025-Standadrd Application Document for Accreditation of Testing and Calibration Facilities                                                                                                                                                                                                                                                                                                                                                                      | Used as Reference                           |
| 23.                                                 | Laboratory Corrosion tests of mild steel with special reference to ship plate by Henry S Rawdon                                                                                                                                                                                                                                                                                                                                                                           | Used as Reference                           |
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| 25.                                                 | Probabilistic Indicators of Structural Redundancy in Mechanics by Branko Blagojević, Kalman Žiha                                                                                                                                                                                                                                                                                                                                                                          | Used as Reference                           |
| 26.                                                 | Ultimate Limit State Assessment of Stiffened Panel Structures for Very Large Ore Carrier via Nonlinear Finite Element Method (FEM) by Hung-Chien Do <sup>1</sup> , Wei Jiang <sup>2</sup> , Jianxin Jin, Xuedong Chen<br><br><sup>1</sup> State Key Laboratory of Digital Manufacturing Equipment and Technology, Huazhong University of Science and Technology, Wuhan, Hubei, 430074, P.R. China<br><sup>1</sup> dhchienvn@hotmail.com , <sup>2</sup> jiangw@hust.edu.cn | Used as Reference                           |

| List of Publications and References (Cont..) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                      |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
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| 27.                                          | 17th International Ship and Offshore Structures Congress 2009, August 16-21, 2003 Seoul, Korea Vol 1, Committee III. ULTIMATE STRENGTH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Used as Reference                    |
| 28.                                          | 2008 ASM International Chapter 14 Faigue Ref 4 05224G                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Used as Reference                    |
| 29.                                          | Fatigue Analysis of Seam Welded Structures using nCode Design Life Whitepaper 201303-3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Used as Reference                    |
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| 31.                                          | Effect of environmental factors on steel plate corrosion under marine immersion conditions/Corrosion Engineering, Science & Technology by C. Guedes Soares*, Y. Garbatov and A. Zayed.<br><br>*Email author: <a href="mailto:guedess@mar.ist.utl.pt">guedess@mar.ist.utl.pt</a>                                                                                                                                                                                                                                                                                                                                                                                                                       | Used as Reference                    |
| 32.                                          | Laboratory Corrosion Tests of Mild Steel with Special Reference to Ship Plate/Bureau of Standards Journal of Research by Henry S. Rawdon                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Used as Reference                    |
| 33.                                          | Probabilistic Indicators of Structural Redundancy in Mechanics/World Journal of Machanics, 2012<br><br>By Branko Blagojević <sup>1</sup> , Kalman Žiha <sup>2</sup><br>1Department of Mechanical Engineering and Naval Architecture, Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture (FESB), University of Split, Split, Croatia<br>2Department of Ship Structures, Faculty of Mechanical Engineering and Naval Architecture (FSB), University of Zagreb, Zagreb, Croatia<br>Email: <a href="mailto:bblag@fesb.hr">bblag@fesb.hr</a> , <a href="mailto:kziha@fsb.hr">kziha@fsb.hr</a><br>Received July 20, 2012; revised August 23, 2012; accepted September 2, 2012 | Used as Reference                    |
| 34.                                          | Stochastic Uncertainty Modelling for Ship Design loads and Operational Guidance/Ocean Engineering by Apostolos Papanikolaoua, E. Alfred Mohammedb, Spyros E. Hirdarisc.<br><br>a) National Technical University of Athens, Ship Design Laboratory, Greece<br>b) School of Marine Science and Technology, Newcastle University, UK<br>c). Lloyd's Register Group Ltd., UK                                                                                                                                                                                                                                                                                                                              | Copyright acquired                   |
| 35.                                          | Sea Loads on Ships and Offshore Structures book by O.M. Faltinsen – Cambridge Ocean Technology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Used as Reference                    |
| 36.                                          | Ship Technology Research Vol. 60 No. 2 Published by Institute of Ship Technology and Ocean Engineering                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Used as Reference                    |
| 37.                                          | SSC 354 Structural Redundancy for Continuous and discrete systems                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Used as Reference                    |
| 38.                                          | TB Report Pt 1, Ch 5, HG Longitudinal Strength, Revision 1, IACS, November 2012.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Used as Reference                    |
| 39.                                          | TB Report Pt 1, Ch 5, Sec 3 HG Residual Strength, Revision 2, IACS, November 2013.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Used as Reference                    |
| 40.                                          | TB Report Pt 1, Ch 8, Sec 5, Structural Redundancy, Revision 1, IACS, November 2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Used as Reference                    |

| <b>List of Publications and References (Cont..)</b> |                                                                                                                                                                                                                                                                                       |                                             |
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| <b>Sl. No.</b>                                      | <b>Reference</b>                                                                                                                                                                                                                                                                      | <b>Confidential/proprietary information</b> |
| 41.                                                 | TB Report Pt 1, Ch 4, Sec 2, EDW for Extreme Loads, Revision 3, IACS, November 2013                                                                                                                                                                                                   | Used as Reference                           |
| 42.                                                 | TB Report Pt 1, Ch 3, Sec 3, Corrosion Additions, Revision 3, IACS, February 2014                                                                                                                                                                                                     | Used as Reference                           |
| 43.                                                 | Welding Research, January 2003, Assessing the effects of Residual Stresses on the Fatigue strength of spot welds by D. H. BAE, I. S. SOHN, AND J. K. HONG                                                                                                                             | Used as Reference                           |
| 44.                                                 | SSC-34 Technical Progress Report on THE FUNDAMENTAL FACTORS INFLUENCING THE BEHAVIOR OF WELDED STRUCTURES UNDER CONDITIONS OF MULTIAXIAL STRESS, AND VARIATIONS OF TEMPERATURE. STRESS CONCENTRATION, AND RATES OF STRAIN by L.J. Klingler, L.J. Ebert and W.M. Baldwin Jr. (US Navy) | Used as Reference                           |
| 45.                                                 | SSC-14 Final Report on FATIGUE TESTS OF SHIP WELDS by S.C. Hollister, J. Garcia and T.R. Cuykendall – Cornell University                                                                                                                                                              | Used as Reference                           |
| 46.                                                 | SSC-7 Progress Report on FATIGUE TESTS OF SHIP WELDS by S.C. Hollister, J. Garcia and T.R. Cuykendall – Cornell University                                                                                                                                                            | Used as Reference                           |
| 47.                                                 | SSC-331 DESIGN GUIDE FOR SHIP STRUCTURAL DETAILS – Ship Structure Committee 1990                                                                                                                                                                                                      | Used as Reference                           |
| 48.                                                 | Combination of primary load effects in ship structures-                                                                                                                                                                                                                               | Copyright acquired                          |
| 49.                                                 | Global wave load combinations by cross-spectral method                                                                                                                                                                                                                                | Copyright acquired                          |
| 50.                                                 | Introduction to MARINE ENGINEERING- By D.A.TAYLOR                                                                                                                                                                                                                                     | Used as Reference                           |
| 51.                                                 | MARINE ENGINEERING- ROY L.HARRINGTON                                                                                                                                                                                                                                                  | Used as Reference                           |
| 52.                                                 | MARINE AUXILIARY MACHINERY –By H.D.mCGeorge                                                                                                                                                                                                                                           | Used as Reference                           |
| 53.                                                 | Griffin M J (1990). Handbook on Human Vibration. Academic Press Ltd., London                                                                                                                                                                                                          | Used as Reference                           |
| 54.                                                 | Ship Technology Research Vol. 60 No. 2 Published by Institute of Ship Technology and Ocean Engineering                                                                                                                                                                                | Used as Reference                           |
| 55.                                                 | Handbook of Electrical Engineering- Alan L. Sheldrake                                                                                                                                                                                                                                 | Used as Reference                           |
| 56.                                                 | The statutory requirements for convention ships are referred to international conventions or codes and the amendments                                                                                                                                                                 | Used as Reference                           |
| 57.                                                 | IACS UR W7 “Hull and machinery steel forgings”                                                                                                                                                                                                                                        | Used as Reference                           |
| 58.                                                 | IACS UR W8 “Hull and machinery steel castings”                                                                                                                                                                                                                                        | Used as Reference                           |
| 59.                                                 | IACS UR W11 “Normal and higher strength hull structural steel                                                                                                                                                                                                                         | Used as Reference                           |
| 60.                                                 | IACS UR W13 “Allowable under thickness tolerances of steel plates and wide flats”                                                                                                                                                                                                     | Used as Reference                           |
| 61.                                                 | IACS UR W14 “Steel plates and wide flats with improved through thickness properties”                                                                                                                                                                                                  | Used as Reference                           |
| 62.                                                 | IACS UR W17 “Approval of consumables for welding normal and higher strength hull structural steels”                                                                                                                                                                                   | Used as Reference                           |
| 63.                                                 | IACS UR Z10.1 “Hull surveys of oil tankers” and Z10.2 “Hull surveys of bulk carriers” Annex I                                                                                                                                                                                         | Used as Reference                           |

| List of Publications and References (Cont..) |                                                                                                                                                                                                                                                                                                                                                                                                    |                                      |
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| Sl. No.                                      | Reference                                                                                                                                                                                                                                                                                                                                                                                          | Confidential/proprietary information |
| 64.                                          | IACS Recommendation No. 12 "Guidelines for surface finish of hot rolled plates and wide flats                                                                                                                                                                                                                                                                                                      | Used as Reference                    |
| 65.                                          | IACS Recommendation No. 20 " Guide for inspection of ship hull welds                                                                                                                                                                                                                                                                                                                               | Used as Reference                    |
| 66.                                          | IACS –UR M51 FACTORY ACCEPTANCE TEST AND SHIPBOARD TRIALS OF IC ENGINES                                                                                                                                                                                                                                                                                                                            | Used as Reference                    |
| 67.                                          | Resolution A.1120(30) Adopted on 6 December 2017 (Agenda item 9) SURVEY GUIDELINES UNDER THE HARMONIZED SYSTEM OF SURVEY AND CERTIFICATION (HSSC), 2017                                                                                                                                                                                                                                            | Used as Reference                    |
| 68.                                          | PASSENGER SHIPS----- Chapters II-1 and II-2 of the SOLAS Convention IACS Unified Requirements (IACS URs), IACS Unified Interpretations (IACS UIs), IACS Procedural Requirements (IACS PRs) and IACS Recommendations (IACS Recs). Reference is made to IMO Res.A.951(23) "Improved Guidelines for Marine Portable Fire Extinguishing"                                                               | Used as Reference                    |
| 69.                                          | MSC/Circ. 1120, as amended " Regulation 10.5: Number of Systems, Appliances, and Extinguishers Required in Machinery Spaces"<br>Reference is made to IMO circular MSC.1/Circ.1384, "Guidelines for the Testing and Approval of Fixed High-Expansion Foam Systems                                                                                                                                   | Used as Reference                    |
| 70.                                          | MSC.I/Circ.1268, "Guidelines for the Approval of Fixed Pressure Water-Spraying and Water-Based Fire-Extinguishing Systems for Cabin Balconies                                                                                                                                                                                                                                                      | Used as Reference                    |
| 71.                                          | ISO 15371 "Ships and marine technology – Fire extinguishing systems for protection of galley cooking equipment                                                                                                                                                                                                                                                                                     | Used as Reference                    |
| 72.                                          | IEC 60079, "Electrical apparatus for explosive Atmospheres                                                                                                                                                                                                                                                                                                                                         | Used as Reference                    |
| 73.                                          | ISO 9712:2012; Non-destructive testing -Qualification and certification of NDT personnel - ISO/IEC 17020:2012; Conformity assessment - Requirements for the operation of various types of bodies performing inspection - ISO/IEC 17024:2012; Conformity assessment - General requirements for bodies operating certification of persons - ISO 9001:2015; Quality Management Systems – Requirements | Used as Reference                    |
| 74.                                          | Bend tests (replacement for DIN 50121-1 and 50121-2) - EN875/ISO9016                                                                                                                                                                                                                                                                                                                               | Used as Reference                    |
| 75.                                          | Notched bar impact test (replacement for DIN 50122) - EN 1043/ISO 9015                                                                                                                                                                                                                                                                                                                             | Used as Reference                    |
| 76.                                          | Hardness test, miscellaneous parts (Replacement for DIN 50163) - EN 1320/ISO 9017                                                                                                                                                                                                                                                                                                                  | Used as Reference                    |
| 77.                                          | Hardness test, miscellaneous parts (Replacement for DIN 50163) - EN 1320/ISO 9017                                                                                                                                                                                                                                                                                                                  | Used as Reference                    |
| 78.                                          | EN ISO 17639 Macroscopic and microscopic examinations                                                                                                                                                                                                                                                                                                                                              | Used as Reference                    |
| 79.                                          | EN ISO 8249 Determination of ferrite number The mechanical and technological tests shall, wherever possible, be performed in accordance with the new standards                                                                                                                                                                                                                                     | Used as Reference                    |

| <b>List of Publications and References (Cont..)</b> |                                                                                                                                                                                                                                                                                                                                                                                   |                                             |
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| <b>Sl. No.</b>                                      | <b>Reference</b>                                                                                                                                                                                                                                                                                                                                                                  | <b>Confidential/proprietary information</b> |
| 80.                                                 | ISO 15614-1 "Specification and qualification of welding procedures for metallic materials – Welding procedure test – Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys" and ISO 15614-2 "Specification and qualification of welding procedures for metallic materials – Welding procedure test – Part 2: Arc welding of aluminium and its alloys" | Used as Reference                           |
| 81.                                                 | International Assn of Classification Societies (IACS)- Requirements concerning Materials and welding                                                                                                                                                                                                                                                                              | Used as Reference                           |
| 82.                                                 | IEC 60079, "Electrical apparatus for explosive atmospheres"                                                                                                                                                                                                                                                                                                                       | Used as Reference                           |
| 83.                                                 | IEC 60079, "Electrical apparatus for explosive atmospheres"                                                                                                                                                                                                                                                                                                                       | Used as Reference                           |
| 84.                                                 | IEC publication 60092-401. Lightning Protection                                                                                                                                                                                                                                                                                                                                   | Used as Reference                           |
| 85.                                                 | IEC 60079, "Electrical apparatus for explosive Atmospheres"                                                                                                                                                                                                                                                                                                                       | Used as Reference                           |
| 86.                                                 | IEC 60076-11. Dry-type transformers                                                                                                                                                                                                                                                                                                                                               | Used as Reference                           |
| 87.                                                 | IEC 60034-15 high frequency high voltage test on rotating machinery                                                                                                                                                                                                                                                                                                               | Used as Reference                           |
| 88.                                                 | IEC 61508: Functional safety of electrical/electronic/programmable electronic safety-related systems                                                                                                                                                                                                                                                                              | Used as Reference                           |
| 89.                                                 | ISO/IEC 12207: Systems and software engineering - Software life cycle processes<br>ISO 9001:2008 Quality Management Systems -                                                                                                                                                                                                                                                     | Used as Reference                           |
| 90.                                                 | ISO/IEC 90003: Software engineering - Guidelines for the application of ISO 9001:2008 to computer software                                                                                                                                                                                                                                                                        | Used as Reference                           |
| 91.                                                 | IEC 60092-504: Electrical installations in ships                                                                                                                                                                                                                                                                                                                                  | Used as Reference                           |
| 92.                                                 | ISO/IEC 25000: Systems and software engineering - Systems and software Quality                                                                                                                                                                                                                                                                                                    | Used as Reference                           |
| 93.                                                 | IEC 61511: Functional safety – Safety instrumented systems for the process industry sector                                                                                                                                                                                                                                                                                        | Used as Reference                           |
| 94.                                                 | ISO/IEC 15288: Systems and software engineering - system life cycle process                                                                                                                                                                                                                                                                                                       | Used as Reference                           |
| 95.                                                 | IEC publication 60092-501: "Special features - Electric propulsion plant"                                                                                                                                                                                                                                                                                                         | Used as Reference                           |
| 96.                                                 | IEC 60092 502 Hazardous areas                                                                                                                                                                                                                                                                                                                                                     | Used as Reference                           |
| 97.                                                 | IEC publication 60092-506 Special features - Ships carrying specific dangerous goods and materials hazardous only in bulk                                                                                                                                                                                                                                                         | Used as Reference                           |
| 98.                                                 | IEC 60092- 506 table B1, item B - For pipes having open ends (e.g., ventilation and bilge pipes, etc.) in a hazardous area, the pipe itself is to be classified as hazardous area.                                                                                                                                                                                                | Used as Reference                           |
| 99.                                                 | IEC 60529 Protection of the enclosures of electrical components installed in the cargo holds, ballast tanks and dry spaces is to satisfy the requirements of IP 68                                                                                                                                                                                                                | Used as Reference                           |
| 100.                                                | IEC Publication 60529-Protection of the enclosures of electrical equipment for the dewatering system installed in any of the forward dry spaces are to satisfy IPX8 standard as defined in for a water head equal to the height of the space in which the electrical equipment is installed for a time duration of at least 24 hours                                              | Used as Reference                           |

| List of Publications and References (Cont..) |                                                                                                                                                                                                                                                                                                                                                                                                                 |                                      |
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| Sl. No.                                      | Reference                                                                                                                                                                                                                                                                                                                                                                                                       | Confidential/proprietary information |
| 101.                                         | IEC 60034-1. Overload, overcurrent test t for generators as a proof of overload capability of generators and excitation system, for motors as a proof of momentary excess torque                                                                                                                                                                                                                                | Used as Reference                    |
| 102.                                         | IEC 60034-1. Overload, overcurrent test t for generators as a proof of overload capability of generators and excitation system, for motors as a proof of momentary excess torque                                                                                                                                                                                                                                | Used as Reference                    |
| 103.                                         | IEC 60034-1-Overspeed test of Machines                                                                                                                                                                                                                                                                                                                                                                          | Used as Reference                    |
| 104.                                         | IEC 60034-1. Dielectric strength test (high-voltage test)                                                                                                                                                                                                                                                                                                                                                       | Used as Reference                    |
| 105.                                         | IEC 60034-15- Electrical machines with voltage ratings acc. To Section 8 shall be subjected to a lightning impulse withstand voltage test acc. to. The test shall be carried out for the coils as a random sample test                                                                                                                                                                                          | Used as Reference                    |
| 106.                                         | IEC 60092-303 - The design of transformers shall in general comply with the requirements of and relevant parts of IEC 60076 – “Power Transformers IEC publication 60332-3-21 or IEEE 45.- 18.13.5 - cable- and wire types have passed a bundle fire test to, the installation of fire stops is dispensed with when laying in bundles (see also Section 12, D. 14 and SOLAS, Chapter II-1, Part D, Rule 45.5.2). | Used as Reference                    |
| 107.                                         | IEC publication 60331-1 for testing electric cables of greater than 20 mm overall diameter;<br>IEC publication 60331-21 or 60331-2 for testing electric cable of up to 20 mm overall diameter;<br>IEC publication 60331-23 for testing electric data cables;<br>IEC publication 60331-25 for testing optical fibre cables                                                                                       | Used as Reference                    |
| 108.                                         | IEC publication 60083 or 60320-1- Plug-and-Socket Connections<br>In the accommodation area, day rooms and service rooms (up to 16 A, 250 V AC) –                                                                                                                                                                                                                                                                | Used as Reference                    |
| 109.                                         | Power circuits (up to 250 A, 690 V AC) – IEC publication 60309-1 and 60309-2;                                                                                                                                                                                                                                                                                                                                   | Used as Reference                    |
| 110.                                         | IEC publications, e.g. 60130 and 60603; - Electronic switchgear -                                                                                                                                                                                                                                                                                                                                               | Used as Reference                    |
| 111.                                         | ISO 1496-2. Refrigerated containers                                                                                                                                                                                                                                                                                                                                                                             | Used as Reference                    |
| 112.                                         | ISO 7547, Shipbuilding – Air-conditioning and ventilation of accommodation spaces on board ships – Design conditions and basis of calculations- ISO 8861, Shipbuilding                                                                                                                                                                                                                                          | Used as Reference                    |
| 113.                                         | ISO 9785, Ships and marine technology – Ventilation of cargo spaces where vehicles with Internal combustion are driven                                                                                                                                                                                                                                                                                          | Used as Reference                    |
| 114.                                         | ISO 9943, Shipbuilding – Ventilation and air treatment of galleys and pantries with cooking appliances                                                                                                                                                                                                                                                                                                          | Used as Reference                    |
| 115.                                         | IEC publication 60332-1 Flame-Retardation of Individual Cables test                                                                                                                                                                                                                                                                                                                                             | Used as Reference                    |
| 116.                                         | IEC Publication 60085. The insulation classes                                                                                                                                                                                                                                                                                                                                                                   | Used as Reference                    |
| 117.                                         | IEC Publication 60092-351- The materials used for insulation of cables.                                                                                                                                                                                                                                                                                                                                         | Used as Reference                    |
| 118.                                         | IEC Publication 60533 - “Electromagnetic Compatibility of Electrical and Electronic Installations in Ships and of Mobile and Fixed Offshore Units” may be applied as applicable to ships less than 500 GT                                                                                                                                                                                                       | Used as Reference                    |

| <b>List of Publications and References (Cont..)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                             |
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| <b>Sl. No.</b>                                      | <b>Reference</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Confidential/proprietary information</b> |
| 119.                                                | IEC publication 61111-The floor in front of, and where necessary behind, main switchboards with an operating voltage of more than 50 V shall be provided with an appropriately insulating covering, or insulating gratings or mats shall be in place                                                                                                                                                                                                             | Used as Reference                           |
| 120.                                                | IEC Publication 60092-301-AC generators general to comply                                                                                                                                                                                                                                                                                                                                                                                                        | Used as Reference                           |
| 121.                                                | IEC 60092-303. Power Transformers used for power, lighting and as static convertors, starting transformers, static balancers, saturable reactors and transducers, including single phase transformers rated at less than 1kVA, and three phase transformers rated at less than 5 kVA.                                                                                                                                                                            | Used as Reference                           |
| 122.                                                | IEC Publication 60092-304.Converters/inverters                                                                                                                                                                                                                                                                                                                                                                                                                   | Used as Reference                           |
| 123.                                                | Cables manufactured in accordance with the relevant recommendations of IEC Publications of the series 60092-3 (i.e. 60092-350, 60092-352, 60092-353, 60092-354, 60092-360, 60092-370, 60092-376)                                                                                                                                                                                                                                                                 | Used as Reference                           |
| 124.                                                | IEC Publication No. 60529-The degrees of protection for equipment in general and IEC Publication No. 60034-5 for rotating machines<br>The following are acceptable for the bridge and deck zone test standards:<br>IEC 60945 Maritime navigation and radio communication equipment and systems –<br>General requirements – Methods of testing and required test results IEC 60533 Electrical and electronic installations in ships Electromagnetic Compatibility | Used as Reference                           |
| 125.                                                | IEC publication 60092-502: Electrical installations in ships – Part 502:Tankers –Special Features.<br>IEC publication 60092-506:Special features –Ships carrying specific dangerous goods and materials hazardous only in bulk                                                                                                                                                                                                                                   | Used as Reference                           |
| 126.                                                | Refer to Code on Alerts and Indicators, 2009 adopted by IMO resolution A.1021(26).                                                                                                                                                                                                                                                                                                                                                                               | Used as Reference                           |
| 127.                                                | IEC 62040 -UPS units utilizing valve regulated sealed batteries, the ventilation arrangements.<br>IEC Publication 60947-2: Low-Voltage Switch Gear and Control Gear–Part 2: Circuit-Breakers.<br>Refer to the Guidelines for the Evaluation, Testing and Application of Low-Location Lighting on Passenger Ships adopted by IMO resolution A.752(18).                                                                                                            | Used as Reference                           |
| 128.                                                | IEC 60945, All electrical and electronic appliances installed on the bridge and vicinity of the bridge other than mandatory navigation and communication equipment type tested                                                                                                                                                                                                                                                                                   | Used as Reference                           |
| 129.                                                | Lifting Appliance Regulations are based on national and European standards, e.g. DIN 15018 (Cranes, Principles for Steel Structures, Stress Analysis) and F.E.M. standards (Section 1, Rules for the Design of Hoisting Appliances                                                                                                                                                                                                                               | Used as Reference                           |
| 130.                                                | "Safety and Health in Dock Work" issued by the International Labour Organization (ILO).                                                                                                                                                                                                                                                                                                                                                                          | Used as Reference                           |
| 131.                                                | Fibre ropes must conform to recognized national standards (e.g. DIN 83305) or international standards (e.g. ISO 1140, 1141, 1181, 1346).                                                                                                                                                                                                                                                                                                                         | Used as Reference                           |
| 132.                                                | ISO 6803 – Rubber and plastics hoses and hose assemblies – Hydraulic-pressure impulse test without flexing                                                                                                                                                                                                                                                                                                                                                       | Used as Reference                           |



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| Sl. No.                                      | Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Confidential/proprietary information |
| 133.                                         | □ ISO 15540 – Ships and marine technology – Fire resistance of hose assemblies – Test methods.                                                                                                                                                                                                                                                                                                                                                                                  | Used as Reference                    |
| 134.                                         | ISO 15541 – Ships and marine technology – Fire resistance of hose assemblies – Requirements for test bench.                                                                                                                                                                                                                                                                                                                                                                     | Used as Reference                    |
| 135.                                         | ISO 6803 – Rubber and plastics hoses and hose assemblies – Hydraulic-pressure impulse test without flexing                                                                                                                                                                                                                                                                                                                                                                      | Used as Reference                    |
| 136.                                         | PRESSURE VESSELS AND HEAT EXCHANGERS                                                                                                                                                                                                                                                                                                                                                                                                                                            | Used as Reference                    |
| 137.                                         | ASME Boiler and Pressure Vessel Code Section VIII Div. 1; or Section VIII Div. 2<br><br>□ Standards of Tubular Exchanger Manufacturers Association<br><br>□ British Standard BS 5500 Specification for unfired fusion welded pressure vessels<br><br>□ Japanese Industrial Standard JIS B8270 et al for Pressure vessels                                                                                                                                                        | Used as Reference                    |
| 138.                                         | Requirements concerning NAVIGATION IACS Req. 1992- Bridge lay out<br>One man bridge operated (OMBO) ships Nov 1992 IACS Req. 1992                                                                                                                                                                                                                                                                                                                                               | Used as Reference                    |
| 139.                                         | INTERNATIONAL STANDARD ISO 8468 Third edition 2007-07-15<br>Ships and marine technology — Ship's bridge layout and associated equipment — Requirements and guidelines                                                                                                                                                                                                                                                                                                           | Used as Reference                    |
| 140.                                         | COMSAR/Circ.32 16 August 2004 HARMONIZATION OF GMDSS REQUIREMENTS FOR RADIO INSTALLATIONS ON BOARD SOLAS SHIPS                                                                                                                                                                                                                                                                                                                                                                  | Used as Reference                    |
| 141.                                         | CODE OF SAFETY FOR SMALL COMMERCIAL VESSELS OPERATING IN THE CARIBBEAN SCV CODE 2014                                                                                                                                                                                                                                                                                                                                                                                            | Used as Reference                    |
| 142.                                         | IMO- SAFETY REGULATIONS FOR CARGO SHIPS NOT COVERED BY THE PROVISIONS OF IMO CONVENTIONS IN THE MEDITERRANEAN REGION                                                                                                                                                                                                                                                                                                                                                            | Used as Reference                    |
| 143.                                         | RESOLUTION A.800(19) adopted on 23 November 1995 REVISED GUIDELINES FOR APPROVAL OF SPRINKLER SYSTEMS EQUIVALENT TO THAT REFERRED TO IN SOLAS REGULATION II-2/12                                                                                                                                                                                                                                                                                                                | Used as Reference                    |
| 144.                                         | <u>DRONE SURVEY</u><br>Manual on Remotely Piloted Aircraft System (RPAS), International Civil Aviation Organization (ICAO), First Edition, Montreal, Quebec, Canada, 2015<br>Recommendation No. 42 Guidelines for Use of Remote Survey Techniques, International Association of Classification Societies (IACS), Revision 2, June 2016<br>Safety and Environment Management Systems, Bureau of Safety and Environmental Enforcement (BSEE), Washington, DC, United States, 2010 | Used as Reference                    |

| List of Publications and References (Cont..) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                      |
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| Sl. No.                                      | Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Confidential/proprietary information |
| 145.                                         | IACS Recommendation 42 'Guidelines for Use of Remote Inspection Techniques for surveys'                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Used as Reference                    |
| 146.                                         | "Fire Protection Handbook," 19th Edition, National Fire Protection Association                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Used as Reference                    |
| 147.                                         | <b>Design Transparency</b><br>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.<br>International Goal-based Ship Construction Standards for Bulk Carriers and Oil Tankers (GBS), adopted by IMO Res. MSC 287(87).<br>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 | Used as Reference                    |
| 148.                                         | Qualification of welders<br>Welders are to be qualified in accordance with recognized national or international standard, e.g. EN 287, ISO 9606, ASME Section IX, ANSI/AWS D1.1.<br>Qualification of welding procedures<br>2.3.2.1Welding procedures are to be qualified in accordance with a recognized national or international standard, e.g. EN288, ISO 9956, ASME Section IX, ANSI/AWS D1.1.<br>Correlation of welding consumables with hull structural steels<br>For the different hull structural steel grades welding consumables are to be selected in accordance with IACS UR W17                                                                                                                                                                                                         | Used as Reference                    |
| 149.                                         | For oil tankers, reference is made to IACS Recommendation No.87 - Guidelines for Coating Maintenance & Repairs for Ballast Tanks and Combined Cargo/Ballast Tanks on Oil Tankers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Used as Reference                    |
| 150.                                         | For examination of anchors and chain cables, refer to IACS Rec.No.79 "Guidance for Anchoring Equipment in Service"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Used as Reference                    |
| 151.                                         | IACS Rec.144 "Inspection of ship's side valves".                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Used as Reference                    |
| 152.                                         | NO:99 (DEC2007) RECOMMENDATIONS FOR THE SAFETY OF CARGO VESSELS LESS THAN THE CONVENTION SIZE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Used as Reference                    |

## CHAPTER 2 NEW CONSTRUCTION SURVEY REQUIREMENTS

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## **SECTION 1 GENERAL**

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**1.1. APPLICATION**

- 1.1.1. This chapter is applicable for surveys during new constructions of Hull and installation of machinery equipment and essential systems of vessels, contemplating the distinguishing Mark  to be prefixed to the characters of class.
- 1.1.2. Requirements contained in this chapter are also applicable for all vessel classed with the Society undergoing repairs, alterations or modification to the extent such repairs, alterations or modifications carried out affects the conditions under which the vessel is classed and class notations assigned to the vessel, as far as they are reasonable and practicable.
- 1.1.3. Requirements of surveys during construction of machinery and components are covered by the respective chapters of the Rules and Regulations.
- 1.1.4. Requirements for inspections during installation of machinery and anchoring mooring equipment's are to be complied with as per the relevant parts of the Rules and Regulations.
- 1.1.5. The Society may require more stringent requirements or procedures to be adopted under special circumstances for individual vessels to achieve same level of quality and reliability envisaged by the Rules and Regulations.

**1.2. SHIPYARD QUALITY SYSTEM**

- 1.2.1. **Shipyard:** Means the organization which is building, repairing, altering or modifying vessels classed or to be classed by the Society.
- 1.2.2. The shipyard performing the activities for which the provisions of this chapter are applicable shall demonstrate its ability to perform such activities to the level of quality and reliability envisaged by the rules. Previously having satisfactorily carried out such activities under societies survey shall be considered as acceptable evidence of such ability.
- 1.2.3. Shipyard shall have an established quality system which exercises adequate controls in its activities, as applicable to these rules, to the satisfaction of the Society. Surveyors to the Society shall have access to the quality records of the shipyard as far as they are relevant to the survey being performed.
- 1.2.4. Shipyard shall have adequate number of supervisory and managerial staff having adequate competence to perform the job to the satisfaction of Society's surveyors.
- 1.2.5. Shipyard's quality system shall ensure material control procedures to ensure traceability and only those materials, which have been accepted by the surveyors to the Society for the specific job shall be used.

- 1.2.6. Certificates as required by the rules for the machinery, components, raw materials and consumables shall be maintained by the shipyard and produced for verification by Society's surveyors.
- 1.2.7. A quality plan specifying the construction procedures and quality assurance methods adopted including the scope of inspections to be carried out by the shipyard's quality assurance department and the scope of inspections to be carried out by the surveyors shall be agreed to by the shipyard and the Society prior to commencement of the job in compliance with the provisions of the Rules and Regulations.

### **1.3. MATERIALS AND WORKMANSHIP**

- 1.3.1. Only welding procedures approved by the Society for the type of job being carried out shall be adopted.
- 1.3.2. Only those welders who have proven their competence to perform the welding procedure being applied shall be employed.
- 1.3.3. Approval of welding procedures and welders shall be carried out as per recognized national or international standards.
- 1.3.4. Fabrication tolerances for hull construction adopted by the shipyard shall be acceptable to the Society. As far as practicable fabrication tolerances as per a recognized national or international standard shall be mutually agreed to by the shipyard and the Society.
- 1.3.5. Rolled steel plates and sections, hull steel forgings and hull steel castings used for hull construction shall be manufactured under survey as per part II of the rules. Society may accept materials manufactured as per recognized national or international standards on the basis of reasonable equivalence with the specifications of the rules. Additional tests may be required by the surveyors to establish the quality of such materials.
- 1.3.6. Welding consumables used shall be of a compatible grade approved by the Society as per part 2 of the Rules and Regulations.
- 1.3.7. All essential machinery installations shall comply with the requirements of part 5 of the Rules and Regulations.
- 1.3.8. All electrical installations shall comply with the requirements of part 6 of the Rules and Regulations.

## **SECTION 2 INSPECTION OF SHIP HULL WELDS**

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**2.1. SCOPE**

- 2.1.1. This section provides guidelines for quality control of ship hull welds during new construction. The document contains general guidance for the application of non-destructive examination (NDE) methods, extent of examinations and recommended quality level for satisfactory workmanship.
- 2.1.2. The guidelines contained herein are intended for welds in structural members within 0,4L amidships in new constructions of vessels having length greater than 100 m.
- 2.1.3. In general, these guidelines shall be followed to the extent considered necessary by the attending surveyor for examination of other weldments in new constructions and as far as practicable for repairs.
- 2.1.4. This section is only intended to provide guidelines and increased extent of examination may be required, as considered necessary by the surveyor in view of the criticality of any joints or the quality level of the shipyard.

**2.2. APPLICATION**

- 2.2.1. These requirements are applicable for butt weld joints, T, corner and cruciform joints with and without full penetration, fillet weld joints within 0.4L amidships in bottom plating, including keel plate, strength deck plating, continuous longitudinal members above strength deck, excluding longitudinal hatch coamings, upper strake in longitudinal bulkhead, vertical strake (hatch side girder) and upper sloped strake in top wing tank Sheer strake at strength deck, Stringer plate in strength deck, Deck strake at longitudinal bulkhead, Bilge strake, Continuous longitudinal hatch coamings.
- 2.2.2. Welds in other structural may be subject to less stringent requirements. For welds in high stressed areas more stringent requirements shall be applied at the discretion of attending surveyor.
- 2.2.3. Gas metal arc, gas tungsten arc, flux cored arc, shielded metal arc, submerged arc, electro-slag and electro-gas welding are the welding processes for which these requirements are applicable.
- 2.2.4. These requirements consider Visual examination (VE), Magnetic particle examination (ME) and Liquid penetrant examination (PE) for detection of surface discontinuities and Ultrasonic examination (UE) Radiographic examination (RE) for detection of embedded discontinuities.
- 2.2.5. Other methods may be employed as far as they are acceptable to the Society.



**2.3. APPLICABILITY OF NDE METHODS**

- 2.3.1. The different types of weldments are divided into four groups of weld joint configurations with respect to the applicability of methods for detection of embedded discontinuities (UE and RE)
- 2.3.2. **Weld joint configuration group A:** Weldments for which both UE and RE are applicable. Normally this group includes butt weld joints (of full penetration) in plates of minimum 10 mm plate thickness.
- 2.3.3. **Weld joint configuration group B:** Weldments for which only RE is applicable. Normally this group includes but welded joints in plates of thickness less than 10 mm (or partly penetrated butt welds).
- 2.3.4. **Weld joint configuration group C:** Weldments for which only UE is applicable. Normally this group includes T-joints, corner-joints and cruciform joints of full penetration in plates of minimum 10 mm thickness.
- 2.3.5. **Weld joint configuration group D:** Weldments for which neither UE nor RE is applicable. Normally this group includes T, corner and cruciform joints of partly penetration or plate thickness less than 10 mm and fillet welded joints.
- 2.3.6. A general guidance for selection of the appropriate test method to detect anticipated weld discontinuities is shown in Table 2.1 for each group of weld joint configuration. Deviations from this table are allowed when the adequacy of the technique used to identify the anticipated discontinuity is acceptable to the Society based on the procedure submitted by the shipyard.

**Table 2.1: APPLICABLE NDE METHODS FOR VARIOUS TYPES OF WELD DISCONTINUITIES**

| Type of Weld Discontinuity | Weld Joint Configuration Group |                    |                  |              |
|----------------------------|--------------------------------|--------------------|------------------|--------------|
|                            | A                              | B                  | C                | D            |
| <b>Porosity</b>            | VE, ME, PE, UE, RE             | VE, ME, PE, RE     | VE, ME, PE, UE   | VE, ME, PE   |
| <b>Undercut</b>            | VE, ME, PE, RE                 | VE, ME, PE, RE     | VE, ME, PE       | VE, ME, PE   |
| <b>Under fill</b>          | VE, RE                         | VE, RE             | VE               | VE           |
| <b>Overlap</b>             | (VE), ME, PE                   | (VE), ME, PE       | (VE), ME, PE     | (VE), ME, PE |
| <b>Cracks</b>              | (VE), ME, PE, UE, (RE)         | (VE), ME, PE, (RE) | (VE), ME, PE, UE | (VE), ME, PE |

| Table 2.1 (Cont..)                                                                                                                                                                                                                                                                                                   |                                |                    |    |    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------|----|----|
| Type of Weld Discontinuity                                                                                                                                                                                                                                                                                           | Weld Joint Configuration Group |                    |    |    |
|                                                                                                                                                                                                                                                                                                                      | A                              | B                  | C  | D  |
| Lack of fusion                                                                                                                                                                                                                                                                                                       | (VE), ME, PE, UE, (RE)         | (VE), ME, PE, (RE) | UE | -- |
| Incomplete Penetration                                                                                                                                                                                                                                                                                               | VE, ME, PE, UE, RE             | VE, ME, PE, RE     | UE | -- |
| Slag inclusions                                                                                                                                                                                                                                                                                                      | UE, RE                         | RE                 | UE | -- |
| Lamellar tearing                                                                                                                                                                                                                                                                                                     | UE                             | --                 | UE | -- |
| <b>Notes:</b> <ol style="list-style-type: none"> <li>1. The method shown in parenthesis denotes that the method has only marginal ability to identify the discontinuity listed.</li> <li>2. VE and PE can detect only those discontinuities on surface, ME may detect discontinuities just below surface.</li> </ol> |                                |                    |    |    |

## 2.4. QUALIFICATION OF PERSONNEL

- 2.4.1. The shipyard is responsible for supplying properly trained operators certificated in accordance with an acceptable international or national scheme. Records of operators and their current certificates are to be kept and made available to the surveyors for inspection.
- 2.4.2. Alternatively, external sub-contractors approved by the Society for the method being used may be employed.

## 2.5. EXTENT OF EXAMINATION

- 2.5.1. The extent of examination as a percentage of the length of welds to be examined by a specific method shall be in general as per Table 2.2. The extent of examination will also depend on the type of ship and the location of the joints.
- 2.5.2. For group A either RE or UE, or a combination of the two methods may be chosen.
- 2.5.3. The welds shall be examined in sections of length in the range 0,2 to 0,5 m for RE and about 1m for UE.
- 2.5.4. The sections to be examined shall be selected by the Surveyor. These sections shall principally be evenly distributed, and special attention shall be paid to weld crossings and erection welds.
- 2.5.5. The extent of examination may be modified at the discretion of the Surveyor depending on the overall quality of the production welds, the welding procedures used and the quality control procedures employed at the shipyard.

