

TÜRK LOYDU



Classification and Surveys JANUARY 2018

This latest edition incorporates all rule changes. The latest revisions are shown with a vertical line. The section title is framed if the section is revised completely. Changes after the publication of the rule are written in red colour.

Unless otherwise specified, these Rules apply to ships for which the date of contract for construction is on or after 1st of January 2018. New rules or amendments entering into force after the date of contract for construction are to be applied if required by those rules. See Rule Change Notices on **TL** website for details.

If there is a difference between the rules in English and in Turkish, the rule in English is to be considered as valid. This publication is available in print and electronic pdf version.

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AMENDMENTS

Revised Sections	RCS No.	EIF Date*
Section 01	02/2018	01.03.2018
Section 02	02/2018	01.03.2018

* Entry into Force (EIF) Date is provided for general guidance only, EIF dates given in Rule Change Summary (RCS) are considered valid. In addition to the above stated changes, editorial corrections may have been made.

SECTION 1**GENERAL TERMS AND CONDITIONS**

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A. General

Türk Loydu (TL) is an independent, impartial, reliable, specialised, "Classification Society" which is rendering survey, audit and certification services, aiming to safeguard life, property and environment, governed by a Code of Ethics.

TL, with surveyors and technical staff carries out its work without in any way harming the intellectual property rights of shipyards, equipment suppliers, and shipowners, including patents, licences, know-how, or any other kind of knowledge whose use is legally protected at international or national level.

B. Proviso

Any confirmation or certification of compliance of technical facts or of a product with the Classification and Construction Rules published by Türk Loydu (TL) is due to TL exclusively. Mention of due observance of these regulations during production is permissible solely with the consent of TL.

C. Protective Rights

Application of the Rules of construction of TL does not infringe possible rights for protection of their products on part of the manufacturers.

D. Fees

For services rendered by TL fees are to be paid in accordance with the Tariffs of Fees of TL, even if no classification is granted. In addition to these fees, TL will charge for any extra expenses incurred in connection with the services rendered (e.g. travelling or other expenses and, where applicable, any value added / turnover tax).

E. Payment of Invoices

1. All fees for all services rendered by TL are due for payment immediately upon receipt of the invoice.

On default TL is - without prejudice to any further claims (e.g. legal costs, overtime and other expenditure) - entitled to charge interest at a highest rate of rediscount in banking, to withhold certificates and other documents and to withdraw the classification.

2. Any rights of set-off with counter-claims in favour of the client are excluded, unless such counter-claim is undisputed or finally adjudicated upon the courts.

F. Confidentiality

TL maintains confidentiality with respect to all documents and other kinds of information received in connection with the orders entrusted to them. Documents and information shall only be provided to third parties with the prior written consent of the client, except as required by judicial order, governmental order or regulation, by subpoena or by direction of a governmental agency with subpoena power. The duty of the confidentiality shall survive the end of the contract between TL and the client.

Notwithstanding the general duty of confidentiality owed by TL to its clients in accordance with the TL Rules, TL clients hereby accept that TL will participate in the Early Warning System which requires each IACS Member and Associate to provide the involved Classification Societies and other relevant parties with relevant technical information on serious hull structural and engineering systems failures, as defined in the Early Warning System, but not including any drawings relating to the ship which may be the specific property of another party, to enable such useful information to be shared and utilized to facilitate the proper working of the Early Warning System. TL will provide its client with written details of such information upon sending the same to the involved class societies and other relevant parties.

Clients admits that TL has right to give access to the European Commission for the information necessary for the purposes of the assessment referred to in EC Regulation 391/2009 Article 8(1) and no contractual clauses may be invoked to restrict this access.

Free access is also to be given to auditors

accompanying the surveyors of **TL** within the scope of the audits as required in pursuance of the society's quality system. Additionally, the client shall not oppose the access of the European Commission inspectors on board the ship to conduct inspections according to EC Regulation 391/2009 Article 8(1).

G. Responsibility and Liability

TL shall exercise due diligence in selecting its surveyors and all other personnel whose services are employed for the purpose of performing its obligations. In no event, **TL** shall be liable for the services and/or consequences of such services provided by or to be provided by its personnel and/or surveyors. Notwithstanding the above, if any client employing the services of **TL** suffers a loss, damage or expense which is proven by finalized court order to have been caused by the omission, fault or deliberate action of **TL**'s personnel and/or surveyors towards the client, then the liability of **TL** towards the client for any and all losses, damages or expenses or under any other name whatsoever, whether material or moral, negative or affirmative, direct or indirect shall under no circumstances exceed 2 (two) times of the fee charged for that particular service and shall not exceed Euro 40.000.-Euro in any case.

TL is not an insurer or guarantor of the integrity, safety, suitability or seaworthiness of a vessel or of the materials, components, products, systems, equipment, machinery and other items incorporated in it.