TABLE 2.2: EXTENT OF NDE EXAMINATION

| NDE Method                                                                                                                                                                                                                                                                                        | Weld Joint Configuration Group |                     |                     |                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------|---------------------|---------------------|
|                                                                                                                                                                                                                                                                                                   | A                              | B                   | C                   | D                   |
| VE                                                                                                                                                                                                                                                                                                | 100%                           | 100%                | 100%                | 100%                |
| ME/PE                                                                                                                                                                                                                                                                                             | Critical Points (1)            | Critical Points (1) | Critical Points (1) | Critical Points (1) |
| UE                                                                                                                                                                                                                                                                                                | 2-4%                           | --                  | 2-4%                | --                  |
| RE                                                                                                                                                                                                                                                                                                | 2-4%                           | 2-4%                |                     |                     |
| Notes:<br>1. ME and PE shall be carried out at critical points such as crossings, fillet weld ends, excavations and repairs and any location with suspected discontinuities, as a supplementary examination to VE<br>2. Spots for NDE where 100% is not required shall be judged by the surveyor. |                                |                     |                     |                     |

## 2.6. ACCEPTANCE CRITERIA AND NON-CONFORMING WELDMENTS

2.6.1. The techniques used for each method shall in general comply with the requirements specified in section 3.

2.6.2. The acceptance criteria for different methods are given Table 2.3 as a general guide. However stringent requirements may be required by the Society in way of highly stressed areas and areas subjected to vibration stresses. Cracks and lack of fusion of any magnitude is not acceptable.

2.6.3. If a non-conforming discontinuity is detected by a method which is applied to an extent less than 100%, the lengths welded immediately before and after the section containing the discontinuity shall be examined by this method.

If systematically, repeated discontinuities are revealed the extent of examination may be increased at the Surveyors discretion for welds manufactured under same conditions and where similar defects may be expected.

2.6.4. If non-conforming discontinuities are found to occur regularly, the Surveyor may require that the welding procedures are reassessed before continuation of the welding and necessary actions shall be taken to bring the production to the required quality level.

2.6.5. Detected non-conforming discontinuities are to be repaired unless they are found acceptable by the Society.

2.6.6. Removal of weld discontinuities and repair are to be performed in accordance with a procedure approved by the Society.

2.6.7. Parts of weldments which are repaired shall be examined by VE and one other surface inspection method (ME or PE) as well as one volumetric inspection method (UE or RE).

TABLE 2.3 ACCEPTANCE CRITERIA

| Discontinuity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Applicable Methods | Criteria                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------|
| Porosity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                                           |
| • Pore diameter (d)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | VE, ME, PE, RE     | t/4 or 3 mm, whichever is lesser (Max.)   |
| • Distance to adjacent pore                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | VE, ME, PE, RE     | 2.5d (Min)                                |
| Clustered Porosity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                                           |
| • Length of cluster                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | VE, ME, PE, RE     | 25 mm. (Max.)                             |
| Undercut                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                                           |
| • Depth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | VE, ME, PE, RE     | 0.5 mm. (Max.)                            |
| Under fill                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                                           |
| • Depth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | VE, ME, PE, RE     | 1.5 mm (Max.)                             |
| • Length                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | VE, ME, PE, RE     | t/2 (Max.)                                |
| Excess Reinforcement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                                           |
| • Height                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | VE, ME, PE, RE     | b/5 or 6mm, whichever is lesser (Max.)    |
| Incomplete Penetration                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                                           |
| • Height                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | VE, ME, PE, RE     | t/10 or 1.5 mm whichever is lesser (Max.) |
| • Length                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | VE, ME, PE, RE     | t(max.)                                   |
| Overlap                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                                           |
| • Length                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | VE, ME, PE         | t (Max.)                                  |
| Slag Inclusions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                                           |
| • Width                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | RE                 | 3.0 mm (Max.)                             |
| • Length                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | RE                 | t or 25 mm, whichever is lesser (Max.)    |
| <b>Notes:</b> <ol style="list-style-type: none"> <li>1. t: Thickness of the thinnest plate in the connection</li> <li>2. b: Width of weld reinforcement</li> <li>3. Discontinuities on a line where the distance between discontinuities are shorter than the longest discontinuity are to be treated as one discontinuity.</li> <li>4. Where UE is employed discontinuities up to an amplitude rejection level of 100% shall be disregarded. For ARL&gt;100% excavation and repairs may not be necessary for length of indications less than the thickness of the thinnest plate in the connection or 25 mm, whichever is lesser.</li> </ol> |                    |                                           |

## SECTION 3 NDE TECHNIQUES

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**3.1. GENERAL**

- 3.1.1. In general, an NDE-procedure specification for each specific NDE-method being employed shall be prepared in accordance with a recognized national or international standard and in compliance with this section. The procedure to be used shall be acceptable to the attending surveyor.
- 3.1.2. In addition to the requirements for each method the procedure shall contain surface requirements such as cleaning and preparation, location reference such as identification and marking, evaluation of findings and indications and reporting.

**3.2. VISUAL EXAMINATION (VE)**

- 3.2.1. Direct visual examination requires sufficient illumination at the weldment being examined to reveal and describe unacceptable surface discontinuities. The welds shall be presented clean and without paint.

**3.3. MAGNETIC PARTICLE EXAMINATION (ME)**

- 3.3.1. The technique to be used for Magnetic particle examination is detection of magnetic leakage fluxes from surface discontinuities, and to a certain extent also subsurface discontinuities, in ferromagnetic materials by means of ferromagnetic particles during application of a magnetic field.
- 3.3.2. The ME procedure shall contain the following in addition to the requirements specified in 2.6.2.
- Magnetizing procedure and equipment
  - Detection media
  - Field strength measurement/verification
  - Detection media application
  - Viewing conditions
  - Demagnetization
  - Precautions against arcing
- 3.3.3. The ME technique employed shall meet the following requirements:
- Provide search for weld surface discontinuities of any orientation.
  - The surface to be examined may be as welded, but shall be clean and dry and, if noticeable irregularities exist, smoothed by grinding.
  - The peak value of the tangential magnetic field strength in the area being examined shall be between 2.4 and 4.0 kA/m.
  - Magnetization by AC or HWDC shall be used.
  - Fluorescent or non-fluorescent magnetic inks may be applied.
  - The preparation and illumination (by visible or ultraviolet light, depending on type of detection media) of the surface under examination shall be sufficient to reveal and describe any unacceptable surface discontinuity.

**3.4. PENETRANT EXAMINATION (PE)**

3.4.1. The Penetrant examination technique shall comprise of application of a low surface tension liquid, which penetrates into surface open discontinuities and use of a suitable developer that makes the penetrated liquid visible and thus indicating the discontinuity.

3.4.2. The procedure for PE shall contain the following:

- Reference/calibration/verification specimens
- Surface cleaning and preparation
- Object temperature
- Penetrant and developer type
- Penetrant application and removal
- Penetration time
- Developer application
- Development time.

3.4.3. The PE technique employed shall meet the following requirements.

- The surface to be examined may be as welded, but shall be clean and dry and without noticeable irregularities.
- In order to avoid masking of discontinuities, grinding shall be applied with considerable care.
- Fluorescent or visible, water washable, solvent removable or post emulsified penetrants may be applied.
- Developers may be aqueous, non-aqueous wet or dry powders.
- Outside the temperature range 5 - 50°C reference comparator blocks shall be used.
- Penetration times shall typically be between 20 and 60 minutes and development times minimum 15 minutes.
- When the temperature is below 15°C the development times shall be minimum 30 minutes.
- During the first 2 minutes of development the building up of indications shall be carefully watched.
- The illumination (by visible or ultraviolet light, depending on type of detection media) of the surface under examination shall be sufficient to reveal and describe any unacceptable surface discontinuity.

**3.5. ULTRASONIC EXAMINATION (UE)**

3.5.1. The Ultrasonic examination technique to be used is the ultrasonic pulse echo technique supplying normal and angle probes. The examination may be performed manually or by mechanized or automated equipment.

3.5.2. The procedure for UE shall contain the following.

- Equipment type
- Probe types, frequencies and angles
- Calibration block(s)
- Reference block(s)
- Couplant
- Equipment calibration and checks (linearity, resolution, wear)
- Sensitivity setting and transfer corrections
- Examination of parent material
- Scanning techniques
- Sizing techniques

3.5.3. The UE technique employed shall meet the following requirements

- The examination shall cover search for longitudinal and transverse weld discontinuities using at least one angle probe from each side of the weld.
- The weld geometry may also require normal probes to be used to reveal weld discontinuities.
- The weld examination shall be done using the echo from a 3 mm diameter side drilled hole as reference (defining the Reference Level).
- Other reflectors such as flat-bottomed holes or notches may replace the side drilled hole as reference reflector, provided the same sensitivity is achieved, for example the DGS- method (Distance Gain Sensitivity - m).

**3.6. RADIOGRAPHIC EXAMINATION (RE)**

3.6.1. The technique that shall be used is projective imaging using X or Gamma-rays with film as the recording and displaying medium. For material thickness less than 15 mm X-rays are to be preferred. Other displaying media, e.g. Fluoroscopic screens, may be applied provided the basic requirements to the applied technique are met.



3.6.2. The procedure for RE shall contain the following

- Radiation source, type and focal spot size
- Geometry of radiographic setup
- Film type
- Intensifying screens
- Film coverage
- Image quality indicators
- Film identification marking
- Exposure conditions
- Film processing
- Film density
- Film viewing conditions

3.6.3. The RE technique employed shall meet the following requirements

- The following wire image quality indicator sensitivities, or equivalent for other types of image quality indicators (IQI), shall be achieved:

| Plate thickness (t) | IQI Wire Sensitivity |
|---------------------|----------------------|
| 10 mm               | 2.0%                 |
| 80 mm               | 1.0%                 |
| >80 mm.             | 0.8mm/t              |

- For thickness between 10 and 80 mm the required sensitivity is found by linear interpolation between the above values.

### **3.7. ACCEPTANCE CRITERIA**

3.7.1. The acceptance criteria shall be as per the rules where they are applicable. In all other situation's acceptance criteria shall be mutually agreed to between the shipyard and the Society, in advance.

3.7.2. Acceptance criteria of other codes or standards may be in agreement with the Society fully or partly replace the requirements specified in the rules.

3.7.3. Discontinuities, which are not found acceptable according to the rules or eventually other criteria agreed upon, are referred to as "non-conforming" discontinuities in the rules.

## SECTION 4 HULL TESTING REQUIREMENTS

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**4.1. DEFINITIONS:**

- 4.1.1. **Structural Testing** is a test to verify the structural adequacy of the design and the tightness of the tanks. Structural testing may be either hydrostatic testing or hydro pneumatic testing.
- 4.1.2. **Leak Testing** is a test to verify the tightness of the structure by means of air pressure difference. All boundary welds, erection joints, and penetrations including pipe connections are to be examined in accordance with the approved procedure and under a pressure differential not less than 0.15 bar (0.15 kgf/cm<sup>2</sup>) with a leak indicating solution. It is recommended that the air pressure in the tank be raised to and maintained at 0.20 bar (0.20 kgf/cm<sup>2</sup>) for approximately one hour, with a minimum number of personnel around the tank, before being lowered to the test pressure. A U-tube with a height sufficient to hold a head of water corresponding to the required test pressure is to be arranged. The cross-sectional area of the U-tube is to be not less than that of the pipe supplying air. In addition to U-tube, a master gauge or other approved means is to be provided to verify the pressure. Other effective methods of leak testing, including compressed air fillet weld testing or vacuum testing, may be considered by the Society upon submission of full particulars.
- 4.1.3. **Hose Testing** is a test to verify the tightness of the structure by a jet of water. Hose testing is to be carried out with the pressure in the hose of at least 2 bar (2 kgf/cm<sup>2</sup>). The nozzle is to have minimum inside diameter of 12 mm (0.5 in.) and located at a distance to the joint not exceeding 1.5 m.
- 4.1.4. **Hydro Pneumatic Testing** is a combined hydrostatic and leak testing wherein a tank is filled by water with air pressure applied on top. Hydro pneumatic testing may use as an alternative to hydrostatic testing for verifying the structural adequacy of the design, provided every part of the structure being tested will be subjected to a pressure at least equal to the pressure that part would have been subjected to in a hydrostatic testing.
- 4.1.5. **Hydrostatic Testing** is a test to verify the structural adequacy of the design and the tightness of the tanks structures by means of water pressure, by filling water to the level as specified in Table 2.4.

**4.2. TEST REQUIREMENTS**

- 4.2.1. All tank boundaries, watertight boundaries other than tank boundaries and weather tight boundaries including their closing appliances shall be tested in accordance with the requirements of Table 2.4
- 4.2.2. No coatings, which may conceal defects or leaking, other than shop primer, shall be applied prior to the testing as required by 4.2.1. However, this requirement may be waived provided the surveyor after careful visual examination of the welds or suitable tests is satisfied with the condition of the welds. For example, final coating may be carried out prior to structural testing provided a leak test is carried out before coating.

4.2.3. Tests are to be carried out in the presence of the Surveyor at a stage sufficiently close to completion, after all attachments, outfitting or penetrations which may affect the strength or tightness of the structure have been completed, and before any ceiling and cement work is applied over joints.

**TABLE 2.4 HULL TESTING REQUIREMENTS-NEW CONSTRUCTION**

| S. No.                                                                                                                                                                                                                                            | Structures to be tested                                         | Type of Testing | Hydrostatic Head or Pressure                                                                            | Remarks                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.                                                                                                                                                                                                                                                | Double Bottom Tanks                                             | Structural      | The greater of top of the overflow or top of bulkhead deck.                                             | If more than one tank is structurally similar, leak testing may be acceptable, provided at least one tank of each type has been satisfactorily subjected to structural testing. |
| 2.                                                                                                                                                                                                                                                | Ballast of Bulk holds Carriers of Bulk                          | Structural      | The greater of top of overflow or to 0.9 m. above top of tank.                                          |                                                                                                                                                                                 |
| 3                                                                                                                                                                                                                                                 | Independent Tanks not forming part of hull structure.           |                 |                                                                                                         |                                                                                                                                                                                 |
| 4                                                                                                                                                                                                                                                 | All other tanks and cofferdams                                  | Structural      | The greatest of top of overflow, to 2.4m above top of tank or setting of pressure relief valve, if any. |                                                                                                                                                                                 |
| 5.                                                                                                                                                                                                                                                | Fore peak void space                                            | Structural      | To top of bulkhead deck.                                                                                |                                                                                                                                                                                 |
| 6                                                                                                                                                                                                                                                 | Aft peak void space                                             | Leak            |                                                                                                         |                                                                                                                                                                                 |
| 7.                                                                                                                                                                                                                                                | Watertight bulk heads                                           | Hose            |                                                                                                         |                                                                                                                                                                                 |
| 8                                                                                                                                                                                                                                                 | Watertight doors below freeboard deck.                          |                 |                                                                                                         |                                                                                                                                                                                 |
| 9.                                                                                                                                                                                                                                                | Weather-tight hatch covers, doors and other closing appliances. |                 |                                                                                                         |                                                                                                                                                                                 |
| 10.                                                                                                                                                                                                                                               | Shaft tunnel clear of deep Tanks                                |                 |                                                                                                         |                                                                                                                                                                                 |
| 11.                                                                                                                                                                                                                                               | Hawse pipes                                                     | Structural      | To top of chain locker                                                                                  |                                                                                                                                                                                 |
| 12.                                                                                                                                                                                                                                               | Chain Locker aft of collision Bulkhead                          |                 |                                                                                                         |                                                                                                                                                                                 |
| 13.                                                                                                                                                                                                                                               | Double plate rudder                                             | leak            |                                                                                                         |                                                                                                                                                                                 |
| Notes:                                                                                                                                                                                                                                            |                                                                 |                 |                                                                                                         |                                                                                                                                                                                 |
| 1. Top of tank is the deck forming top of the tank excluding hatchways except for ballast holds in Bulk Carriers and tanks of combination carriers, where the top of hatch cover shall be treated as the top of tank.                             |                                                                 |                 |                                                                                                         |                                                                                                                                                                                 |
| 2. Structural testing may be carried out after the vessel is launched.                                                                                                                                                                            |                                                                 |                 |                                                                                                         |                                                                                                                                                                                 |
| 3. Those structures or closing appliances subjected to satisfactory structural testing or leak testing need not be hose tested as required by this table.                                                                                         |                                                                 |                 |                                                                                                         |                                                                                                                                                                                 |
| 4. Where hose testing is impractical due to the stage of outfitting, same may be replaced by leak testing, careful visual examination of the boundary. Where necessary ultrasonic leak testing or another acceptable test method may be required. |                                                                 |                 |                                                                                                         |                                                                                                                                                                                 |

**SECTION 5 HULL SURVEYABLE ITEMS - NEW BUILDING****Contents**

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**5.1. SCOPE**

- 5.1.1. 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.
- 5.1.2. Appraisal of the manufacturing, construction, control and qualification procedures, including welding consumables, weld procedures, weld connections and assemblies, with indication of relevant approval tests.
- 5.1.3. Witnessing inspections and tests as required in the classification rules used for ship construction including materials, welding and assembling, specifying the items to be examined and/or tested and how (e.g. by hydrostatic, hose or leak testing, non destructive examination, verification of geometry) and by whom.
- 5.1.4. Appraisal of material and equipment used for ship construction and their inspection at works is not included in this Section. Details of requirements for hull and machinery steel forgings and castings and for normal and higher strength hull structural steel, acceptance of these items is verified through the survey process carried out at the manufacturer's works and the issuing of the appropriate certificates.
- 5.1.5. 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 Appendix 2 to this document.

**5.2. DEFINITIONS\***

- 5.2.1. The hull structure 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 ILLC 1966, as amended, items;
  - g) welded attachments to shell, decks and primary members, e.g. crane pedestals, bitts and bollards, but only as regards their interaction on the hull structure.
- 5.2.2. Reference to documents also includes electronic transmission or storage.
- 5.2.3. Definition of survey methods which the surveyor is directly involved in: Patrol, Review, Witness.
  - 5.2.3.1. Patrol, the act of checking on an independent and unscheduled basis that the applicable processes, activities and associated documentation of the shipbuilding functions identified in Table 2.5.1 continue to conform to classification and statutory requirements.
  - 5.2.3.2. Review, the act of examining documents in order to determine traceability, identification and to confirm that processes continue to conform to classification and statutory requirements.

- 5.2.3.3. Witness is 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.

### 5.3. APPLICATIONS

- 5.3.1. This Section 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.

- 5.3.2. This Section covers all statutory items, relevant to the hull structure and coating, i.e. Load Line and SOLAS Safety Construction.

- 5.3.3. This Section does not cover the manufacture of equipment, fittings and appendages regardless whether they are made inside or outside of the shipyard, examples being as follows.

Evidence of acceptance shall be provided by accompanying documentation from class surveyor at manufacturer and verified at the shipyard:

- 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.

- 5.3.4. This Section applies to the installation into the ship, welding and testing of:

- 5.3.4.1. the items listed in 5.3.3 above;
- 5.3.4.2. equipment forming part of the watertight and weather tight integrity of the ship.

- 5.3.5. This Section applies to the hull structures and coating constructed at any of the following:

- 5.3.5.1. shipbuilder's facilities;
- 5.3.5.2. sub-contractors at the shipbuilder's facilities;
- 5.3.5.3. sub-contractors at their own facilities or at other remote locations.

### 5.4. QUALIFICATION AND MONITORING OF PERSONNEL

- 5.4.1. Exclusive surveyors of INTLREG, are to confirm through patrol, review and witness as defined in [ 5.2.3], that the 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 the tasks and procedures are to be in place to ensure that their activities are monitored..

**5.5. SURVEY OF THE HULL STRUCTURE**

- 5.5.1. Table 2.5.1 provides a list of surveyable items for the hull structure and coating covered by this Section, including:
- 5.5.1.1. description of the shipbuilding functions;
  - 5.5.1.2. classification and statutory survey requirements;
  - 5.5.1.3. survey method required for classification;
  - 5.5.1.4. relevant IACS and statutory requirement references;
  - 5.5.1.5. documentation to be available for the classification surveyor during construction.
    - 5.5.1.5.1. The shipbuilder is to provide the classification surveyors access to documentation required by classification, this includes documentation retained by the shipbuilder or other third parties.
    - 5.5.1.5.2. The list of documents approved or reviewed by the classification society for the specific new construction are as follows:
      - a) plans and supporting documents
      - b) examination and testing plans
      - c) NDE plans
      - d) welding consumable details
      - e) welding procedure specifications
      - f) welding plan or details
      - g) welder's qualification records
      - h) NDE operator's qualification records
  - 5.5.1.6. Documents to be inserted into the ship construction file. Refer to [5.10] for details.
  - 5.5.1.7. 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.
- 5.5.2. Evidence is also to be made available, as required, by the shipbuilder, to the surveyor whilst the construction process proceeds to prove that the material and equipment supplied to the ship has been built or manufactured under survey relevant to the classification rules and statutory requirements.

**5.6. REVIEW OF THE CONSTRUCTION FACILITY\***

- 5.6.1. The society is to familiarize themselves with the yard's production facilities, management processes, and Safety for consideration in complying with the requirements of Table 2.5.1 prior to any steelwork or construction taking place in the following circumstances:
- 5.6.1.1. where the society has none or no recent experience of the construction facilities – typically after a one year lapse - or when significant new infrastructure has been added;
  - 5.6.1.2. where there has been a significant management or personnel re-structuring having an impact on the ship construction process;
  - 5.6.1.3. or where the shipbuilder contracts to construct a vessel of a different type or substantially different in design.



Note: Reference is made to Appendix 1 “shipyard review record”, as an example.

## 5.7. NEWBUILDING SURVEY PLANNING

- 5.7.1. 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 Table 2.5.1. The purpose of the meeting is to review and agree how the list of specific activities shown in Table 2.5.1 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 upon the contents of the Table 2.5.1 – the Table can be used as the record with comments made into the appropriate column. If the society has nominated a surveyor for a specific newbuilding project then the 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 the builder to agree to keep the classification society advised of the progress of any 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.

- 5.7.2. The records are to take note of specific published Administration requirements and interpretations of statutory requirements.
- 5.7.3. 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. E.g. if the shipbuilder chooses to use or change sub-contractors, 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.
- 5.7.4. 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 Recognized Fabrication Standard(RFS) which has been accepted by the Classification 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 classification society.

INTLREG may accept an RFS as an alternative to IACS Rec. 47 provided that [5.7.4.1] or [5.7.4.2] is complied with as applicable.

- 5.7.4.1. Where a RFS is well established and has well documented history (3 or more years prior to the new vessel contract) of successful application to similar designs as the new vessel and that history is for the same Shipyard as the new vessel. Then the Shipyard is to create a summary document referencing the RFS to be used in construction and highlighting any limitations to usage of the selected RFS. This summary document is to be included with the “record of kick-off meeting” for the vessel.

The summary document is also to be included in the SCF, (for Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10 per App 2, Table A Tier II Item 11), as applicable.

- 5.7.4.2. Where a RFS is new or revised or otherwise not as per [5.7.4.1] the following steps are to be carried out:

- (a) The tolerances and fabrications standards of the RFS are to be compared with those of Recommendation 47. Any that are less stringent than those of Recommendation 47 are to be identified.
- (b) The tolerances and fabrication standards of the RFS identified in [5.7.4.2] (a) are to be assessed to determine the acceptability for use and/or any restrictions for usage for the subject (or proposed) design. Details of how the acceptability for use and/or restrictions are to be recorded, and,
- (c) A summary document including the outcomes of [5.7.4.2](a) and [5.7.4.2](b) is to be compiled. This document is to also include a reference to the RFS, details of the tolerance and fabrication standards not analyzed as part of [5.7.4.2] (b) and any limitations to the usage of the RFS.

The summary document is to be included with the “record of the kick-off meeting” of the vessel. The summary document is also to be included in the SCF, (for Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10 per App 2, Table A Tier II Item 11), as applicable.

- 5.7.5. The kick-off meeting may be attended by other parties (owner, administrations, etc.) subject to agreement by the shipbuilder.
- 5.7.6. In the event of series ship production\*, the requirement for a kick off meeting in paragraph [5.7.1] 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.

\*Series Ship Production: vessels in the series subsequent to the first one (prototype), i.e. sister ships built in the same shipyard.

## **5.8. EXAMINATION AND TEST PLAN FOR NEWBUILDING ACTIVITIES**

- 5.8.1. 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 kickoff meeting.

They are to include:

- 5.8.1.1. proposals for the examination of completed steelwork - generally referred to as the block plan and are to include details of joining blocks together at the pre-erection and erection stages or at other relevant stages ;
- 5.8.1.2. proposals for fit up examinations where necessary;
- 5.8.1.3. proposals for testing of the structure (leak and hydrostatic) as well as for all watertight and weathertight closing appliances;
- 5.8.1.4. proposals for non-destructive examination;
- 5.8.1.5. any other proposals specific to the ship type or to the statutory requirements.
- 5.8.2. 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.
- 5.8.3. In addition to above, for Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10 see also Appendix 2 to this Section.

**5.9. PROOF OF THE CONSISTENCY OF SURVEYS**

- 5.9.1. The classification society is to be able to provide evidence, e.g. through records, check lists, inspection and test records, etc. that its 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.
- 5.9.2. In addition, the classification society is to maintain records of deficiencies found during the patrolling activities required in Table 2.5.1 and described in [5.2.3.1]. Records shall include the date when deficiency was found, description of the deficiency and the date the deficiency was cleared.

**5.10. SHIP CONSTRUCTION FILE**

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 paragraph 3 of Appendix 2 to this Section is to be applied.

- 5.10.1. 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 which excludes the shipbuilder, that party has the responsibility.

The Ship Construction File shall be reviewed for content in accordance with the requirements of para [5.10.2].

- 5.10.2. It is recognised that the purpose of documents held in the Ship Construction File on board the ship, is to facilitate inspection (survey) and repair and maintenance, and, therefore, is to include in addition to documents listed in Table 2.5.1, but not be limited to:

5.10.2.1. 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 .

5.10.2.2. manuals required for classification and statutory requirements, e.g. loading and stability, bow doors and inner doors and side shell doors and stern doors – operations and maintenance manuals .

5.10.2.3. ship structure access manual, as applicable;

5.10.2.4. copies of certificates of forgings and castings welded into the hull.

5.10.2.5. details of equipment forming part of the watertight and weather tight integrity of the ship;

5.10.2.5.1. a Cable Transit Seal Systems Register, to be prepared by the shipbuilder for watertight cable transits. The Register can be in either a hard copy or digitized media. For an example of a register see Appendix 3 - Recommendatory Sample - Cable Transit Seal Systems Register. It is to include a marking / identification system, documentation referencing manufacturer manual(s) for each type of cable transit installed, the Type Approval certification for each type of transit system, applicable installation drawings, and a recording of each installed transit documenting the as built condition after final inspection in the shipyard. This is to include sections to record any inspection, modification, repair and maintenance.

5.10.2.6. tank testing plan including details of the test requirements ;

- 5.10.2.7. corrosion protection specifications ;
- 5.10.2.8. details for the in-water survey, if applicable, information for divers, clearances measurements instructions etc., tank and compartment boundaries;
- 5.10.2.9. docking plan and details of all penetrations normally examined at drydocking;
- 5.10.2.10. Coating Technical File, for ships subject to compliance with the IMO Performance
- 5.10.2.11. Standard for Protective Coatings (PSPC) as a class requirement under the IACS Common Structural rules.

**Attachments:**

- A. Table 1 - Hull Surveyable Items Activities Table
- B. Appendix 1 - Shipyard Review Record
- C. Appendix 2 - Requirements 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*
- D. Appendix 3 - Recommendatory Sample - Cable Transit Seal Systems Register

Table 5.2.1, Hull Surveyable Items Activities Table, Rev.7

| Reference | Shipbuilding function                 | Survey Requirements for Classification                 | Survey Method required for Classification                                                                                | IACS reference *  | statutory requirements and relevant reference | Documentation available to classification surveyor during construction | Documentation for ship construction file | Specific activities                                                              | Classification society proposals for the project |
|-----------|---------------------------------------|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------|------------------------------------------------------------------------|------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------|
|           | shipbuilding quality control function |                                                        |                                                                                                                          |                   |                                               |                                                                        |                                          |                                                                                  |                                                  |
| 1         | welding                               |                                                        |                                                                                                                          |                   |                                               |                                                                        |                                          |                                                                                  |                                                  |
| 1.1       | welding consumables                   | Classification approved separately at the manufacturer | review approval status and patrol, verify storage, handling and treatment in accordance with manufacturer's requirements | UR W17            |                                               | 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                                                                                | Recommendation 47 |                                               | shipyards 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                                     |                                                  |

Table 2.5.1, Hull Surveyable Items Activities Table, Rev.7

| Reference | Shipbuilding function                                | Survey Requirements for Classification                                                                                                                                       | Survey Method required for Classification | IACS reference * | statutory requirements and relevant reference | Documentation available to classification surveyor during construction                         | Documentation for ship construction file | Specific activities                                                                                                                                                                                  | Classification 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 classification society or by another IACS member available           | review and patrol                         | UR W28           |                                               | Approved weld procedure specification and welding plan relevant to the ship project or process | not required                             | verify procedures are available at relevant workstations                                                                                                                                             |                                                  |
|           |                                                      | the classification society witnesses all new weld procedure qualification tests carried out in the shipyard whenever the classification society is surveying in the shipyard | witness                                   |                  |                                               |                                                                                                |                                          | verify weld procedures records have been approved and cover all weld processes and positions in accordance with classification or recognised standards and are available for the surveyors reference |                                                  |

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Table 2.5.1, Hull Surveyable Items Activities Table, Rev.7

| Reference | Shipbuilding function | Survey Requirements for Classification | Survey Method required for Classification | IACS reference * | statutory requirements and relevant reference | Documentation available to classification surveyor during construction | Documentation for ship construction file | Specific activities                                                              | Classification society proposals for the project |
|-----------|-----------------------|----------------------------------------|-------------------------------------------|------------------|-----------------------------------------------|------------------------------------------------------------------------|------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------|
| 1.3a      | welding equipment     | correctly calibrated and maintained    | patrol and review                         |                  |                                               | shipbuilders 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                       |                                                  |

Table 2.5.1, Hull Surveyable Items Activities Table, Rev.7

| Reference | Shipbuilding function           | Survey Requirements for Classification                                         | Survey Method required for Classification                                                    | IACS reference *          | statutory requirements and relevant reference | Documentation available to classification surveyor during construction                                                     | Documentation for ship construction file | Specific activities                                                                                      | Classification society proposals for the project |
|-----------|---------------------------------|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------|----------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| 1.3b      | welding environment             | satisfactory environment                                                       | patrol                                                                                       | Recommendation 47         |                                               |                                                                                                                            | 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                                                                |                                                  |
| 1.3c      | welding supervision             | sufficient number of skilled supervisors                                       | Review and patrol                                                                            | UR W33, Recommendation 47 |                                               |                                                                                                                            |                                          | verify upervision 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 | UR W33, Recommendation 47 |                                               | Shipbuilders and recognised standards and Rules as applicable, welding and NDE plans, NDE reports, operator qualifications | not required                             | Identify workstations where NDE is carried out, e.g. panel line butt welds, castings into hull structure |                                                  |
|           |                                 |                                                                                |                                                                                              |                           |                                               |                                                                                                                            |                                          | Verify NDE carried out in accordance with approved plans where                                           |                                                  |



INTLREG Rules and Regulations for Classification of Steel Vessels

|  |  |  |  |  |  |  |  |                                                                                           |  |
|--|--|--|--|--|--|--|--|-------------------------------------------------------------------------------------------|--|
|  |  |  |  |  |  |  |  | applicable                                                                                |  |
|  |  |  |  |  |  |  |  | Verify suitability of NDE methods                                                         |  |
|  |  |  |  |  |  |  |  | Verify operators suitably qualified particularly where sub-contractors have been employed |  |
|  |  |  |  |  |  |  |  | Verify NDE is carried out according to the acceptable process                             |  |
|  |  |  |  |  |  |  |  | Review NDE records                                                                        |  |

Table 2.5.1, Hull Surveyable Items Activities Table, Rev.7

| Reference | Shipbuilding function              | Survey Requirements for Classification                                                                                             | Survey Method required for Classification                                                            | IACS reference *          | statutory requirements and relevant reference | Documentation available to classification surveyor during construction                                                     | Documentation for ship construction file | Specific activities                                                                                      | Classification society proposals for the project |
|-----------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------|----------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| 1.5       | Welding - embedded discontinuities | NDE 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 | UR W33, Recommendation 47 |                                               | Shipbuilders and recognised standards and Rules as applicable, welding and NDE plans, NDE reports, operator qualifications | not required                             | Identify workstations where NDE is carried out, e.g. panel line butt welds, castings into hull structure |                                                  |
|           |                                    |                                                                                                                                    |                                                                                                      |                           |                                               |                                                                                                                            |                                          | Verify NDE carried out in accordance with approved plans where applicable                                |                                                  |
|           |                                    |                                                                                                                                    |                                                                                                      |                           |                                               |                                                                                                                            |                                          | Verify suitability of NDE 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        |                                                  |

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|  |  |  |  |  |  |  |  |                                                                                                                                                    |  |
|--|--|--|--|--|--|--|--|----------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  |  |  |  |  |  |  |  | sensitivity recorded                                                                                                                               |  |
|  |  |  |  |  |  |  |  | Verify that reports and radiographs have been evaluated correctly by the shipbuilder. Systematic review of radiographs carried out by the surveyor |  |
|  |  |  |  |  |  |  |  | Verify equipment calibration satisfactory and in accordance with manufacturer's and recognised standards requirements                              |  |
|  |  |  |  |  |  |  |  | Verify NDE is carried out according to the acceptable process                                                                                      |  |

Table 2.5.1, Hull Surveyable Items Activities Table, Rev.7

| Reference  | Shipbuilding function                           | Survey Requirements for Classification                                                                                               | Survey Method required for Classification | IACS reference *  | statutory requirements and relevant reference | Documentation available to classification surveyor during construction                                                          | Documentation for ship construction file | Specific activities                                                                                             | Classification society proposals for the project |
|------------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| <b>2</b>   | <b>Steel preparation and fit up:</b>            |                                                                                                                                      |                                           |                   |                                               |                                                                                                                                 |                                          |                                                                                                                 |                                                  |
| <b>2.1</b> | <b>surface preparation, marking and cutting</b> | traceability and acceptability of material, check of steel plates & profiles materials type, scantling identification, testing marks | patrol                                    | Recommendation 47 |                                               | material certificates, shipbuilder's marking/cutting production documents at the workstage - 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 shotblasting and priming                                                                     |                                                  |
|            |                                                 |                                                                                                                                      |                                           |                   |                                               |                                                                                                                                 |                                          | Verify suitability of primer                                                                                    |                                                  |
|            |                                                 |                                                                                                                                      |                                           |                   |                                               |                                                                                                                                 |                                          | Verify that steel grades can be identified                                                                      |                                                  |
|            |                                                 |                                                                                                                                      |                                           |                   |                                               |                                                                                                                                 |                                          | Verify machinery adjusted to maintain within                                                                    |                                                  |

INTLREG Rules and Regulations for Classification of Steel Vessels

|     |               |                                                                   |                   |                   |  |                                           |              |                                                                                                       |  |
|-----|---------------|-------------------------------------------------------------------|-------------------|-------------------|--|-------------------------------------------|--------------|-------------------------------------------------------------------------------------------------------|--|
|     |               |                                                                   |                   |                   |  |                                           |              | IACS or manufacturers recommendations                                                                 |  |
|     |               |                                                                   |                   |                   |  |                                           |              | Verify accuracy of marking and cutting                                                                |  |
|     |               |                                                                   |                   |                   |  |                                           |              | Verify storage of piece parts.                                                                        |  |
| 2.2 | straightening | Approval of straightening methods/ procedures against deformation | patrol and review | Recommendation 47 |  | recognised standards, approved procedures | not required | Verify that straightening processes are approved for the grade and type of steel, e.g. tmcp, z plate. |  |
|     |               |                                                                   |                   |                   |  |                                           |              | Verify that plates and sections are within recognised tolerances                                      |  |

Table 2.5.1, Hull Surveyable Items Activities Table, Rev.7

| Reference | Shipbuilding function                         | Survey Requirements for Classification                                                   | Survey Method required for Classification | IACS reference *  | statutory requirements and relevant reference | Documentation available to classification surveyor during construction | Documentation for ship construction file | Specific activities                                                                                         | Classification society proposals for the project |
|-----------|-----------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------|-------------------|-----------------------------------------------|------------------------------------------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| 2.3       | forming                                       | Maintain material properties. Acceptance of forming method against improper deformations | patrol                                    | Recommendation 47 |                                               | Shipbuilders 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                                    | Recommendation 47 |                                               | Shipbuilders and recognized 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 |  |

Table 2.5.1, Hull Surveyable Items Activities Table, Rev.7

| Reference | Shipbuilding function                                                                    | Survey Requirements for Classification               | Survey Method required for Classification | IACS reference *  | statutory requirements and relevant reference | Documentation available to classification surveyor during construction                                      | Documentation for ship construction file       | Specific activities                                                                                   | Classification 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                        | Recommendation 47 |                                               | Shipbuilders 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          |                                                  |



Table 2.5.1, Hull Surveyable Items Activities Table, Rev.7

| Reference | Shipbuilding function                                                                                                         | Survey Requirements for Classification                                                                          | Survey Method required for Classification               | IACS reference *  | statutory requirements and relevant reference | Documentation available to classification surveyor during construction                                                                                      | Documentation for ship construction file | Specific activities                                                                                   | Classification society proposals for the project |
|-----------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| 3         | <b>Steelwork process, e.g. sub assembly, block, grand and mega block assembly, pre- erection and erection, closing plates</b> | compliance with approved drawings, visual examination of welding and material, check alignment and deformations | patrol of the process and witness of the completed item | Recommendation 47 |                                               | approved plans, shipbuilders inspection records, Shipbuilders and recognised standards and Rules as applicable, construction plan (steelwork 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                |                                                  |
|           |                                                                                                                               |                                                                                                                 |                                                         |                   |                                               |                                                                                                                                                             |                                          | Verify that piece parts are identifiable                                                              |                                                  |
|           |                                                                                                                               |                                                                                                                 |                                                         |                   |                                               |                                                                                                                                                             |                                          | Verify that fit ups are                                                                               |                                                  |

**PART 1**  
**CHAPTER 2**

**INTLREG Rules and Regulations for Classification of Steel Vessels**

|          |                                     |                                               |                            |                   |  |                                              |  |                                                                                                                                                              |  |
|----------|-------------------------------------|-----------------------------------------------|----------------------------|-------------------|--|----------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|          |                                     |                                               |                            |                   |  |                                              |  | within recognized tolerances                                                                                                                                 |  |
|          |                                     |                                               |                            |                   |  |                                              |  | Verify that correct welding requirements specified in reference 1 of this table have been adopted                                                            |  |
|          |                                     |                                               |                            |                   |  |                                              |  | Verify processes for closing plates etc. are acceptable                                                                                                      |  |
|          |                                     |                                               |                            |                   |  |                                              |  | Confirm that steelwork is in accordance with the approved plan                                                                                               |  |
| <b>4</b> | <b>Remedial work and alteration</b> | welding, check against deformation, alignment | review records and witness | Recommendation 47 |  | 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 |  |



Table 2.5.1, Hull Surveyable Items Activities Table, Rev.7

| Reference | Shipbuilding function                                                      | Survey Requirements for Classification | Survey Method required for Classification | IACS reference * | statutory requirements and relevant reference | Documentation available to classification surveyor during construction | Documentation for ship construction file | Specific activities                                                                                                 | Classification society proposals for the project |
|-----------|----------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|------------------|-----------------------------------------------|------------------------------------------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
|           |                                                                            |                                        |                                           |                  |                                               |                                                                        |                                          | Verify that all deviations brought to the attention of the classification society by the shipbuilder are acceptable |                                                  |
| 5         | Tightness testing, including leak and hose testing, hydropneumatic testing | Absence of leaks                       | Review and witness of the test            | UR S14           | Reg. II-1/11 of SOLAS as amended;             | approved tank testing plan, shipbuilders 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                                                                  |                                                  |
|           |                                                                            |                                        |                                           |                  |                                               |                                                                        |                                          | Confirm that correct test pressures maintained for leak, hose and hydro and hydropneumatic testing is satisfactory  |                                                  |
|           |                                                                            |                                        |                                           |                  |                                               |                                                                        |                                          | Verify that adequate records of the tank testing have been maintained                                               |                                                  |

## INTLREG Rules and Regulations for Classification of Steel Vessels

Table 2.5.1, Hull Surveyable Items Activities Table, Rev.7

| Reference | Shipbuilding function                                                                                                                | Survey Requirements for Classification                                                                                                                   | Survey Method required for Classification                     | IACS reference *                | statutory requirements and relevant reference | Documentation available to classification surveyor during construction | Documentation for ship construction file | Specific activities                                                           | Classification society proposals for the project |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------|-----------------------------------------------|------------------------------------------------------------------------|------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------|
| 6         | <b>Structural testing</b>                                                                                                            | structural adequacy of the design                                                                                                                        | Review and witness of the test                                | UR S14                          | Reg. II-1/11 of SOLAS as amended;             | approved tank testing plan, shipbuilders 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 is satisfactory    |                                                  |
|           |                                                                                                                                      |                                                                                                                                                          |                                                               |                                 |                                               |                                                                        |                                          | Verify that adequate records of the tank testing have been maintained         |                                                  |
| 7         | <b>corrosion protection systems, e.g. coatings, cathodic protection, impressed current except for coating system subject to PSPC</b> | Salt water ballast tanks with boundaries formed by the hull envelope, and also bulk carrier hold internal surfaces, coamings and hatch covers shall have | Review and report on builder's & manufacturer's documentation | UR Z 8 and Z 9, UI SC122, UR F1 | 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   |                                                  |

Table 2.5.1, Hull Surveyable Items Activities Table, Rev.7

| Reference  | Shipbuilding function                                                                                                                                             | Survey Requirements for Classification                                               | Survey Method required for Classification | IACS reference * | statutory requirements and relevant reference | Documentation available to classification surveyor during construction | Documentation for ship construction file | Specific activities                                                                                                               | Classification society proposals for the project |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------|------------------|-----------------------------------------------|------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
|            |                                                                                                                                                                   | an efficient protective coating. Safety aspects of cathodic systems to be dealt with |                                           |                  |                                               |                                                                        |                                          | Verify that adequate records have been maintained and copied to the ship construction file                                        |                                                  |
|            | <b>Application Antifouling Systems</b>                                                                                                                            |                                                                                      | Review                                    |                  | AFS Convention                                | Painting Specification                                                 | Paint Specification and Mfg Declaration  | Verify that adequate records have been maintained and copied to the ship construction file                                        |                                                  |
| <b>7.1</b> | <b>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</b> | 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). |                                                  |

INTLREG Rules and Regulations for Classification of Steel Vessels

Table 2.5.1, Hull Surveyable Items Activities Table, Rev.7

| Reference | Shipbuilding function                               | Survey Requirements for Classification | Survey Method required for Classification | IACS reference * | statutory requirements and relevant reference | Documentation available to classification surveyor during construction | Documentation for ship construction file | Specific activities                 | Classification society proposals for the project |
|-----------|-----------------------------------------------------|----------------------------------------|-------------------------------------------|------------------|-----------------------------------------------|------------------------------------------------------------------------|------------------------------------------|-------------------------------------|--------------------------------------------------|
| 8         | Installation, welding and testing of the following: |                                        |                                           |                  |                                               |                                                                        |                                          |                                     |                                                  |
| 8.1       | hatch covers                                        | tightness and securing                 | witness                                   | UR S14 & Rec 14  | Reg. 13-14-15 and 16 of ILLC '66              | approved tank testing plan, shipbuilders inspection records            | details required, structural drawings    | Confirm leak test of hatch covers   |                                                  |
|           |                                                     |                                        |                                           |                  |                                               |                                                                        |                                          | Confirm operation and securing test |                                                  |

Table 2.5.1, Hull Surveyable Items Activities Table, Rev.7

| Reference | Shipbuilding function                                 | Survey Requirements for Classification | Survey Method required for Classification | IACS reference * | statutory requirements and relevant reference                | Documentation available to classification surveyor during construction | Documentation for ship construction file | Specific activities                                                                                  | Classification society proposals for the project |
|-----------|-------------------------------------------------------|----------------------------------------|-------------------------------------------|------------------|--------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------|------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| 8.2       | doors and ramps integral with the shell and bulkheads | tightness and securing                 | witness                                   | UR S14           | Reg. II-1/18 of SOLAS as amended; Reg. 12 and 21 of ILLC '66 | approved tank testing plan, shipbuilders 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                     |                                                  |
| 8.3       | rudders                                               | fitting                                | witness                                   | UR S14           |                                                              | approved plan, shipbuilders 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 |                                                  |



Table 2.5.1, Hull Surveyable Items Activities Table, Rev.7

| Reference | Shipbuilding function | Survey Requirements for Classification                                                                          | Survey Method required for Classification               | IACS reference * | statutory requirements and relevant reference | Documentation available to classification surveyor during construction                                                                                      | Documentation for ship construction file        | Specific activities                                                                                                       | Classification 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 | UR W7 & W8       |                                               | approved plans, shipbuilders inspection records, Shipbuilders and recognised standards and Rules as applicable, construction plan (steelwork sub- division) | copies of certificates of forgings and castings | Verify casting 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                                              |                                                  |
|           | appendages            |                                                                                                                 |                                                         |                  |                                               |                                                                                                                                                             |                                                 | Verify that correct welding and fit up requirements specified in reference 1, 2.4 and 2.5 of this table have been adopted |                                                  |

Table 2.5.1, Hull Surveyable Items Activities Table, Rev.7

| Reference | Shipbuilding function                                                                                                      | Survey Requirements for Classification | Survey Method required for Classification | IACS reference * | statutory requirements and relevant reference                                           | Documentation available to classification surveyor during construction | Documentation for ship construction file | Specific activities                                                                                                                   | Classification society proposals for the project |
|-----------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| 8.5       | equipment forming the watertight and weathertight 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, shipbuilders 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 |                                                  |
|           |                                                                                                                            |                                        |                                           | UR P3            |                                                                                         |                                                                        |                                          | Verify air pipes, vents etc closing device 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                            |                                                  |

INTLREG Rules and Regulations for Classification of Steel Vessels

|  |                                        |                                                                             |         |        |                                   |  |                  |                                                                                                                                  |  |
|--|----------------------------------------|-----------------------------------------------------------------------------|---------|--------|-----------------------------------|--|------------------|----------------------------------------------------------------------------------------------------------------------------------|--|
|  | <b>Freeboard marks and draft marks</b> | within allowable tolerances and in accordance with the freeboard assignment | witness | UI LL4 | Reg. 4- 5- 6- 7 and 8 of ILLC '66 |  | details required | Verify freeboard marks in accordance with load line assignment                                                                   |  |
|  |                                        |                                                                             |         |        |                                   |  |                  | Verify draft marks in accordance with the agreed tolerances specified by the builder unless more onerous flag state requirements |  |

Table 2.5.1, Hull Surveyable Items Activities Table, Rev.7

| Reference  | Shipbuilding function                        | Survey Requirements for Classification                                                         | Survey Method required for Classification               | IACS reference *  | statutory requirements and relevant reference             | Documentation available to classification surveyor during construction | Documentation for ship construction file | Specific activities                                                                                                                     | Classification society proposals for the project |
|------------|----------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|-------------------|-----------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
|            | <b>Principal dimensions</b>                  | within allowable tolerances                                                                    | review and witness                                      | Recommendation 47 |                                                           |                                                                        | details required                         | Verify principal dimensions in accordance with recognised standard                                                                      |                                                  |
|            |                                              |                                                                                                |                                                         |                   |                                                           |                                                                        |                                          | Verify dimensions included in ship construction file                                                                                    |                                                  |
|            | <b>Safety Construction certification</b>     | 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                                                  |                                                  |
| <b>8.6</b> | <b>watertight cable transit seal systems</b> | compliance with approved drawings, visual examination of fitting, check alignment and securing | patrol of the process and witness of the completed item |                   | Reg. II-1/13 and 13-1 of SOLAS as amended                 | shipbuilder's inspection records, manufacturer's specification         | Cable Transit Seal Systems Register      | Verify that correct welding and fit up requirements, including as specified in reference 1, 2.4 and 2.5 of this table have been adopted |                                                  |
|            |                                              |                                                                                                |                                                         |                   |                                                           |                                                                        |                                          | Verify watertight cable transit                                                                                                         |                                                  |

**INTLREG Rules and Regulations for Classification of Steel Vessels**

|  |  |  |  |  |  |  |  |                                                     |  |
|--|--|--|--|--|--|--|--|-----------------------------------------------------|--|
|  |  |  |  |  |  |  |  | seal systems<br>are type<br>approved                |  |
|  |  |  |  |  |  |  |  | Verify the format<br>and content of<br>the Register |  |

|                                   |  |
|-----------------------------------|--|
| <b>Shipbuilder's name</b>         |  |
| <b>project</b>                    |  |
| <b>project duration</b>           |  |
| <b>kick off meeting date</b>      |  |
| <b>representing builder</b>       |  |
| <b>representing class society</b> |  |

**APPENDIX 1**  
**Shipyard Review Record**

| Name of Shipyard | Date |
|------------------|------|
|                  |      |

**1. Details of any Management Systems**

| Obtained approval | Certified by | Expiry Date | Remarks<br>(scope, etc.) |
|-------------------|--------------|-------------|--------------------------|
| ISO 9001          |              |             |                          |
| ISO 14001         |              |             |                          |
| ISO 45001         |              |             |                          |
| Other:            |              |             |                          |

**2. Construction Facilities:** (Documents such as a brochure of shipyard can be attached in lieu of completing this section.)**2.1. BUILDING BERTH (B) OR DOCK (D) \*IN CASE OF BERTH, DEPTH IS NOT APPLICABLE**

| B / D | Name | Length<br>(m) | Width<br>(m) | Depth*<br>(m) | Building<br>Capacity<br>(Gross<br>Tonnage) | Crane (Ton<br>x No.) |
|-------|------|---------------|--------------|---------------|--------------------------------------------|----------------------|
|       |      |               |              |               |                                            |                      |
|       |      |               |              |               |                                            |                      |
|       |      |               |              |               |                                            |                      |
|       |      |               |              |               |                                            |                      |
|       |      |               |              |               |                                            |                      |
|       |      |               |              |               |                                            |                      |

**2.2. OUTFITTING QUAYS**

| Name | Length<br>(m) | Width<br>(m) | Depth<br>(m) | Berthing<br>Capacity<br>(Gross<br>Tonnage) | Crane (Ton<br>x No.) |
|------|---------------|--------------|--------------|--------------------------------------------|----------------------|
|      |               |              |              |                                            |                      |
|      |               |              |              |                                            |                      |
|      |               |              |              |                                            |                      |
|      |               |              |              |                                            |                      |
|      |               |              |              |                                            |                      |
|      |               |              |              |                                            |                      |

**2.3. MAIN FABRICATION AND ERECTION FACILITIES**

|                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| (1) Marking and cutting of steel plates (including internal members) <ul style="list-style-type: none"> <li>- Marking method (Manual, Photo x ____, EPM x ____, NC x ____ others ____)</li> <li>- NC cutting machine (Gas x ____, Plasma x ____, Laser x ____)</li> <li style="padding-left: 40px;">Control procedure of NC (On-line, other)</li> <li>- Cutting equipment (Edge planer x ____, Roll-shear x ____)</li> </ul> |  |
| (2) Marking and cutting of section bar <ul style="list-style-type: none"> <li>- Marking method (Manual, NC)</li> <li>- Marking of reference curved line (Manual, NC)</li> <li>- Cutting method (Manual, NC)</li> <li>- In case of NC (Gas x ____, Plasma x ____)</li> </ul>                                                                                                                                                  |  |
| (3) One-side automatic welding machine (Yes, No) <ul style="list-style-type: none"> <li>- Type of welding machine (Flux Backing x ____, Flux and Copper Backing x ____ other ____)</li> <li>- Existence of special surface plate for plate welding (Yes, No)</li> </ul>                                                                                                                                                      |  |
| (4) Fillet welding machine (Gravity, Automatic) Percentage of automatization except gravity: about ____% <ul style="list-style-type: none"> <li>- Line Welder (No, Yes: submerged arc x ____ heads, CO<sub>2</sub> x ____ heads)</li> <li>- Small automatic fillet welding machine (No, Yes: Name: _____ x ____)</li> <li>- Welding robot (No, Yes: Portal x ____, Rectangular x ____, Articulated x ____)</li> </ul>        |  |
| (5) Painting equipment <ul style="list-style-type: none"> <li>- Plate shot blasting/primer coating machine (No, Yes: Max. Width ____ m, Length ____ m)</li> <li>- Section bar shot blasting/primer coating machine (No, Yes: Max. Length ____ m)</li> <li>- Special coating factory (No, Yes: ____ m x ____ m x ____ sections)</li> </ul>                                                                                    |  |
| (6) Vertical automatic welding machine (No, Yes: EG x ____, SEG x ____, ES x ____)<br><br>EG: Electrogas SEG: Simplified Electrogas ES: Electroslag                                                                                                                                                                                                                                                                          |  |
| (7) Other main fabrication facilities                                                                                                                                                                                                                                                                                                                                                                                        |  |

### 3. Shipyard Control of Qualified Welders

#### (1) Normal steel

|                       |                         | certification | traceability | supervision | maintenance of qualification |
|-----------------------|-------------------------|---------------|--------------|-------------|------------------------------|
| Shipyard workers      | confirm system in place | Yes / No      | Yes / No     | Yes / No    | Yes / No                     |
| Subcontracted workers | confirm system in place | Yes / No      | Yes / No     | Yes / No    | Yes / No                     |

### 4. Feature of Construction Procedure

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>(1) Subcontract of hull blocks (weight)</p> <ul style="list-style-type: none"> <li>- Sub members (No, Yes: Ratio of subcontracted works ____ %, No., of subcontractors ____)</li> <li>- Blocks (No, Yes: Ratio of subcontracted works ____ %, No., of subcontractors ____)</li> </ul>                                                                                                                                                                                                                                                                                    |
| <p>(2) Method of plate block assembly</p> <ul style="list-style-type: none"> <li>- Method fitting and welding longitudinals and transverse webs on jointed panels</li> <li>- Method welding longitudinals on jointed panels prior to fitting and welding transverse webs</li> <li>- Method fitting and welding a frame consists of longitudinals and transverse webs on jointed panels</li> <li>- Method jointing panels with pre-assembled longitudinals by welding prior to fitting and welding transverse webs</li> <li>- Other (please specify in (5) below)</li> </ul> |
| <p>(3) - pre-erection outfitting carried out</p> <p>grand block/mega block adopted</p> <p>Method of erection at building berth/dock</p> <ul style="list-style-type: none"> <li>- Max. weight of loading block: ____ ton</li> <li>- Construction method in building dock/berth/land construction etc. (1 ship, 1.5 ships: Semi-tandem, dual entrance)</li> <li>- Block loading process (single starting block, multi starting blocks, inserting block: No, Yes)</li> </ul>                                                                                                   |
| <p>(4) Final dock (No, Yes: In-house, Other place of the same company, Use other company)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p>(5) Other feature of construction procedure</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

**5. Quality Control System:**

| Item and description                                                                                                                                                                                                                                                           | Result                                | Remarks |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------|
| <p>(1) Existence of the organization chart including the departments of design, purchasing, manufacturing and quality assurance</p> <ul style="list-style-type: none"> <li>- Are the function, responsibility and competence of the organization clear?</li> </ul>             |                                       |         |
| <p>(2) Quality control organization</p> <ul style="list-style-type: none"> <li>- Existence of quality control organization</li> <li>- Number of employees in this organization</li> <li>- Existence of procedures or plans related to tests and inspections</li> </ul>         | <p>__ persons including the chief</p> |         |
| <p>(3) Pre-inspection system of shipyard</p> <ul style="list-style-type: none"> <li>- Is pre-inspection carried out prior to Class inspection?</li> <li>- Are pre-inspectors assigned? (Check the list.)</li> <li>- Number of pre-inspectors (related to hull only)</li> </ul> | <p>_____ persons</p>                  |         |



|                                                                                                                                                                                                                                                                                                               |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| - Are inspection results marked on the object and/or recorded in the checklist?                                                                                                                                                                                                                               |  |  |
| (4) Records of inspections and tests<br>- Are records made and kept properly?<br>- Does the responsible person verify the records?<br>- Can the adoption of necessary corrective actions against non-conformity happened be checked?                                                                          |  |  |
| (5) Condition at the time of the surveys in the presence of class surveyors<br>- Is the schedule of the surveys changed often?<br>- Are pre-inspection, shipyard inspection and repairs completed beforehand?<br>- Are the sufficient preparations for surveys such as scaffoldings, lighting, cleaning made? |  |  |
| Note:<br>Above-mentioned (3) and (4) include the acceptance inspection of subcontracted items.                                                                                                                                                                                                                |  |  |

**6. Measures for Safety and Health**

| Item and description                                                                            | Result | Remarks |
|-------------------------------------------------------------------------------------------------|--------|---------|
| (1) Are conditions of scaffolding, nets, safety belt, lighting and ventilation good?            |        |         |
| (2) Does sufficient attention paid for radiographic examination and operation of cherry picker? |        |         |
| Note:                                                                                           |        |         |

**7. Control System of Non-Destructive Examination (NDE)**

| Item and description                                                                                      | Result                                                                  | Remarks |
|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|---------|
| (1) Number of NDE supervisors in shipyard (including persons responsible for judging results)             | ____ persons                                                            |         |
| (2) Dependence on subcontracted NDE work<br>- Number of shipyard employees<br>- Number of sub-contractors | ____ persons<br><br>____ persons                                        |         |
| (3) NDE sub-contractor company's name and official technical qualifications                               | Name _____<br>(approved by) __<br><br>Name _____<br>(approved by) _____ |         |

**PART 1****APPENDIX 1****INTLREG Rules and Regulations for Classification of Steel Vessels**

|                                                                                                                               |                         |  |
|-------------------------------------------------------------------------------------------------------------------------------|-------------------------|--|
| (4) Grade and number of NDE employees with official technical qualifications in shipyard                                      | ____ Grade ____ persons |  |
| Specialized in radiography                                                                                                    |                         |  |
| Specialized in ultrasonic                                                                                                     | ____ Grade ____ persons |  |
| Specialized in surface detection                                                                                              | ____ Grade ____ persons |  |
| (5) If non-destructive examinations are subcontracted, the grade and number of officially qualified persons                   | ____ Grade ____ persons |  |
| Specialized in radiography                                                                                                    |                         |  |
| Specialized in ultrasonic                                                                                                     | ____ Grade ____ persons |  |
| Specialized in surface detection                                                                                              | ____ Grade ____ persons |  |
| (6) Non-destructive examination equipment (in house)                                                                          |                         |  |
| - Number of radiographic equipment                                                                                            | _____                   |  |
| - Number of ultrasonic equipment                                                                                              | _____                   |  |
| Note:<br>Even if all works are subcontracted, it is recommendable to attach the qualified person(s) who can verify the works. |                         |  |

**8. Quality Control on Production Line**

| Item and description                                                                                                                                                                                                                                                                               | Result                                                      | Remarks |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|---------|
| <b>8.1 Preventative measures for misuse of materials</b>                                                                                                                                                                                                                                           |                                                             |         |
| (1) Job title of supervisor and person in charge of collating ordered steel and received steel, and checking of mill sheet                                                                                                                                                                         | Title of supervisor:<br>_____<br>Title of person in charge: |         |
| (2) Are means for checking the material grade in hand prescribed for high-grade steels                                                                                                                                                                                                             |                                                             |         |
| (3) Are regulations prescribed for checking the material grade for high-tensile steel for low-temperature applications?<br><br>Are there regulations for inscribing high tensile steel on the surface of the high tensile steel and special indication for steel for low temperature applications? |                                                             |         |
| (4) Are procedures for re-using of remaining cut-off mild steel?                                                                                                                                                                                                                                   |                                                             |         |
| (5) Are there procedures for re-using of remaining cut-off high-tensile steel?                                                                                                                                                                                                                     |                                                             |         |
| (6) In the case of (4) and (5) above, can a collation be made with the mill sheet?                                                                                                                                                                                                                 |                                                             |         |
| (7) Section of controlling the lists of remaining cut-off steel                                                                                                                                                                                                                                    | Name of section:                                            |         |
| Note:                                                                                                                                                                                                                                                                                              |                                                             |         |

|                                                                                                                                                                                                                                          |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| <ul style="list-style-type: none"> <li>- In case of high tensile steel, are means identifying different grades</li> <li>- In the case of (3) and (4) above, are the materials approved by other classes controlled similarly?</li> </ul> |  |  |
| <b>8.2 Shot blasting/Primer coating</b>                                                                                                                                                                                                  |  |  |
| (1) Existence of surface preparation standards                                                                                                                                                                                           |  |  |
| (2) Existence of coating thickness control standards <ul style="list-style-type: none"> <li>- Existence of thickness measurement records</li> </ul>                                                                                      |  |  |
| Note: <ul style="list-style-type: none"> <li>- The standard is to include the description related traceability after shot blasting and primer coating.</li> </ul>                                                                        |  |  |
| <b>8.3 Marking and cutting (Assembly work)</b>                                                                                                                                                                                           |  |  |
| (1) Existence of standards for accuracy and periodical inspection of tape measures, tapes, stencils, etc.                                                                                                                                |  |  |
| (2) Existence of standards for accuracy of cut dimensions and edge preparation                                                                                                                                                           |  |  |
| (3) Existence of standards for finish of cutting face                                                                                                                                                                                    |  |  |
| (4) What is the frequency and extent of maintenance and inspection carried out for ensuring accuracy of NC cutter and/or flame planer?                                                                                                   |  |  |

| Item and description                                                                                                                                                                                                                                     | Result | Remarks |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------|
| (5) In case of NC, are the disks, tapes etc. maintained in good condition?                                                                                                                                                                               |        |         |
| (6) What are the measures adopted and guidance given to make the worker fully conversant with cutting work standards for maintaining accuracy?                                                                                                           |        |         |
| Note: <ul style="list-style-type: none"> <li>- In case of (2) and (3) above, check items are to include confirmation of edge preparations free from piercing hole.</li> <li>- NC for section bars is also to be in accordance with the above.</li> </ul> |        |         |
| <b>8.4 Bending and strain free</b>                                                                                                                                                                                                                       |        |         |
| (1) Existence of standards for maximum heating temperatures during water cooling and at the time of bending and distortion removal of steel by quick heating and cooling                                                                                 |        |         |
| (2) Existence of regulations for plate thickness and bending radius for flange processing                                                                                                                                                                |        |         |
| (3) What are the measures adopted and guidance given to make the worker fully conversant with maintaining quality and accuracy during the bending process?                                                                                               |        |         |
| Note:                                                                                                                                                                                                                                                    |        |         |
| <b>8.5 Control of welding procedure</b>                                                                                                                                                                                                                  |        |         |
| (1) Are all welding procedures applied to the ships approved by the Society or other IACS members?                                                                                                                                                       |        |         |
| Note:                                                                                                                                                                                                                                                    |        |         |

| 8.6 Treatment of serious non-conformities                                               |        |         |
|-----------------------------------------------------------------------------------------|--------|---------|
| (1) Are repair plans submitted to the Society when serious non-conformities happened?   |        |         |
| (2) Were the NDE (RT/UT) plans submitted at appropriate timing?                         |        |         |
| (3) Was the extent of tests extended considering the results of the test?               |        |         |
| Note:                                                                                   |        |         |
| 8.7 Hydrostatic and watertight tests                                                    |        |         |
| (1) Is the test plan submitted to the Society?                                          |        |         |
| (2) Are vacuum tests applied to?                                                        |        |         |
| (3) Are local air injection tests during sub-assembly works applied to?                 |        |         |
| Item and description                                                                    | Result | Remarks |
| (4) If (2) or (3) above is applied to, are the test procedures approved by the Society? |        |         |
| Note:                                                                                   |        |         |

## APPENDIX 2

### Requirements 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*

#### 1. Examination and test plan for newbuilding activities

1.1. The shipbuilder is to provide plans of the items which are intended to be examined and tested in accordance with the Society's Rules 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 must include:

1.1.1.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.

1.1.2.a description of the requirements for all types of testing during survey, including test criteria.

#### 2. Design Transparency

2.1. For ships subject to compliance with IMO Res. MSC.287(87), IMO Res. MSC.290(87), IMO Res. MSC.296(87)MSC.454(100) 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.

#### 3. Ship Construction File (SCF)

3.1. 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.

3.1.1. 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 certificates of forgings and castings welded into the hull (UR W7 and UR W8).
- .9. Details of equipment forming part of the watertight and weather tight integrity of the ship.
  - .9.1 A Cable Transit Seal Systems Register, to be prepared by the shipbuilder for watertight cable transits. The Register can be in either a hard copy or digitized media. For an example of a register see Appendix 3 - Recommadatory Sample - Cable Transit Seal Systems Register. It is to include a marking / identification system, documentation referencing manufacturer manual(s) for each type of cable transit installed, the Type Approval certification for each type of transit system, applicable installation drawings, and a recording of each installed transit documenting the as built condition after final inspection in the shipyard. This is to include sections to record any inspection, modification, repair and maintenance.
- .10. Tank testing plan including details of the test requirements (UR S14).
- .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 drydocking.

.13. Coating Technical File, for ships subject to compliance with the IMO Performance Standard for Protective Coatings (PSPC<sup>2</sup>).

3.1.2. Refer to table a of this Appendix 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 measures.

3.1.3. 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.

3.1.4. The SCF has to include the list of documents constituting the SCF and all information listed in Table A of this Appendix, which is required for a ship's safe operation, maintenance, survey, 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.

3.1.5. When developing an SCF, all of the columns in Table A of this Appendix have to be reviewed to ensure that all necessary information has been provided.

3.1.6. It may be possible to provide information listed in the annex under more than one Tier II1 functional requirement as a single item within the SCF, for example, the Coating Technical File required by the PSPC<sup>2</sup> is relevant for both "Coating life" and "Survey during construction".

3.1.7. 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.

3.1.8. 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.

3.2. The SCF shall be reviewed<sup>3</sup>, at the time of new building, in accordance with the requirements of paragraphs 3.1.1 and

3.2.1. and the normal storage location shall be distinguished.

3.2.2. 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.

3.2.3. 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.

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)

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

3 "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 paragraph 3 of the appendix 2 to the UR Z23, 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/regulations

#### 4. Determination of number of Surveyor(s)

INTLREG will assign adequate number of suitable qualified surveyor(s) for new building projects according to the construction progress of each ship to meet appropriate coverage of the examination and testing activities as agreed in the Survey plan.

**Table A - List of Information to be Included in the Ship Construction File (SCF)**

| Tier II items |                          | Information to be included         | Further explanation of the content                                                                                        | Example documents      | Normal storage location |
|---------------|--------------------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------|
| <b>DESIGN</b> |                          |                                    |                                                                                                                           |                        |                         |
| 1             | Design life              | • assumed design life in years     | • statement or note on midship section                                                                                    | • SCF-specific         | on board ship           |
|               |                          |                                    |                                                                                                                           | • midship section plan | on board ship           |
| 2             | Environmental conditions | • assumed environmental conditions | • statement referencing data source or Rule (specific rule and data) or;<br>• in accordance with Rule (date and revision) | • SCF-specific         | on board ship           |
| 3             | Structural strength      |                                    |                                                                                                                           |                        |                         |
| 3.1           | General design           | • applied Rule (date and revision) | • applied design method alternative to Rule and subject structure(s)                                                      | • SCF-specific         | on board ship           |
|               |                          | • applied alternative to Rule      |                                                                                                                           | • capacity plan        | on board ship           |



|     |                               |                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                       |                                                                                                                                                           |                                                                                                                  |
|-----|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| 3.2 | Deformation and failure modes | <ul style="list-style-type: none"> <li>calculating conditions and results;</li> <li>assumed loading conditions</li> </ul>                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>allowable loading pattern</li> <li>maximum allowable hull girder bending moment and shear force</li> </ul>                                                     | <ul style="list-style-type: none"> <li>loading manual</li> <li>trim and stability booklet</li> </ul>                                                      | <ul style="list-style-type: none"> <li>on board ship</li> <li>on board ship</li> </ul>                           |
| 3.3 | Ultimate strength             | <ul style="list-style-type: none"> <li>operational restrictions due to structural strength</li> </ul>                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>maximum allowable cargo density or storage factor</li> </ul>                                                                                                   | <ul style="list-style-type: none"> <li>loading instrument instruction manual</li> <li>operation and maintenance manuals</li> </ul>                        | <ul style="list-style-type: none"> <li>on board ship</li> <li>on board ship</li> </ul>                           |
| 3.4 | Safety margins                | <ul style="list-style-type: none"> <li>strength calculation results</li> <li>gross hull girder section modulus</li> <li>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</li> </ul> | <ul style="list-style-type: none"> <li>bulky output of strength calculation</li> <li>plan showing highly stressed areas (e.g. critical structural areas) prone to yielding and/or buckling</li> </ul> | <ul style="list-style-type: none"> <li>strength calculation</li> <li>areas prone to yielding and/or buckling</li> <li>general arrangement plan</li> </ul> | <ul style="list-style-type: none"> <li>on shore archive</li> <li>on board ship</li> <li>on board ship</li> </ul> |

| Tier II items |  | Information to be included                                                                                                                                                                                                                                                                            | Further explanation of the content                                                                                                                   | Example documents                                                                                                                                                                            | Normal storage location                                                                                                                                        |
|---------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               |  | bottom zone, the renewal value for the neutral axis zone<br><br><ul style="list-style-type: none"> <li>gross scantlings of structural constituent parts</li> <li>net scantlings of structural constituent parts, as built scantlings and voluntary addition thicknesses</li> <li>hull form</li> </ul> | <ul style="list-style-type: none"> <li>structural drawings</li> <li>rudder and stern frame</li> <li>structural details of typical members</li> </ul> | <ul style="list-style-type: none"> <li>key construction plans</li> <li>rudder and rudder stock plans</li> <li>structural details</li> <li>yard plans</li> <li>dangerous area plan</li> </ul> | <ul style="list-style-type: none"> <li>on board ship</li> <li>on board ship</li> <li>on board ship</li> <li>on shore archive</li> <li>on board ship</li> </ul> |

|                      |                              |                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                        |
|----------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
|                      |                              |                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>• hull form information indicated in key construction plans</li> <li>• hull form data stored within an onboard computer necessary for trim and stability and longitudinal strength calculations</li> </ul>                                                        | <ul style="list-style-type: none"> <li>• lines plan</li> </ul> <p>or</p> <p>equivalent</p>                                                                                                                                                                                                                                                                                                                                                         | <p>on shore archive</p> <p>on board ship</p>                                           |
| 4                    | Fatigue life                 | <ul style="list-style-type: none"> <li>• applied Rule (date and revision)</li> <li>• applied alternative to Rule</li> <li>• calculating conditions and results;</li> <li>• assumed loading conditions</li> <li>• fatigue life calculation results</li> </ul> | <ul style="list-style-type: none"> <li>• applied design method alternative to Rule and subject structures</li> <li>• assumed loading conditions and rates</li> <li>• bulky output of fatigue life calculation</li> <li>• plan showing areas (e.g. critical structural areas) prone to fatigue</li> </ul> | <ul style="list-style-type: none"> <li>• SCF-specific</li> <li>• structural details</li> <li>• fatigue life calculation</li> <li>• areas prone to fatigue</li> </ul>                                                                                                                                                                                                                                                                               | <p>on board ship</p> <p>on board ship</p> <p>on shore archive</p> <p>on board ship</p> |
| 5                    | Residual strength            | <ul style="list-style-type: none"> <li>• applied Rule (date and revision)</li> </ul>                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>• SCF-specific</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                   | <p>on board ship</p>                                                                   |
| <b>Tier II items</b> |                              | <b>Information to be included</b>                                                                                                                                                                                                                            | <b>Further explanation of the content</b>                                                                                                                                                                                                                                                                | <b>Example documents</b>                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Normal storage location</b>                                                         |
| 6                    | Protection against corrosion |                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                        |
| 6.1                  | Coating life                 | <ul style="list-style-type: none"> <li>• 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</li> </ul>                                | <ul style="list-style-type: none"> <li>• plans showing areas (e.g. critical structural areas) prone to excessive corrosion</li> </ul>                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• SCF-specific</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                   | <p>on board ship</p>                                                                   |
| 6.2                  | Corrosion addition           |                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>• 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)</li> </ul> | <p>on board ship</p>                                                                   |

|                      |                                       |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                         |                                                                                                                                                                                |                                    |
|----------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
|                      |                                       | <ul style="list-style-type: none"> <li>• specification for coating and other measures for corrosion protection in holds, cargo and ballast tanks, other structure-integrated deep tanks and void spaces</li> <li>• gross scantlings of structural constituent parts</li> <li>• net scantlings of structural constituent parts, as built scantlings and voluntary addition thicknesses</li> </ul> |                                                                                                                                         | <ul style="list-style-type: none"> <li>• areas prone to excessive corrosion</li> <li>• key construction plans</li> </ul>                                                       | on board ship<br><br>on board ship |
| 7                    | Structural redundancy                 | <ul style="list-style-type: none"> <li>• applied Rule (date and revision)</li> </ul>                                                                                                                                                                                                                                                                                                             |                                                                                                                                         | <ul style="list-style-type: none"> <li>• SCF-specific</li> </ul>                                                                                                               | on board ship                      |
| 8                    | Watertight and weathertight integrity | <ul style="list-style-type: none"> <li>• applied Rule (date and revision)</li> <li>• key factors for watertight and weathertight integrity</li> </ul>                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>• details of equipment forming part of the watertight and weathertight integrity</li> </ul>      | <ul style="list-style-type: none"> <li>• SCF-specific</li> <li>• structural details of hatch covers, doors and other closings integral with the shell and bulkheads</li> </ul> | on board ship<br><br>on board ship |
| 9                    | Human element considerations          | <ul style="list-style-type: none"> <li>• list of ergonomic design principles applied to ship structure design to enhance safety during operations, inspections and maintenance of ship</li> </ul>                                                                                                                                                                                                |                                                                                                                                         | <ul style="list-style-type: none"> <li>• SCF-specific</li> </ul>                                                                                                               | on board ship                      |
| 10                   | Design transparency                   | <ul style="list-style-type: none"> <li>• applied Rule (date and revision)</li> <li>• applicable industry standards for design transparency and IP protection</li> <li>• reference to part of SCF information kept ashore</li> </ul>                                                                                                                                                              |                                                                                                                                         | <ul style="list-style-type: none"> <li>• intellectual property provisions</li> <li>• summary, location and access procedure for part of SCF information on shore</li> </ul>    | on board ship<br><br>on board ship |
| <b>Tier II items</b> |                                       | <b>Information to be included</b>                                                                                                                                                                                                                                                                                                                                                                | <b>Further explanation of the content</b>                                                                                               | <b>Example documents</b>                                                                                                                                                       | <b>Normal storage location</b>     |
| <b>CONSTRUCTION</b>  |                                       |                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                         |                                                                                                                                                                                |                                    |
| 11                   | Construction quality procedures       | <ul style="list-style-type: none"> <li>• applied construction quality standard</li> </ul>                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>• recognized national or international construction quality standard</li> </ul>                  | <ul style="list-style-type: none"> <li>• SCF-specific</li> </ul>                                                                                                               | on board ship                      |
| 12                   | Survey during construction            | <ul style="list-style-type: none"> <li>• survey regime applied during construction (to include all owner and class scheduled inspections during construction)</li> </ul>                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>• applied Rules (date and revision)</li> <li>• copies of certificates of forgings and</li> </ul> | <ul style="list-style-type: none"> <li>• SCF-specific</li> <li>• tank testing plan</li> </ul>                                                                                  | on board ship<br>on board ship     |

|                                  |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                           |
|----------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                  |                        | <ul style="list-style-type: none"> <li>information on non-destructive examination</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | castings welded into the hull                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>non-destructive testing plan</li> <li>Coating Technical File required by PSPC</li> </ul>                                                                                                                                                                                                                                                                                      | on board ship<br><br>on board ship                                                                                                                        |
| <b>IN-SERVICE CONSIDERATIONS</b> |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                           |
| 13                               | Survey and maintenance | <ul style="list-style-type: none"> <li>maintenance plans specific to the structure of the ship where higher attention is called for</li> <li>preparations for survey</li> <li>gross hull girder section modulus</li> <li>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</li> <li>gross scantlings of structural constituent parts</li> <li>net scantlings of structural constituent parts, as built</li> </ul> | <ul style="list-style-type: none"> <li>plan showing highly stressed areas (e.g. critical structural areas) prone to yielding, buckling, fatigue and/or excessive corrosion</li> <li>arrangement and details of all penetrations normally examined at dry-docking</li> <li>details for dry-docking</li> <li>details for in-water survey</li> </ul> | <ul style="list-style-type: none"> <li>SCF-specific</li> <li>operation and maintenance manuals (e.g. hatch covers and doors)</li> <li>docking plan</li> <li>dangerous area plan</li> <li>Ship Structure Access Manual</li> <li>Means of access to other structure-integrated deep tanks</li> <li>Coating Technical File required by PSPC</li> <li>key construction plans</li> <li>rudder and rudder stock</li> </ul> | on board ship<br>on board ship<br><br>on board ship<br>on board ship<br>on board ship<br>on board ship<br>on board ship<br>on board ship<br>on board ship |
| <b>Tier II items</b>             |                        | <b>Information to be included</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Further explanation of the content</b>                                                                                                                                                                                                                                                                                                         | <b>Example documents</b>                                                                                                                                                                                                                                                                                                                                                                                             | <b>Normal storage location</b>                                                                                                                            |
|                                  |                        | scantlings and voluntary addition thicknesses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>hull form information indicated in key construction plans</li> </ul>                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>structural details</li> <li>yard plans</li> <li>lines plan</li> </ul>                                                                                                                                                                                                                                                                                                         | on board ship<br><br>on shore archive<br>on shore archive                                                                                                 |

|                                 |                          |                                                                                                                                         |                                                                     |                                                                                                  |                                    |
|---------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------|
|                                 |                          | • hull form                                                                                                                             |                                                                     | or<br>equivalent                                                                                 | on board ship                      |
| 14                              | Structural accessibility | • means of access to holds, cargo and ballast tanks and other structure-integrated deep tanks                                           | • plans showing arrangement and details of means of access          | • Ship Structure Access Manual<br><br>• means of access to other structure-integrated deep tanks | on board ship<br><br>on board ship |
| <b>RECYCLING CONSIDERATIONS</b> |                          |                                                                                                                                         |                                                                     |                                                                                                  |                                    |
| 15                              | Recycling                | • identification of all materials that were used in construction and may need special handling due to environmental and safety concerns | • list of materials used for the construction of the hull structure | • SCF-specific                                                                                   | on board ship                      |

**Notes:**

1 "SCF-specific" means documents to be developed especially to meet the requirements of these 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.

## CHAPTER 3 PERIODICAL SURVEY REQUIREMENTS

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## SECTION 1 GENERAL

### Contents

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**1.1. APPLICATION**

- 1.1.1. All vessels classed by the Society are required to undergo the applicable surveys in accordance with the scope and frequency specified in this chapter.

The objective of a survey shall be to ascertain that the vessel, its hull structure, machinery, systems and equipment are in compliance with the rules and suitable for continued safe and reliable operation.

A survey may consist of a combination of visual inspections, audits, measurements, functional testing, non-destructive testing and review of maintenance and other relevant records

- 1.1.2. Alternate survey systems may be adopted by the Technical Committee, at the request of owners, if the same is considered to provide equivalent level of reliability for the vessel or in case of a novel type of a vessel, where in the opinion of the Technical Committee a different survey system is considered necessary based on the reliability analysis of the vessel.