H. Applicable Law and Jurisdiction

Any and all disputes arising out of or in connection with Türk Loydu services shall be subject to Turkish law and exclusive jurisdiction of Istanbul (Caglayan) Courts and Bailiff's Offices.

I. Rules

The electronic pdf version of this document found through <http://www.turkloydu.org> is the officially binding version. Any comments can be sent by e-mail to tl_kural@turkloydu.org.

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CLASSIFICATION

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A. General Principles

1. Definitions

- 1.1** Society denotes Türk Loydu (TL).
- 1.2** Administration means the Government of the State whose flag the ship is entitled to fly.
- 1.3** Rules mean requirements issued by the Society as the basis for classification.
- 1.4** Surveyor means personnel authorized to carry out surveys related with classification and certification.
- 1.5** Classification means a service verifying compliance with the rules throughout the ship's life.
- 1.6** Certification means a service confirming compliance with the requirements of related rules and regulations.
- 1.7** Date of "contract for construction" of a ship is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date is to be declared to TL by the party applying for the assignment of class to a newbuilding.

The date of "contract for construction" of a series of vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder.

Vessels built under a single contract for construction are considered a "series of vessels" if they are built to the same approved plans for classification purposes.

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

If a contract for construction is later amended to include additional vessels or additional options, the date of

"contract for construction" for such vessels is the date on which the amendment to the contract is signed between the prospective owner and the shipbuilder.

The amendment to the contract is to be considered as a "new contract" to which the above applies.

If a contract for construction is amended to change the ship type, the date of "contract for construction" of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder.

1.8 "Date of Build" for New Construction is the year, month and date at which the new construction survey process is completed. Where there is substantial delay between completion of construction survey process and the ship commencing active service, the date of commissioning may be also specified.

In case of after modifications, "Date of Build" shall remain assigned to the ship after modifications are completed.

Where a complete replacement or addition of a major portion of the ship such as a complete forward or after section, a complete main cargo section (which may include a complete hold/ tank of a cargo ship), a complete block of deck structure of a passenger ship or a structural modification of a single hull to a double hull is involved, the following shall apply:

- "Date of Build" associated with each major portion of the ship is to be indicated where it has been agreed that the newer structure is to be on a different survey cycle;
- Survey requirements is to be based on the "Date of Build" associated with each major portion of the ship;
- Survey due dates may be aligned at the discretion of TL.

1.9 "Delivery date" is the date on which the finished vessel is handed over from the yard to the owner. Date of build and delivery date may be regarded as concurrent.

1.10 “Keel laying date” is the date on which the keel is laid or which are at a similar stage of construction.

Similar stage of construction is when construction identifiable with a specific ship has started and assembly of that ship has commenced comprising at least 50 tonnes or one per cent of the estimated mass of all structural material (for high speed crafts three per cent), whichever is less.

Note:

For the purposes of the application of the IMO Conventions and Codes (Performance Standards, Technical Standards, Resolutions and Circulars) for Fibre-Reinforced Plastic (FRP) Craft, the term “the keels of which are laid or which are at a similar stage of construction” should be interpreted as the date that the first structural reinforcement of the complete thickness of the approved hull laminate schedule is laid either in or on the mould.

1.11 “Double class vessel” is a vessel which is classed by **TL** and another Society and where each work as if it is the only Society classing the vessel, and does all surveys in accordance with its own requirements and schedule.

1.12 “Dual class vessel” is a vessel which is classed by **TL** and another Society between which there is a written agreement regarding sharing of work.

2. Classification Process

2.1 General

The classification process consists of:

2.1.1 The development of Rules, Additional Rules, Guidelines and other documents relevant to design and construction of ships and marine vessels.

2.1.2 The review of plans and documents and surveys, checks and tests during and after construction to verify compliance with such Rules, Additional Rules, Guidelines and other documents.

2.1.3 The assignment of class when compliance with the **TL** Rules, Additional Rules, Guidelines and other documents has been verified.

2.1.4 The issuance of Class Certificate.

2.1.5 The performance of the annual, intermediate, class renewal and occasional surveys to verify that the vessel meets the conditions for maintenance of class.

2.2 Rules and regulations

2.2.1 The latest edition of Classification and Surveys rules and the construction rules of **TL** related with the ship type applicable on the date of contract between shipyard and shipowners are to be taken as a basis for the classification of new ships. Construction rules include; hull, machinery, electric, material, welding and other special rules of **TL**.

2.2.2 The rules, guidelines and other documents are, in general, developed by **TL** staff, and accepted by the related rule development committees. In rule development; international rules and regulations, theoretical researches and service experiences are utilized.

2.2.3 Respective flag state rules and regulations will not be affected by Classification and Surveys rules. Various requirements stipulated by international conventions are taken into account in **TL** Rules.