- 1.1.3. When a survey results in the identification of significant corrosion, significant structural defects or other deficiencies, which in the opinion of the Surveyor will impair the vessels fitness for continued service, remedial measures shall be implemented before the ship continues in service.

**1.2. DEFINITIONS**

- 1.2.1. Anniversary date is the due date for annual surveys every year, which shall coincide with the month and date of the expiry date for the certificate of class.

- 1.2.2. A Ballast Tank is a tank, which is being used primarily for water ballast.

- 1.2.3. Spaces are separate compartments including holds and tanks.

- 1.2.4. A Transverse Section includes all longitudinal members such as plating, longitudinal and girders at the deck, side, bottom, inner bottom, and longitudinal bulkhead. For transversely framed vessels, a transverse section includes adjacent frames and their end connections in way of transverse sections.

- 1.2.5. Representative Spaces are those, which are expected to reflect the conditions of other spaces of similar type and service and with similar corrosion protection systems. When selecting representative spaces, account shall be taken of the service and repair history on board and identifiable critical and/or Suspect Areas.

- 1.2.6. Suspect Areas are locations showing Substantial Corrosion and/or are considered by the Surveyor to be prone to rapid wastage.



- 1.2.7. Substantial Corrosion is an extent of corrosion such that assessment of corrosion pattern indicates wastage in excess of 75% of allowable margins, but within acceptable limits.
- 1.2.8. Protective Coatings shall usually be epoxy coating or equivalent. Other coating systems may be considered acceptable as alternatives provided that they are applied and maintained in compliance with the manufacturer's specification.
- 1.2.9. 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 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
- 1.2.10. "Bulk carrier" is a ship which is constructed generally with single deck, top-side tanks and hopper side tanks in cargo spaces, and is intended primarily to carry dry cargo in bulk and includes such types as ore carriers and combination carriers.
- 1.2.11. "Oil tanker" means a ship constructed or adapted primarily to carry oil in bulk in its cargo spaces and includes combination carriers and any "chemical tanker" as defined in 1.2.12, when it is carrying a cargo or part cargo of oil in bulk.
- 1.2.12. "Chemical tanker" means a ship constructed or adapted primarily to carry a cargo of noxious liquid substances in bulk and includes an "oil tanker" as defined in 1.2.11, when carrying a cargo or part cargo of noxious liquid substances in bulk.
- 1.2.13. "Combination carrier" means a ship designed to carry either oil or solid cargoes in bulk.
- 1.2.14. A "Double Hull Oil Tanker" is a sea going self-propelled ship which is constructed primarily for the carriage of oil in bulk, where the cargo tanks are protected by a double hull extending for the entire length of the cargo area, consisting of double side and double bottom spaces for the carriage of salt-water ballast.

### **1.3. SURVEY FREQUENCIES**

- 1.3.1. All vessels classed by the Society shall be subjected to the surveys specified in Table 3.1 at intervals specified therein as far as they are applicable to the vessel in accordance with the class notations assigned to the vessel.
- 1.3.2. Surveys are to be carried out within window periods allowed for the type of survey as per Table 3.1.

**TABLE 3.1 SURVEY FREQUENCIES**

| Type of Survey                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Interval (Months)                               | Window Period (months) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|------------------------|
| Special Survey -- Hull                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 60                                              | -3                     |
| Special Survey -- Machinery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 60                                              | -3                     |
| Annual Survey -- Main Class                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 12                                              | +/-3                   |
| Intermediate Survey – Main Class                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | With second or third annual survey (see note 1) |                        |
| Bottom Survey (see note 2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 30                                              | +/-6                   |
| Boiler Survey (See Note 3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 30                                              | +/-6                   |
| Tail Shaft Survey                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                 |                        |
| • <b>TS (OG), TS (CL), TS (NC)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 60                                              | -6                     |
| • <b>TS (CM)</b> (See Note 4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 120                                             | -6                     |
| • <b>TS (ES)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 30                                              | +/-6                   |
| Survey of Special Propulsion Device ( <b>SP</b> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 60                                              | -60                    |
| Unattended Machinery Space ( <b>UM</b> ) – Annual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 12                                              | +/-3                   |
| Unattended Machinery Space ( <b>UM</b> )- Special                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 60                                              | +/-3                   |
| Inert Gas System (IGS)- Annual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 12                                              | +/-3                   |
| Inert Gas System (IGS)- Special                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 12                                              | -3                     |
| Refrigeration Machinery (RM)- Annual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 12                                              | +/-3                   |
| Refrigeration machinery (RM)- Special                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 60                                              | -3                     |
| Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                 |                        |
| <ol style="list-style-type: none"> <li>Intermediate surveys shall be carried out generally with second or third annual survey. However, survey items in addition to annual survey may be dealt with in between second and third annual survey with a view to complete the intermediate survey at the third annual survey.</li> <li>Bottom surveys to be credited towards special survey hull shall be carried out in a dry dock. In water surveys may be permitted by the Society at alternate bottom surveys not coinciding with special surveys based on the general condition of the vessel, for vessels less than 15 years of age. For vessels of more than 15 years age special consideration by the Technical Committee would be required for permitting in water surveys.</li> <li>For vessels not having adequate capacity for generation of steam for supplying for all essential services, in the event of one boiler being shut down, boilers of more than 15 years old from the date of commissioning shall be examined at 12 months interval, unless specifically recommended by the surveyor, based on the satisfactory condition of the boiler.</li> <li>Intervals of 120 months between withdrawal of tail shaft shall be permitted subject to condition monitoring as per 7.2 being carried out and a modified survey as per 7.3 being carried out within 60 months (+/-6 months) from the previous withdrawal.</li> </ol> |                                                 |                        |

#### 1.4. SURVEY PREPARATIONS

- 1.4.1. Precautions are to be taken to ensure safety during inspection. Tanks are to be made safe for entry and work. In preparation for survey and to allow for a meaningful examination, all spaces are to be cleaned including removal from surfaces of all loose accumulated corrosion scale. Spaces are to be sufficiently clean to reveal corrosion, deformation, fractures, damages, or other structural deterioration.
- 1.4.2. Sufficient illumination shall be provided to reveal significant corrosion, deformation, fractures, damages or other structural deterioration.
- 1.4.3. Where soft coatings are found, safe access is to be provided for the Surveyor to determine the effective-ness of the coatings and to carry out an assessment of the conditions of internal structures, which may include spot removal of the coating. Shall the soft coating be found no longer effective, the space shall be treated as an uncoated tank and sufficient cleaning as required by [1.5.1] shall be carried out prior to survey.

- 1.4.4. Based on conditions found, thickness gauging and means of access to upper part of the tank or space may be required. Where extensive areas of wastage or structural damage are found, the extent of the overall examination may be expanded to other spaces.
- 1.4.5. 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.
- 1.4.6. For overall survey, means shall be provided to enable the surveyor to examine the structure in a safe and practical way.
- 1.4.7. For close-up survey, one or more of the following means for access, acceptable to the surveyor, shall be provided:
- permanent staging and passages through structures
  - temporary staging and passages through structures
  - lifts and moveable platforms
  - other equivalent means
- 1.4.8. Thickness measurements shall normally be carried out by means of ultrasonic test equipment. The accuracy of the equipment shall be proven to the surveyor as required.
- 1.4.9. One or more of the following fracture detection procedures may be required if deemed necessary by the surveyor:
- Radiographic equipment
  - Ultrasonic equipment
  - Magnetic particle equipment
  - Dye penetrant
  - Other equivalent means
- 1.4.10. Survey at sea or at anchorage may be accepted provided the surveyor is given the necessary assistance from the personnel on board. Necessary precautions and procedures for carrying out the survey shall be to the complete satisfaction of the attending surveyor. A safety checklist shall be provided.
- 1.4.11. A communication system shall be arranged between the survey party in the spaces and the responsible officer on deck.
- 1.4.12. Explosimeter, oxygen-meter, breathing apparatus, lifeline and whistles, as found necessary, shall be at hand during the survey, particularly for survey at sea or anchorage.

## SECTION 2 ANNUAL SURVEYS

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**2.1. MAIN CLASS**

- 2.1.1. For Annual Survey of Hull, Equipment and Machinery of all vessels classed with INTLREG, the Surveyors shall verify the following:
- 2.1.1.1. Whether any new equipment has been fitted and, if so, confirm that it has been approved before installation and that any changes are reflected in the appropriate certificate;
  - 2.1.1.2. Stability information loading manual and the damage control plans are on board, as far as they are applicable
  - 2.1.1.3. Maneuvering booklet is on board and that the maneuvering information is displayed on the navigating bridge
  - 2.1.1.4. That the testing and the emergency drills of the steering gear have been carried out, by checking the log book entries;
  - 2.1.1.5. Confirming that the fire control plans are permanently exhibited or, alternatively, emergency booklets have been provided and that a duplicate of the plans or the emergency booklet are available in a prominently marked enclosure external to the ship's deckhouse;
  - 2.1.1.6. Checking whether any fire has occurred on board necessitating the operation of the fixed fire-extinguishing systems or the portable fire extinguishers since the last survey;
  - 2.1.1.7. Checking, when appropriate, that the ship is provided with a document indicating compliance with the special requirements for carrying dangerous goods;
  - 2.1.1.8. Confirming, when appropriate, that there is a special list, manifest or stowage plan for the carriage of dangerous goods;
  - 2.1.1.9. Checking from the log-book entries the date when the last fire drill took place;
  - 2.1.1.10. Surveys of the boilers and other pressure vessels, as required by this chapter, have been carried out and that safety devices, such as the boiler safety valves, have been tested;
  - 2.1.1.11. Where the hull and/or machinery surveys are being carried out under the continuous survey system, verifying that no items are overdue or overdue items, if any, are postponed by agreement.
  - 2.1.1.12. A complete file of the enhanced survey reports and the Condition Evaluation Report are on board for Bulk Carriers, Oil Tankers and Chemical Tankers;

2.1.2. Inspection of hull structure and equipment towards annual survey shall include:

2.1.2.1. Checking, in general, that there has been no deterioration in the strength of the hull;

2.1.2.2. Checking of the positions of the deck line and load line which, if necessary, are to be re-marked and re-painted;

2.1.2.3. Checking that no alterations have been made to the hull or superstructures that would affect the calculations determining the position of the load lines;

2.1.2.4. Examining the superstructure end bulkheads and the openings therein; hatchways and other openings on the freeboard and superstructure decks;

2.1.2.5. It shall be confirmed that no unapproved changes have been made to the hatch covers, hatch coamings and their securing and sealing devices since the last survey.

2.1.2.6. Where mechanically operated steel covers are fitted, the satisfactory condition of the following shall be confirmed:

- 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.

2.1.2.7. Where portable covers, wooden or steel pontoons are fitted, the satisfactory condition of the following shall be confirmed:

- Wooden covers and portable beams, carriers or sockets for the portable beam, and their securing devices;
- Steel pontoons, including close-up survey of hatch cover plating;
- 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).
- 2.1.2.8. If considered necessary by the surveyor the effectiveness of sealing arrangements of all hatch covers shall be confirmed.
- 2.1.2.9. Checking the satisfactory condition of hatch coaming plating and its stiffeners, including close-up survey, shall be made.
- 2.1.2.10. Random checking of the satisfactory operation of mechanically operated hatch covers shall be made, including:
- stowage and securing in the open condition;
  - proper fit and efficiency of sealing in the closed condition;
  - operational testing of hydraulic and power components, wires, chains, and link drives
- 2.1.2.11. Examining the ventilators and air pipes, including their coamings and closing appliances;
- 2.1.2.12. Examining the watertight integrity of the closures to any openings in the ship's side below the freeboard deck;
- 2.1.2.13. Examining the scuppers, inlets and discharges;
- 2.1.2.14. Examining the side scuttles and deadlights;
- 2.1.2.15. Examining the bulwarks including the provision of freeing ports, special attention being given to any freeing ports fitted with shutters;
- 2.1.2.16. Examining the guardrails, gangways, walkways and other means provided for the protection of the crew and for gaining access to and from crew's quarters and working spaces;
- 2.1.2.17. Examining, when applicable, the special requirements for ships permitted to sail with reduced freeboards;
- 2.1.2.18. Checking, when applicable, the fittings and appliances for timber deck cargoes;
- 2.1.2.19. Examining the anchoring and mooring equipment as far as can be seen;
- 2.1.2.20. Examining the collision and the other watertight bulkheads as far as can be seen);
- 2.1.2.21. Examining and testing (locally and remotely) all the watertight doors in watertight bulkheads.
- 2.1.2.22. Examination of ballast tanks where a coating is found in POOR condition as defined in 1.2.9, in previous intermediate or special survey, and it is not renewed, or where soft coating has been applied, or where a coating has not been applied.

- 2.1.2.23. Thickness gauging shall be carried out in way of suspect areas and areas identified as having substantial corrosion at previous intermediate or special survey.
- 2.1.3. Inspection of the Machinery and Piping Systems shall include:
- 2.1.3.1. Examining each bilge pump and confirming that the bilge pumping and alarm system for each watertight compartment is satisfactory.
- 2.1.3.2. Confirming that the drainage from enclosed cargo spaces situated on the freeboard deck is satisfactory;
- 2.1.3.3. Confirming that the machinery, boilers and other pressure vessels, associated piping systems and fittings are installed and protected as to reduce to a minimum any danger to persons on board, due regard being given to moving parts, hot surfaces and other hazards;
- 2.1.3.4. Confirming that the normal operation of the propulsion machinery can be sustained or restored even though one of the essential auxiliaries becomes inoperative;
- 2.1.3.5. Confirming that means are provided so that the machinery can be brought into operation from the dead ship condition without external aid;
- 2.1.3.6. Carrying out a general examination of the machinery, the boilers, all steam, hydraulic, pneumatic and other systems and their associated fittings to see whether they are being properly maintained and with particular attention to the fire and explosion hazards;
- 2.1.3.7. Examining and testing the operation of main and auxiliary steering arrangements, including their associated equipment and control systems;
- 2.1.3.8. Confirming that the means of communication between the navigation bridge and steering gear compartment and the means of indicating the angular position of the rudder are operating satisfactorily;
- 2.1.3.9. Confirming that with ships having emergency steering positions there are means of relaying heading information and, when appropriate, supply visual compass readings to the emergency steering position;
- 2.1.3.10. Confirming that the various alarms required for hydraulic power-operated, electric and electro-hydraulic steering gears are operating satisfactorily and that the recharging arrangements for hydraulic power-operated steering gears are being maintained;
- 2.1.3.11. Examining the means for the operation of the main and auxiliary machinery essential for propulsion and the safety of the ship, including, when applicable, the means of remotely controlling the propulsion machinery from the navigating bridge and the arrangements to operate the main and other machinery from a machinery control room;



- 2.1.3.12. Confirming the operation of the ventilation for the machinery spaces;
  - 2.1.3.13. Confirming that the measures to prevent noise in machinery spaces are effective;
  - 2.1.3.14. Confirming that the engine room telegraph, the second means of communication between the navigation bridge and the machinery space and the means of communication with any other positions from which the engines are controlled are operating satisfactorily;
  - 2.1.3.15. Examining, as far as practicable, visually and in operation, the electrical installations, including the main source of power and the lighting systems;
  - 2.1.3.16. Confirming, as far as practicable, the operation of the emergency source(s) of electrical power including their starting arrangements, the systems supplied and, when appropriate, their automatic operation;
  - 2.1.3.17. Examining, in general, that the precautions provided against shock, fire and other hazards of electrical origin are being maintained;
  - 2.1.3.18. Examining visually the condition of any expansion joints in sea water systems.
- 2.1.4. Inspection of Fire Protection detection and Extinction Arrangements shall include:
- 2.1.4.1. Confirming, as far as practicable, that no changes have been made in the structural fire protection, examining any manual and automatic fire doors and proving their operation, testing the means of closing the main inlets and outlets of all ventilation systems and testing the means of stopping power ventilation systems from outside the space served;
  - 2.1.4.2. Confirming that the means of escape from accommodation, machinery and other spaces are satisfactory;
  - 2.1.4.3. Examining the arrangements for gaseous fuel for domestic purpose;
  - 2.1.4.4. Examining the fire pumps, fire main, hydrants, hoses and nozzles and the international shore connection and checking that each fire pump, including the emergency fire pump, can be operated separately so that two jets of water are produced simultaneously from different hydrants at any part of the ship whilst the required pressure is maintained in the fire main;
  - 2.1.4.5. Checking the provision and randomly examining the condition of the portable and non-portable fire extinguishers;
  - 2.1.4.6. Confirming that the firemen's outfits are complete and in good condition and that the cylinders, including the spare cylinders, of any required self-contained breathing apparatus are suitably charged;

- 2.1.4.7. Examining the fixed firefighting system for the machinery and cargo spaces, as appropriate, and confirming that its means of operation is clearly marked;
- 2.1.4.8. Examining the fire extinguishing and special arrangements in the machinery spaces and confirming, as far as practicable and as appropriate, the operation of the remote means of control provided for the opening and closing of the skylights, the release of smoke, the closure of the funnel and ventilation openings, the closure of power operated and other doors, the stopping of ventilation and boiler forced and induced draft fans and the stopping of oil fuel and other pumps that discharge flammable liquids;
- 2.1.4.9. Examining, as far as possible, and testing, as feasible, any fire detection and alarm system;
- 2.1.4.10. Examining the arrangements for oil fuel, lubricating oil and other flammable oils and confirming, as far as practicable and as appropriate, the operation of the remote means of closing the valves on the tanks that contain oil fuel, lubricating oil and other flammable oils;
- 2.1.4.11. Examining the fire protection arrangements in cargo spaces and confirming, as far as practicable and as appropriate, the operation of the means of control provided for closing the various openings;
- 2.1.4.12. Examining, when appropriate, the special arrangements for carrying dangerous goods, including checking the electrical equipment and wiring and boundary insulation and the provision of protective clothing and portable appliances and the testing of the water supply, bilge pumping and any water spray system;
- 2.1.5. Examining that the conditions under which the additional class notations, if any, have been assigned, continues to remain efficient.

## **2.2. BULK CARRIERS:**

- 2.2.1. In addition to the requirements of 2.1, vessels assigned with class notations "Bulk Carrier" and 'ESP' scope of annual survey shall include the following:
- 2.2.2. For bulk carriers over 10 years of age, the following shall be carried out:
- 2.2.2.1. Overall survey of all cargo holds. Where a protective coating is provided in cargo holds and is found to be in GOOD condition, the extent of close-up surveys and thickness measurements may be specially considered based on sufficient close-up inspection and thickness measurements are taken to confirm the actual average condition of the structure under the coating.
- 2.2.2.2. Close-up examination 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 the side frames 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;

2.2.2.3. When considered necessary by the surveyor, 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 shall be increased in accordance with Table 3.10.

2.2.3. For bulk carriers over 15 years of age, the following shall be carried out:

2.2.3.1. Overall survey of all cargo holds. Where a protective coating is provided in cargo holds and is found to be in GOOD condition, the extent of close-up surveys and thickness measurements may be specially considered based on sufficient close-up inspection and thickness measurements are taken to confirm the actual average condition of the structure under the coating.

2.2.3.2. Close-up examination 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 the side frames 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 plating of that cargo hold as well as a close-up survey of sufficient extent of all remaining cargo holds;

2.2.3.3. When considered necessary by the surveyor, thickness measurements shall be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements shall be increased in accordance with Table 3.10.

2.2.3.4. All piping and penetrations in cargo holds, including overboard piping, shall be examined.

### **2.3. OIL TANKERS:**

2.3.1. In addition to the requirements of 2.1 vessels assigned with class notation "Oil Tanker", scope of annual survey shall include the following:

2.3.2. Confirming, when appropriate, that the requisite arrangements to regain steering capability in the event of the prescribed single failure are being maintained;

2.3.3. Examining the cargo tank openings, including gaskets, covers, coamings and screens;

- 2.3.4. Examining the cargo tank pressure/vacuum valves and devices to prevent the passage of flame;
- 2.3.5. Examining the devices to prevent the passage of flame on vents to all bunker, oily- ballast and oily-slop tanks and void spaces, as far as practicable;
- 2.3.6. Examining the cargo tank venting, cargo tank purging and gas-freeing and other ventilation systems;
- 2.3.7. Examining the cargo, crude oil washing, ballast and stripping systems both on deck and in the cargo pump rooms and the bunker system on deck;
- 2.3.8. Confirming that all electrical equipment in dangerous zones is suitable for such locations, is in good condition and is being properly maintained;
- 2.3.9. Confirming that potential sources of ignition in or near the cargo pump room are eliminated, such as loose gear, combustible materials, etc., that there are no signs of undue leakage and that access ladders are in good condition;
- 2.3.10. Examining all pump room bulkheads for signs of oil leakage or fractures and, in particular, the sealing arrangements of all penetrations of cargo pump room bulkheads;
- 2.3.11. Examination of the condition of all piping systems and pipe tunnels.
- 2.3.12. Examining, as far as practicable, the cargo, bilge, ballast and stripping pumps for undue gland seal leakage, verification of proper operation of electrical and mechanical remote operating and shutdown devices and operation of cargo pump room bilge system, and checking that pump foundations are intact;
- 2.3.13. Confirming that the pump room ventilation system is operational, ducting intact, dampers are operational and screens clean;
- 2.3.14. Verifying that installed pressure gauges on cargo discharge lines and level indicator systems are operational;
- 2.3.15. Examining the emergency towing arrangements to ensure ready availability.
- 2.3.16. Checking the deck foam system, including the supplies of foam concentrate and testing that the minimum number of jets of water at the required pressure in the fire main is obtained, when the system is in operation
- 2.3.17. Examining the fixed firefighting system for the cargo pump rooms, and confirming, as far as practicable and when appropriate, the operation of the remote means for closing the various openings.

**2.4. CHEMICAL TANKERS**

2.4.1. In addition to the requirements as per 2.1 vessels assigned with class notation “Chemical Tanker”, scope of annual survey shall include the following:

2.4.2. Verification of documentation on board shall include:

2.4.2.1. Confirming that damage survival capability information is supplied on the basis of loading information for all anticipated conditions of loading and variations in draught and trim;

2.4.2.2. Confirming that a table giving the filling ratios for the cargo tanks at various densities has been provided;

2.4.2.3. Confirming that a copy of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk or the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk, or the equivalent national regulations, has been provided;

2.4.2.4. Confirming that information relating to the chemical and physical properties of the products to be carried has been provided together with the measures to be taken in an accident have been provided;

2.4.2.5. Confirming that a manual covering procedure for cargo transfer, tank cleaning, gas freeing, ballasting, etc., has been provided;

2.4.2.6. Confirming that the Procedures and Arrangements Manual is on board;

2.4.2.7. Confirming that the Cargo Record Book is being correctly used;

2.4.2.8. Confirming that the oil discharge monitor is certified for oil-like substances as may be listed on the Oil Pollution Prevention Certificate;

2.4.2.9. Sighting the records of the recording device, as fitted, when category B cargoes are carried.

2.4.3. The structure, equipment, fittings, arrangements and materials shall be checked for the following:

2.4.3.1. Confirming that wheelhouse doors and windows, side scuttles and windows in superstructure and deckhouse ends facing the cargo area are in a satisfactory condition.

2.4.3.2. Confirming that potential sources of ignition in or near the cargo pump room are eliminated, such as loose gear, combustible materials, etc., that there are no signs of undue leakage and that access ladders are in a satisfactory condition.

- 2.4.3.3. Confirming that removable pipe lengths or other approved equipment necessary for cargo separation are available in the pump room and are in a satisfactory condition;
- 2.4.3.4. Examining all pump room bulkheads for signs of cargo leakage or fractures and, in particular, the sealing arrangements of all penetrations of pump room bulkheads;
- 2.4.3.5. Confirming that the remote operation of the cargo pump bilge system is satisfactory;
- 2.4.3.6. Examining the bilge and ballast arrangements and confirming that pumps and pipelines are identified;
- 2.4.3.7. Confirming, when applicable, that the bow or stern loading and unloading arrangements are in order and testing the means of communication and the remote shut down for the cargo pumps;
- 2.4.3.8. Examining the cargo transfer arrangements and confirming that any hoses are suitable for their intended purpose;
- 2.4.3.9. Examining, when applicable, the cargo heating or cooling systems, including any sampling arrangements, and confirming that the means for measuring the temperature and associated alarms are operating satisfactorily;
- 2.4.3.10. Examining, as far as practicable, the cargo tank vent system, including the pressure/vacuum valves and devices to prevent the passage of flame;
- 2.4.3.11. Examining the gauging devices, high-level alarms and valves associated with overflow control;
- 2.4.3.12. Confirming that arrangements for sufficient gas to be carried or generated to compensate for normal losses and that the means provided for monitoring ullage spaces are satisfactory;
- 2.4.3.13. Confirming that arrangements are made for sufficient medium to be carried where drying agents are used on air inlets to cargo tanks;
- 2.4.3.14. Confirming that all electrical equipment in dangerous zones is suitable for such locations, is in satisfactory condition and has been properly maintained;
- 2.4.3.15. Examining the fixed fire-fighting system for the cargo pump room and the deck foam system for the cargo area and confirming that their means of operation are clearly marked;
- 2.4.3.16. Confirming that the condition of the portable fire extinguishing equipment for the cargoes to be carried in the cargo area is satisfactory;

2.4.3.17. Examining, as far as practicable, and confirming the satisfactory operation of, the arrangements for the ventilation of spaces normally entered during cargo handling operations and other spaces in the cargo area;

2.4.3.18. Confirming, 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;

2.4.3.19. Examining the equipment for personnel protection and in particular that:

- The protective clothing for crew engaged in loading and discharging operations and its stowage is in a satisfactory condition;
- The required safety equipment and associated breathing apparatus and associated air supplies and, when appropriate, emergency-escape respiratory and eye protection are in a satisfactory condition and are properly stowed;
- Medical first-aid equipment, including stretchers and oxygen resuscitation equipment are in a satisfactory condition;
- Arrangements have been made for the antidotes for the cargoes actually carried to be on board;
- Decontamination arrangements and eyewashes are operational;
- The required gas detection instruments are on board and that arrangements have been made for the supply of the appropriate vapor detection tubes;
- The arrangements for the stowage of cargo samples are satisfactory;

2.4.3.20. Examining externally and confirming that the pumping and piping systems, including a stripping system if fitted, and associated equipment remain as approved;

2.4.3.21. Examining externally the tank washing piping and confirming that the type, capacity, number, and arrangement of the tank washing machines are as approved;

2.4.3.22. Examining externally the wash water heating system;

2.4.3.23. Examining externally, as far as practicable, the underwater discharge arrangements;

2.4.3.24. Confirming that the means of controlling the rate of discharge of the residue is as approved;

2.4.3.25. Confirming that the flow rate indicating device is operable;

2.4.3.26. Confirming that the ventilation equipment for residue removal is as approved;

2.4.3.27. Examining externally, as far as is accessible, the heating system required for solidifying

and high viscosity substances;

2.4.3.28. Confirming that any cargo tank high-level alarms are operable;

2.4.3.29. Examining any additional requirements listed on the International Certificate for the Carriage of Noxious Liquids in Bulk.

## **2.5. UNMANNED MACHINERY SPACES**

2.5.1. For vessels assigned a class notation '**UM**', examining the arrangements for periodically unattended machinery spaces shall include the requirements of this sub section.

2.5.2. Random testing of alarm, automatic and shutdown functions, required by the rules for assignment of the notation '**UM**' shall be carried out to the extent considered necessary by the surveyor.

2.5.3. It shall be confirmed that the engineer's alarm is clearly audible in the engineers' accommodation;

2.5.4. Efficient condition of bilge level detection and alarm systems shall be verified.

## **2.6. INERT GAS SYSTEM**

2.6.1. For "Oil Tankers" and "Chemical Tankers" assigned with class notation '**IGS**' the Annual Survey of the Inert Gas system shall include the following:

2.6.1.1. Confirming, when appropriate, that the instruction manuals for the inert gas system have been provided and checking from the records of the pressure and oxygen content that the inert gas system is being operated correctly;

2.6.1.2. Examining externally for any sign of gas or effluent leakage;

2.6.1.3. Confirming the proper operation of both inert gas blowers;

2.6.1.4. Observing the operation of the scrubber-room ventilation system;

2.6.1.5. Checking the deck water seal for automatic filling and draining;

2.6.1.6. Examining the operation of all remotely operated or automatically controlled valves and, in particular, the flue gas isolating valves;

2.6.1.7. Observing a test of the interlocking feature of soot blowers;

2.6.1.8. Observing that the gas pressure regulating valve automatically closes when the inert gas blowers are secured;



2.6.1.9. Checking, as far as practicable, the following alarms and safety devices of the inert gas system using simulated conditions where necessary:

- High oxygen content of gas in the inert gas main;
- Low gas pressure in the inert gas main;
- Low pressure in the supply to the deck water seal;
- High temperature of gas in the inert gas main;
- Low water pressure or low water-flow rate;
- Accuracy of portable and fixed oxygen-measuring equipment by mean of calibration gas;
- High water level in the scrubber;
- Failure of the inert gas blowers;
- 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;
- High pressure of gas in the inert gas main;

2.6.2. Checking, when practicable, the proper operation of the inert gas system on completion of the checks listed above

## SECTION 3 INTERMEDIATE SURVEY

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**3.1. GENERAL**

- 3.1.1. In addition to the requirements of annual survey, inspections required by this section shall be carried out onboard all vessels, classed by the Society, which are older than 5 years, along with the second or third annual survey towards Intermediate survey.
- 3.1.2. Additional requirements contained in this section may be dealt with between second and third annual survey, with a view to complete the Intermediate survey at third annual survey.

**3.2. MAIN CLASS**

- 3.2.1. For all vessels classed by the Society requirements for Intermediate Survey shall include the following:
- 3.2.2. For ships over 5 years of age, an internal examination of representative spaces used for water ballast;
- 3.2.3. For ships over 10 years of age, other than ships engaged in the carriage of dry cargoes only, an internal examination of selected cargo spaces;
- 3.2.4. For ships over 15 years of age, engaged in the carriage of dry cargoes only, an internal examination of selected cargo spaces.

**3.3. OIL TANKERS:**

- 3.3.1. In addition to the requirements as per [2.3] and [3.2] vessels assigned with class notation "Oil Tanker" the intermediate survey shall consist of the requirements of this sub section.
- 3.3.2. Testing the insulation resistance of electrical circuits in dangerous zones such as cargo pump rooms and areas adjacent to cargo tanks but in cases where a proper record of testing is maintained consideration shall be given to accepting recent readings.
- 3.3.3. For weather decks, an 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, the piping may be required to be pressure tested, thickness measured or both.
- 3.3.4. In the case of oil tankers over 5 years of age but not more than 10 years of age, the following shall apply in addition to [3.3.2] and [3.3.8]:
  - 3.3.4.1 For ballast tanks, an overall survey of representative tanks selected by the surveyor shall be carried out. If such inspections reveal no visible structural defects, the examination may be limited to a verification that the corrosion prevention system remains effective.

3.3.4.2 Where POOR coating condition, corrosion or other defects are found in ballast tanks or where a coating has not been applied, the examination shall be extended to other ballast tanks of the same type.

3.3.4.3 A ballast tank where a coating is found in POOR condition as defined in [1.2.9] and it is not renewed, or where soft coating has been applied, or where a coating has not been applied, the tank in question shall be examined at annual intervals.

3.3.4.4 Thickness measurements shall be carried out as deemed necessary by the surveyor.

3.3.5. In the case of oil tankers over 10 years of age the following shall apply in addition to [3.3.2] and [3.3.8]:

3.3.5.1 An overall survey of at least two representative cargo tanks shall be carried out.

3.3.5.2 An overall survey of all ballast tanks and combined cargo/ballast tanks shall be carried out. If such survey reveals no visible structural defects, the survey may be limited to a verification that the corrosion prevention system remains effective.

3.3.5.3 Close-up survey shall be carried out to the following extent:

- For ballast tanks: to the same extent as previous periodical survey, after second periodical survey;
- For cargo tanks: at least two combined cargo/ballast tanks after second periodical survey. The extent of survey shall be based on the record of the previous periodical survey, and repair history of the tanks;
- Additionally, at least one cargo tank after third periodical survey. The extent of survey shall be based on the record of the previous periodical survey and repair history of the tanks.
- The extent of close-up surveys may be extended as deemed necessary by the surveyor.
- For areas in tanks where coatings are found to be in GOOD condition as defined in [1.2.9], the extent of close-up survey may be specially considered by the Society. Close-up inspection and thickness measurements are taken to confirm the actual average condition of the structure under coating.

3.3.6. Extent of thickness measurements

3.3.6.1 Thickness measurements at the intermediate survey shall be carried out for areas found to be suspect as defined in [1.2.6] at the previous periodical survey.

3.3.6.2 Where substantial corrosion as defined in [1.2.7] is found the extent of thickness measurements shall be increased in accordance with the requirements of Table 3.11.

### 3.4. BULK CARRIERS

#### 3.4.1. Ballast tanks

3.4.1.1 An overall survey of representative ballast tanks selected by the surveyor shall be carried out. For ships over 10 years of age, all ballast tanks shall be examined. If such inspections reveal no visible structural defects, the examination may be limited to a verification that the coating remains efficient.

3.4.1.2 Where POOR coating condition, corrosion or other defects are found in ballast tanks or where a coating has not been applied from the time of construction, the examination shall be extended to other ballast tanks of the same type.

3.4.1.3 For ballast tanks excluding double-bottom tanks, where a coating is found in POOR condition, as defined in 1.2.9, and it is not renewed, or where soft coating has been applied, or where a coating has not been applied, the tanks in question shall be examined at annual intervals.

3.4.1.4 When such breakdown of coating is found in ballast double-bottom tanks, or where soft coating has been applied, or where a coating has not been applied, the tanks in question may be examined at annual intervals. When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurements shall be carried out.

3.4.1.5 In addition to the requirements above, areas found suspect at the previous special survey shall be subject to overall and close-up surveys.

#### 3.4.2. Cargo holds

3.4.2.1 For bulk carriers over 5 years of age, An overall survey of all cargo holds, including a close-up survey of sufficient extent, minimum 25% of frames, shall 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 the previous special survey; and where considered necessary by the surveyor as a result of the overall and close-up survey the survey shall be extended to include a close-up survey of all the shell frames and adjacent shell plating of that cargo hold as well as close-up survey of sufficient extent of all remaining cargo holds.

3.4.2.2 For bulk carriers over 10 years of age, an overall survey of all cargo holds, including a 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 all cargo holds; areas found suspect at the previous special survey; and where considered necessary by the surveyor as a result of the overall and close-up survey, the survey is to be extended to include a close-up survey

of all the shell frames and adjacent shell plating of all cargo holds.

3.4.2.3 For bulk carriers over 15 years of age, an overall survey of all cargo holds, including a close-up survey is to be carried out to establish the condition of: all shell frames including their upper and lower end attachments, adjacent shell plating and transverse bulkheads in all cargo holds; and areas found suspect at the previous special survey.

**3.4.3. Thickness measurements**

3.4.3.1 Thickness measurements shall be carried out to an extent sufficient to determine both general and local corrosion levels at areas subject to close-up survey, as described in [3.4.1.5], [3.4.2.1], [3.4.2.2] and [3.4.2.3]. The minimum requirement for thickness measurements at the intermediate survey are areas found to be suspect at the previous special survey. Where substantial corrosion is found, the extent of thickness measurements shall be increased in accordance with the requirements of Table 3.10.

3.4.3.2 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 coating where applied remains effective.

3.4.3.3 Where a protective coating is provided in cargo holds and is found in GOOD condition, the extent of close-up surveys and thickness measurements may be specially considered.

**3.5. CHEMICAL TANKERS**

3.5.1. In addition to the requirements as per [2.4] and [3.2] vessels assigned with class notation "Chemical Tanker" the intermediate survey shall consist of the requirements of this sub section.

3.5.2. Examination of vent line drainage arrangements

3.5.3. Confirmation, where applicable, that pipelines and independent cargo tanks are electrically bonded to the hull.

3.5.4. Generally examining the electrical equipment and cables in dangerous zones such as cargo pump rooms and areas adjacent to cargo tanks to check for defective equipment, fixtures and wiring. The insulation resistance of the circuits shall be tested and in cases where a proper record of testing is maintained, consideration shall be given to accepting recent readings;

3.5.5. Confirmation that spares are provided for cargo area mechanical ventilation fans;

3.5.6. Confirming, if possible, that the discharge outlet(s) are in good condition;

- 3.5.7. Confirming that the ventilation equipment for residue removal is satisfactory and that the pressure in the driving medium for portable fans for ventilation equipment for residue removal can be achieved to give the required fan capacity.
- 3.5.8. For weather decks, an examination as far as applicable of cargo, bunker, ballast, steam and vent piping systems as well as vent masts and headers is to be carried out. If upon examination there is any doubt as to the condition of the piping, the piping may be required to be pressure tested, thickness measured or both.
- 3.5.9. In the case of Chemical Tankers over 5 years old and up to 10 years of age, the following shall apply in addition to [3.5.2] to [3.5.8]
- 3.5.9.1 For tanks used for salt 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 a verification that the Protective Coating remains efficient
- 3.5.9.2 Where POOR Coating Condition, corrosion or other defects are found in salt water Ballast Tanks or where a Protective Coating was not applied from time of construction, the examination is to be extended to other Ballast Tanks of the same type.
- 3.5.9.3 In salt water Ballast Tanks, where a Protective Coating is found in POOR condition as defined in, and it is not renewed, where soft coating has been applied, or where a Protective Coating was not applied from time of construction, maintenance of class is to be subject to the tanks in question being examined and thickness measurements carried out as considered necessary at annual intervals.
- 3.5.10. In the case of Chemical Tankers over 10 years old: the following shall apply in addition to requirements of [3.4.2] to [3.4.8]:
- 3.5.10.1 An Overall Survey of at least two Representative Cargo Tanks is to be carried out. In addition to the structure, fittings such as valves and instrumentation is to be subject to general examination.
- 3.5.10.2 For tanks used for salt water ballast including combined cargo/ballast tanks, an Overall Survey of all such tanks is to be carried out. If such survey reveals no visible structural defects, the Survey may be limited to a verification that the Protective Coatings remain efficient.
- 3.5.11. Extent of Close-up Survey
- 3.5.11.1 Ballast Tanks: - To the same extent as previous Special Survey after second Special Survey.

3.5.11.2 Cargo Tanks: - Two combined cargo/ballast tanks after second Special Survey. The extent of survey shall be based on the record of the previous Special Survey, and repair history of the tanks.

3.5.11.3 Additionally, one cargo tank after third Special Survey. The extent of survey shall be based on the record of the previous Special Survey, and repair history of the tanks

3.5.11.4 The extent of Close-up surveys may be extended as deemed necessary by the surveyor.

3.5.11.5 For areas in tanks where coatings are found to be in GOOD condition as defined by 1.2.9, the extent of the close-up surveys may be specially considered by the Society.

3.5.12. Extent of Thickness Measurement

3.5.12.1 The minimum requirement for thickness measurements at the Intermediate Survey are areas found to be Suspect Areas according to [1.2.6] at the previous Special Survey. Where substantial corrosion as defined in [1.2.7] is found, the extent of thickness measurements shall be increased in accordance with the requirements of Table 3.11.



## SECTION 4 BOTTOM SURVEY

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**4.1. GENERAL**

- 4.1.1. The Owner shall notify the Classification Society whenever the outside of ship's bottom and related items can be examined in dry dock or on a slipway.
- 4.1.2. The outside of ship's bottom and related items are to be examined on two occasions in any five-year period, but with a period not exceeding three years between examinations. Consideration may be given at the discretion of the Society to any special circumstances justifying an extension of these intervals.
- 4.1.3. The interval between examinations of the outside of ship's bottom and related items for ships operating in fresh water and for certain harbor or non-self-propelled craft may be greater than that given in [4.1.2]
- 4.1.4. The examination of the outside of ship's bottom and related items of ships may be carried out while the ship is afloat as an In-water Survey, subject to the provisions of [4.3], provided the interval between two examinations in dry dock or on a slipway does not exceed five years. Special consideration shall be given to ships of 15 years or over before being permitted to have such inspections.
- 4.1.5. Attention is to be given to the statutory requirements, especially when shorter intervals between examination of the ship's bottom for certain types of ships are required (e.g. Passenger Vessels).

**4.2. SCOPE OF THE SURVEY**

- 4.2.1. When a ship is in dry dock or on a slipway, 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.
- 4.2.2. The shell plating is to be examined for excessive corrosion, or deterioration due to chafing or contact with the ground and for any undue unfairness or buckling. Special attention is to be paid to bilge keels. Important plate unfairness or other deterioration which do not necessitate immediate repairs are to be recorded.
- 4.2.3. 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 period of five years unless considered necessary by the Surveyor.

- 4.2.4. Visible parts of rudder, rudder pintles, rudder shafts and couplings and stern frame are to be examined. If considered necessary by the Surveyor, the rudder is to be lifted or the inspection plates removed for the examination of pintles. The clearance in the rudder bearings is to be ascertained and recorded.
- 4.2.5. Visible parts of propeller and stern bush, are to be examined. The clearance in the stern bush and the efficiency of the oil gland, if fitted, are to be ascertained and recorded. For controllable pitch propellers, the Surveyor is to be satisfied with the fastenings and tightness of hub and blade sealing. Dismantling need not to be carried out unless considered necessary by the Surveyor.
- 4.2.6. 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 arrangements of propeller blades, propeller shaft and steering column are to be verified.
- 4.2.7. When chain cables are ranged, the anchors and cables are to be examined by the Surveyor.
- 4.2.8. Where the anti-fouling system is changed completely, or partial repair is carried out affecting 25 per cent or more of the antifouling system, the coating specification and anti-fouling system is to be examined by the Surveyor in accordance with the AFS  
- International Convention on the Control of Harmful Anti-Fouling Systems on Ships, 2001 (AFS 2001)
- 4.2.9. To maintain an **\*IWS** notation, at completion of each dry-docking the condition of the high resistance paint is to be confirmed and, as applicable, satisfactory access arrangements to take the stern-bush clearance and rudder pintle/bearing clearances are to be verified

### 4.3. IN-WATER SURVEYS

- 4.3.1. The In-water Survey is to provide the information normally obtained from a docking survey, so far as practicable. Proposals for In-water Surveys are to be submitted in advance of the survey so that satisfactory arrangements can be agreed with the Society.
- 4.3.2. For ships assigned the Society's **\*IWS** class notation, In-Water Survey **shall** be accepted at alternate Bottom Surveys, provided all applicable conditions of survey are satisfied.
- 4.3.3. For ships not holding the **\*IWS** notation, an In-Water Survey **may** be considered on application by the Owner in special circumstances, where the Society is satisfied that the conditions for such notation are effectively met. If requested, an **\* IWS** notation may be assigned on satisfactory completion of the Survey, provided that the applicable requirements of INTLREG

Rules and Regulations are complied.

- 4.3.4. In-Water Survey shall not be accepted in lieu of intermediate docking for vessels 15 years of age and over that are bulk carriers, oil tankers (including crude, product, and combined carriers), chemical tankers, gas carriers, and other vessel types subject to Enhanced Survey Programme (ESP) requirements. For such vessels, periodic drydocking remains mandatory
- 4.3.5. In-Water Survey shall not be accepted if the vessel has any outstanding Conditions of Class requiring drydock repair work to the shell plating, rudder, propeller, or propeller shaft
- 4.3.6. The In-water Survey is to be carried out with the ship at light draught in sheltered water; the in-water visibility is to be good and the hull below waterline is to be sufficiently clean to permit meaningful examination. The Society is to be satisfied with the methods of localization of the divers on the plating, which shall make use where necessary of permanent markings on the plating at selected points.
- 4.3.7. All approved plans and documents relevant to the In-Water Survey shall be placed on board and made available to the Surveyor and diving firm at the time of survey
- 4.3.8. The In-water Survey is to be carried out, by a qualified diver and trained to carry out In-water Survey, under surveillance of a Surveyor to the Society. The diver has to be employed by a firm approved by the Society.
- 4.3.9. The Surveyor shall be satisfied with the method of pictorial representation, and a good two-way communication between the Surveyor and divers is to be provided.
- 4.3.10. If the In-water Survey reveals damage or deterioration that requires early attention, the Surveyor may require that the ship be dry docked in order that a detailed survey can be undertaken and the necessary repairs carried out.
- 4.3.11. The condition of the coating is to be confirmed at every drydocking as a condition for the continuance of the \*IWS notation.
- 4.3.12. The in-water survey is to provide all the information normally obtained from a docking survey. However, special consideration may 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 tube oil sample reports.
- 4.3.13. Prior to commencing the In-Water Survey, the equipment and procedures for both observing and reporting the survey are to be agreed between the Owners, the Surveyor and the diving firm.

## SECTION 5 SPECIAL SURVEY (HULL)

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**5.1. SURVEY PLANNING**

- 5.1.1. To ensure a meaningful survey adequate planning shall be done for hull special surveys, in consultation with Society's surveyors. As far as practicable a specific survey program worked out by the owner, generally in line with the requirements of [5.1.3] and [5.1.4], and approved by the Society shall be the basis for selection of spaces and locations for overall survey, close up survey, thickness measurement and testing.
- 5.1.2. For vessels subject to an Enhanced survey program a planning document as per the principles laid down in [5.1.3] to [5.1.4] shall be prepared by the owners in cooperation with the Society prior to commencement of survey and shall be maintained onboard until completion of special survey.
- 5.1.3. The following documentation shall be collected, consulted and maintained onboard for preparation of the planning document with a view to selecting tanks, areas, and structural elements to be examined and shall be available onboard.
- Survey status and basic ship information,
  - Main structural plans, including information regarding use of higher strength steels,
  - Relevant previous survey and inspection reports from both the Bureau and the Owner,
  - Information regarding the use of the ship's tanks, typical cargoes, ballast and other relevant data,
  - Information regarding corrosion protection level on the new building,
  - Information regarding the relevant maintenance level,
  - Previous thickness measurement reports
  - Previous repair history
  - Extent of use of inert gas plant and tank cleaning procedures
  - Inspections and action taken by ship's personnel with reference to structural deterioration, coating conditions and leaks of bulkheads and piping, etc.
  - Any other information that will help to identify suspect areas requiring inspection.
- 5.1.4. Survey planning document is to account for and comply with the requirements for overall survey, close up Survey, thickness measurement and tank testing as per this chapter and shall include at least the following information
- Basic ship information and particulars,
  - Plan of tanks and holds
  - List of tanks/ holds with information on use, protection and condition of coating,
  - Conditions for survey (e.g., information regarding tank cleaning, gas freeing, ventilation, lighting, etc.),
  - Provisions and methods for access to structures,
  - Equipment for surveys,
  - Spaces and areas selected for Overall/Close-up Survey, thickness measurement and tank testing.
  - Corrosion, failures and damage experience related to the vessel.

- 5.1.5. Special Survey may be commenced at the 4th Annual Survey and be progressed with a view to completion by the 5th anniversary date. When the Special Survey is commenced prior to the 4th Annual Survey, the entire survey is to be completed within 15 months if such work is to be credited to the Special Survey. As part of the preparation for the Special Survey, the thickness determination shall be dealt with, so far as practicable, in connection with the 4th Annual Survey.

## **5.2. MAIN CLASS**

- 5.2.1. The Special Survey shall include, in addition to the requirements of the Annual Survey, examination, tests and checks of sufficient extent to ensure that the hull, equipment and related piping are in satisfactory condition and that the ship is fit for its intended purpose for the next five (5) year class period, subject to proper maintenance and operation and the periodical surveys being carried out at the due dates.
- 5.2.2. The examinations of the hull are to be supplemented by thickness measurements and testing as deemed necessary, to ensure that the structural integrity remains effective and is to be sufficient to discover Substantial Corrosion, significant deformation, fractures, damages or other structural deterioration.
- 5.2.3. The Special Survey shall include a bottom survey as per section [4.2] of this chapter. The anchors and chain cables are to be ranged, 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 Special Surveys of vessels older than 10 years, chain cables are to be gauged and renewed in cases where their mean diameter is diminished to below 88% of the original diameter. Maximum allowable diminution of weight of anchors is 10%.
- 5.2.4. All spaces including holds and their 'tween decks 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 may be specially considered. The minimum extent of internal examination of tanks shall be as per Table 3.2.
- 5.2.5. Engine room structure is to be examined. 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 engine room bulkheads in way of tank top and bilge wells. Where wastage is evident or suspect, thickness measurements are to be carried out, and renewals or repairs made when wastage exceeds allowable limits.

- 5.2.6. For spaces used for salt water ballast, if there is no protective coating, soft coating, or POOR protective coating condition and it is not renewed, maintenance of class is to be subject to the spaces in question being internally examined at every subsequent annual survey. Waiver of internal examination at annual intervals for tanks of 12 Cu. M. or less in size, with soft coating, may be considered.
- 5.2.7. Boundaries of all tanks forming part of the hull structure, including holds adapted for the carriage of salt water ballast, are to be tested with a head of liquid to the top of hatches or top of air pipes, whichever is greater.
- 5.2.8. For vessels less than 10 years old testing of fuel oil, lube oil and fresh water tanks may be limited to representative tanks based on external examination of all tanks. For vessels of age between 10 to 20 years, special consideration may be given to limit testing of fuel oil, lube oil and fresh water tanks to representative tanks based on the results of internal examination of representative tanks.
- 5.2.9. Hatch covers and coamings are to be examined to verify that no unapproved changes have been made; that hatch covers are structurally sound and weather tight, and where mechanically operated steel covers are fitted, satisfactory operation is to be verified.
- 5.2.10. Thickness measurements for vessels other than Bulk Carriers, Oil tankers, Combination carriers and Chemical tankers are to be carried out in accordance with Table 3.3.
- 5.2.11. Additionally, any part of the vessel where wastage is evident or suspect, the Surveyor may require thickness measurements in order to ascertain the actual thickness of the material.
- 5.2.12. In addition to the requirements specified in this section Bulk Carriers, Oil tankers, Combination Carriers and Chemical tankers shall be subject to Enhanced survey requirements as per respective sections.
- 5.2.13. The permissible thickness diminution for various structures, in general, shall be as per Table 3.9. For vessels having reduced scantlings in view of notation "Cathodic Protection System" shall be specially considered.
- 5.2.14. Where thickness measurements indicate Substantial Corrosion, the number of thickness measurements shall be increased to determine the extent of Substantial Corrosion. Table 3.10 & 3.11 may be used as guidance for additional thickness measurements. Maintenance of class will be subject to gauging of areas identified as having substantial corrosion at every annual survey, until renewed.



**5.3. BULK CARRIERS**

- 5.3.1. In addition to the requirements of 5.2, vessels assigned with class notations “Bulk Carrier” and “ESP” scope of special survey shall include the requirements of this section.
- 5.3.2. Close up surveys shall be carried out as specified in Table 3.4-A and Table 3.4-B.
- 5.3.3. Thickness measurements shall be carried out as per Table 3.5
- 5.3.4. Where substantial corrosion is found the extent and pattern of thickness measurements shall be increased as per [5.2.14]

**5.4. OIL TANKERS AND CHEMICAL TANKERS**

- 5.4.1. In addition to the requirements of 5.2, vessels assigned with class notations “Oil Tanker” or “Chemical Tanker” scope of special survey shall include the requirements of this section.
- 5.4.2. Close up surveys shall be carried out as specified in Table 3.6.
- 5.4.3. Thickness measurements shall be carried out as per Table 3.7.
- 5.4.4. Where substantial corrosion is found the extent and pattern of thickness measurements shall be increased as per [5.2.14]

**5.5. COMBINATION CARRIERS**

- 5.5.1. For “Combination Carriers” as defined in [1.2.13], in addition to the requirements of [5.2], requirements special survey shall consist of combined requirements of section [5.3] and [5.4]

**5.6 TABLES FROM [3.2] TO TABLE [3.11] ARE FURNISHED AS BELOW**

**TABLE 3.2 MINIMUM REQUIREMENTS FOR INTERNAL EXAMINATION OF TANKS AT  
SPECIAL SURVEYS FOR ALL VESSELS**

| <b>Tank Category</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Age 0 - 5 years</b> | <b>Age 5 - 15 years</b> | <b>Age 15 -25 years</b> | <b>Age &gt;25 years</b> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------|-------------------------|-------------------------|
| Peak Tanks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All                    | All                     | All                     | All                     |
| Ballast Tanks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Note 3                 | All                     | All                     | All                     |
| Fresh Water                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | None                   | Note 2                  | Note 3                  | All                     |
| Fuel Oil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | None                   | Note 2                  | Note 3                  | All                     |
| Lube Oil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | None                   | None                    | Note 2                  | All                     |
| <p>Notes.</p> <ol style="list-style-type: none"><li>1. Subject to satisfaction of the surveyor based on external examination and test and if used exclusively for fuel oil.</li><li>2. At least one tank of each category shall be examined. Examination may be extended to other tanks also based on the condition of the tank examined.</li><li>3. At least one tank of each type shall be examined. Examination may be extended to remaining tanks also based on the condition of the tanks examined.</li></ol> |                        |                         |                         |                         |

**TABLE 3.3: MINIMUM REQUIREMENTS FOR THICKNESS MEASUREMENTS AT SPECIAL SURVEYS**

(Thickness measurements for vessels other than Bulk Carriers, Oil tankers, Combination carriers and Chemical tankers are to be carried out in accordance with this Table)

| Age 0 - 5 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Age 5 - 10 years                                                                           | Age 10 - 15 years                                                                           | Age > 15 years                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| 1) Suspect areas throughout the vessel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1) Suspect areas throughout the vessel.                                                    | 1) Suspect areas throughout the vessel.                                                     | 1) Suspect areas throughout the vessel.                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2) One transverse section of deck plating abreast, a cargo space within the amidships 0.5L | 2) Two transverse sections Within the amidships 0.5L abreast of two different cargo spaces. | 2) A minimum of three transverse sections in way of cargo spaces within the amidships 0.5L.                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                            | 3) Internals in forepeak tank.                                                              | 3) Internals in forepeak and aft peak tanks.                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                            | 4) All cargo hold hatch covers and coamings (plating and stiffeners).                       | 4) All cargo hold hatch covers and coamings (plating and stiffeners).                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                            | 5) Exposed deck plating within amidships 0.5 L may be required.                             | 5) All exposed main deck plating full length.                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                            |                                                                                             | 6) Representative exposed superstructure deck plating (poop, bridge, and forecastle deck).                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                            |                                                                                             | 7) Lowest strake and strakes in way of 'tween decks of all transverse Bulkheads in cargo spaces together with internals in way. |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                            |                                                                                             | 8) All wind- and water Strakes, port and starboard, full length.                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                            |                                                                                             | 9) All keel plates full length. Also, additional bottom plates in way of cofferdams, machinery space, and aft end of tanks.     |
| <p>Notes:</p> <ol style="list-style-type: none"> <li>1. Thickness measurement locations shall 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.</li> <li>2. Thickness measurements of internals may be modified at the discretion of the Surveyor if the protective coating is in GOOD condition.</li> </ol> <p>For vessels less than 100 meters in length, the number of transverse sections required for age 10 - 15 years may be reduced to one (1) and thickness measurements for deck plating may be waived and the number of transverse sections required at Subsequent Special Surveys may be reduced to two (2).</p> |                                                                                            |                                                                                             |                                                                                                                                 |

**TABLE 3.4-A: REQUIREMENTS FOR CLOSE-UP SURVEY AT SPECIAL SURVEYS OF BULK CARRIERS EXCLUDING ORE CARRIERS**

| <b>Age ≤ 5 years</b>                                                                                                                                                                                                            | <b>5 &lt; Age ≤ 10 years</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>10 &lt; Age ≤ 15 years</b>                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Age &gt; 15 years</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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)<br><b>(A)</b> | One transverse web with associated plating and longitudinals as applicable in each water ballast tank.<br><b>(A)</b><br><br>Forward and aft transverse bulkheads including stiffening system in a transverse section including topside, hopper side and double side ballast tanks on one side of the ship (i.e. port or starboard).<br><b>(A)</b><br><br>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 the foremost double side tanks.<br><b>(B)</b> | All transverse webs with associated plating and longitudinals as applicable in each water ballast tank.<br><b>(A)</b><br><br>All transverse bulkheads including stiffening system in each water ballast tank. <b>(A)</b><br><br>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.<br><b>(B)</b> | All transverse webs with associated plating and longitudinals as applicable in each water ballast tank.<br><b>(A)</b><br><br>All transverse bulkheads including stiffening system in each water ballast tank.<br><b>(A)</b><br><br>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.<br><b>(B)</b><br><br>Areas <b>(C) – (E)</b> as for age interval 10 to 15 years. |
| Two selected cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted.<br><b>(C)</b>                                                                                               | One transverse bulkhead in each cargo hold, including internal structure of upper and lower stools, where fitted.<br><b>(C)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted.<br><b>(C)</b>                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| All cargo hold hatch covers and coamings (platings and stiffeners).<br><b>(D)</b>                                                                                                                                               | All cargo hold hatch covers and coamings (platings and stiffeners).<br><b>(D)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All cargo hold hatch covers and coamings (platings and stiffeners).<br><b>(D)</b>                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                       |                                                                                                                       |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches.<br><b>(E)</b> | All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches.<br><b>(E)</b> |  |
| <p><b>(A), (B), (C), (D) and (E)</b> are areas to be subjected to close-up surveys and thickness measurements (see Figure 10 and 11).</p> <p>(A) Transverse web frame or watertight transverse 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 bulkheads 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><b>Note:</b> 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): Above 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> |                                                                                                                       |                                                                                                                       |  |

**TABLE 3.4-B: REQUIREMENTS FOR CLOSE-UP SURVEY AT SPECIAL SURVEYS OF ORE CARRIERS**

| Age ≤ 5 years                                                                                                                                                                                                                                  | 5 < Age ≤ 10 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10 < Age ≤ 15 years                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Age > 15 years                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| One web frame ring complete including adjacent structural members in a ballast wing tank.<br><b>(A)</b><br><br>One transverse bulkhead lower part - including girder system and adjacent structural members - in a ballast tank.<br><b>(A)</b> | All web frame rings complete including adjacent structural members in a ballast wing tank.<br><b>(A)</b><br><br>One deck transverse including adjacent deck structural members in each remaining ballast tank.<br><b>(A)</b><br><br>Forward and aft transverse bulkheads complete – including girder system and adjacent structural members - in a ballast wing tank.<br><b>(A)</b><br><br>One transverse bulkhead lower part - including girder system and adjacent structural members - in each remaining ballast tank.<br><b>(A)</b> | All web frame rings complete including adjacent structural members in each ballast tank.<br><b>(A)</b><br><br>All transverse bulkheads complete – including girder system and adjacent structural members - in each ballast tank.<br><b>(A)</b><br><br>One web frame ring complete including adjacent structural members in each wing void space.<br><b>(A)</b><br><br>Additional web frame rings in void spaces as deemed necessary by the Classification Society.<br><b>(A)</b> | As for Special Survey for age from 10 to 15 years.                |
| Two selected cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted.<br><b>(C)</b>                                                                                                              | One transverse bulkhead in each cargo hold, including internal structure of upper and lower stools, where fitted.<br><b>(C)</b>                                                                                                                                                                                                                                                                                                                                                                                                         | All cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted.<br><b>(C)</b>                                                                                                                                                                                                                                                                                                                                                          | Areas <b>(C)</b> - <b>(E)</b> as for age interval 10 to 15 years. |
| All cargo hold hatch covers and coamings (plating and stiffeners).<br><b>(D)</b>                                                                                                                                                               | All cargo hold hatch covers and coamings (plating and stiffeners).<br><b>(D)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All cargo hold hatch covers and coamings (plating and stiffeners).<br><b>(D)</b>                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                   |
|                                                                                                                                                                                                                                                | All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches.<br><b>(E)</b>                                                                                                                                                                                                                                                                                                                                                                                                                   | All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches.<br><b>(E)</b>                                                                                                                                                                                                                                                                                                                                                             |                                                                   |
| <b>(A), (C), (D) and (E)</b> are areas to be subjected to close-up surveys and thickness measurements (see Figure 10 and Figure 11).                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                   |
| <b>(A)</b> Transverse web frame or watertight transverse bulkhead in ballast wing tanks and void spaces. In fore and aft peak tanks transverse web frame means a complete transverse web frame ring including adjacent structural members      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                   |

- (C) Cargo hold transverse bulkheads plating, stiffeners and girders
- (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.
- (E) Deck plating and under deck structure inside line of hatch openings between cargo hold hatches

**Note:** Close-up Survey of transverse bulkheads to be carried out at four levels:

Level (a): Immediately above the inner bottom and immediately above the line of gussets (if fitted) and shedders for ships without lower stool.

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.

Level (c): About mid-height of the bulkhead.

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.

**TABLE 3.5: REQUIREMENTS FOR THICKNESS MEASUREMENTS AT SPECIAL SURVEYS OF BULK CARRIERS**

| <b>Age ≤ 5 years</b> | <b>5 &lt; Age ≤ 10 years</b>                                                                                                                                                                   | <b>10 &lt; Age ≤ 15 years</b>                                                                                                                                                                                                                                                      | <b>Age &gt; 15 years</b>                                                                                                                                                                                                                                                    |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Suspect areas        | Suspect areas                                                                                                                                                                                  | Suspect areas                                                                                                                                                                                                                                                                      | Suspect areas                                                                                                                                                                                                                                                               |
|                      | <p>Within the cargo length:</p> <ul style="list-style-type: none"> <li>- Two transverse sections of deck plating outside line of cargo hatch openings</li> </ul>                               | <p>Within the cargo length:</p> <ul style="list-style-type: none"> <li>- each deck plate outside line of cargo hatch openings</li> <li>- two transverse sections, one in the amidships area, outside line of cargo hatch openings</li> <li>- all wind and water strakes</li> </ul> | <p>Within the cargo length:</p> <ul style="list-style-type: none"> <li>- each deck plate outside line of cargo hatch openings</li> <li>- three transverse sections, one in the amidships area, outside line of cargo hatch openings</li> <li>- each bottom plate</li> </ul> |
|                      | <p>Wind and water strakes in way of the two transverse sections considered above</p> <p>Selected wind and water strakes outside the cargo length area</p>                                      | <p>Selected wind and water strakes outside the cargo length area</p>                                                                                                                                                                                                               | <p>All wind and water strakes, full length</p>                                                                                                                                                                                                                              |
|                      | <p>Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Table 3.4-A or Table 3.4-B, as applicable.</p> | <p>Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Table 3.4-A or Table 3.4-B, as applicable.</p>                                                                                     | <p>Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Table 3.4-A or Table 3.4-B, as applicable.</p>                                                                              |



**TABLE 3.6 : REQUIREMENTS FOR CLOSE-UP SURVEY AT SPECIAL SURVEYS OF OIL TANKERS AND CHEMICAL TANKERS**

| <b>Age ≤ 5 years</b>                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>5 &lt; Age ≤ 10 years</b>                                                                                                                                                                                                                   | <b>10 &lt; Age ≤ 15 years</b>                                                                                                                                    | <b>Age &gt; 15 years</b>    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| (A) One web frame ring - in a ballast wing tank, if any, or a cargo Wing tank used Primarily for water ballast.                                                                                                                                                                                                                                                                                                                                                | (A) All web frame rings - in a ballast wing tank, if any, or a cargo wing tank used Primarily for water ballast.                                                                                                                               | (A) All web frame rings - in all ballast tanks.<br>(A) All web frame rings - in a cargo wing tank<br>(A) One web frame ring - in each remaining cargo wing tanks | Same as<br>10<Age<15(Years) |
| (B) One deck transverse - in a cargo tank                                                                                                                                                                                                                                                                                                                                                                                                                      | (B) One deck transverse - in each remaining ballast tanks, if any<br>(B) One deck transverse - in a cargo wing tank                                                                                                                            |                                                                                                                                                                  |                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (C) Both transverse bulkheads - in a ballast wing tank, if any, or a cargo wing tank primarily used for water ballast.                                                                                                                         | (C) All transverse bulkheads - in all cargo and ballast tanks                                                                                                    |                             |
| (D) One transverse bulkhead - in a cargo wing tank<br>(D) One transverse bulkhead - in a cargo center tank.                                                                                                                                                                                                                                                                                                                                                    | (D) One transverse bulkhead - in each remaining ballast tank<br>(D) One transverse bulkhead - in each remaining ballast tank<br>(D) One transverse bulkhead - in a cargo wing tank<br>(D) One transverse bulkhead - in two cargo center tanks. |                                                                                                                                                                  |                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                | (E) One deck and bottom transverse - in each cargo center tank                                                                                                   |                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                | (F) As considered necessary by the Society                                                                                                                       |                             |
| (A) Complete transverse web frame ring including adjacent structural members<br>(B) Deck transverse including adjacent deck structural members<br>(C) Transverse bulkhead complete - including girder system and adjacent members<br>(D) Transverse bulkhead lower part - including girder system and adjacent structural members<br>(E) Deck and bottom transverse including adjacent structural members<br>(F) Additional complete transverse web frame ring |                                                                                                                                                                                                                                                |                                                                                                                                                                  |                             |

**TABLE 3.7: REQUIREMENTS FOR THICKNESS MEASUREMENTS AT SPECIAL SURVEYS OF OIL TANKERS AND CHEMICAL TANKERS**

| <b>Age ≤ 5 years</b>                                                                                                                                                          | <b>5 &lt; Age ≤ 10 years</b>                                                                                                                  | <b>10 &lt; Age ≤ 15 years</b>                                                                                                                 | <b>Age &gt; 15 years</b>                                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Within the cargo area:<br>1.1 One section of deck plating for full beam of the vessel (in way of a ballast tank, if any, or a cargo tank used primarily for water ballast) | 1. Within the cargo area:<br>1.1 Each deck plates<br>1.2 One transverse sections                                                              | 1. Within the cargo area:<br>1.1 Each deck plates<br>1.2 Two transverse sections<br>1.3 All wind and water strakes                            | 1. Within the cargo area:<br>1.1 Each deck plates<br>1.2 Three transverse sections<br>1.3 All wind and water strakes<br>1.4 Each bottom plate |
| 2. Measurements, for general assessment a recording of corrosion pattern, of structural members subject to close-up survey according to table                                 | 2. Measurements, for general assessment a recording of corrosion pattern, of structural members subject to close-up survey according to table | 2. Measurements, for general assessment a recording of corrosion pattern, of structural members subject to close-up survey according to table | 2. Measurements, for general assessment a recording of corrosion pattern, of structural members subject to close-up survey according to table |
| 3. Suspect areas                                                                                                                                                              | 3. Suspect areas                                                                                                                              | 3. Suspect areas                                                                                                                              | 3. Suspect areas                                                                                                                              |
|                                                                                                                                                                               | 4. Selected wind and water strakes outside the cargo area                                                                                     | 4. Selected wind and water strakes outside the cargo area                                                                                     | 4. Selected wind and water strakes outside the cargo area                                                                                     |

**TABLE 3.8: REQUIREMENTS FOR TANK TESTING AT SPECIAL SURVEYS OF OIL TANKERS AND CHEMICAL TANKERS**

| <b>Age ≤ 5 years</b>                                                                                             | <b>5 &lt; Age ≤ 10 years</b>                                                                                     | <b>10 &lt; Age ≤ 15 years</b>                                                                                    | <b>Age &gt; 15 years</b>                                                                                         |
|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| All ballast tanks boundaries                                                                                     | All ballast tanks boundaries                                                                                     | All ballast tanks boundaries                                                                                     | All ballast tanks boundaries                                                                                     |
| Cargo tank boundaries facing, ballast tanks, void spaces, pipe tunnels, fuel oil tanks, pump-rooms or cofferdams | Cargo tank boundaries facing, ballast tanks, void spaces, pipe tunnels, fuel oil tanks, pump-rooms or cofferdams | Cargo tank boundaries facing, ballast tanks, void spaces, pipe tunnels, fuel oil tanks, pump-rooms or cofferdams | Cargo tank boundaries facing, ballast tanks, void spaces, pipe tunnels, fuel oil tanks, pump-rooms or cofferdams |
|                                                                                                                  | All cargo tank bulkheads forming Boundaries of segregated cargoes.                                               | All remaining cargo tank boundaries                                                                              | All remaining cargo tank boundaries                                                                              |

TABLE 3.9: MAXIMUM PERMISSIBLE THICKNESS DIMINUTION.

| Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Bulk Carriers, Oil and Chemical Tankers, L>100 m | Other Ship Types, L > 100 m | All Ships, L < 100 m |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------|----------------------|
| Hull envelope and longitudinal bulkhead individual plates                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 20%                                              | 30%                         | 30%                  |
| Transverse W.T. and O.T. Bulkheads                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 25%                                              | 30%                         | 30%                  |
| Miscellaneous structures -- Plating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 25%                                              | 30%                         | 30%                  |
| Stiffening members excluding cargo hold frames.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 25%                                              | 25%                         | 25%                  |
| Cargo hold frames                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 20%                                              | 25%                         | 25%                  |
| Top side Area within mid-ship 0.5L (Note 1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 12%                                              | 12%                         | N/A                  |
| Bottom side Area within mid-ship 0.5L (Note 2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 15%                                              | 15%                         | N/A                  |
| Notes:<br>1. Topside area shall be the total cross-sectional area of deck plating outside line of openings, stringer strake, sheer strake and associated longitudinals.<br>2. Bottom side area shall be the total cross-sectional area of the keel, bottom, bilge plating and associated longitudinals.<br>3. Where the diminution of the topside or bottom side area is in excess of the criterion given in the table residual section modulus calculations shall be carried out which shall not be less than 88% of original mid-ship section modulus. |                                                  |                             |                      |

**TABLE 3.10: REQUIREMENTS FOR EXTENT OF THICKNESS MEASUREMENT AT AREAS OF SUBSTANTIAL CORROSION OF BULK CARRIER WITHIN THE CARGO AREA**

| S. No.   | Structural Member                                                                                              | Extent of Measurement                                                                                                                            | Pattern of Measurement                                                                   |
|----------|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| <b>1</b> | <b>SHELL PLATING</b>                                                                                           |                                                                                                                                                  |                                                                                          |
| 1.1      | Bottom and side shell plating not in way of tanks and cargo hold                                               | 1) Suspect plate plus four adjacent plates                                                                                                       | 1) Five-point pattern for each panel between longitudinals                               |
| 1.2      | Bottom and side shell longitudinals                                                                            | Minimum of three longitudinals in way of suspect areas                                                                                           | 3 measurements in line across web and 3 measurements on flange                           |
| <b>2</b> | <b>TRANSVERSE BULK HEADS IN CARGO HOLDS</b>                                                                    |                                                                                                                                                  |                                                                                          |
| 2.1      | Lower stool                                                                                                    | 1) Transverse band within 25 mm of welded connection to inner bottom<br>2) Transverse band within 25 mm of welded connection to shelf plate      | Five-point pattern between stiffeners over 1m length                                     |
| 2.2      | Transverse Bulkhead                                                                                            | 1) Transverse band at approximately mid height<br>2) Transverse band at part of bulkhead adjacent to upper deck or below upper stool shelf plate | 5 Point Pattern over 1 sq. m. of plating                                                 |
| <b>3</b> | <b>DECK STRUCTURE INCLUDING CROSS STRIPS, MAIN CARGO HATCH WAYS, HATCH COVERS, COAMINGS AND TOP SIDE TANKS</b> |                                                                                                                                                  |                                                                                          |
| 3.1      | Cross deck strip plating                                                                                       | Suspect Cross deck strip plating                                                                                                                 | 5-point pattern between under deck stiffeners over 1 m. length                           |
| 3.2      | Under deck stiffeners                                                                                          | 1) Transverse members<br>2) Longitudinal Members                                                                                                 | 1) 5-point pattern at each end and mid span<br>2) 5-point pattern on both web and flange |
| 3.3      | Hatch covers                                                                                                   | 1) Skirt, each side and ends, 3 locations<br>2) 3 longitudinal bands, outboard strakes (2) and centerline strake (1)                             | 1) 5-point pattern at each location<br>2) 5-point measurement each band                  |
| 3.4      | Hatch Coaming                                                                                                  | Each side and end of coaming, one band lower 1/3, one band upper 2/3 of coaming                                                                  | 5-point measurement each band, i.e. end or side coaming                                  |

| S. No.   | Structural Member                         | Extent of Measurement                                                                                                  | Pattern of Measurement                                                                                                                                        |
|----------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.5      | Top side water ballast tanks              | 1) Water tight transverse bulkheads<br>a) Lower 1/3 of bulkhead<br>b) Upper 1/3 of bulkhead<br>c) Stiffeners           | a) 5-point pattern over 1 sq. m. of plating<br>b) 5-point pattern over 1 sq. m. of plating<br>c) 5-point pattern over 1m. length                              |
|          |                                           | 2) representative swash transverse bulkheads<br>a) lower 1/3 of bulk head<br>b) Upper 2/3 of bulkhead<br>c) Stiffeners | a) 5-point pattern over 1 sq. m. of plating<br>b) 5-point pattern over 1 sq. m. of plating<br>c) 5-point pattern over 1m. length                              |
|          |                                           | 3) representative bays of slope plating<br>a) lower 1/3 of tank<br>b) Upper 2/3 of tank                                | 3) 5-point pattern over 1 sq. m. of plating                                                                                                                   |
| 3.6      | Main deck plating                         | Suspect plates and adjacent (4)                                                                                        | 5-point pattern over 1 sq. m. of plating                                                                                                                      |
| 3.7      | Main Deck longitudinals                   | Minimum of 3 longitudinals where plating is measured                                                                   | 5-point pattern on both web and flange                                                                                                                        |
| 3.8      | Web frames/transverses                    | Suspect plates                                                                                                         | 5-point pattern over 1 sq. m. of plating                                                                                                                      |
| <b>4</b> | <b>DOUBLE BOTTOM AND HOPPER STRUCTURE</b> |                                                                                                                        |                                                                                                                                                               |
| 4.1      | Inner/double bottom plating               | Suspect plate plus all adjacent plates                                                                                 | 5-point pattern for each panel between longitudinals over 1m. length                                                                                          |
| 4.2      | Inner/double bottom longitudinals         | 3 longitudinals where plates measured                                                                                  | 3 measurements in line across web and 3 measurements on flange                                                                                                |
| 4.3      | Longitudinal girders or transverse floors | Suspect plates                                                                                                         | 5-point pattern over 1 sq. m. of plating                                                                                                                      |
| 4.4      | Water tight bulk heads (WT floors)        | 1) Lower 1/3 of tank 2)<br>3) Upper 2/3 of tank                                                                        | 1) 5-point pattern over 1 sq. m. of plating<br>2) 5-point pattern alternate plates over 1 sq. m. of plating                                                   |
| 4.5      | Web frames                                | Suspect plate                                                                                                          | 5-point pattern over 1 sq. m. of plating                                                                                                                      |
| 4.6      | Bottom/side shell longitudinals           | Minimum of three longitudinals in way of suspect area                                                                  | 3 measurements in line across web and 3 measurements on flange                                                                                                |
| <b>5</b> | <b>CARGO HOLDS</b>                        |                                                                                                                        |                                                                                                                                                               |
| 5.1      | Side shell frames                         | Suspect frames and each adjacent                                                                                       | 1) At each end and mid span: 5-point pattern of both web and flange<br>2) 5-point pattern within 25 mm of weld attachment to both shell and lower slope plate |

**TABLE 3.11: REQUIREMENTS FOR EXTENT OF THICKNESS MEASUREMENT AT AREAS OF SUBSTANTIAL CORROSION OF OIL TANKERS AND CHEMICAL TANKERS WITHIN THE CARGO AREA**

| S. No. | Structural Member                                                     | Extent of Measurement                                                                            | Pattern of Measurement                                                                                                                                                                                                    |
|--------|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | <b>BOTTOM STRUCTURES</b>                                              |                                                                                                  |                                                                                                                                                                                                                           |
| 1.1    | Bottom plating                                                        | Minimum three bays across tank, including aft bay. Measurements around and under all bell mouths | 5-point pattern for each panel between longitudinals and webs                                                                                                                                                             |
| 1.2    | Bottom longitudinals                                                  | Minimum three longitudinals in each bay where bottom plating measured                            | 3 measurements in line across flange and 3 measurements on vertical web                                                                                                                                                   |
| 1.3    | Bottom girders and brackets                                           | At fore and aft transverse bulkhead bracket toes and in center 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 |
| 1.4    | Bottom transverse webs                                                | 3 webs in bays where bottom plating measured, with measurements at both ends and middle          | 5-point pattern over 2 sq. m. area. Single measurements on face flats                                                                                                                                                     |
| 1.5    | Panel stiffening                                                      | Where fitted                                                                                     | Single measurements                                                                                                                                                                                                       |
| 2      | <b>DECK STRUCTURE</b>                                                 |                                                                                                  |                                                                                                                                                                                                                           |
| 2.1    | Deck plating                                                          | Two bands across tank                                                                            | Minimum of three measurements per plate band                                                                                                                                                                              |
| 2.2    | 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)                                                                                                                                       |
| 2.3    | Deck girders and brackets                                             | At fore and aft transverse bulkhead bracket toes and in center 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 |
| 2.4    | Deck transverse webs                                                  | Minimum of two webs with measurements at middle and both ends of span                            | 5-point pattern over 2 sq. m. area. Single measurements on face flats                                                                                                                                                     |
| 2.5    | Panel stiffening                                                      | Where fitted                                                                                     | Single measurements                                                                                                                                                                                                       |
| 3      | <b>SHELL AND LONGITUDINAL BULK HEADS</b>                              |                                                                                                  |                                                                                                                                                                                                                           |
| 3.1    | Deck head and bottom strakes and strakes in way of stringer platforms | Plating between each pair of longitudinals in a minimum of 3 bays                                | Single measurement                                                                                                                                                                                                        |
| 3.2    | All other strakes                                                     | Plating between every 3 <sup>rd</sup> pair of longitudinals in same 3 bays                       | Single measurement                                                                                                                                                                                                        |
| 3.3    | Longitudinals - Deck head and bottom strakes                          | Each longitudinal in same 3 bays                                                                 | 3 measurements across web and one measurement on flange                                                                                                                                                                   |

| S. No. | Structural Member                                                     | Extent of Measurement                                                                                                           | Pattern of Measurement                                                                                                                                                                                               |
|--------|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.4    | Longitudinals – all others                                            | Every third longitudinal in same 3 bays                                                                                         | 3 measurements across web and one measurement on flange                                                                                                                                                              |
| 3.5    | Longitudinals - Bracket                                               | Minimum of three at top, middle and bottom of tank in same 3 bays                                                               | 5-point pattern over the area of bracket                                                                                                                                                                             |
| 3.6    | 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 about 2 sq. m. area, plus single measurements on web frame and cross tie face flats                                                                                                             |
| 4      | <b>TRANSVERSE BULKHEADS AND SWASH BULKHEADS</b>                       |                                                                                                                                 |                                                                                                                                                                                                                      |
| 4.1    | Deck head and bottom strakes and strakes in way of stringer platforms | Plating between pair of stiffeners at three locations – approx. $\frac{1}{4}$ , $\frac{1}{2}$ , and $\frac{3}{4}$ width of tank | 5-point pattern between stiffeners over 1 m length                                                                                                                                                                   |
| 4.2    | All other strakes                                                     | Plating between pair of stiffeners at middle location                                                                           | Single measurement                                                                                                                                                                                                   |
| 4.3    | Strakes in corrugated bulkheads                                       | Plating for each change of scantling at center of panel and at flange or fabricated connection                                  | 5-point pattern over 1 sq. m. of plating                                                                                                                                                                             |
| 4.4    | 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 center of span). For flange, single measurements at each toe and at center of span. |
| 4.5    | Brackets                                                              | Minimum of three at top middle and bottom of tank                                                                               | 5-point pattern over area of bracket                                                                                                                                                                                 |
| 4.6    | Deep webs and girders                                                 | Measurements at toe of bracket and center of span                                                                               | For web, 5-point pattern over about 1 sq. m. area. 3 measurements across face flat.                                                                                                                                  |
| 4.7    | Stringer platforms                                                    | All stringers with measurements at both end and middle                                                                          | 5-point pattern over 1 sq. m. area plus single measurements near bracket toes and on face flats.                                                                                                                     |

## SECTION 6 SPECIAL SURVEY (MACHINERY)

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**6.1. SCOPE OF SURVEY- MAIN CLASS**

- 6.1.1. For all vessels classed by the Society the main and auxiliary machinery including electrical installations shall be subjected to Special Survey as required by this section at intervals not exceeding five years.
- 6.1.2. Surveys requiring dry-docking: While the ship is in dry-dock, the sea inlet and discharge valves are to be dismantled and examined. Bow thruster and positioning equipment are to be subjected to a general survey, and to trials, upon floating of the ship. If vessels are equipped with scoops, these are also to be covered by the survey.
- 6.1.3. Propulsion system: Inspections of the propulsion system, except the tail shaft and propellers, which are dealt separately, are to mainly cover:
- intermediate shafts and bearings, including
  - thrust bearings
  - gearings
  - mechanical and flexible couplings
  - turning gear
- 6.1.4. **Main propulsion engines:** The components listed below are to be inspected and, where deemed necessary by the Surveyor, checked in unmounted condition:
- Cylinders, cylinder covers, pistons, piston rods and bolts, crossheads, crankshaft and all bearings
  - Camshaft, with drive and bearings
  - Tie rod, frame, foundation and fastening elements
  - Injection system, attached pumps and compressors,
  - Superchargers, suction and exhaust lines,
  - Charging air coolers, filters, monitoring, control,
  - Protective and safety equipment, starting, re-versing and maneuvering equipment.
- 6.1.5. **Main propulsion turbines:** The vibration behavior of the main propulsion turbines is to be proved, possibly by regular checks during operation. Depending on the result obtained and as required by the Surveyor, the turbine casings will have to be opened up. The safety equipment of the turbines is to be tested.
- 6.1.6. **Auxiliary engines:** For all essential auxiliary engines, the survey scope is identical to that applying to main engines. A reduction in the scope of survey may be agreed to upon examination of the maintenance records.
- 6.1.7. **Auxiliary machinery, equipment and piping:** Machinery and components of the following essential systems are to be inspected and tested in the dismantled condition, to the extent considered necessary by the surveyor based on the age and service of the installation.