2.2.4 In statutory matters, when authorized by the flag state concerned and acting on its behalf, the Society applies the IACS Unified Interpretations (UIs) applicable to a vessel, its machinery and equipment, in accordance with the implementation dates and provisions stated in the UI, unless the flag state provides a different interpretation with written instruction to apply or decides otherwise.

2.3 Certificates and reports

2.3.1 If the applicable requirements have been met, class is to be assigned. The assignment of class is documented by the issuance of a class certificate. Class certificates are issued only for the use of **TL**, its clients and other authorized entities.

2.3.2 Certificates, reports and other document issued by TL are in no way intended to replace the duties and responsibilities of flag state, designers, shipbuilders, manufacturers, suppliers, owners, operators, etc.

The activities of such parties falling outside the scope of the classification, such as design, manufacturing, choice of machinery and equipment, form and performance of the ship, life-saving appliances, number and qualification of crew remain responsibility of these parties.

2.3.3 TL will release information from reports and certificates to the Port State to assist in rectification of deficiencies during port state controls. Such information includes recommendations, survey due dates, and certificate expiration dates.

2.3.4 The class is to be retained on the condition that the requirements applicable for retention of class are complied with. Retention of class is confirmed by annual endorsements and renewal of the class certificate at five year intervals.

2.4 Responsibilities

2.4.1 Surveyor's intervention

2.4.1.1 For the purpose of verifying compliance with the rules, the client is to provide the Society's surveyors with the free access to ships and/or to their premises.

2.4.1.2 The clients are to take the necessary measures for the surveyor's inspections and testing to be carried out safely. The surveyor is to be constantly accompanied during surveys by personnel of the client.

2.4.2 Operation and maintenance of ships

2.4.2.1 The classification of a ship is based on the principle that the ship is operated in a proper manner by competent crew.

2.4.2.2 It is to be assumed that the ship is not to be loaded more than the draught of the ship corresponding to the freeboard assigned, that the ship is to be properly

loaded taking into account its stability and strength and that the cargoes are to be properly stowed and secured.

2.4.2.3 Ships are to maintain at all times in proper condition complying with international safety and pollution prevention regulations;

- Load Lines Convention;
- International Convention for the Safety of Life at Sea, 1974 and its Protocol of 1978;
- International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto;
- International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code);
- International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code);

and applicable Amendments thereto.

TL requires the applicable Convention Certificates to be issued by a flag state or TL or an organization which is authorized by the flag state. Safety Management Certificates in accordance with the provisions of the International Safety Management Code (ISM Code) may be issued by an organisation complying with IMO Resolution A.739(18) amended by Resolution MSC.208(81) and authorised by the flag state with which the ship is registered. Cargo Ship Radio Certificates may be issued by an organisation authorised by the flag state with which the ship is registered. In the case of dual-classed ships, Convention Certificates may be issued by the other Society with which the ship is classed provided this is recognised in a formal Dual Class Agreement with TL and provided the other Society is also authorised by the flag state. In the event of a flag state withdrawing any ship's Convention Certificate (referred to in this section) then the TL may suspend the ship's class. If a ship is removed from the flag state's Registry for the non-compliance with the Conventions or Classification Requirements referred to here in then the TL will suspend the ship's class.

In the event of ISM Code certification being withdrawn from a ship or Operator then the TL will suspend the ship's class.

2.4.2.4 Documents issued by TL in relation to its activities reflect the condition of the ship found at the time and within the scope of the survey. It is the interested party's responsibility to ensure proper maintenance of the ship and to inform TL of any events or circumstances affecting the class.

2.4.3 Port state inspections

In case of a ship's detention by port state control the operators are obliged to call in a TL surveyor without delay. This requirement has to be met in any case, where the deficiencies are related to statutory certificates issued by TL on behalf of a flag state.

2.4.4 Disclosure of information

2.4.4.1 TL will not disclose any information received or reports made in connection with classification to any other party than those entitled or to those having been given the right to receive information by legislation, court decision or written permission from the owner.

2.4.4.2 Information recorded in TL's Register of Ships which encompasses the status of classification and statutory surveys and certificates issued by TL, overdue conditions, class suspensions and withdrawals are to be published and/or released to any interested party.

2.4.5 Client's responsibilities

2.4.5.1 It is the responsibility of the owner/ operator, designer, builder and the installer to familiarize themselves and to abide by the applicable TL Rules, international conventions, EU Regulations and/ or flag administration requirements and other standards applicable to the contract

2.5 Appeals

The client may request in writing that a decision made by TL is to be taken up for reconsideration. TL will subsequently consider the matter and announce its decision according to its procedures.

2.6 Register

The Classification data of each ship classified will be included in the TL data base. An extract of these ship data will be entered in the Register published by TL. During the period of Class TL will update these details on the basis of relevant reports submitted by the Surveyors.

B. Assignment and Transfer of Class

1. General

1.1 Request for classification of a new ship or an existing ship is to be submitted to TL in writing by the client.

1.2 Class is transferred to a ship after approval of necessary plans and completion of surveys during construction or class transfer surveys in accordance with IACS PR1A.

1.3 In cases of transfer of class from non IACS member class society or non-classed existing vessel, the Owner is to be notified in writing of :

- The relevant surveys specified in 3.3.2.1 that are required to be satisfactorily completed for entry into class;
- the plan submittal and appraisal requirements for classification by the TL as a prerequisite to obtaining an Interim or Full Term Certificate of Class;
- the requirement that an Interim or Full Term Certificate of Class can be issued only after the TL has satisfactorily completed all required plan appraisal and surveys.

1.4 Requirements pertaining to adding, maintaining or withdrawing of a double or dual class are to be in accordance with the IACS PR 1B and PR 1 Annex.

2. Assignment of Class to a New Ship

2.1 Scope

2.1.1 Classification covers the ship's hull, its machinery, equipment and electrical installations. For sailing ships, the rigging is also included.

2.1.2 On application, certain installations - e. g. refrigerating installations - may be classed separately.

2.1.3 TL reserve the right to extend the scope of classification to all equipment and machinery used in the operation of the ship, which by their character and/or arrangement may impair the safety of human life, of the ship and her cargo or of the environment.

2.1.4 Structural systems and equipment determining the ship type are subject to examination within the scope of Classification, if the ship type is specified in the form of a Notation affixed to the Character of Classification (Refer to Table 2.1 ÷ 2.11 and Table 2.12, 2.13, 2.16, 2.17).

2.1.5 Cargo refrigerating installations for the refrigeration of insulated cargo holds and container refrigerating installations for the refrigeration of insulated containers, are considered to be refrigerating installations provided that the refrigerating installations are permanently installed and form an integral part of the ship.

The refrigerating installation includes the technical installations required for power supply.

Reefer units which can be connected to a container and transported in combination therewith, and containers with or without a reefer unit, are subject to Chapter 55 – Construction, Repair and Testing of Freight Containers.

2.2 Plan approval

2.2.1 Drawings and calculation required for plan approval are to be submitted to TL.

2.2.2 Drawings and calculations to be submitted are listed in the applicable chapter of the rules.

TL may request additional documents according to the specific nature of the ship to be classed.

2.2.3 The drawings and calculations subject to approval are to be examined by TL in scope of the class applied for.

2.2.4 The results of the examination are to be stated both in the drawings and in the letter of approval.

2.2.5 Modifications of the approved plans need to be reapproved.

2.2.6 Design data to be submitted with the documents are to incorporate all information necessary for the assessment of the design of the ship.

2.2.7 Submitted plans are to include the necessary information for checking the compliance with the rules.

2.3 Surveys during construction

2.3.1 When a ship is constructed under the supervision of TL, the Society carries out surveys, attends tests and trials stated in its rules.

TL verifies that the work is carried out in compliance with the applicable rules and standards.

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 1 of IACS UR Z23. The purpose of the meeting is to review and agree how the list of specific activities shown in Table 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.

2.3.2 The survey at the clients sites may consist of a combination of visual inspections, tests, measurements and review of records.

2.3.3 Welding of hull structures, machinery installations and equipment is to be carried out by approved welders, with approved welding consumables.

2.3.4 Where specified by the rules, tests are to be carried out in the presence of TL surveyor.

A test programme for harbour and sea trials is to be submitted to TL by the client.

2.3.5 Tests in addition to those stated in **TL** rules may be requested by **TL** in order to verify compliance with the rules.

2.3.6 The compliance of a new construction **and repair** with the corresponding requirements of IACS Rec. 47 is mandatory and has to be checked by the involved surveyor(s).

2.4 Use of materials, machinery and equipment

2.4.1 Materials, machinery and equipment to be installed on new buildings are to, in general, be new.

2.4.2 All materials, machinery and equipment covered by the class and used or fitted on board ships are to be certified according to **TL** rules.

2.4.3 Second hand materials, machinery and equipment may be used on new buildings subject to the specific agreement of **TL** and the owner.

2.4.4 New installation of materials which contain asbestos is not permitted for all new and existing ships.

2.5 Defects and deficiencies

2.5.1 **TL** may reject items found as defective or need supplementary survey and tests.

2.5.2 All repairs need to be preliminary agreed with **TL**. When the defect tolerances are specified in **TL** rules or by the manufacturer, they are to be taken into consideration during repair works.

2.6 Class certificate

2.6.1 When **TL** satisfied that all requirements corresponding to the class in question have been met, an interim class certificate or the class certificate is to be issued. Interim class certificate is valid to a date not exceeding 5 months from transfer of class.