Items to be inspected shall include all pumps of the essential systems, air compressors including safety equipment, separators, filters and valves, coolers, pre-heaters, main and auxiliary steering gear, anchor windlasses, including their drives, piping, pipe connections, compensators and hoses, emergency drain valves and bilge piping systems, tank filling level indicators, freshwater distillation plant, oil purifier and sewage systems and additional systems and components, where deemed necessary by the Surveyor.

- Compressed air system
- Fuel System
- Lubricating Oil System
- Cooling System
- Bilge and Ballast System
- Steering System
- Condensate System
- Feed water system
- Steam system
- Hydraulic system
- Inert Gas system of ships not assigned with the notation '**IGS**'
- Instrumentation and automation equipment for vessels not assigned with '**UM**'
- Any other systems which are covered by additional class notations assigned to the vessel or considered essential for the safe operation of the vessel.

**6.1.8. Electrical installations:**

6.1.8.1 If the ship is propelled by electric machinery, the propulsion motors, the propulsion generators, exciters, particularly the windings of these machines, and their ventilating systems are to be examined and tested. Checking of the electric switch gear for operability is to also cover the protective, safety and inter-locking devices. The electric cables and their connections are to be inspected. The insulation resistance of all electric machinery and equipment is to be tested.

6.1.8.2 Positioning equipment, including electrical control systems, is to be subjected to operational tests.

6.1.8.3 The electrical equipment, including the generators, the motors of the essential auxiliary machinery, the switch gear, including its protective and interlocking devices, as well as the cable network, is to be inspected externally. The insulation resistance is to be measured.

6.1.8.4 Electrical installations, including machinery and equipment, located in spaces in which there is a risk of inflammable gas or steam air mixtures accumulating, are to be checked as to the explosion protection provided.

**6.1.9. Pressure Vessels:**

6.1.9.1 Pressure vessels for which the provisions of society's rules are to be examined internally

and externally.

6.1.9.2 Periodical tests of CO<sub>2</sub> cylinders for fire-extinguishing purposes are to be carried out at every alternate special survey.

6.1.9.3 Where pressure vessels cannot be satisfactorily examined internally and where their unobjectionable condition cannot be clearly recognized during the internal inspection, recognized non-destructive test methods are to be applied and/or hydraulic pressure tests are to be carried out. The hydraulic pressure test is to be carried out at a test pressure of 1.5 times the allowable working pressure. However, the test pressure must not be less than 1 bar, in excess of the working pressure. Where the pressure vessels were manufactured in accordance with recognized national or international standards, test pressures according to that standards may be adopted.

#### 6.1.10. Steam Pipes/ heating coils

6.1.10.1 Steam pipes with steam temperatures of up to 350 °C and with internal diameters of more than 75 mm, are to be examined at random. Examinations of the internal condition of the pipelines, especially of pipe bends, or additional more detailed examinations may be required. Instead of the internal inspection, a hydraulic test may be affected to a pressure equal to 1.5 times the design pressure, but not exceeding that of the prescribed test pressure for the pertinent boiler plant.

6.1.10.2 In the case of steam pipes with steam temperatures exceeding 350 °C (at least two) selected individual parts of pipes are to be dismantled from each piping system (main steam pipe and auxiliary steam pipes of each service group) having a nominal diameter exceeding 32 mm. Approximately 10 % of the welding seams at bends, flanges or tee-branches are to be subjected to an inspection for cracks by recognized non-destructive test methods. Before being used again, removed screws of flanged joints are to be inspected for their general condition and cracks and renewed, if necessary.

6.1.10.3 If internal examination of welded piping systems through the inspection holes appears to be inadequate or if their reliable assessment is not possible even by ultrasonic testing or an equivalent examination method, it may be necessary to cut out certain parts of pipes. At least 20 % of the welding seams are to be inspected for cracks.

6.1.10.4 Heating coils in oil tanks and vessels are to be subjected to a pressure test to 1.5 times the allowable working pressure.

6.1.11. Upon completion of the special surveys, the surveyor must be satisfied that the entire machinery installation, including the electrical machinery and equipment and the steering gear, is operable without any restrictions and is considered to remain efficient for a class period of 5 years subject to periodic maintenance and surveys as required by this chapter

being satisfactorily carried out. In case of doubt, this may have to be proved by trials and/or operational tests.

## **6.2. UNMANNED MACHINERY SPACE**

- 6.2.1. For vessels assigned a class notation 'UM', examining the arrangements for periodically unattended machinery spaces, towards special survey, shall include the requirements of this sub section.
- 6.2.2. Control Actuators: All mechanical, hydraulic and pneumatic control actuators and their power systems are to be examined and tested as considered necessary.
- 6.2.3. Electrical: The insulation resistance of the windings of electrical control motors or actuators is to be measured, with all circuits of different voltages above ground being tested separately, and is to be on the order of one-half to one mega-ohm.
- 6.2.4. Unattended Plants: Control systems for unattended machinery spaces are to be subjected to dock trials at reduced power on the propulsion engine to check the proper performance of all automatic functions, alarms and safety systems.

## **6.3. INERT GAS SYSTEM**

- 6.3.1. For "Oil Tankers" and "Chemical Tankers" assigned with class notation 'IGS' the Special Survey of the Inert Gas system shall include the following:
- 6.3.2. All valves, including valves at boiler uptakes, air seal valves at uptakes, scrubber isolating valve, fans inlet and outlet isolating valves, main isolating valve, recirculating valve (if fitted), pressure/vacuum breaker and cargo tank isolating valves are to be examined.
- 6.3.3. Scrubber is to be examined.
- 6.3.4. Fans (blowers) including casing drain valves are to be examined.
- 6.3.5. Fan (blower) drives, either electric motor or steam turbine, Bellows expansion pieces are to be examined.
- 6.3.6. Sea water pumps, valves and strainers for scrubbers and water seals together with piping connections at the scrubber, water seals, shell plating and the remainder of the sea water piping are to be examined.
- 6.3.7. Stand pipe, where fitted, for purging in each cargo tank is to be examined.
- 6.3.8. Deck Seals or double block and bleed assemblies, and non-return valves are to be examined externally and internally.

**6.3.9. Separate Inert Gas Generator System**

6.3.9.1 Automatic combustion control system is to be examined and tested as necessary.

6.3.9.2 Combustion chamber and mountings are to be examined internally and externally.

6.3.9.3 Forced draft fan is to be examined.

6.3.9.4 Fuel oil service pumps are to be examined.

**6.3.10. Inert Gas Stored In Bottles**

6.3.10.1 Bottles are to be examined internally. If they cannot be examined internally, they are to be gauged. When considered necessary by the Surveyor, they are to be hydrostatically tested. Relief valves are to be proven operable.

6.3.10.2 Where an alkali (or other) scrubber is fitted in the system the scrubber, circulating pump, valves and piping are to be examined internally and externally.

## **SECTION 7 TAIL SHAFT SURVEY**

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## 7.1. COMPLETE SURVEY

7.1.1. As far as applicable, the complete survey of the Tail shaft covers:

- The shaft in its entirety, especially the cone, the keyway and thread or the fillet of the flange
- Non-destructive examination of the aft part of the shaft by approved crack detection methods
- Examination of the oil sealing glands (overhaul or renewal of the sealing rings depending on period of service, design and findings)
- Examination of the chrome steel liner
- Examination of the contact surfaces and liners of the shaft
- Examination of the stern tube bearing
- Examination of the propeller fit and of the propeller
- Functional testing of controllable pitch propellers and examination for leaks and shall be opened up as deemed necessary by the surveyor.
- Examination of the bearing clearances before and after the survey, with documentation of values measured (poker gauge readings)

## 7.2. CONDITION MONITORING

7.2.1. Upon request by the owners, the periodicity of the complete tail shaft surveys for oil lubricated shafts may be extended to 120 months subject to the following conditions for vessels having class notation "**TS (CM)**".

- Two temperature sensors shall be installed at the aft stern tube bearing to enable measurement of maximum heat load. If the sensor can be easily replaced at sea only one sensor needs to be fitted and a second sensor kept onboard as spare.
- Stern tube bearing shall be fitted with a high temperature alarm.
- Lubricating oil header tank shall be provided with a low-level alarm.
- Oil sealing rings are to be replaceable without the need for removal of propeller
- Oil consumption and bearing temperatures shall be regularly recorded.
- Lube oil analysis shall be done every six months at a laboratory acceptable to the Society.
- A modified survey as per 7.3 shall be done at 5 years intervals.

**7.3. MODIFIED SURVEY**

7.3.1. The scope of the modified survey covers:

- All accessible parts of the shaft, including the propeller connection to the shaft and the propeller
- Checking of the oil sealing glands, i.e. renewal or overhaul of components, depending on period of service, design and findings
- Checking of the lubricating oil analyses, oil consumption and bearing temperatures as per the shipboard records
- Measurement of the clearances of the stern tube bearings and check by poker gauge, with documentation of values measured, as well as
- Non-destructive examination by recognized crack detection methods of the fillet of the coupling flange, if the propeller is coupled to a solid flange, or in way of the forward part of the aft shaft taper, in case of the propeller being fitted on a cone.
- For the crack detection test the area to be examined is to be sufficiently exposed, if necessary, by shifting of the propeller shaft or backing-off of the propeller.



## **SECTION 8 SPECIAL PROPULSION SYSTEMS**

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**8.1. SCOPE OF SURVEY**

- 8.1.1. For “Directional Propulsion Devices, shafts, gearing and maneuvering devices shall be examined in disassembled condition.
- 8.1.2. For “Vertical axis propulsion devices, blades, oil glands, blade control rods, bevel gears, surfaces of horizontal thrust rings and oil pumps for hydraulic control and lubrication system are to be examined in disassembled condition. After re-assembly, a running test shall be carried out to verify proper operation.
- 8.1.3. For water jet units, impeller, casing, shaft seal, shaft bearing, shaft bearing, inlet and outlet channels, steering nozzle, reversing arrangements and control gear shall be examined in disassembled condition.

## **SECTION 9 BOILER SURVEY**

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**9.1. SCOPE OF SURVEY**

- 9.1.1. The term 'boiler' includes exhaust gas boilers in the exhaust gas pipe system of combustion engines and hot water boilers with outlet temperatures exceeding 120 °C (except where they are heated by steam or liquids).
- 9.1.2. Where deemed necessary by the Surveyor, the boiler is to be cleaned on the water and flue gas sides, and, if required, its outside surfaces are to be exposed as well, so that all walls subject to pressure may be examined. Where the design of the boiler does not permit an adequate internal inspection, hydraulic tests may be required. It is left to the Surveyor's discretion to have the internal inspection supplemented by hydraulic tests, if required on account of the condition of the boiler.
- 9.1.3. Where there are doubts concerning the thickness of the boiler walls, it is to be ascertained by means of a recognized gauging method. On the basis of the result of such inspection the allowable working pressure at which the boiler may be operated in future is to be decided on.
- 9.1.4. The hydraulic pressure test is to be carried out to a test pressure of 1.3 times the allowable working pressure. After repair of major damages, the test pressure shall be 1.5 times the working pressure. In no case, however, is the test pressure to be less than 1 bar in excess of working pressure and it is not to exceed the test pressure applied during the first inspection of the boiler after completion.
- 9.1.5. Boiler mountings, stays, openings and their closing arrangements and safety valves shall be examined to the extent deemed necessary by the surveyor.
- 9.1.6. Proper operation of the safety valve shall be confirmed at each survey.

## SECTION 10 CONTINUOUS SURVEY SYSTEM

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**10.1. Application**

- 10.1.1. 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 (CSH), machinery (CSM) covered by an additional class notation.
- 10.1.2. 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**).
- 10.1.3. For ships other than those referred to in [11.1.2], 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.
- 10.1.4. When the continuous survey system is applied, this is indicated in the Certificate of Classification and appropriate notations as indicated in [11.1.1] are entered in the Register of Ships.
- 10.1.5. Ships subject to the continuous survey system are provided with lists of items to be surveyed under this system; these lists are attached to the Certificate of Classification.
- 10.1.6. For items surveyed under the continuous survey system, the following requirements generally apply:
- a) the interval between two consecutive surveys of each item is not to exceed five years
  - b) 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 surveys 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
- 10.1.7. For ships more than ten 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 survey system for the class renewal survey.
- 10.1.8. 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's inspection is to be followed by a confirmatory survey carried out by a Surveyor
- 10.1.9. The continuous survey system does not supersede the annual surveys and other periodical and occasional surveys.

10.1.10. 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.

**10.2. Planned maintenance survey system for machinery (PMS)**

10.2.1. A planned maintenance survey system 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 system other than those normally adopted and with intervals different from those of the continuous survey system as detailed in [11.1] may be accepted.

10.2.2. The conditions for approval of the planned maintenance survey system, the determination of survey item intervals and the general scope of surveys are detailed in Appendix 1.

10.2.3. When the planned maintenance survey system is applied, this is indicated in the Certificate of Classification and notation PMS is entered in the Register of Ships.

10.2.4. The conditions related to Chief Engineer's inspections within the scope of PMS are given in this Chapter, Appendix 2.

10.2.5. The planned maintenance survey system does not supersede the annual surveys and other periodical and occasional surveys.

10.2.6. The planned maintenance 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

## APPENDIX 1 PLANNED MAINTENANCE SURVEY SYSTEM

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## SECTION 1 GENERAL

### Contents

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**1.1. SCOPE**

1.1.1. A Planned Maintenance survey system (hereafter referred to as PMS) is a survey system for machinery items which may be considered as an alternative to the Continuous Machinery Survey system (hereafter referred to as CMS), as described in Chapter 3, Sect 11 [11.1].

1.1.2. This survey scheme is to be approved by the Society before being implemented. When the PMS system is applied, the scope and periodicity of the class renewal survey are tailored for each individual item of machinery and determined on the basis of recommended overhauls stipulated by the manufacturers, documented experience of the operators and, where applicable and fitted, condition monitoring.

For instance, within the scope of a PMS system the following cases may occur:

- switchboard is surveyed based on the regular expiry date of the class renewal survey
- lubricating oil pump is surveyed based on CSM scope and periodicity
- diesel engine is surveyed based on running hours
- turbo pump is surveyed based on condition monitoring

1.1.3. In general, the survey intervals for items surveyed under the PMS system should not exceed those specified for the CSM. However, for components where the maintenance is based on running hours, longer intervals may be accepted as long as the intervals are based on the manufacturer's recommendations. If an approved condition monitoring system is in effect, the machinery survey intervals based on the CSM system may also be extended.

1.1.4. The Chief Engineer shall be the responsible person on board in charge of the PMS.

The surveys of machinery items and components covered by the PMS are to be carried out by a Chief Engineer who has been issued a statement of authorisation, under the conditions and limits given in Chapter 3, Appendix 2.

Items surveyed by this authorised Chief Engineer will be subject to the confirmatory survey as detailed in Chapter 3, Appendix 2.

Documentation on overhauls of items covered by the PMS are to be reported and signed by the Chief Engineer.

1.1.5. The conditions and procedures for the approval of a PMS are indicated in [1.2] below.

**1.2. CONDITIONS AND PROCEDURES FOR THE APPROVAL OF THE SYSTEM**

1.2.1. The PMS is to be approved by the Society. To this end the Owner is to make a formal request to the Society and provide the documentation and information specified in [1.3] below, combined in a manual describing the proposed scheme and including sample copies of the different documents to be used during the implementation of the scheme. The PMS is to be programmed and maintained by a computerized system. However, this may not be applied to the current already approved schemes.

- 1.2.2. When using computerised systems, access for updating of the maintenance documentation and the maintenance programmes is only granted to the person responsible for the PMS or another person authorised by him.

The computerised systems are to include a back-up procedure, which is to be activated at regular intervals.

The functional application of these systems is to be approved by the Society.

### **1.3. DOCUMENTATION**

- 1.3.1. The documentation to be submitted is the manual mentioned above, which is to include:

- a) a description of the scheme and its application on board as well as the proposed organisation chart identifying the areas of responsibility and the people responsible for the PMS on board
- b) the list of items of machinery and components to be considered for classification in the PMS, distinguishing for each the principle of survey periodicity used as indicated in [1.1.2]
- c) the procedure for the identification of the items listed in b), which is to be compatible with the identification system adopted by the Society
- d) the scope and time schedule of the maintenance procedures for each item listed in b), including acceptable limit conditions of the parameters to be monitored based on the manufacturers' recommendations or recognised standards and laid down in appropriate preventive maintenance sheets
- e) the original reference data, monitored on board, for machinery undergoing maintenance based on condition monitoring
- f) the list and specifications of the condition monitoring equipment, including the maintenance and condition monitoring methods to be used, the time intervals for maintenance and monitoring of each item and acceptable limit conditions
- g) the document flow and pertinent filing procedure

### **1.4. INFORMATION ON BOARD**

- 1.4.1. The following information is to be available on board:

- a) all the documentation listed in [1.3 ], duly updated
- b) the maintenance instructions including routine tests and inspections for each item of machinery, as applicable (supplied by the manufacturer or by the shipyard)
- c) the condition monitoring data of the machinery, including all data since the last dismantling and the original reference data
- d) reference documentation (trend investigation procedures etc.)
- e) the records of maintenance performed, including conditions found, repairs carried out, spare parts fitted
- f) the list of personnel on board in charge of the PMS management

**1.5. LIST OF ITEMS**

- 1.5.1. Ships subject to the planned maintenance survey system are provided with lists of items to be surveyed under this system, as indicated in [1.8.2.10]

**1.6. IMPLEMENTATION OF THE SYSTEM**

- 1.6.1. When the documentation submitted has been approved and the PMS system has been implemented on board and used for a sufficient period (which is not to exceed one year) so that all personnel become familiar with it, a survey is to be carried out in order to start the system and make it officially operational. The scope of this survey, referred to as Implementation Survey, is given in [1.8.1.1]
- 1.6.2. Upon the successful outcome of the Implementation Survey, the PMS is considered approved. The relevant annex to the Certificate of Classification of the ship is updated and the survey notation PMS is entered in the Register of Ships.

**1.7. RETENTION AND WITHDRAWAL OF THE SYSTEM**

- 1.7.1. The PMS system is retained throughout the class period provided that:
- an annual report covering the years' service is supplied to the Society in accordance with [1.8.2.9]
  - an annual audit in accordance with [1.8.2] is satisfactorily completed
  - any change to the approved PMS is submitted to the Society for agreement and approval
- 1.7.2. The survey arrangement for machinery according to the PMS may be withdrawn by the Society if the PMS is not satisfactorily operated on account of either the maintenance or the general condition of the machinery or the failure to observe the agreed intervals between overhauls.
- 1.7.3. The Owner may discontinue the PMS at any time by informing the Society in writing. In this case, the items which have been inspected under the PMS since the last annual audit will be credited for class at the discretion of the attending Surveyor.
- 1.7.4. In the case of sale or change of management of the ship or classification after construction, the approval of the PMS will be reconsidered.

**1.8. SURVEYS**

- 1.8.1. Scope and Implementation survey
- 1.8.1.1. The implementation survey is to be carried out by a Surveyor of the Society, as stated in [1.6.1], within one year from the date of the documentation approval

1.8.1.2. The scope of this survey is to verify that:

- the PMS is implemented in accordance with the approved documentation and is suitable for the type and complexity of the components and systems on board
- the documentation required for the annual audit is produced by the PMS
- the requirements of surveys and testing for retention of class are complied with
- the shipboard personnel are familiar with the PMS procedures

Upon the successful outcome of the survey confirming the proper implementation of the PMS, the system is considered operational subject to the submission to the Society of a report describing the system.

1.8.2. Annual audit and confirmatory surveys

1.8.2.1. Once the PMS system is implemented, the continued compliance with the requirements for checks, overhauls and repairs, where needed, indicated in [1.2] is to be verified by means of annual audits and confirmatory surveys in order to confirm the validity of the approved survey scheme system.

1.8.2.2. The annual audit and confirmatory surveys are to be carried out in conjunction with the annual class surveys.

1.8.2.3. The purpose of this audit is to verify that the scheme is being correctly operated, in particular that all items (to be surveyed in the relevant period) have actually been surveyed in due time. A general examination of the items concerned is carried out.

1.8.2.4. The maintenance and performance records are examined to verify that the machinery has been functioning satisfactorily since the previous survey or audit or, if necessary, that the necessary measures have been taken in response to machinery operating parameters exceeding acceptable tolerances, and that the overhaul intervals have been observed.

1.8.2.5. Written reports of breakdown or malfunction are to be made available.

1.8.2.6. The description of the repairs, if any, carried out is to be examined. Any machinery part or component which has been replaced by a spare due to damage is to be retained on board, where possible. On this occasion such replaced parts are to be submitted to the examination of the Surveyor.

1.8.2.7. Where condition monitoring equipment is in use, functions tests, confirmatory surveys and random check readings are to be carried out as far as practicable and reasonable, at the discretion of the Surveyor.

1.8.2.8. The Surveyor also checks that the personnel on board in charge of the PMS have the appropriate authorisation (Refer this Chapter, Appendix 2).

1.8.2.9. An annual report covering the years' service is to be supplied to the Society. It is to include the following information:

- the list of items of machinery and components (item b) in [1.3.1]) and the procedures for their identification
- the preventive maintenance sheets
- the condition monitoring data, including all data since the last dismantling and the original reference data of the machinery checked through condition monitoring
- any changes to the other documentation in [1.3.1]
- Full trend analysis (including spectrum analysis for vibrations) of machinery displaying operating parameters exceeding acceptable tolerances.

The Surveyor is to review this annual report or verify that it has been reviewed by the Society.

1.8.2.10. The Surveyor carries out a confirmatory survey of the items which have been surveyed by the Chief Engineer and decides which items can be credited for maintenance of machinery items classification, on the PMS list of items.

1.8.2.11. Upon the satisfactory outcome of this audit, the Surveyor confirms the validity of the PMS by endorsing the Certificate of Classification.

## **1.9. DAMAGE AND REPAIRS**

1.9.1. Damage to components or items of machinery covered by the PMS which may affect the class is to be reported to the Society. Where applicable, a Surveyor will attend on board, survey the damaged items and, on the basis of the survey results, decide whether recommendations are to be imposed.

1.9.2. All parts of machinery or components which need to undergo substantial repairs are to be surveyed before, during and after the repairs, as deemed appropriate by the Surveyor.

Any repair and corrective action regarding machinery under PMS system shall be recorded in the PMS logbook.

1.9.3. In the case of overdue recommendations or records of unrepaired damage which may affect the PMS, the relevant items are to be taken out of the PMS until the recommendations have been fulfilled or the repairs carried out.

## **1.10. MACHINERY ITEMS SURVEYED ON THE BASIS OF CONDITION MONITORING**

1.10.1. The extent of condition-based maintenance and associated monitoring equipment to be included in the maintenance scheme is decided by the Owner. The minimum parameters to be checked in order to monitor the condition of the various machinery for which this type of maintenance is accepted are indicated in [1.10.2] to [1.10.5]

1.10.2. For the main diesel engine the parameters to be checked are the following:

- power output
- rotational speed
- indicator diagram (where possible)
- fuel oil temperature and/or viscosity
- charge air pressure
- exhaust gas temperature for each cylinder
- exhaust gas temperature before and after the turbochargers
- temperatures and pressure of engine cooling systems
- temperatures and pressure of engine lubricating oil system
- rotational speed of turbochargers
- vibrations of turbochargers
- results of lubricating oil analysis
- crankshaft deflection readings
- temperature of main bearings

1.10.3. For the main and auxiliary steam turbines the parameters to be checked are the following:

- turbine bearing vibrations
- power output
- rotational speed
- plant performance data, i.e. steam conditions at the inlet and outlet of each turbine, saturated, superheated and de-superheated steam conditions at the outlet of boilers, condenser vacuum, sea temperature

1.10.4. For the auxiliary diesel engines the parameters to be checked are the following:

- exhaust gas temperature before and after the turbochargers
- temperatures and pressure of engine cooling systems
- temperatures and pressure of engine lubricating oil system
- rotational speed of turbochargers
- crankshaft deflection readings

1.10.5. For other auxiliary machinery the parameters to be checked are the following, as applicable:

- inlet and outlet temperatures of cooling systems
- inlet and outlet temperatures of heating systems
- vibrations and performance data of pumps and fans
- differential pressure at filters

**APPENDIX 2 CSM AND PMS SYSTEMS: SURVEYS  
CARRIED OUT BY THE CHIEF ENGINEER  
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**1.1. CONDITIONS**

- 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. The Chief Engineer must be a permanent employee of the Company. When the Company applies for the appointment of a Chief Engineer with the Society for the first time, he or she must have been working in this position for a reasonable period of time or have possessed the recognition of the Society for another Company by which he or she was employed. He or she must hold a certificate of competency as provided by STCW 95 Convention for the power of the main propulsive installation of the ship. He or she must have at least three years of seagoing experience as Senior Engineer Officer on ships of the type (motor or steam ship) for which the authorization is requested. The authorization may be given for both the propelling systems.
- 1.1.3. The Owner is to submit a written application to the Society requesting the authorization of a Chief Engineer together with his or her curriculum vitae, providing in particular:
- name(s) and surname
  - date of birth
  - professional certificates with date of issue
  - appointment date in the Company and, if applicable, reference to preceding authorization(s) obtained from the Society when employed in other Companies (number, date, period)
  - list of the different appointments since the acquisition of the certificate, specifying the names of ships with their types of propulsion, the period of each appointment and the rank in each appointment
  - technical training and courses

The Owner is to keep the Society informed about any changes concerning the Chief Engineers employed with his Company due to resignations, alternations, etc.

- 1.1.4. If the application for the recognition of the Chief Engineer is accepted, the Society sends a "Letter of authorization "to the Owner, who will arrange to forward it to the Chief Engineer in question.
- 1.1.5. This letter allows him or her to carry out the survey of the machinery items when the CMS system or PMS system, as applicable, is implemented on board ships, in accordance with the requirements indicated in [1.2.1] and [1.2.2], respectively The Owner is also to provide the Chief Engineer with a copy of this Appendix, enabling him or her to familiarise himself or herself with the conditions, scope and limits of his or her interventions. The authorization ceases to be valid when the Chief Engineer leaves the Company.

**1.2. LIMITS OF THE INTERVENTIONS**

1.2.1. For ships where the CMS system is implemented, the following items of the class renewal survey for machinery cannot be inspected by the Chief Engineer:

- pressure vessels
- 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

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.

1.2.2. For ships where the PMS system is implemented, all items covered by the system can be surveyed by the Chief Engineer, with the exception of pressure vessels.

1.2.3. In no case may the surveys of tail shafts and boilers, which are items not included in the scope of the class renewal survey, be carried out by the Chief Engineer.

**1.3. PROCEDURE FOR CARRYING OUT SURVEYS****1.3.1. General**

1.3.1.1. 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

It is the responsibility of the ship's Captain 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.

1.3.2. Main diesel engines

1.3.2.1. 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

1.3.3. Auxiliary diesel engines

1.3.3.1. The survey generally consists of 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

1.3.4. Reciprocating compressors

1.3.4.1. 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

**1.3.5. Coolers, condensers, heaters****1.3.5.1. 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

**1.3.6. Electrical switchboard****1.3.6.1. 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.

**1.3.7. A.C. and D.C. generators****1.3.7.1. 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 slip-rings
- the measurement of air gap clearances
- the checking of journals and bearings
- the megger test

**1.3.8. Other items (pumps, electric motors, etc.)****1.3.8.1. 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.****1.4. RECORDS OF SURVEYS CARRIED OUT****1.4.1. 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 shall be accepted.

The report may be provided in hard copy or using a computerised recording system

1.4.2. The report is to indicate the following information:

- identification data:
  - name of ship and register number
  - name of Chief Engineer and reference of the Society's authorization
  - 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.

## **1.5. CONFIRMATORY SURVEY**

1.5.1. 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 system, 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 system, at the next annual audit (Refer this Chapter, Appendix 1, [1.8.2])

1.5.2. The Surveyor is to be supplied with a copy of this survey report and also shown in the engine log-book.

1.5.3. 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.

1.5.4. If the persons on board are authorized to survey the main engine crankshaft and bearings (see [1.2.2]) the Surveyor performs the following:

- check of condition monitoring records (Refer this Chapter, Appendix 1, [1.10.2])
- 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

1.5.5. 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.

1.5.6. The date of the execution of the surveys will be assumed to be the date of the confirmatory survey.

#### **1.6. SUSPENSION OF THE CHIEF ENGINEER'S AUTHORIZATION**

1.6.1. Where the condition of the items surveyed by the Chief Engineer as specified in his or her reports does not correspond to the findings of the attending Surveyor, the Society may suspend the validity of the Chief Engineer's authorization.

1.6.2. The Society may also suspend the validity of the Chief Engineer's authorization in case of doubt on the general maintenance of the machinery installation

## **CHAPTER 4 PROCEDURAL REQUIREMENTS FOR APPROVAL OF SERVICE PROVIDERS**

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## **SECTION 1 GENERAL**

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**1.1. APPLICATION**

- 1.1.1. Firms providing services on behalf of the owner of a ship or a mobile offshore unit, such as measurements, tests or maintenance of safety systems and equipment, the results of which are used by Surveyors in making decisions affecting classification are subject to approval by the Society in accordance with the requirements of this chapter
- 1.1.2. Where surveyors use such services in making decisions affecting statutory certifications, the firms are subject to approval by the Society where the Society is so authorized by the relevant flag Administration. For such services the Society may accept approvals done by the flag Administration itself or duly authorized organizations acting on behalf of the flag Administration.
- 1.1.3. Firms providing services described in 1.1.1 and 1.1.2 shall be hereinafter referred to as “suppliers” or “service providers”

**1.2. APPROVAL PROCEDURE**

- 1.2.1. Suppliers requiring approval as per [1.1] shall prove the adequacy of their operation system with respect to resources, competence and quality assurance system, as per the procedural requirements set forth in section 2, except as provided in [1.2.4] to [1.2.6]
- 1.2.2. Additional requirements as per section 3 would be applicable for the following categories of suppliers:
- Firms engaged in thickness measurements on ships
  - Firms engaged in tightness testing of hatches with ultrasonic equipment
  - Firms carrying out in-water survey of ships and mobile offshore units
  - Firms engaged in surveys and maintenance of fire extinguishing equipment and systems
- 1.2.3. Specific requirements for suppliers of categories other than those described in [1.2.2] shall be specially considered.
- 1.2.4. A modified approval procedure may be adopted by the Society, where the supplier proposes to prove its compliance with the requirements set forth in this chapter by means other than those described in this chapter, acceptable to the Society.
- 1.2.5. Deviations from the requirements of this chapter may be permitted by the Society, if the Technical Committee is satisfied that the operation system adopted by the supplier provides reasonable equivalence to the requirements of this chapter in terms of having same level of reliability of the services provided by the supplier as envisaged by the regulations of this chapter.
- 1.2.6. Suppliers having approval from other recognized classification societies may be, at the discretion of the Society, waived from the requirement an audit as per [2.4.1] based on the satisfactory review of documentation as per 2.1 and a satisfactory demonstration test as per [2.4.2].

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**2.1. SUBMISSION OF DOCUMENTS**

2.1.1. The following documents are to be submitted to the Society for review.

2.1.1.1 Outline of company, e.g. organization and management structure, including subsidiaries to be included in the approval/certification

2.1.1.2 List of nominated agents

2.1.1.3 Experience of the company in the specific service area

2.1.1.4 List of operators/technicians/inspectors documenting training and experience within the relevant service area, and qualifications according to recognized national, international or industry standards, as relevant

2.1.1.5 Description of equipment used for the particular service for which approval is sought

2.1.1.6 A guide for operators of such equipment

2.1.1.7 Training programs for operators/technicians/inspectors

2.1.1.8 Check lists and record formats for recording results of the services provided

2.1.1.9 Quality Manual and/or documented procedures covering requirements in 2.3

2.1.1.10 Evidence of approval/acceptance by other bodies, if any

2.1.1.11 Information on the other activities which may present a conflict of interest

2.1.1.12 Record of customer complaints and of corrective actions requested by certification bodies

2.1.1.13 Where relevant, list and documentation of licenses granted by equipment's manufacturer

**2.2. GENERAL REQUIREMENTS**

2.2.1. **Extent of Approval:** The supplier shall demonstrate, as required by [2.2.2] to [2.2.9], that it has the competence and control needed to perform the services for which approval is sought.

2.2.2. **Training of personnel** – The supplier is responsible for the qualification and training of its personnel to a recognized national, international or industry standard as applicable. Where such standards do not exist, the supplier is to define standards for the training and qualification of its personnel relevant to the functions each is authorized to perform in agreement with the Society. The personnel shall also have an adequate experience and be familiar with the operation of any necessary equipment. Operators/technicians/inspectors shall have had a minimum of one (1) year tutored on-the-job training.

- 2.2.3. **Supervision** – The supplier shall provide supervision for all services provided. The responsible supervisor shall have had minimum two (2) years' experience as an operator/technician/inspector within the activity for which the supplier is approved.
- 2.2.4. **Personnel records** – The supplier shall keep records of the approved operators/technicians/inspectors. The record shall contain information on age, formal education, training and experience for the services for which they are approved.
- 2.2.5. **Equipment and facilities** – The supplier shall have the necessary equipment and facilities for the service to be supplied. A record of the equipment used shall be kept. The record shall contain information on maintenance and calibration.
- 2.2.6. **Procedures** – The supplier shall have documented work procedures covering all services supplied.
- 2.2.7. **Subcontractors** – The supplier shall give information of agreements and arrangements if any parts of the services provided are subcontracted. Subcontractors shall also meet the requirements of this chapter as far as they are reasonable and applicable.
- 2.2.8. **Verification** – The supplier shall verify that the services provided are carried out in accordance with approved procedures.
- 2.2.9. **Reporting** – The report shall be prepared in a form acceptable to the Society. Guidelines as given in chapter 3, where applicable, shall be complied with. Where the regulations do not provide such guidelines, same shall be to the satisfaction of the surveyor. The report shall include a copy of the Certificate of Approval.

### 2.3. QUALITY ASSURANCE SYSTEM

- 2.3.1. The supplier shall have a documented system covering at least the following:
- Code of conduct for the relevant activity
  - Maintenance and calibration of equipment
  - Training programs for operators/technicians/inspectors
  - Supervision and verification of operations to ensure compliance with the approved operational procedures
  - Recording and reporting of information
  - Quality management of subsidiaries and agents
  - Job preparation
  - Periodic review of work process procedures, complaints, corrective actions, and issuance, maintenance and control of documents

- 2.3.2. A documented Quality Assurance system complying with the ISO 9000 standard or equivalent and including the above items, would be considered acceptable.

#### **2.4. AUDIT AND DEMONSTRATION TEST**

- 2.4.1. Upon reviewing the submitted documents with satisfactory result, the supplier is audited in order to ascertain that the supplier is duly organized and managed in accordance with the submitted documents, and that it is considered capable of conducting the services for which approval/certification is sought.
- 2.4.2. Certification is conditional on a practical demonstration of the specific service performance as well as satisfactory reporting being carried out.

#### **2.5. CERTIFICATION**

- 2.5.1. Upon satisfactory completion of both the audit of the supplier and the demonstration test, the Society will issue a Certificate of Approval stating that the supplier's service operation system has been found to be satisfactory and that the results of services performed in accordance with that system may be accepted and utilized by the Society's Surveyors in making decisions affecting classification or statutory certification, as relevant.
- 2.5.2. The type and scope of services and any limitations or restrictions imposed shall be clearly shown in the certificate of approval. The supplier will also be included in the Society's records of approved service providers.
- 2.5.3. The certificate of approval shall be valid for a period not exceeding five years subject to intermediate audit between the second and third anniversary date, and any additional audits as deemed necessary by the Society.
- 2.5.4. On satisfactory completion of audits, described in 2.5.3, the certificate of approval shall be duly endorsed.
- 2.5.5. Where a given company owns several servicing stations, each station shall be subject to approval procedure as per this chapter, to the extent deemed necessary by the Society.
- 2.5.6. In case where any alteration to the certified service operation system of the supplier is made, such alteration is to be immediately reported to the Society. Re-audit may be required when deemed necessary by the Society.

**2.6. CANCELLATION OF APPROVAL**

2.6.1. The Society reserves the right to cancel the approval in the following cases:

- Where the service was improperly carried out or the results were improperly reported.
- Where a Surveyor finds deficiencies in the certified service operation system of the supplier and appropriate corrective action is not taken, within the time frame stipulated by the Society.
- Where the supplier fails to report to the Society of any alteration as described in 2.5.6 or fails to prove to the Society the compliance of the operation system thus altered with the requirements of this chapter.
- Where intermediate or additional audits, as required by [2.5.3], has not been carried out to the satisfaction of the Society.
- Where willful acts or omissions are ascertained.
- Where the supplier fails to pay to the Society the fees applicable as per the societies tariff.

2.6.2. A Supplier which has had the approval cancelled may apply for re-approval after a period of six (6) months. This possibility is not open if the cancellation is based on a grave fault such as a violation of ethics.

## **SECTION 3 ADDITIONAL REQUIREMENTS**

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**3.1. FIRMS ENGAGED IN THICKNESS MEASUREMENTS**

- 3.1.1. **Extent of engagement** – Thickness measurement of structural material of ships.
- 3.1.2. **Supervisor** – The responsible supervisor shall be qualified according to a recognized national or international industrial NDT standard (e.g. EN 473 level II or ISO 9712 level II).
- 3.1.3. **Operators** – The operators carrying out the measurements shall be certified to a recognized national or international industrial standard (e.g. EN 473 level or ISO 9712 level I) and shall have adequate knowledge of ship structures sufficient to elect a representative position for each measurement.
- 3.1.4. **Equipment** – Instruments with pulsed echo technique are required for preservation of coating. The oscilloscope type or multiple echo with transmitter/receiver probe (twin crystal method) instruments are recommended.
- 3.1.5. **Procedures** – Work procedures are documented at least to contain information on survey preparation, selection and identification of test locations, surface preparation, protective coating preservation, calibration checks, and report preparation and content.
- 3.1.6. **Reporting** – The report shall be based on the guidelines given in chapter 3 of this section.
- 3.1.7. **Verification** – The supplier must have the Surveyor's verification of each separate job, documented in the report by his signature.