2.6.2 The interim certificate is to be replaced by a full term class certificate when **TL** has confirmed that applicable requirements have been met.

2.6.3 The class certificate is valid to a date not exceeding 5 years from the date of class assignment provided condition for class retention are complied with.

2.6.4 **TL** reserves the right to introduce special remarks in the class certificate stating assumptions for the assignment of the class and restrictions regarding the use of the ship.

3. Transfer of Class

3.1 General

3.1.1 When an Owner applies to **TL** for a ship in service for classification, she will be admitted to **TL**'s class upon verification of documentation and satisfactory surveys.

3.1.2 Class may be transferred with recommendation not impairing safe operation of ship.

3.2 Documents

3.2.1 For a ship built in accordance with rules of an IACS member society, the following documentation is to be submitted to **TL** which is to be taken as a basis for forthcoming surveys. If the vessel is transferred from a non-IACS society or is non-classed then Stern frame plan is to be submitted in addition to the documentation listed in paragraph 3.2.1.2 Steel Plans.

3.2.1.1 Main plans

- General arrangement plan
- Capacity Plan
- Hydrostatic Curves
- Stability booklet
- Damage stability booklet, where required
- Loading manual, where required

3.2.1.2 Steel Plans

- Midship section
- Scantling Plan
- Longitudinal section and decks
- Shell expansion
- Bulkheads

- Rudder and Rudder Stock
- Hatch covers, if any
- For CSR vessels, plans showing, for each structural element, both as-built and renewal thicknesses and any thickness for “voluntary addition”.

3.2.1.3 Machinery plans

- Machinery Arrangement
- Intermediate, Thrust and Screw Shafts
- Propellers
- Main Engines, Propulsion Gears and Clutch Systems (or Manufacturer make, model and rating information)
- For Steam Turbine Vessels, Main Boilers, Superheaters and Economisers (or Manufacturer make, model and rating information) and Steam Piping
- Steering gear systems piping and arrangements and steering gear manufacturer make and model information
- Bilge piping diagram
- Ballast piping diagram
- Wiring diagram

3.2.1.4 Torsional Vibration Calculations

For vessels less than two (2) years old, torsional vibration calculations are to be submitted.

3.2.1.5 Additional requirements for vessels with ice strengthening

Plans for flexible couplings and/or torque limiting shafting devices in the propulsion line shafting (or manufacturer make, model and rating information) are to be submitted.

3.2.1.6 Additional plans required for oil tankers

Pumping arrangement at the forward and after ends and drainage of cofferdams and pump rooms are to be submitted.

3.2.1.7 Additional plans required for unattended machinery space notation

The following additional plans are to be submitted:

- Instrument and Alarm List
- Fire Alarm System
- List of Automatic Safety Functions (e.g. slowdowns, shutdowns, etc.)
- Function Testing Plan

3.2.1.8 Additional Documents required for approval of Alternative Design and Arrangements

3.2.1.8.1 Document(s) of Approval of Alternative Design and Arrangements are to be submitted, if any.

Note:

1. *Additional information may be necessary according to Flag State requirements.*

2. *Alternative technical data may be accepted in lieu of specific items of the listed documentation not being available at the time of the transfer.*

3.2.2 If the documentation stated in 3.2.1 is not available, these documents are to be prepared and submitted to TL for approval.

3.2.3 In case of class transfer from a non-IACS Society to Türk Loydu or non-classed vessel, the submission of plans, documents or alternative technical information are required to verify that the vessel complies with the TL's Rules.

In cases where the vessel has been previously classed by TL or an IACS Member, the submission of plans may be specially considered subject to confirmation of no alteration/modification to the vessel.

Where plan appraisal issues remain outstanding, TL may impose a Recommendation for a limited time period in accordance with IACS PR 35.

if it proves not practicable (after having made a good faith effort to obtain the information) to acquire certain plans as listed in 3.2.1, equivalent/alternative technical data must be provided prior to TL issuing the Full Term Class Certificate.

3.2.4 TL may also request additional drawings and documentation in addition to drawings stated in 3.2.1.

3.3 Class entry surveys

Note:

Class entry surveys may be, but are not required to be, credited as periodical surveys for maintenance of classification. Recommendations due for compliance at a specified periodical survey for maintenance of classification need not be carried out/complied with at a class entry survey unless the class entry survey is credited as the specified periodical survey for maintenance of classification or the recommendation is overdue.

3.3.1 Prior to transfer of class to an existing ship, that ship is to undergo the surveys based on the age and type of the ship.

The extent of these surveys is to be as follows:

3.3.1.1 Hull surveys

3.3.1.1.1 For ships of age less than 5 years, the survey is to be carried out in the scope of an annual survey.

3.3.1.1.2 For ships between 5 and 10 years, the survey is to include an Annual Survey and inspection of a representative number of ballast spaces.

3.3.1.1.3 For ships of 10 years of age and above but less than 20 years of age, the survey is to include an Annual Survey and inspection of a representative number of ballast spaces and cargo holds and/or cargo tanks, as applicable. For gas carriers, in lieu of internal inspection of cargo spaces, the following applies:

- Inspection of representative spaces surrounding cargo tanks, including external inspection of the tank and its supporting systems as far as possible;
- Review of cargo log books and operational records to verify the correct functioning of the cargo containment system.

1.1.4 For ships with ESP class notation and 15 years of age and above but less than 20 years of age, the survey is to be carried out in the scope of class renewal survey or of intermediate survey, whichever is due next.

3.3.1.1.5 For all ships of 20 years of age and above, the survey is to be carried out in the scope of class renewal survey.

Note:

The requirement of item 3.3.1.1.5 is also applicable to the vessels having their hull under continuous survey.

In the two latter cases, if a bottom survey in dry dock is not due at the time of class entry, consideration can be given to perform an in-water survey in lieu of bottom survey in dry dock

3.3.1.1.6 In lieu of the requirements in items 3.3.1.1.1 through 3.3.1.1.5, the following apply for site specific purpose-built Floating Production and/or Storage Vessels:

- For vessels of age less than 5 years, the survey is to have the scope of an Annual Survey;
- For vessels of age between 5 and 10 years, the survey is to include an Annual Survey and inspection of twenty percent of ballast spaces;
- For vessels of age between 10 and 20 years, the survey is to include an Annual Survey and inspection of twenty percent of ballast spaces and twenty percent of cargo spaces.
- For vessels over 20 years of age, the survey is to have the scope of a class renewal survey.

3.3.1.1.7 For site specific Floating Production and/or Storage Vessels which have been converted from other vessels, the survey is to take the form of an Annual Survey and also include inspection of twenty percent of ballast spaces and twenty percent of cargo spaces until 20 years have elapsed since conversion. After 20 years the survey is to have the scope of a class renewal survey.

3.3.1.1.8 In the context of applying items 3.3.1.1.4 and 3.3.1.1.5 above, if a dry-docking of the vessel is not due at the time of transfer, consideration can be given to carrying out an underwater examination in lieu of dry-docking.

3.3.1.1.9 In the context of applying items 3.3.1.1.4 and 3.3.1.1.5, as applicable, the anchors and anchor chain cables ranging and gauging for vessels over 15 years of age is not required to be carried out as part of the class entry survey unless the class entry survey is being credited as a periodical survey for maintenance of class. If the class entry survey is to be credited as a periodical survey for maintenance of class, consideration may be given by the gaining society to the acceptance of the anchors and anchor chain cables ranging and gauging carried out by the losing society provided they were carried out within the applicable survey window of the periodical survey in question.

3.3.1.1.10 In the context of applying items 3.3.1.1.1 to 3.3.1.1.8 above, as applicable,

- If the class entry survey is to be credited as a periodical survey for maintenance of class consideration may be given by the gaining society to the acceptance of thickness measurements taken by the losing society provided they were carried out within the applicable survey window of the periodical survey in question.
- If the class entry survey is not to be credited as a periodical survey for maintenance of class, consideration may be given by the gaining society to the acceptance of thickness measurements taken by the losing society provided they were carried out within 15 months prior to completion of class entry survey when it is in the scope of a Class Renewal Survey, within

months prior to completion of class entry survey when it is in the scope of an Intermediate Survey.

In both cases, the thickness measurements are to be reviewed by the gaining society for compliance with the applicable survey requirements, and confirmatory gauging are to be taken to the satisfaction of the gaining society.

3.3.1.1.11 In the context of applying 3.3.1.1.3 to 3.3.1.1.8 above, as applicable, tank testing for vessels over 15 years of age is not required to be carried out as part of the class entry survey unless the class entry survey is being credited as a periodical survey for maintenance of class. If the class entry survey is to be credited as a periodical survey for maintenance of class, consideration may be given by the gaining society to the acceptance of the tank testing carried out by the losing society provided they were carried out within the applicable survey window of the periodical survey in question.

3.3.1.1.12 In the context of applying 3.3.1.1.1 to 3.3.1.1.8 above, as applicable, compliance with IACS Unified Requirements that require compliance at the forthcoming due periodical surveys (such as S26 and S27) are not required to be carried out/completed as part of the class entry survey unless the class entry survey is credited as a periodical survey for maintenance of class.

3.3.1.2 Machinery surveys

A general examination of all essential machinery is to be held and is to include:

3.3.1.2.1 Examination under working conditions of oil fuel burning equipment of boiler, economisers and steam generators. The adjustment of safety valves of this equipment is to be verified by checking the records on the vessel.