**3.2. FIRMS ENGAGED IN ULTRASONIC TIGHTNESS TESTING OF HATCHES**

- 3.2.1. **Extent of engagement**- ultrasonic tightness testing of hatches.
- 3.2.2. **Operators** – The operator is to have the following qualifications:
- Have knowledge of different hatch designs, their functioning and sealing features
  - Have experience with operation and maintenance of different hatch designs
  - Be able to document a theoretical and practical training onboard in using ultrasonic equipment specified.
- 3.2.3. **Equipment** – The ultrasonic equipment to be used shall be of a type approved by the Society. It shall be demonstrated to the satisfaction of the surveyor that the equipment is fit for the purpose of detecting leakage in hatch covers.
- 3.2.4. **Procedures** – The supplier shall have documented work procedures, which shall include the manual for the ultrasonic equipment specified, its adjustment, its maintenance, its operation and approval criteria.

**3.3. FIRMS CARRYING OUT IN-WATER SURVEY**

- 3.3.1. **Extent of engagement** – In-water survey of ships and mobile offshore units.

- 3.3.2. **Training of personnel** – The supplier is responsible for the qualification of its divers and the diving equipment utilized when carrying out survey. The following qualifications shall be documented:
- Knowledge of ship's underwater structure and appendages, tail shaft, propeller, rudder and its bearings, etc.
  - Ship's terminology in English
  - Under-water thickness gauging and non-destructive testing in accordance with a recognized national or international industrial NDT standard
  - Bearing clearance measurements on rudders and tail shaft
  - Under-water video monitoring with TV monitors on deck, as well as still picture work
  - Operation of under-water communication system
  - Special equipment and tools like hull cleaners, grinders, cutters, etc.
  - A plan for training of personnel in the reporting system, minimum Rule requirements for relevant ship types, ship's underwater structure, measuring of bearing clearances, the recognition of corrosion damage, buckling and deteriorated coatings, etc. shall be included.
- 3.3.3. **Supervisor** – The supervisor shall be qualified according to the supplier's general requirements and shall have minimum two (2) years' experience as a diver carrying out survey.
- 3.3.4. **Divers carrying out survey** – The diver carrying out the survey shall have had at least one (1) years' experience as an assistant diver carrying out survey (minimum 10 different assignments).
- 3.3.5. **Equipment** – The following shall be available:
- Closed circuit color television with sufficient illumination equipment
  - Two-way communication between diver and surface staff
  - Video recording device connected to the closed-circuit television
  - Still photography camera
  - Equipment for carrying out thickness gauging, non-destructive testing and measurements, e.g. clearances, indents, etc., as relevant to the work to be performed.
  - Equipment for cleaning of the hull
- 3.3.6. **Procedures and guidelines** – The supplier shall have documented operational procedures and guidelines for how to carry out the survey and how to handle the equipment. These shall include:
- Two-way communication between diver and surface
  - Video recording and closed-circuit television operation
  - Guidance of the diver along the hull to ensure complete coverage of the parts to be surveyed
- 3.3.7. **Verification** – The supplier must have the Surveyor's verification of each separate job, documented in the report by his signature.

**3.4. FIRMS ENGAGED IN SURVEYS AND MAINTENANCE OF FIRE EXTINGUISHING EQUIPMENT AND SYSTEMS**

- 3.4.1. **Extent of engagement** – The supplier shall have the professional knowledge of fire theory, firefighting and fire extinguishing appliances sufficient to carry out the surveys and to make the necessary evaluations of the condition of the equipment.
- 3.4.2. **Facility-** Provision for servicing at workshop of fire extinguishing system components such as portable extinguishers, non-portable extinguishers, hoses and nozzles, foam agent, etc. or servicing of fixed fire extinguishing installations and/or fire detection equipment on board ships and offshore units
- 3.4.3. **Servicing station-** Engaged in surveys and maintenance of fire extinguishing equipment is to be approved by the equipment's Manufacturer(s) as per a dedicated list of equipment.
- The service supplier shall provide proof of such license granted by equipment manufacturer(s)
- 3.4.4. **Documentation-**The Service Supplier shall have access to the relevant par Rules and Regulations and Guidelines, Ad-hoc IMO Resolutions and Circulars.

**3.5. FIRMS ENGAGED IN SURVEY AND MAINTENANCE OF LIFE SAVING APPLIANCES**

- 3.5.1. **Extent of engagement -** Servicing of inflatable life-rafts, inflatable lifejackets, hydrostatic release units and/or inflatable rescue boats
- 3.5.2. **Equipment-** IMO Res. A.761 (18) states recommendations on conditions for the approval of servicing stations for inflatable life-rafts which shall be observed as relevant
- 3.5.3. The Servicing Station is to be approved by the equipment's manufacturer(s) as per dedicated list of equipment.
- 3.5.4. The Service Supplier shall provide proof of authorized or licensed to service the particular makes and models of equipment for which approval is sought by the equipment's Manufacturer
- 3.5.5. **Procedures** The Service Supplier shall have documented procedures and instructions for carry out service of equipment.
- 3.5.6. The procedures shall include requirements to record the nature and extent of damages to and defects observed in equipment during servicing and repair work. This data shall be informed to the Class Society upon request

**3.6. FIRMS ENGAGED IN RADIO EQUIPMENT SERVICES AND TESTING OF RADIO COMMUNICATION EQUIPMENTS**

- 3.6.1. **Extent** - Inspection, testing, and/or measurement of radio equipment aboard ships or mobile offshore units for compliance with SOLAS regulations.
- 3.6.2. **Supervisor**- The supervisor shall be qualified minimum two (2) years' education from a technical school and experience as an inspector, and shall preferably hold a General Operator's Certificate(GOC).
- 3.6.3. **Radio inspector**--The inspector carrying out the inspection shall have passed the internal training of the Service Supplier in Radiotelephony, GMDSS, and initial and renewal surveys, as applicable. The inspector shall also have at least one (1) year's technical school and at least one (1) years' experience as an assistant radio inspector.
- 3.6.4. **Equipment** - The Service Supplier shall have the major and auxiliary equipment required for correctly performing the inspection. A record of the equipment used shall be kept. The record shall contain information on manufacturer and type of equipment, and a log of maintenance and calibrations.
- 3.6.5. A standard which is relevant to the radio equipment to be tested shall be available for the equipment and shall be cited in the inspection report.
- 3.6.6. **Software**- For equipment employing software in the conjunction with testing/examination, this software shall be fully described and verified.
- 3.6.7. **Instruments** -Equipment for measuring frequency, voltage, current and resistance. Equipment for measuring output and reflect effect on VHF and MF/ HF Equipment for measuring modulation on MF/HF and VHF (AM, FM, PM)

**3.7. FIRMS ENGAGED IN INSPECTIONS AND MAINTENANCE OF SELF CONTAINED BREATHING APPARATUS**

- 3.7.1. **Extent** - inspections and maintenance of self-contained breathing apparatus, Emergency Escape Breathing Devices (EEBD)
- 3.7.2. Procedures
- Service Suppliers are to have documented procedures and instructions on how to carry out the servicing of the equipment and/or system. These are to either contain or make reference to the Manufacturer's servicing manuals, servicing bulletins, instructions and training manuals, as appropriate

3.7.3. **Documents** - The Service Supplier is to have access to the following documents:

- Manufacturers' servicing manuals, servicing bulletins, instructions and training manuals, as appropriate
- Type Approval certificates showing any conditions which may be appropriate during the servicing and/or maintenance of self-contained breathing apparatus

3.7.4. **Equipment**

- Sufficient and appropriate spares and tools are to be available for repair, maintenance and servicing of self-contained breathing apparatus in accordance with the requirements of the Manufacturers
- These are to include, as required by the self-contained breathing apparatus equipment and/or systems:
  - Various scales to weigh items
  - Means to hydrostatically pressure test components/systems/storage bottles
  - Flow meters; and
  - Pressure gauges or manometers
  - Equipment for checking air quality
  - Recharging facilities for breathing apparatus

**3.8. FIRMS ENGAGED IN THE SERVICING AND MAINTENANCE OF LIFEBOATS, LAUNCHING APPLIANCES, ON-LOAD RELEASE GEAR AND DAVIT-LAUNCHED LIFERAFT AUTOMATIC RELEASE HOOKS**

3.8.1. **Extent** – Servicing and maintenance of lifeboats, launching appliances, on-load release gear and davit-launched life-raft automatic release hooks.

3.8.2. **Extent of Approval**

3.8.2.1 The contents of this procedure apply equally to manufacturers when they are acting as Service Suppliers.

Any Service Supplier engaged in the thorough examination, operational testing, repair and overhaul of lifeboats, launching appliances, on-load release gear and davit-launched life-raft automatic release hooks carried out in accordance with SOLAS regulation III/20 shall be qualified in these operations for each make and type of equipment for which they provide the service, and provide manufacturers documentary evidence that they have been so authorized or they are certified in accordance with an established system for training and authorization in accordance with MSC.1/Circ.1277, as amended.

3.8.2.2 In cases where an equipment manufacturer is no longer in business or no longer provides technical support, Service Suppliers may be authorized for the equipment on the basis of prior authorization for the equipment and/or long term experience and demonstrated expertise as an authorized service provider.

3.8.3. Qualifications

Service Suppliers shall be trained and qualified in the operations for which they are authorized, for each make and type of equipment for which they provide the service.

3.8.4. The Service Supplier shall require refresher training as appropriate to renew the Certification

3.8.5. **Equipment** - The Service Supplier is to have access to the following:

- Sufficient tools,
- sufficient materials, spare parts

3.8.6. Reporting - The report shall conform to the requirements of MSC.1/Circ.1206/Rev.1 (annex 1, paragraph 15). When repairs, thorough examinations and annual servicing are completed, a statement confirming that the lifeboat arrangements remain fit for purpose shall be promptly issued by the Service Supplier.

**3.9. FIRMS ENGAGED IN SURVEY USING REMOTE INSPECTION TECHNIQUES (RIT) AS AN ALTERNATIVE MEANS FOR CLOSE-UP SURVEY OF THE STRUCTURE OF SHIPS AND MOBILE OFFSHORE UNITS.**

3.9.1. **Extent** – Close-up Survey of ships' structure and mobile offshore units' structure by remote inspection techniques.

3.9.2. **Qualification of operators** – The supplier is responsible for the training and qualification of its operators to undertake the remote inspections. UAV Pilots are to be qualified and licensed in accordance with applicable national requirements or an equivalent industrial standard acceptable to the Society.

3.9.3. Training Plan – the supplier is to maintain a documented training plan for personnel. The plan shall include requirements for training in the minimum Rule requirements for the structure of relevant ships types and MOUs, the recognition of structural deterioration (including corrosion, buckling, cracking and deteriorated coatings) and use of the reporting system.

3.9.4. **Supervisor** – The supervisor shall be certified according to the recognized national requirements or an equivalent industrial standard and shall have a minimum of two years' experience in the inspection of ship's and/or MOU's structure.

3.9.5. **Operators** – The operator carrying out the inspection shall be certified according to the recognized national requirements or an equivalent industrial standard and have at least one year's experience as an assistant carrying out inspections of ship's and/or MOU's structure (including participation in a minimum of five different assignments).

The operators of those RIT which require, according to the international and national legislations, to be licensed for their use shall hold valid documentation issued by the appropriate Bodies (e.g. UAV Pilots are to be qualified and licensed in accordance with applicable national requirements).

3.9.6. Equipment –

- Remotely operated platform with data capture devices capable of operation within an enclosed space.
- Means of powering the platforms with sufficient capacity to complete the required inspections, including spare batteries if applicable.
- Data collection devices which may include cameras capable of capturing in high definition both video images and still images.
- Illumination equipment.
- High definition display screen with live high definition feed from inspection cameras.
- (When this is part of the RIT).
- Means of communication.
- Data recording devices, as applicable.
- Equipment for carrying out thickness gauging and/or non-destructive testing, as relevant to the work to be performed.

3.9.7. **Procedures** – The supplier shall have documented operational procedures and guidelines for how to plan, carry out and report inspections; how to handle/operate the equipment; collection and storage of data. These shall include:

- Requirements for preparation of inspection plans when UAV are part of the equipment flight plans shall be included.
- Operation of the remotely operated platforms.
- Operation of lighting.
- Calibration of the data collection equipment.
- Operation of the data collection equipment.
- Two-way communication between the operator, platform, Surveyor, other personnel such as support staff and ships officers and crew.
- Guidance of the operator to provide complete coverage of the structure to be inspected.
- Guidance for the maintenance of the remotely operated platforms, data capture and storage devices and display screens, as applicable.
- Requirements for the collection and validation of data.
- If data is to be stored, then requirements for location attribution (geo-tagging), validation and storage of data.
- Requirements for the reporting of inspections, including the recording of damages and defects found during inspection and repair work.

3.9.8. **Documentation** - The supplier shall maintain the following:

- Records of training.
- Operator statutory and regulatory certificates and licenses.
- Equipment register for UAVs, Robots, data collection devices, data analysis devices and any associated equipment necessary to perform inspections.
- Equipment maintenance manuals and records / logbook.
- Records of calibration.
- UAV logbook.

3.9.9. **Verification** – The supplier must have the Surveyor's verification of each separate job, documented in the report by the attending Surveyor(s) signature.

### **3.10. FIRMS ENGAGED IN REMOTE SURVEY GENERAL REQUIREMENTS**

#### **3.10.1. Extent of approval**

The service supplier is to demonstrate, as required by [3.10.1] to [3.10.11], that it has the competence and control needed to perform the services for which the approval is sought.

#### **3.10.2. Personnel**

- a) The remote inspection Service Provider should utilize competent personnel to perform remote inspection related services.

Depending on the nature of the job, different training programs should be provided by the remote inspection Service Provider to their operators. If recognized national/local authorities have qualification and training requirements, these should be considered as minimum standards. In addition to the applicable statutory and regulatory requirements, the remote inspection Service Provider is recommended to have mandatory standard requirements for the qualification and training/re-training of its personnel.

- b) **Inspection Knowledge**

If the remote inspection Service Provider's personnel are not sufficiently familiar with basic maritime and/or offshore asset designs, training should be provided. This training should include maritime and/or offshore nomenclatures in order to communicate effectively with the asset Owner/Operator and/or the attending Surveyor during the inspection

#### **3.10.3. Supervision**

The service supplier is to provide supervision for all services provided. The responsible supervisor is to have had a minimum of two years of experience as operator/technician/inspector within the activity for which the service supplier is approved. For a service supplier consisting of one person, that person is to meet the requirements of a supervisor.

#### **3.10.4. Personnel records**

The service supplier is to keep records of the approved operators/technicians/inspectors. The record is to contain information on age, formal education, training and experience for the services for which they are approved.



**3.10.5. Subcontractors**

The service supplier is to give information of agreements and arrangements if any parts of the provided services are subcontracted.

Particular emphasis is to be given to quality management by the service supplier in following-up of such subcontracts.

**3.10.6. Equipment and facilities**

The service supplier is to have the necessary equipment and facilities for the service to be supplied. A record of the equipment used is to be kept and available. The record is to contain information on maintenance and results of calibration and verifications.

Based on the intended application of the RIT (e.g., external offshore structure inspection, internal marine vessel cargo tank/hold/ballast/void inspections, wind turbine inspection, dropped objects inspection, Underwater Inspections in Lieu of Dry-docking (UWILD)), the specifications and capabilities of the hardware and software equipment may be different.

Onboard camera that provides adequate visual quality of still images, live-stream videos, and recorded videos. It is recommended the camera possess High-Definition (HD) resolution (e.g., 4K resolution for still images).

The RIT system should include an appropriate platform to display and replay visual data on location for the owner/Surveyor, including still images, live-stream videos, and recorded videos.

All frequencies used to support safety-critical functionality should be coordinated and licensed in accordance with the appropriate licensing regime, as applicable

**3.10.7. Control of data**

When computers are used for the acquisition, processing, recording, reporting, storage, measurement assessment and monitoring of data, the ability of computer software to satisfy the intended application is to be documented and confirmed by the service supplier. This is to be undertaken prior to initial use and reconfirmed as necessary.

The remote inspection Service Provider should have data security policies and procedures in place to verify that the data collected during the inspection and any data analyses are captured, transmitted, and stored in a secure way that has minimum vulnerability to unauthorized manipulation and distribution

3.10.8. Where several servicing stations are owned by a given company, each station is to be assessed and approved.

**3.10.9. Procedures and instructions**

The service supplier is to have documented work procedures and instructions covering all the services supplied.

Documented procedures and instructions should be available for the recording of damages and defects found during inspection, servicing and repair work. This documentation is to be made available upon request.

**3.10.10. Verification**

The service supplier shall verify that the services provided are carried out in accordance with approved procedures.

**3.10.11. Reporting**

The report shall be prepared in a form acceptable to the Society. The report should detail the results of inspections, measurements, tests, maintenance and/or repairs carried out. The report shall include a copy of the Certificate of Approval. The report shall be made available to the Surveyor.

**3.10.12. Documentation**

The remote inspection Service Provider should have an organized documentation system to confirm that service-related records are well maintained. It should include, but is not limited to:

- i) Documentation of the organizational and management structure.
- ii) Statutory and Regulatory Certificates: Required certificate of authorization from recognized national/local authorities or according to an equivalent industrial standard.
- iii) Equipment Registry: The Service Provider should obtain a registry of each operational device with OEM specifications, serial number, technical bulletins, software versions, and hardware alteration and customization history.
- iv) Training/Retraining Record: The training/retraining record should include all applicable information of personnel in terms of personal portfolio, training hours, dates, scores, and other company-specified categories
- v) Operations Logbook: The Service Provider should maintain a logbook to record all applicable operational information such as operation date, time, duration, malfunction incident, accident, etc.
- vi) Operations Manual: The Service Provider should have operations manuals for each RIV detailing the operating environments, inspection planning and procedures, as well as pre-operation checks and operational procedures.

- vii) Maintenance Logbook: The Service Provider should maintain a logbook to record maintenance activities, calibration certificates, and software revision for each device and payload module.
- viii) Safety Assessment Plan: The remote inspection Service Provider should have a documented plan in place that details how to assess potential risks and hazards, corresponding mitigation plans, and emergency procedures for response, escape and evacuation

## CHAPTER 5 REMOTE SURVEYS

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SECTION 1 APPLICATION

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**1.1. GENERAL**

A remote survey is a method used for carrying out survey through bi-directional communication with the vessel, by sharing images, video contents and digital photographs between concerned Surveyor and Ship for non-attendance verification of select surveys.

Remote survey program improves scheduling efficiencies and reduces operational disruptions. Remote Survey can complete select surveys on time without physical surveyor attendance. All requests are subject to International Register of Shipping (INTLREG) review and acceptance on a case-by-case basis.

The remote survey concept will be applicable for vessels engaged in International & Ocean going voyages as well as domestic vessels.

**1.2. DEFINITIONS**

**Remote Surveys:** method of obtaining survey process information equivalent to that obtained from site survey by applying digital and mobile internet technologies so as to realize survey without surveyor's attendance. Remote Surveys to be carried out by only by International Register of Shipping (INTLREG) exclusive surveyors.

**Livestreaming:** service using digital and internet technologies to realize synchronous transfer of audio and video.

**Survey Process information:** Contents of electronic documentation or live streaming will reflect ship structure, equipment condition or inspection process. Electronic survey documentation may include survey photos, videos, documents & information as well as statements of the Master and the Chief Engineer

**UAV:** an unmanned aerial vehicle which is maneuvered by wireless remote control equipment and self-provided program remote control device, controlled by a flight controller, and can be used to collect survey process information

**1.3. SURVEY PROCESS**

- 1.3.1. Request for surveys specifying reasons for requesting remote surveys.
- 1.3.2. International Register of Shipping (INTLREG) THO Business Support Officer reviews the request and confirms the feasibility, both in case of Survey in port or for ship in transit.
- 1.3.3. Document collection & Survey coverage.
- 1.3.4. Remote attendance is scheduled
- 1.3.5. Submission of survey reports and issuance of certificates for remote surveys shall be done following the same guidelines applicable for regular surveys
- 1.3.6. All remote surveys on board to be attended or supervised by senior officers (Master, Chief Engineer, Chief Officer, Second Engineer) in direct communication with International Register of Shipping (INTLREG) surveyor.

- 1.3.7. All relevant areas of the ship shall be shown as directed by the surveyor using video streaming or recordings

Survey related documents as requested in Survey Instruction to be collected by the Surveyor from the Master by e-mail. These documents to be attested by the Master prior to sending by e-mail or other electronic means

#### **1.4. REMOTE SURVEY**

A remote survey may be permitted in below cases:

- The vessels location is remote, and surveyor cannot reach in person.
- The vessel is at sea when damage or breakdown is sustained.
- The vessel is at a terminal or port or location where the services of a surveyor are not available or permitted.
- The port or terminal has been closed to any visitors, including Surveyors.
- Any health or safety concerns preventing free travel of Surveyors.
- Any other extraordinary situation preventing Surveyor attendance in person
- All requests are subject to International Register of Shipping (INTLREG) review and acceptance on a case-by-case basis
- Adoption of this program improves scheduling efficiencies and reduces operational disruptions

#### **1.5. EXEMPTIONS**

- Oil tanker which has hazard zone restrictions in using mobile devices will be assessed on case by case basis. While doing remote surveys, necessary safety precautions on using mobile phones, cameras in hazardous areas on tankers are to be taken.

**SECTION 2 CERTIFICATION**

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**2.1. ISSUANCE OF CERTIFICATES**

- 2.1.1. If the survey is completed to the satisfaction of the surveyor and on confirming that vessel meets the necessary regulatory/ rules requirement, surveyor may proceed to issue certificates or endorse the certificate whichever is applicable.
- 2.1.2. The surveyor conducting the remote surveys shall not proceed with issuance or endorsement of certificates if he/she is not fully satisfied with the surveys or find any deficiency or condition, which can affect the safety of ship or the crew.
- 2.1.3. During remote surveys, if surveyor finds any deficiency or condition of class which can affect the certificate to be issued or endorsed, International Register of Shipping (INTLREG) head office to be contacted

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**3.1. CLASSIFICATION SURVEYS**

The surveyor shall verify all areas of the vessel based on scope of survey as far as possible, in the same way when survey is done in person during attendance. Surveyor need to plan in advance and inform vessel the survey plan path, so that vessel can plan the bi-directional audio / video survey in accordance. Dry docking Survey does not come under preview of remote surveys.

Intermediate / Renewal surveys will also be considered on a case by case basis for an interim period and travel restrictions.

**3.2. CONDITION OF CLASS SURVEYS**

Condition of Class / Memoranda given to vessel can be closed on successful completion of rectification of finding. Proof / Evidence can be shown to the Surveyor during the arranged remote survey. Relevant documentation, closing reports with photographs can be send to the Surveyor by e – mail by the Master.

**3.3. MINOR DAMAGE AND REPAIR SURVEYS FOR HULL AND MACHINERY**

Minor damage and repair surveys for hull and machinery will be accepted through remote surveys. Damages shall be detailed- like hull minor contact damage- hull location and areas to be marked on the shell expansion plan. Similarly, for the machinery surveys, all details to be given so that Surveyor will get a good idea to the location and extent of damage. If minor repairs carried out by service provider / makers - repair report to be provided.

**3.4. EXTENSION OF SURVEYS (CLASS CONDITIONS, PROPELLER SHAFT, BOILER ETC.)**

Extension of Class Surveys, Class Conditions, and Boiler & Propeller shaft surveys will be permitted through Remote Surveys. The Owners/ Managers to provide valid reasons for extension of such surveys. Surveyor to witness where practical & applicable proper operation of these equipment's prior to extension. For equipment related extension surveys, the equipment need to be in normal operational condition at the time of extension.

**3.5. CONTINUOUS SURVEY MACHINERY (CSM)**

The 5 yearly approved continuous survey machinery cycle items carried out will be permitted to be credited after a remote survey. During the remote survey, the surveyor can be shown the items opened for inspection / running test and parameters as applicable. CSM Hull items will be considered on a case by case basis at the discretion of the RO.

**3.6. CHANGE OF OWNER, CHANGE OF VESSEL NAME & FLAG.**

Remote surveys for Change of Vessels name and Change of Vessel Owner / Flag will be permitted. These surveys may require more documentation. During the remote survey, the main documents relating to Registration Proof, Radio Station License and certification to be verified.

For Change of name, survey may be more complex. Surveyor need to verify whether vessels name has been changed on the hull & other areas are as per requirement. Vessels new name also to be marked in various LSA- Life boats, life rafts, life buoys & life jackets as applicable.

For vessels plans / Manuals which require endorsement for name change- a letter will be issued after Remote Survey stating all manuals / plans stated in letter require changes has been approved and will be endorsed at the next Surveyor attendance. Master to keep this class letter for Port State or other inspections. For vessel certification, corrected certificates will be send by Surveyor to Vessel Managers on completion of Remote Surveys.

In worst case scenario, if Owners/ Managers request Surveyor attendance due to commercial reasons, surveyor will attend but time spend on board by Surveyor will be minimized and only for these certification works. This certification can also be arranged in an office environment arranged by Owners when there is travel / movement restriction.

**SECTION 4 AUDITS AND OTHER SURVEY****Contents**

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**4.1. ISM, ISPS, MLC AUDITS & COMPANY DOC AUDITS.**

The mentioned vessel related management audits and Company DOC audit will be permitted for Remote Surveys. Bi- directional communication with crew and relevant surroundings areas sighting will be carried out for this remote survey.

ISM, ISPS, MLC audits- Interim, transitional, Intermediate & Renewal audits will be considered for remote surveys. Company DOC audits- Annual & Renewal DOC audits will be considered for remote surveys. Interviews of relevant crew or staff shall be done using Skype or WA by the auditor remotely and shall be documented. All other audit procedures shall be followed as applicable.

**4.2. IN WATER SURVEY**

“In Water Surveys” underwater diver surveys will be permitted for remote surveys. Authorization for carrying out “In water Survey” to be taken in advance from Flag / RO as required. Service Provider carrying out the “In Water Surveys” will have to be approved by International Register of Shipping (INTLREG). The Master / Chief Engineer on board will witness the diving operation with the Surveyor, where applicable and attest the divers report.

**4.3. ALL STATUTORY SURVEYS TO THE SCOPE OF ANNUAL SURVEYS**

Statutory Surveys to the scope of annual surveys will be considered on case by case basis and is subject to concurrence from the flag administration. The surveyor shall verify all areas of the vessel based on scope of survey as far as possible in the same way when survey is done in person during attendance. Surveyor need to plan in advance and inform vessel the survey plan, so that vessel can plan the bi-directional audio / video survey in accordance.

In all cases, the mandatory annual services for LSA / FFA / Radio services has to be carried out during the remote surveys by International Register of Shipping (INTLREG) approved Service Providers.

**4.4. STATUTORY FINDING RELATED TO DOCUMENTATION OR AVAILABILITY OF SPARES ON BOARD.**

Statutory findings related to documentation or availability of spares will be carried out by remote surveys. Evidence of closure by way of documents and physical verification to confirm on board availability will be carried out by remote surveys.

**4.5. SINGLE DELIVERY VOYAGES**

Remote Surveys for Single delivery voyage (SDV) for active “Ships in Service” will be permitted. These vessels must have no outstanding recommendations nor any overdue certificates. In some cases, where Surveyor attendance is required- attendance time on board will be limited to bare minimum to reduce exposure chances for all concerned.

Remote surveys cannot be applied to for Class (Renewal/ Intermediate) surveys or Enhance Survey Program (ESP) as they require dry-docking, thickness gauging, and repairs/renewals. However based on remote survey extension of class renewal or intermediate surveys may be considered in unavoidable circumstances

**4.6. SURVEYS NOT LISTED ABOVE**

For any other remote surveys not listed above, International Register of Shipping (INTLREG) will consider same on case by case basis, if Surveyor attendance in person for the survey is not possible



## ANNEX I

### Application for Remote Surveys

|                                      |  |
|--------------------------------------|--|
| <b>Name of Ship</b>                  |  |
| <b>Distinctive numbers / letters</b> |  |
| <b>IMO Number</b>                    |  |
| <b>Gross Tonnage</b>                 |  |
| <b>Port of Registry</b>              |  |
| <b>Year of built</b>                 |  |

|                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Reasons for Remote Survey</b><br><br>1.<br>2.<br>3.                                                                                                                                                                                                                                                                                                            |
| <b>Date of Survey:</b><br><br><b>Time of Survey:</b><br><br><b>Port / Anchorage of Survey:</b>                                                                                                                                                                                                                                                                    |
| <b>Planned trial date &amp; time for video streaming:</b><br><br><b>Proposed media for video streaming:</b><br><br><b>Mobile number:</b><br><br><b>Areas where mobile data may not be available:</b><br><br><b>Alternate means- Photograph / Video Clips:</b><br><br><b>Location of data storage planned:</b><br><br><b>Designated Person in charge on board:</b> |
| <b>Requested by Manager / Owner:</b><br>(Signature & Seal )                                                                                                                                                                                                                                                                                                       |



**If first survey by  
International Register of  
Shipping (INTLREG),  
like SDV surveys- docs  
to attach.**

- : 1. GA Plan
- 2. Ship Survey Status
- 3. Ship Registry Certificate.
- 4. Class / Statutory Certs.
- 5. LSA / FFA eqpt validity.

**If International Register  
of Shipping (INTLREG)  
Vessel only 3 and 5**

**Remarks for Office**



## ANNEX II

### Documents needed prior commencement of Remote Survey.

| Document                                                                                                                                                                                                                                 | Applicable |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| List of class and statutory certificates with validity                                                                                                                                                                                   | General    |
| General Photos of vessels including all decks / cargo spaces and accommodation                                                                                                                                                           | General    |
| Detailed plan for executing remote inspection by owners (and sequential flow of inspection and how). In accordance with the requirement given in IACS recommendation 42 "Guidelines for Use of Remote Inspection Techniques for surveys" | General    |
| List of all LSA FFA equipment service date and validity along with all safety and emergency drills dates                                                                                                                                 | SE,SR,SC   |
| Safety radio done by International Register of Shipping (INTLREG) approved company with reports (including SSAS/AIS etc.)                                                                                                                | SR         |
| Periodical inspections of LSA and FFA with reports                                                                                                                                                                                       | SE,SR,SC   |
| Last 10 port of calls and reports if available.                                                                                                                                                                                          | ISPS       |
| Latest CSR copy                                                                                                                                                                                                                          | General    |
| Copy of updated contact list of SOPEP                                                                                                                                                                                                    | IOPP       |
| Copy of BDN latest                                                                                                                                                                                                                       | IOPP       |
| Last entry copy of oil record book                                                                                                                                                                                                       | IOPP       |
| Last entry in log book on wheel house copy                                                                                                                                                                                               | General    |
| ODS record book copy (latest)                                                                                                                                                                                                            | IAPP       |
| Crew list latest                                                                                                                                                                                                                         | General    |
| Work and rest hour list of crew                                                                                                                                                                                                          | MLC,SMC    |
| Copy of crew duty list (latest).                                                                                                                                                                                                         | MLC,SMC    |
| Record of familiarisation done to the crew (latest)                                                                                                                                                                                      | MLC,SMC    |
| Copy of latest engine log book entry                                                                                                                                                                                                     | General    |
| Machinery alarm print out copy (latest).                                                                                                                                                                                                 | Class-M    |
| Latest minutes of safety meeting conducted on board                                                                                                                                                                                      | SMC        |
| Latest internal audit report by company on board                                                                                                                                                                                         | SMC,ISSC   |

| <b>Document</b>                                                                                                                                                                                                                                               | <b>Applicable</b> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Copy of accident / Incident report on board                                                                                                                                                                                                                   | SMC, ISPS         |
| Latest procurement / order list                                                                                                                                                                                                                               | SMC               |
| Declaration from master that no modification/ no incident/ accident occurred to the vessel and all its equipment's including machinery on board are in good working conditions after last inspection on board by International Register of Shipping (INTLREG) | General           |
| Copy of magnetic compass deviation chart                                                                                                                                                                                                                      | SE                |
| Copy of visitor log entry (latest)                                                                                                                                                                                                                            | ISPS, SMC         |
| List of medical kit with validity dates                                                                                                                                                                                                                       | SE                |
| List of CSM (continuous survey machinery) to be credited.                                                                                                                                                                                                     | Class-M           |
| Copy of request of UW inspection to approved UW inspection company (if applicable). Also flag authorization for the same (if applicable)                                                                                                                      | IW                |
| Last DD report (for the case of intermediate and renewal)                                                                                                                                                                                                     | DD                |
| List of Tanks / Cargo spaces prepared for inspection (for the case of intermediate and renewal)                                                                                                                                                               | Class-H, ESP      |
| ESP report on board (for ESP vessels)                                                                                                                                                                                                                         | ESP               |
| Manufacture declaration along with paint application dates and type approval certificates (for AFS, if applicable)                                                                                                                                            | AFS               |
| Vessel drawings GA / Tank Plans / Stability booklet (if applicable; for vessels not class with International Register of Shipping (INTLREG))                                                                                                                  | SDV               |



## ANNEX III

### SURVEY PLANNING QUESTIONNAIRE FOR REMOTE SURVEY

This Survey Planning Questionnaire should be completed by the Owner/Manager, prior to the development of the Survey Program. It is essential that up-to-date information is provided when completing this questionnaire.

#### 1. Particulars

|                                    |  |
|------------------------------------|--|
| Ship name                          |  |
| IMO number                         |  |
| Flag State                         |  |
| Port of registry                   |  |
| Owner                              |  |
| Gross tonnage                      |  |
| Deadweight                         |  |
| Date of delivery                   |  |
| Assignment No.                     |  |
| Proposed date & time of inspection |  |

A specific Survey Program shall be worked out in advance of the remote Survey by the Owner/Manager in co-operation with International Register of Shipping (INTLREG). The Survey Program shall be in written format and the Survey shall not commence until the Survey Program has been agreed upon.

#### 2. Owner's inspections

The owner/manager shall provide declaration stating that no modification/ no incident/ accident occurred to the vessel and all its equipment's including machinery on board are in good working conditions after last inspection on board by International Register of Shipping (INTLREG).

## 3. Details of Spaces / Areas subjected under this survey.

| Hold/Tank No.              | Coating condition | Structural deterioration |
|----------------------------|-------------------|--------------------------|
| <b>Cargo holds</b>         |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
| <b>Tanks</b>               |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
| <b>Machinery spaces</b>    |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
| <b>Superstructure deck</b> |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
|                            |                   |                          |
|                            |                   |                          |

|                       |  |  |
|-----------------------|--|--|
| <b>Weather deck</b>   |  |  |
|                       |  |  |
|                       |  |  |
|                       |  |  |
|                       |  |  |
|                       |  |  |
| <b>Cargo Hatches</b>  |  |  |
|                       |  |  |
|                       |  |  |
|                       |  |  |
|                       |  |  |
|                       |  |  |
| <b>Void spaces</b>    |  |  |
|                       |  |  |
|                       |  |  |
|                       |  |  |
|                       |  |  |
|                       |  |  |
| <b>Access Hatches</b> |  |  |
|                       |  |  |
|                       |  |  |
|                       |  |  |
|                       |  |  |
| <b>Fore peak</b>      |  |  |
|                       |  |  |
| <b>Aft peak</b>       |  |  |
|                       |  |  |

| Miscellaneous          |  |  |
|------------------------|--|--|
| Pipe Tunnel            |  |  |
| cofferdams             |  |  |
| Access doors           |  |  |
| Ventilators/Vent heads |  |  |
| Chain locker           |  |  |
| Paint room             |  |  |
| Emg. Generator Room    |  |  |
| Co2 Room               |  |  |
| Store Room             |  |  |
| Others                 |  |  |

**4. Lifeboats / Free-fall boats Launching appliances & on-load release gear subjected under this survey**

| Lifeboat / Free-fall Boat No. | Annual through inspection & operational test | 5 Yearly thorough inspection & dynamic load test | Is it considered as rescue boat (yes/no) |
|-------------------------------|----------------------------------------------|--------------------------------------------------|------------------------------------------|
|                               |                                              |                                                  |                                          |
|                               |                                              |                                                  |                                          |
|                               |                                              |                                                  |                                          |

**5. Bottom survey subjected under this survey**

| Location                     | Any structural deterioration | Description of Examination |
|------------------------------|------------------------------|----------------------------|
| Side shell (P&S)             |                              |                            |
| Bottom & Bow plating         |                              |                            |
| Sea chest                    |                              |                            |
| Sea inlet & discharge valves |                              |                            |
| Rudder                       |                              |                            |
| Propeller & Aft Stern tube   |                              |                            |
| Transom                      |                              |                            |

**6. Machinery items subjected under this survey**

| Component                          | Condition | Description of Examination |
|------------------------------------|-----------|----------------------------|
| Main Engine                        |           |                            |
|                                    |           |                            |
| Auxiliary Engine / Generators      |           |                            |
|                                    |           |                            |
|                                    |           |                            |
| Emergency Generator                |           |                            |
|                                    |           |                            |
|                                    |           |                            |
| Main Switchboard                   |           |                            |
|                                    |           |                            |
| Aux Switchboard                    |           |                            |
|                                    |           |                            |
| Pumps                              |           |                            |
|                                    |           |                            |
|                                    |           |                            |
| Compressors                        |           |                            |
|                                    |           |                            |
| Quick closing valves               |           |                            |
|                                    |           |                            |
| Ventilation for CH & ME            |           |                            |
|                                    |           |                            |
| Incinerator                        |           |                            |
|                                    |           |                            |
| Bilge well for CH & ME             |           |                            |
|                                    |           |                            |
| Boiler                             |           |                            |
|                                    |           |                            |
| Oily water separator               |           |                            |
|                                    |           |                            |
| All Alarms (M/E, Co2, Boiler etc.) |           |                            |
|                                    |           |                            |
| Others                             |           |                            |
|                                    |           |                            |

**7. Following measurements / records to be submitted if applicable**

| Description                                                                                                                                   | Applicability               |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| M/E web deflection report                                                                                                                     | Applicable / Not Applicable |
| A/E web deflection reports                                                                                                                    | Applicable / Not Applicable |
| Axial clearance of shaft thrust bearings                                                                                                      | Applicable / Not Applicable |
| Insulation resistance (Mega test report)                                                                                                      | Applicable / Not Applicable |
| For M/E; the clearance of all bearings are to be measured if no overhauling are overdue acc. To Maker.                                        | Applicable / Not Applicable |
| Major spare part list                                                                                                                         | Applicable / Not Applicable |
| LO analysis reports incl. intermediate bearing, stern shaft bearing, boiler feed water analysis report and jacket cooling water analysis etc. | Applicable / Not Applicable |
| Propeller shaft wear down to be recorded.                                                                                                     | Applicable / Not Applicable |
| Rudder clearances to be measured & documented                                                                                                 | Applicable / Not Applicable |
| Anchor chain measurement                                                                                                                      | Applicable / Not Applicable |
| Thickness measurement report                                                                                                                  | Applicable / Not Applicable |
| LSA & FFA servicing reports                                                                                                                   | Applicable / Not Applicable |
| NC report from last internal / external audit (SMS)                                                                                           | Applicable / Not Applicable |
| Approved Radio technician company report including service report of related equipment                                                        | Applicable / Not Applicable |
| Others if any                                                                                                                                 |                             |



**8. Other inspections & load test subjected under this survey**

| Item                 | Description of Examination |
|----------------------|----------------------------|
| Cargo crane          |                            |
|                      |                            |
| Provisional crane    |                            |
|                      |                            |
| ER crane             |                            |
|                      |                            |
| Accommodation ladder |                            |
|                      |                            |
| Gangway              |                            |
|                      |                            |
| Ramp door            |                            |
|                      |                            |
| Others               |                            |
|                      |                            |

**9. Last 10 ports of call with reports**

| Ports | Reports status ( Applicable / Not Applicable) |
|-------|-----------------------------------------------|
|       |                                               |
|       |                                               |
|       |                                               |
|       |                                               |
|       |                                               |
|       |                                               |
|       |                                               |
|       |                                               |
|       |                                               |

**10. Any other inspections under this survey as included below**

|  |  |
|--|--|
|  |  |
|  |  |
|  |  |
|  |  |

Name of the Owner's representative

Name of the Surveyor

Signature:

Signature: \_\_\_\_\_

Date:

Date:

## CHAPTER 6 DRONES SURVEY

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## SECTION 1 APPLICATION

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**1.1. GENERAL**

An unmanned aerial vehicle (UAV), commonly known as a drone, is type of vehicle without a human pilot onboard. The UAV can be remotely controlled or programmed to fly a predetermined route using information on a specific asset's condition to target known areas of concern. It can collect visual data (such as still images, live-stream and recorded video) from difficult-to-reach structures and areas.