3.3.1.2.2 All pressure vessels.

3.3.1.2.3 Insulation resistance, generator circuit breakers, preference tripping relays and generator prime mover governors are to be tested and paralleling and load sharing to be proved.

3.3.1.2.4 In all cases, navigating lights and indicators are to be examined and their working and alternative sources of power verified.

3.3.1.2.5 Bilge pumps, emergency fire pumps and remote control for oil valves, oil fuel pumps, lubricating oil pumps and forced draught fans are to be examined under working conditions.

3.3.1.2.6 Recirculating and ice clearing arrangements, if any.

3.3.1.2.7 The main and all auxiliary machinery necessary for operation of the vessel at sea together with essential controls and steering gear is to be tested under working conditions. Alternative means of steering are to be tested. A short sea trial is to be held at the Surveyors discretion if the vessel has been laid up for a long period.

3.3.1.2.8 Initial start arrangements are to be verified.

3.3.1.2.9 In the case of oil tankers, the cargo oil system and electrical installation in way of hazardous spaces are to be checked for compliance with TL Rule requirements. Where intrinsically safe equipment is installed, the surveyors are to satisfy themselves that a recognised authority has approved such equipment. The safety devices, alarms and essential instruments of the inert gas system are to be verified and the plant generally examined to ensure that it does not constitute a hazard to the vessel.

Note:

For the transfer of class or adding class at ship's delivery, items 3.3.1.2.3 and 3.3.1.2.9 may be verified by reviewing the ship's record.

3.3.2 For non-IACS classed or non-classed vessels, the class entry survey is to be held according to following:

3.3.2.1 As the minimum extent based on the age and the type of the vessel as follows:

- Class renewal survey of Hull and Machinery including thickness measurements;
- Dry docking Survey

- Propeller Shaft Survey(s)
- Boiler Survey(s) and Pressure vessel survey(s)

3.3.2.2 TL may request further examinations, tests and measurements, including but not limited to material testing, non-destructive testing, hydraulic and hydrostatic tests and sea trial.

3.3.2.3 Where the vessel has, during any portion of the five years prior to the request for classification being received, been previously classed by:

- Türk Loydu, or
- an IACS member at the time it classed the vessel,

then survey requirements may be specially considered but are not to be less than those required by 3.3.1.

3.4 Class certificate

3.4.1 When TL satisfied that all requirements corresponding to the class in question have been met, an interim class certificate or the class certificate is to be issued. Interim class certificate is valid to a date not exceeding five months from transfer of class.

3.4.2 The interim certificate is to be replaced by a full term class certificate when TL has confirmed that applicable requirements have been met.

3.4.3 The class certificate is valid to a date not exceeding 5 years from date of class transfer or, if TL accepts the periodical surveys credited by the previous class society, until the expiry date of the class certificate of the previous class society.

3.4.4 For non-IACS Classed and non-classed vessel, the owner is to make a written request to TL to obtain an Interim Certificate of Class.

An Interim Certificate of Class, or other documents enabling for non-IACS Classed or non-classed vessel to trade under TL's classification is issued:

- when all required surveys have been completed;

- when the appraisal of the plans listed in 3.2.1, has been carried out (Where issues remain outstanding, TL may impose a Recommendation for a limited time period in accordance with Procedural Requirement IACS PR 35);
- when the opportunity to the Flag Administration is given to provide any further instruction within three (3) working days (In compliance with the requirements of Art. 10.5 of the Regulation (EC) No 391/2009 as amended).

4. Register

4.1 General

4.1.1 When a vessel has been transferred class, Item A 2.6 is to be followed.

4.1.2 The class transfer date is entered in the Register book. For ships built under the supervision of TL, the due date for the periodical surveys is to be calculated from this date. For ships built under the supervision of an other class society, the due date for the periodical surveys will depend upon the existing periodical survey schedule defined by the previous class society.

5. Transfer of Class at Vessel's Delivery

5.1 General

When an owner applies to TL to accept a vessel into class at its delivery, the vessel will be admitted to TL's class upon verification of documentation and satisfactory surveys.

5.2 Documents

5.2.1 For a ship built in accordance with rules of an IACS member society, the documentation stated in 3.2 is to be submitted to TL as a prerequisite to obtaining a Full Term Certificate of Class.

C. Retention of Class

1. General Requirements

1.1 The hull and machinery have the same

period of class. The class is to be valid on condition that the hull and the machinery are subjected to all surveys stipulated and that any repairs required are carried out to the satisfaction of TL.

1.2 Retention of class is conditional upon the ship is being adequately manned, and the hull, machinery and equipment is being operated such as to comply with the design and with the applicable rules.

1.3 Classed ships are to be subjected to surveys for the retention of class. These surveys include annual survey, intermediate survey and class renewal survey.