**1.2. REMOTE INSPECTION TECHNIQUE (RIT)**

A methodology of survey which allows the inspection of areas by means of devices and/or skilled personnel by making available all or at least equivalent information normally obtainable by the in-place

Intervention of the surveyor. It may be carried out by the use of remote inspection facilities such as:

- Divers
- Unmanned robot arm
- Remote Operated Vehicles (ROV)
- Climbers
- Drones
- Umbilical fiber cameras
- Other means acceptable to the Society

**1.3. ADVANTAGES OF DRONE SURVEYS:**

Survey preparation time is significantly reduced, allowing surveys to be carried out on short notice Staging is no longer required Rafting is eliminated

There is no damage caused to tank coatings Safety improves for surveyors, ship's crew and other personnel

**1.4. APPLICATION**

1.4.1. Drones reduce or replace the need for personnel to work at heights using conventional means of access (e.g., staging, scaffolding, rafting, etc.). It can be employed to periodically monitor temporary repairs which are inaccessible to reach areas. Damage that does not require immediate repair can be monitored through photographic evidence or other data analysis collected by UAVs. (Unmanned Aerial Vehicle)

1.4.2. Remote Inspection Techniques (RIT) shall be used to assist the attending Surveyor for visual examination of the structure as required.

1.4.3. RITs (Remote Inspection Technique) can be used as an alternative means for the close-up survey of marine and offshore structures in compliance with IACS UR Z17.

- 1.4.4. Additional Rule and Regulatory requirements are to be considered and incorporated into Survey Planning Documents for additional inspection methods such as hull gauging and nondestructive testing (NDT).
- 1.4.5. If an owner or operator intends to incorporate RITs (Remote Inspection Technique) into an International Register of Shipping (INTLREG) survey, the local International Register of Shipping (INTLREG) office shall be advised in advance for consideration. The intended use of the RIT (Remote Inspection Technique) may be incorporated into the Survey Planning Document.
- 1.4.6. Flag Administrations may have additional requirements or restrictions for the use of RITs (Remote Inspection Technique) during statutory surveys that shall be considered during survey planning.
- 1.4.7. The drone used is designed in such a way that even in dark, enclosed spaces, the area under inspection can be illuminated to capture high-resolution imagery. Drone surveys are carried out in real-time, with one surveyor operating the drone, while the second surveyor remotely monitors the video recording as it is streamed to a tablet. It is possible to re-examine particular details on the ultrahigh-resolution recording, e.g. through enlarging a specific location on the screen. In the event damage is detected via the recording, a traditional close-up survey may still be required.

## SECTION 2 DEFINITIONS AND ABBREVIATIONS

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**2.1. DEFINITIONS**

- 2.1.1. Drone” means rotorcraft (rotary wing aircraft) and similar aircraft that have been deemed appropriate by the Society, and refers to aircraft which cannot accommodate any person on board for structural reasons and can be flown by remote control (remotely piloted).
- 2.1.2. A person or Society, not employed by an IACS Member, recognized by International Register of Shipping (INTLREG) in the use of the remote inspection techniques. The Service Provider shall be qualified according an International Standard such as ISO 9001/2015 or equivalent. As an alternative, it shall have an internal Quality Management System.
- 2.1.3. “Drone operator” means a person who operates a drone by remote control.
- 2.1.4. “Inertial measurement unit” means a device having the function of detecting tri-axial acceleration and angular velocity, which are necessary for attitude control of a drone
- 2.1.5. “Platform” means an airframe equipped with a receiver, control module, speed controller, motor, propellers, battery, etc.
- 2.1.6. “Control module” means the sensors and flight controller that performs calculations, which are necessary for navigation and attitude control.
- 2.1.7. “Navigation” means the function of deciding the position, speed and attitude of a drone.
- 2.1.8. “Self-diagnosis function” means a function which is capable of informing the drone operator of the error when a malfunction occurs in the components that comprise a drone.
- 2.1.9. “Remote operating system” means the system which is necessary for remote control of a drone and camera; as used in these Guidelines, the remote operating system shall include a transmitter and monitor. Here, “monitor” means a device for confirming images or a device having a similar function
- 2.1.10. Close Up Survey
- 2.1.10. A survey where the details of structural components are within the close visual inspection range of the Surveyor,
- Close Visual Inspection (CVI): The examination carried out at a sufficient proximity of the area of inspection, i.e. the extent, scope, or distance in which a surveyor can personally operator in which its direct sensory visual experience is effective.
- 2.1.11. Hazardous areas: Areas where flammable or explosive gases, flammable or explosive dust are normally present or may be present.
- 2.1.12. Hazardous areas plan
- A plan of the spaces or zones subject to inspection where all hazardous areas, as defined

above, are clearly located.

#### 2.1.13. National Laws

Any law, decree or equivalent document issued by the Administration of the State under which the unit is flying its flag and by the Administration of State where the unit is operating

## **2.2. ABBREVIATIONS**

CVI - Close Visual Inspection  
OEM - Original Equipment Manufacturer (OEM)  
RAIM - Receiver Autonomous Integrity Monitoring)  
ROV - Remote operated vehicle  
RF - Radio Frequency  
RIT - Remote Inspection Technique  
RIV - Remote Inspection Vehicle  
SMS - Safety Management S RIV - Remote Inspection Vehicle system  
SOP - Standard Operation Procedure  
UAV - Unmanned Aerial Vehicle  
UWILD - Underwater Inspections in Lieu of Dry Docking  
VLOS - Visual Line Of Sight



## **SECTION 3 SERVICE PROVIDER CRITERIA**

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**3.1. SERVICE PROVIDER**

3.1.1. The drone service provider must be a provider which has approved by International Register of Shipping (INTLREG).

3.1.2. The drone service provider shall be selected under the responsibility of the applicant. Safety awareness training shall be part of the Service Provider's SMS

3.1.3. Service provider approved by International Register of Shipping (INTLREG) shall comply with all the requirements laid out in the Approval rules and standards.

3.1.4. Equipment

The remote inspection Service Provider can be an Original Equipment Manufacturer (OEM) of the RIV that is capable of providing inspection services to the asset Owner/Operator. The remote inspection Service Provider can also be an inspection service firm that utilizes RIVs manufactured by others. In either case, the quality standards of the equipment, including hardware and software, shall be maintained through equipment selection and maintenance.

3.1.5. Equipment Selection

Based on the intended application of the RIT (e.g., external offshore structure inspection, internal marine vessel cargo tank/hold/ballast/void inspections, wind turbine inspection, dropped objects inspection, Underwater Inspections in Lieu of Dry docking (UWILD), the specifications and capabilities of the hardware and software equipment may be different. The following shall be considered when selecting a remote inspection Service Provider, RIV and associated equipment

## SECTION 4 DRONE SURVEY PLAN AND MEETING

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**4.1. DOCUMENTATION**

4.1.1. Before conducting a survey, inspection plan using drone, including the information listed below, shall be submitted to the Society, and approval shall be obtained.

- Items of survey
- Equipment and materials to be used
- Equipment configuration
- Flight route (it is a precondition that the drone will not be flown near third parties)
- Composition of drone service supplier team (team of at least two persons is recommended)
- Certificate of qualification of drone operator
- Certificate of approval of drone service office (if deemed necessary by the Society)
- If necessary, approval by the national and/or local government with jurisdiction over the area where the flight will take place
- Method by which the Surveyor will confirm images during and after the flight
- Procedure for bringing equipment and materials into the survey site
- Emergency response plan with contact system in case of emergency
- Evacuation route
- Other drawings deemed necessary by the Society

4.1.2. The above-mentioned materials shall be prepared after performing a risk assessment in advance (including confirmation of explosion-proof area, handling in case of collision or crash, response during malfunction and in case data cannot be obtained, locus of responsibility, etc.)

**4.2. CONSULTATIONS**

4.2.1. Under the responsibility of the RIT Service Provider and under the permission of the Owner's representative, the operator(s) performs the remote inspection according to the instructions given by the attending Surveyor by taking in account all the operational limitations as agreed in the survey plan. A consultation shall carry out with the related parties, including the Surveyor, and agreement concerning the survey locations and procedure shall be obtained. Special care shall be taken to clear people from the area, and the weather, atmospheric temperature, wind speed, lighting and other factors related to the survey environment shall also be considered.

4.2.2. The attending surveyor may stop the execution of the survey at any time whenever he/she deems that the inspection is not carried out according to the provisions of the planning or the instructions provided to the operator and if necessary proceed with a normal survey.

## SECTION 5 SURVEY RESPONSIBILITY SCOPE, RISK, PLAN AND SUBMISSION OF REPORTS

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**5.1. SURVEY IMPLEMENTATION**

Plan before survey, preparation and discussion between the attending Surveyor, asset owner/shipyard representatives, and the remote inspection Service Provider is an integral part of the survey process. For details about the roles and responsibilities of different groups, refer to TABLE A below. Before commencing survey, a survey planning meeting shall be arranged between all parties to confirm the arrangements planned in the survey process are in place. A Survey Planning Document prepared by the asset Owner/Operator, with the inspection plan incorporated, shall be provided to the attending Surveyor for review and agreement.

**TABLE A RESPONSIBILITY AND PROCEDURES**

| <b>OWNER/OPERATOR</b>                                      | <b>DRONE SERVICE PROVIDER</b>                                                                                                    | <b>International Register of Shipping (INTLREG) CLASS</b>                              |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Selection of items of survey by Drone                      | Inspection plan to constitute                                                                                                    |                                                                                        |
| Selection of Drone service provider                        |                                                                                                                                  |                                                                                        |
| Selection of equipment to be used, decision of flight plan | Obtain approval of flight from local government (as applicable))                                                                 |                                                                                        |
| Send inspection plan using Drone to attending surveyor     |                                                                                                                                  | Receive inspection plan using Drone and review the proposed plan examination, Approval |
| Co-ordinate survey with surveyor and service provider      | Conduct the Drone inspection as per the survey plan to the satisfaction of International Register of Shipping (INTLREG) Surveyor | Confirm Class survey in compliance with Rules and Regulations and guide lines          |
| Review of survey reports submitted by Service supplier     | Submit reports to Owner and Class surveyor                                                                                       | Drone survey reports to verify and credit                                              |

The following topics shall be addressed during the meeting and included in the Survey Planning Document

**5.2. SCOPE**

The following information shall be considered in the Survey/Inspection Planning scope:

- i. Type and extent of survey (i.e., close-up survey/CVI, Annual Survey, Intermediate Survey, Special Periodical Survey, damage survey, etc.).
- ii. Asset type, operational details, and other asset general information
- iii. Arrangements for the attending Surveyor and third-party specialist to perform confirmatory inspections by conventional means and thickness measurements (i.e., safe access, cleaning/de-scaling, illumination, ventilation, etc.).
- iv. Location and anticipated timeframe for the survey, as well as operational status of the asset (i.e., shipyard, repair facility or lay berth, etc.).
- v. Logistics, including permissions from local authorities, site permissions, work permits, transportation, accommodations, etc.
- vi. Risk assessment, RIV operations plan, and Classification External Specialist certificate number of Service Provider.

### 5.3. RISK ASSESSMENT

Identification of any hazards related to planned remote operations and the need for risk control measures, a specific risk assessment shall be carried out. During the survey planning meeting and incorporated in the Survey Planning Document, the risk assessment be finalized. Each party shall acknowledge the risks associated with the remote inspection activities and agree to the mitigation plan associated with those risks.

Risk assessment shall:

- a) Explosion Risks in Hazardous Areas: If the remote operation is proposed within a hazardous area, the RIT system shall be rated for the intended classification level or the area shall be made safe for the equipment. The remote inspection Service Provider shall refer to the asset's Hazardous Area Plan for area identification and follow the Owner/Operator company-specified safe operation requirements if applicable. Typical factors to consider ,
  - Payload: Risks associated with the motor, camera, or other onboard modules
  - Battery: Risks associated with battery storage, usage, change out, and recharge
  - Operations: Risks associated with operational incidents/accidents
- b) Dropped Object Risks: In the event the RIV fails or malfunctions, it can become a dropped object hazard and become a danger to onsite personnel or the asset,
- c) Collision Risks: Collisions may occur due to unexpected change in the inspection environment, RIV malfunction(s), and/or human errors, including:
  - Collisions with other RIVs in operation, asset structures, operating machinery, or animals (e.g., birds, fish).
  - Collisions due to device communication interference or unexpected malfunction of the RIT system.
  - Collisions of UAV where visual line of sight (VLOS) is not maintained or upon unexpected interruption of pilot operation.
- d) Post Link Risks: Communication control links could be lost when a UAV is operated in an unreliable radio frequency (RF) environment or if nearby systems interfere with the UAV's RF. It is recommended to consider a spectrum or Receiver Autonomous Integrity Monitoring (RAIM) analysis to determine frequency strength, integrity and areas of possible interference. Typical factors to consider include, but are not limited to:
  - Sources of possible radio frequency (RF) interference such as microwave antennas and high voltage lines
  - Sources of possible electromagnetic disturbances of a GPS signal such as large steel structures in close proximity to each other

- e) Other Risks: Other risks shall be identified in terms of personnel health and safety, including:
- High-risk working areas that may contain high voltage, toxic gases, or hazardous contents
  - Risk associated with other ongoing operations in the area during RIV operations
  - Emergency scenarios requiring evacuation from the asset

#### **5.4. RIV OPERATIONS PLAN**

- 5.4.1. At the planning stage a RIV operations plan shall be developed and agreed upon by all parties. It is recommended that the RIV operations plan be prepared by the remote inspection Service Provider and the owner/operator/shipyard. The plan shall be developed based on the survey work scope and requirements as well as the asset's Hazardous Area Plan.
- 5.4.2. The Service Provider shall check with national/local authorities for any required RIV operations plan submittals or approvals needed prior to any RIV operations.
- 5.4.3. It is essential to the survey process to establish a video replay/image reviewing protocol. The recorded image quality shall significantly better than the live-stream video displayed during operation. A protocol shall be established and agreed upon by all parties to determine when and where the video/pictures shall be reviewed and when the results of the survey shall be decided.
- 5.4.4. A model RIV operations plan shall consists of the following information:
- i) RIV Operations Team: RIV operations team consist of at least three persons:
    - Pilot: Responsible for direct control of the RIV to maintain operation stability and accuracy.
    - Camera/Payload Operator: Responsible for direct control of the onboard camera and other intended modules to collect the data and coordination with the Surveyor.
    - Designated Safety Watch: Responsible for monitoring any potential safety hazards that may arise, and is empowered to give up the operation in the event abnormal situations.
  - ii) Equipment Selection :
    - Planned RIV Type and Specifications for the Intended Survey: Verify the capacity of the selected RIV(s) are appropriate for the survey being conducted.
    - Planned RIV Limits: Identify the selected RIV operating limitations and restrictions.
    - Planned Procedure for Bringing RIV(s) and Equipment into the Survey Site/Country: Identify the national/local authorities' requirements to bring RIV(s) and equipment into/out of the survey site/country.



- Planned Launch/Recovery Zones: Select potential locations for launch/recovery based on the supporting information provided by the asset Owner/Operator.
- RIV Operation Routes, Maps, or Diagram: RIV operation routes, maps, or diagram shall be developed to maximize the effectiveness and efficiency of the remote inspection for the intended structure based on the work scope.
- Planned Distances from the Structure: Altitudes, depths, and distances shall be determined based on local regulatory requirements and safety consideration.
- An emergency RIV operation plan shall be considered in case of an environmental change, malfunction of the RIV system, loss of link incident, or total loss of the RIV.
- A checklist of incident response shall be in available.
- If any external operations at night the operator shall provide a safety case, lighting and sufficient risk mitigation to avoid collision hazards at night.
- Distraction Management Strategies shall be developed to reduce the communication sources during the operation to keep RIV pilots' attention focused. All information be filtered or prioritized, and only appropriate messages convey to RIV pilots.
- Before external survey by a UAV, a Notice to Airman (NOTAM) shall be filed by the Service Provider for any potential affected airspace, as required.

iii) Communication Method:

- Means for reliable and constant communication shall be provided and maintained between all the RIV operations team members throughout the operation.
- A communications protocol between the attending Surveyor and RIV operations team shall be established.
- A survey procedural process between the attending Surveyor and RIV operations team shall be maintained.
- An intermediary (e.g., camera/payload operator) between the attending Surveyor and the pilot shall be present.

iv) Data Viewing Capability:

- Means for real-time data display.
- Means for video data replay/pictures reviewing.

v) RIV Operations – Modifications: Any changes to the RIV operations methodology shall be agreed upon by all parties, such as:

- The appropriate time for proposing a change to any RIV operations methods (e.g., during the operation, between operations or after data review).
- The intermediary (e.g., camera/payload operator) on the RIV operation team to whom changes will be proposed

## **5.5. PROCEDURES REMOTE INSPECTION VEHICLE (RIV) OPERATIONS**

### **5.5.1. Pre-Survey**

Before the commencement of the RIV operations, a short briefing session and job safety analysis (JSA) shall be held for all participating personnel addressing, the following items:

- i) Confirm the work scope of the intended RIV operations and survey/inspection plans.
- ii) Assess the field condition and determine if any amendments to the RIV operations plan are necessary.
- iii) Verify the responsibilities of all personnel, including the representatives from Owner/Operator, International Register of Shipping (INTLREG) Surveyor and RIV operations team.
- iv) Review identified risks and associated mitigation plans.
- v) Review the emergency escape/evacuation plan.
- vi) Review permit to work requirements.
- vii) Review RIV maintenance records to verify that pre-operations and periodic inspections are up-to-date and the RIV is seaworthy/airworthy in all respects.
- viii) Review weather forecast to determine the meteorological conditions (e.g., wind speed, waves, ocean current, rain, etc.) for external inspections.
- ix) Verify proper personal protective equipment (PPE).
- x) Confirm the inspection area/tank surface is clean and devoid of mud, grime, and marine growth.
- xi) For ROV, confirm the enclosed space free of sediments which may be easily stirred by the ROV to reduce the visibility.

Any party shall have the authority to immediately give up the operation at any time if deemed necessary.

### **5.5.2. While at survey**

The remote inspection Service Provider shall possess an organizational Standard Operation Procedure (SOP) for each RIV operation. The following action items are recommended to be included in the SOP, at a minimum:

- i) Checklist Clearance: The checklist shall contain relevant system checks, inspection condition checks, personnel readiness checks, communication equipment checks, and

- testing RIV operation checks (e.g., flight for UAV, magnetic capability for crawler, underwater operation for ROV).
- ii) RIV Launch and Recovery Zones: For typical restrictions of launch and recovery zones to be considered.
  - iii) Communication: If the communication signal is lost or experiences significant interference, the operation shall quit immediately. The time and duration of each lost-link event shall be recorded by the RIV operations team and reported through the incident reporting system in Safety Assurance.
  - iv) Documentation: Whenever conditions that do or may affect Class are observed during operations, reference data (i.e., still image capture, location and orientation in relation the vessel, etc.) shall be properly documented for final reporting and be documented in the operations and maintenance logbooks.
  - v) Visual Line of Sight (VLOS) for UAVs: Some aviation authorities require human direct and unaided VLOS be maintained throughout the operation. VLOS shall be maintained even if no regulatory requirement applies. Extended VLOS (EVLOS) or beyond VLOS (BVLOS) can be accepted upon agreement by all parties when no regulatory requirements apply.
  - vi) De-confliction for UAV: Procedures shall be in place so that adequate de-confliction with helicopters or surface vessels servicing the asset is achieved (e.g., There shall be no UAV operations for external inspection within 30 minutes prior to scheduled helicopter activities).

The attending Surveyor shall be present and direct the RIV operations team, as needed, with regard to the survey requirements.

### 5.5.3. **After Survey**

- i) Logging:
  - RIV operational details shall be logged, including time of launch, duration of the operation, time of recovery, and the type of work completed.
  - Maintenance or technical adjustments conducted during the operation shall be documented.
  - Any accidents or near misses observed during the operation shall be documented and reported to all parties so that the decision to abort the work or other adjustments can be made in a timely manner. If it is required by local laws and requirements (e.g., USA FAA, UK CAA, etc.), the incident or near miss may also need to be reported to local regulatory authorities.
- ii) Maintenance:
  - After survey maintenance may be required according to the OEM instructions and shall be completed immediately after RIV operations, as applicable.
  - Maintenance shall be performed safely and efficiently to minimize the impact to onsite personnel and the asset.

iii) On-site Battery Handling:

- Battery checks shall be conducted and documented to confirm the reliability of the battery's safety and endurance for the next operation.
- Batteries shall be clearly marked for maintenance and recharged.
- Batteries shall be stored and recharged in fire proof containers.
- Transportation of the batteries shall comply with applicable regulations and work site requirements.
- Damaged or underperforming batteries shall be removed from service.

**5.5.4. Data Review**

Digital data is to be reviewed in real-time and/or submitted to the attending Surveyor as agreed in the survey planning stage. The following criteria shall be considered to evaluate the visual data collected by a RIT system:

- i) Image (picture and video) quality shall be adequate to make a meaningful assessment of the structure condition and to identify possible anomalies which may affect Class or the crediting of a Class Survey. Potential factors affecting image quality include:
- Poor image resolution
  - Image out of focus
  - Occluded camera lens (e.g., rain, snow, dust, on lens)
  - Inadequate lighting
  - Unstable RIV
  - Dark or shadowy areas
  - Glare from strong lights or the sun
  - Grime, mud, or marine growth on tank surface
  - Reduced visibility from sediments inside enclosed space stirred up by ROV
  - Lost connectivity between RIV and on-site video monitors (e.g., stuttering frame rate or inconsistent stream speed)
- ii) If an anomaly is suspected or determined to affect Class or the crediting of a Class Survey, the image quality shall enable the Surveyor/Inspector to further identify the nature, severity level, and approximate dimension (if applicable).
- iii) Video footage, live-streaming and recorded data, shall be uninterrupted. In the case of any breaks, gaps, or interruptions in the data, the Surveyor and owner/operator shall be notified. The date and time are recommended to be stamped on images (picture and video)

- iv) Structural member identification data shall be collected, especially associated with anomalies affecting Class, in a way that such data can be tracked afterwards.

As agreed upon by all parties during the planning stage, recorded data is to be available for Surveyor review:

- i) On-site so that additional RIV operations can be made if necessary, or
- ii) Off-site within a specified time period so that additional RIV operations or other alternative inspection methods can be arranged if necessary.

Proper equipment shall be arranged by the asset Owner/Operator and the Service Provider to enable the attending Surveyor to review the data. The Surveyor may require additional inspections using other alternative or traditional inspection techniques depending on the conditions found and results of inspection.

#### 5.5.5. Data Post-Processing

Some remote inspection Service Providers offer post-processing of data for further evaluation after the remote inspection. Advanced post-processing techniques may include:

- i) Advanced image processing to perform anomaly measurement (e.g., crack dimension measurement, corrosion area measurement, or space volumetric measurement)
- ii) Artificial intelligence for pattern recognition of cracks, fractures, or corrosion
- iii) Data analytics for anomaly trending and prediction
- iv) 3D model generation for data integration and reporting

These enhanced post-processing techniques can be particularly beneficial for an asset where life expectancy is important, such as those engaged in site-specific operations. The use of the post-processing of data is at the discretion of the Owner/Operator. However, if such post-processing data reveals conditions which can or do have an immediate impact on Class and were not identified during the survey, International Register of Shipping (INTLREG) to be notified.

#### 5.5.6. Submission Of Reports

The remote inspection Service Provider shall prepare a report which identifies the asset and structure inspected. Any descriptive information associated with the class survey shall be factual and objective. If the asset Owner/Operator has contracted the remote inspection Service Provider to provide additional data, technical support or recommendations outside the scope of the class survey, such information shall be provided in a separate report.

The report submitted to International Register of Shipping (INTLREG) is to include:

- i) General particulars of the asset, including asset name, Classification identification number, port of registry, and year of build.

- ii) Survey information, including survey type and cycle number, locations of the structure or space that was surveyed, and inspection results (satisfactory, further inspection required, or repair required). The recorded inspection result is at the discretion of the Surveyor. The specific inspection areas identified in the Survey Planning Document shall be detailed in the report.
- iii) Remote inspection Service Provider's information, including company name, Classification External Specialist certificate number, RIV operation team members' names, the RIV model name used during the survey, and dates of inspection.
- iv) Details of the RIV operation record, including launch time, operation period, and recovery time.
  - a) Any digital data (e.g., pictures and videos) supporting the crediting of class-related activities.
  - b) Each inspection report is to be endorsed by the Service Provider technician, Owner and Surveyor.
  - c) Video shall be uninterrupted. Any breaks, gaps, or interruptions in the video, shall be documented in the report.

## CHAPTER 7 GUIDELINES TO PERFORM RESIDUAL LIFE ASSESSMENT OF STEEL SHIPS

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## **SECTION 1 GENERAL**

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**1.1. GENERAL**

- 1.1.1. The application of this chapter is not a mandatory requirements for maintaining the classification of a vessel. It is considered to be a comprehensive and independent examination of the ship, accompanied by a thorough evaluation of the Hull Structures' residual life under all expected internal and environmental stresses.
- 1.1.2. The class notation **"RB"** will no longer be used for any vessel requesting a residual life assessment as of the date of publication of **Rev. 03, 2024, of the "Rules."** However, vessels already have been assigned, or have been contracted to be assigned, can continue according to the "RB" class notation.
- 1.1.3. Alternatively a Notation **"RL (Number of Years), YEAR"** shall be assigned to a vessel requiring to operate beyond her normal fatigue life (20-25 years) if the vessel comply with the requirements specified in this chapter.
- 1.1.4. "RL" stands for Residual Life, the "Number of Years" in parentheses represents the span of time the hull structure has left to operate and the "YEAR" is the year of expiry of the notation. For instance, the notation "RL(5), 2028" certifies that the vessel satisfies all inspection, renewal, and design analysis standards of this chapter and that it has 5 years remaining on its residual life, which ends in 2028, starting from the date of assignment.
- 1.1.5. Prior to applying for the Residual Life Notation (**RL**), the owner must assess all previous Classification data and carry out a comprehensive preliminary inspection of the vessel and carry out repairs/renewal with approved procedures, materials and consumables in presence of the INTLREG surveyors.
- 1.1.6. The inspections, repairs analyses and other associated jobs carried out shall be under full supervision of International Register of Shipping (INTLREG) surveyor at the same time the vessel is under survey for Classification purposes.
- 1.1.7. The owner shall inform request International Register of Shipping (INTLREG) THO to attend the vessel for survey at the designated location. It shall cover the full work sheets.

**1.2. REQUIREMENTS**

- 1.2.1. The permissible thickness diminution for various structures, in general, shall be as per Chapter 3 Table 3.9. For vessels having reduced scantlings in view of notation "Cathodic Protection System" shall be specially considered.

Also refer Chapter 3 Table 3.10 & 3.11

**1.3. CLEANING**

1.3.1. For the survey process, vessel shall be prepared by thoroughly cleaning for detailed inspection.

1.3.2. It shall include dry docking of the vessel.

Cleaning methods shall be of following (but not limited to):

- i. Grit blasting
- ii. Ultra-high pressure water blasting
- iii. Disc or brush grinding to bare metal
- iv. Chemical cleaning
- v. Areas exposed to corrosion to be cleaned by grit blasting or high pressure water blasting

## SECTION 2 HULL

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**2.1. GENERAL**

- 2.1.1. The examinations of the hull are to be supplemented by thickness measurements and testing as deemed necessary, to ensure that the structural integrity remains effective and is to be sufficient to discover Substantial Corrosion, significant deformation, fractures, damages or other structural deterioration.
- 2.1.2. The tank internals, the external plating and other internals shall be completely cleaned. Wooden sheathing if any on decks and linings in superstructures shall be removed as required to facilitate the examination.
- 2.1.3. The following shall be cleaned, examined, and gauged.
- water and oil tight bulkheads
  - the vents and air pipes
  - openings in the shell plating
  - the superstructures and deck houses
  - the coamings and covers
  - freeboard and superstructure decks
- 2.1.4. The gauging results shall be reviewed by the attending Surveyor to decide the repair details. The repairs noticed are carried out by the instructions and to the entire satisfaction of the attending Surveyor. Hull exterior shall be recoated.

**2.2. KEEL COOLING**

- 2.2.1. If keel cooling system provided at vessels bottom area, then examine the condition of shell plating in way of coolers. Gauging and visual examination shall be carried out. After well cleaning of plates, hydrostatic testing of 1.5 times the allowable working pressure shall be done.

**2.3. RUDDER**

- 2.3.1. Rudder, rudder pintles, rudder shaft and couplings opened and are to be examined. Clearance in the rudder bearings are to be ascertained and recorded. Accordingly renew parts, as necessary.
- 2.3.2. Examine stocks and skeg by non-destructive test procedures. Clean Rudder plating well. Examine and do ultrasonic thickness gauging.
- 2.3.3. If double plate rudders, appropriate access opening shall be cut on one side of rudder for internal examination.

**2.4. ANCHOR AND WINDLASS**

- 2.4.1. The anchors and chain cables are to be ranged, examined and the required complement and condition verified.

The Chain components shall be gauged and if observed wear 10% below the Rule required diameter, shall be replaced.

- 2.4.2. Connecting links and shackles shall be opened and examined. The chain locker, holdfasts, hawse pipes and chain stoppers are to be examined and pumping arrangements of the chain locker tested.

At Special Surveys of vessels older than 10 years, chain cables are to be gauged and renewed in cases where their mean diameter is diminished to below 88% of the original diameter. Maximum allowable diminution of weight of anchors is 10%.

- 2.4.3. Windlass shall be adrift from foundation and reconditioned. Renew brake lining pads. Clean windlass foundation, clean and gauged.

## **2.5. SEA CHESTS**

- 2.5.1. Sea chests and their gratings, sea connections shall be opened, cleaned, examined, ultrasonic thickness gauged. Sea chest grating plate fastenings shall be renewed. Spool pieces between sea chest and shell plating shall be renewed.

- 2.5.2. Sea chest internal plating and overboard connections shall be cleaned, examined and ultrasonic thickness gauged.

## **2.6. VALVES AND VENTILATORS**

- 2.6.1. sea valves, sanitary and other overboard discharge valves, shall be removed to a shop, and be opened, cleaned, examined and reconditioned or renewed, pressure tested as required and then reinstalled, with new fastenings.

- 2.6.2. Closing appliances related to Load Line regulations viz. ventilators, air pipes, skylights, port-lights doors, hatch covers, windows along with retaining and securing devices shall be examined and overhauled.

## **2.7. LOCKERS**

- 2.7.1. Lockers and storage areas shall be cleaned and examined. Plating and internals shall be ultrasonic thickness gauged.

## **2.8. TANKS**

2.8.1. Vessel's tanks including cargo, ballast water tanks, and void spaces shall be cleaned, examined and all tank internals shall be ultrasonic thickness gauged.

2.8.2. Ballast water tanks and void spaces coating condition shall be inspected.

Uncoated ballast water tanks and void spaces, or those ballast water tanks and void spaces coating is not in condition, are to be blasted, prior to the tank internals being ultrasonic thickness gauged, and surfaces hard coated to a good coating condition.

## **2.9. ENGINE ROOM TANK TOPS**

2.9.1. Engine room structure is to be examined. 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 engine room bulkheads in way of tank top and bilge wells.

2.9.2. Where wastage is evident or suspect, thickness measurements are to be carried out, and renewals or repairs made when wastage exceeds allowable limits

## **2.10. STEERING GEAR**

2.10.1. Steering gear shall be disassembled, examined. Clearances noticed if excessive shall be restored to original. Foundation bolts are to be examined and refitted.

## **2.11. INCLINING EXPERIMENT**

2.11.1. If any major structural steel renewals or any major modifications have been done and new stability information provided to the vessel, then an inclining experiment shall be carried out.

If stability is a requirement of Classification, or if International Register of Shipping (INTLREG) issuing the Load Line Certificate, then the inclining experiment shall be witnessed by the International Register of Shipping (INTLREG) Surveyor.

The experiment records and calculations for subdivision and stability are to be submitted to International Register of Shipping (INTLREG) for review.

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**3.1. PLANNED MAINTENANCE**

- 3.1.1. Surveyor shall verify Machinery updated PMS and confirm maintenance are carried out as laid out by the Manufacturer schedule.

So, if maintenance reports are within the limits of running hours required for opening (less than 50% of maximum allowed hours) shall be accepted, provided the vessel continues the maintenance program, with Surveyor approval.

**3.2. TAILSHAFTS**

- 3.2.1. Tail shafts shall be drawn out and examined along with bearings

- 3.2.2. The complete survey of the Tail shaft covers:

- The shaft in its entirety, especially the cone, the keyway and thread or the fillet of the flange
- Non-destructive examination of the aft part of the shaft by approved crack detection methods.
- Examination of the oil sealing glands (overhaul or renewal of the sealing rings depending on period of service, design and findings)
- Examination of the chrome steel liner
- Examination of the contact surfaces and liners of the shaft
- Examination of the stern tube bearing
- Examination of the propeller fit and of the propeller
- Functional testing of controllable pitch propellers and examination for leaks and shall be opened as deemed necessary by the surveyor.
- Examination of the bearing clearances before and after the survey, with documentation of values measured (poker gauge readings)

**3.3. PROPELLERS**

- 3.3.1. Fixed and Controllable Pitch Propellers (CPP) shall be examined, including a suitable non-destructive test for cracks in way of blade roots.

The Hub of CPP shall be examined internally. Operating lube oil sample shall send for laboratory analysis. Previous routine lube oil analysis reports also shall be verified for comparative study.

**3.4. PROPULSION DIESEL ENGINE**

- 3.4.1. The components listed below are to be inspected and, where deemed necessary by the Surveyor, checked in unmounted condition:

- Cylinders, cylinder covers, pistons, piston rods and bolts, crossheads, crankshaft and all bearings
- Camshaft, with drive and bearings
- Tie rod, frame, foundation and fastening elements
- Injection system, attached pumps and compressors,
- Superchargers, suction and exhaust lines,
- Charging air coolers, filters, monitoring, control,
- Protective and safety equipment, starting, re-versing and maneuvering equipment.



**3.5. REDUCTION GEARS**

- 3.5.1. Main reduction gears shall be opened for examination and gear teeth contact checked. Gear mating surfaces shall be checked. Lube oil sump shall be drained, and the sump well cleaned and flushed.

Excessive wear if noticed shall require further opening out of the gear to analyze the reason for such wear.

**3.6. MAIN THRUST BEARING**

- 3.6.1. Main thrust bearing and line shaft bearings shall be examined, and oil sumps drained. Bearing clearances to be checked.

Bearings shall be renewed as per the clearance reports. Clearances shall be recorded before open and as well as after box up.

**3.7. AUXILLARY ENGINES AND ALTERNATORS**

- 3.7.1. All auxiliary engines and alternators shall be overhauled and examined by the manufacturer's authorized representative and overhauled to original specifications. Alternator's bearings and air gap shall be checked. Windings megger test and varnish.

**3.8. AUXILLARY MACHINERIES, BOILERS**

- 3.8.1. All compressors, pumps shall be dismantled, examined, and renew as required. Compressor relief valve setting shall be checked. All coolers to clean and safety devices shall be checked.

- 3.8.2. Boilers shall be opened. Furnaces and tubes shall be cleaned. Safety v/v settings and entire boiler safety system shall be checked by surveyor. Pressure gauges shall be calibrated. Boiler hydrostatically tested to 1.5 times the maximum working pressure

**3.9. HEAT EXCHANGERS**

- 3.9.1. All heat exchangers shall be opened and examined. Heat exchangers shall be hydro-tested to 1.5 times the maximum working pressure. Relief valve shall be checked.

**3.10. PIPING AND VALVES**

- 3.10.1. Entire piping system and valves shall be examined. Valves are overhauled. Pipes corrosion and pitting shall be examined and crop/renewed, as necessary. Piping to be cleaned and painted by color code.

- 3.10.2. Non-metallic flexible expansion pieces if more than five years age shall be renewed.

All pressure gauges including Air receivers shall be calibrated.

### **3.11. LUBRICATING OIL ANALYSIS**

3.11.1. Lubricating oil samples shall be drawn from all machinery. Samples shall be sent to an approved laboratory for analysis.

Results of analysis shall be reviewed by the Surveyor along with previous records to decide the scope of machinery overhauled

### **3.12. ELECTRICAL**

3.12.1. Main and emergency switchboards shall be cleaned. Busbars connections are to be examined. Switchboard meters shall be calibrated.

All motors shall be examined, re-varnished, baked, and shop tested by an electrical repair facility. Windings to be megger tested.

3.12.2. Generators, motors of the essential auxiliary machinery, the switch gear, including its protective and interlocking devices shall be inspected.

Electrical cables and fittings on deck shall be examined and megger tested and renewed. Dead end cables are to be removed. Cables pass through watertight or fire-rated bulkheads or decks, the stuffing tubes, transit devices or pourable materials of the cable penetrations are to be examined for alterations and continued effectiveness.

3.12.3. All other electrical cabling and fittings shall be examined and subjected to a minimum of three sets of megger tests. All junction box must be examined

### **3.13. AUTOMATION AND ALARM SYSTEM**

3.13.1. If automation system is fitted, shall be examined, and tested by OEM representatives.

3.13.2. Unattended Plants: Control systems for unattended machinery spaces are to be subjected to dock trials at reduced power on the propulsion engine to check the proper performance of all automatic functions, alarms, and safety systems.

After completion of rebuilding jobs all machinery spaces shall be well cleaned. Dock and sea trials shall be carried out to entire satisfaction of the Surveyor

## **SECTION 4 FFA, LSA/NAVIGATION /ACCOMODATION**

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**4.1. FIRE FIGHTING AND LIFE SAVING APPLIANCES.**

- 4.1.1. Fire Extinguishing and Lifesaving appliances shall be examined and tested to the satisfaction of attending Surveyor.

Fire detection, extinguishing and alarm system and fixed fire extinguishing system shall be examined including remote operating stations and safety shutdowns.

**4.2. ACCOMMODATION**

- 4.2.1. Accommodation shall be cleaned well. Fittings examined. Cabins shall be inspected to comply MLC regulations. Galley hot plates, hygiene, reefer cold rooms and safety system arrangements shall be examined.

**4.3. NAVIGATION AND COMMUNICATION EQUIPMENT**

- 4.3.1. All navigational and communication equipment shall be serviced by OEM authorized licensed and qualified representative.

## **SECTION 5 FATIGUE LIFE ASSESSMENT**

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**5.1. FATIGUE LIFE ASSESSMENT**

- 5.1.1 Part 3 of Chapter 15 INTLREG Rules and Regulations for Classification of Steel Vessels may be referred to carry out residual life of the vessel under consideration
- 5.1.2 Part 3 of Chapter 13 INTLREG Rules and Regulations for Classification of Steel Vessels shall be referred for selecting appropriate numerical methods and software for this purposes.
- 5.1.3 "Fatigue Assessment of Ship Structures" by any IACS member societies or any equivalent methods are also acceptable