These surveys are to be carried out at the intervals laid down in the following. In addition to the above periodical surveys, ships are to be subjected to occasional surveys, where required.

1.4 The surveys are to be performed according to the relevant requirements in order to verify that the hull, machinery and equipment comply with the applicable rules and will remain in satisfactory condition.

1.5 If the hull and/or machinery are not subjected to the prescribed surveys on their due dates, the class will be suspended.

If special shipboard equipment classed is not subjected to the prescribed surveys on their due dates, the class of the special equipment only will be suspended.

1.6 TL Head Office or one of the Society's representations are to be immediately informed about any average or deficiencies and damages to hull and machinery or other equipment classed, where these may be of relevance to the vessel's class, including information on casualties. A survey will have to be arranged for a date no later than that of vessel's arrival at the next port.

If the survey reveals that vessel's class has been affected, it will be maintained only on condition that the repairs or modifications demanded by TL will be carried out within the period specified by the Surveyor.

1.7 Requirements pertaining to adding, maintaining or withdrawing of a double or dual class are

to be in accordance with the IACS PR 1B and PR 1 Annex.

2. Definitions

2.1 Anniversary date

Anniversary date means the day of the month of each year in the period of class which corresponds to the expiry date of the period of class.

2.2 Ballast tank

A ballast tank is a tank which is used primarily for sea water ballast.

For single skin or double skin bulk carriers, a ballast tank is a tank which is used solely for sea water ballast, or, where applicable, a space which is used for both cargo and sea water ballast is to be treated as a ballast tank when substantial corrosion has been found in that space.

For oil tanker and chemical tankers, a ballast tank is a tank which is used solely for the carriage of sea water ballast.

2.3 Cargo area

The cargo area is that part of the ship which contains cargo tanks, slop tanks, cargo pump-rooms including pump-rooms, cofferdams, ballast tanks or void spaces adjacent to cargo tanks and also deck areas throughout the entire length and breadth of the part of the ship over the above mentioned spaces.

2.4 Cargo Length Area

Cargo Length Area is that part of the ship which includes cargo holds and adjacent areas including fuel tanks, cofferdams, ballast tanks and void spaces.

2.5 Close-up survey

A close-up survey is a survey where the details of structural components are within the close visual inspection range of the surveyor, i.e. normally within reach of hand.

2.6 Coating condition

Coating condition is defined as follows:

- Good: condition with only minor spot rusting.
- Fair: condition with local breakdown at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for poor condition.
- Poor: condition with general breakdown of coating over 20% or more or hard scale at 10% or more, of areas under consideration.

2.7 Corrosion prevention system

A corrosion prevention system is normally considered a full hard protective coating.

Hard protective coating is usually to be epoxy coating or equivalent. Other coating systems, which are neither soft nor semi-hard coatings, may be considered acceptable as alternatives, provided that they are applied and maintained in compliance with the manufacturer's recommendations.

2.8 Critical areas

Critical areas are locations which have been identified from calculations to require monitoring or from service history of the subject ship or from similar ships, to be sensitive to cracking, buckling or corrosion which would impair the structural integrity of the ship.

2.9 Exceptional circumstances

Exceptional circumstances means unavailability of repair facilities, unavailability of essential materials, equipment or spare parts, or delays incurred by action taken to avoid severe weather conditions.

2.10 Overall survey

An overall survey is a survey intended to report on the overall condition of the hull structure and determine the extent of additional close-up surveys.

2.11 Overdue surveys

Each periodical survey is assigned a limit date specified by the relevant requirements of the rules by which it is to be completed.

A survey becomes overdue when it has not been completed by its limit date.

2.12 Period of class

Period of class means the period starting either from the date of the initial classification or from the credited date of the last class renewal survey, and expiring at the limit date assigned for the next class renewal survey.

2.13 Recommendations

Any defect and/or deficiency affecting the class and to be dealt with within a specific period of time is indicated as a recommendation. Recommendation is pending until it is cleared. Where it is not cleared by its limit date, the recommendation is overdue.

2.14 Representative tanks or spaces

Representative tanks or spaces are those which are expected to reflect the condition of other tanks or spaces of similar type and with similar corrosion prevention systems. When selecting representative tanks or spaces, account is to be taken of the service and repair history on board and identifiable critical structural areas and/or suspect areas.

2.15 Substantial corrosion

Substantial corrosion is an extent of corrosion such that assessment of the corrosion pattern indicates wastage in excess of 75% of allowable margin, but within acceptable limits.

2.16 Suspect areas

Suspect areas are locations showing substantial corrosion and/or considered by the surveyor to be prone to rapid wastage.

2.17 Time window

Time window means the fixed period during which

annual and intermediate surveys are to be carried out.

2.18 Transverse section

A transverse section includes all longitudinal members contributing to longitudinal strength, such as plating, longitudinals and girders, longitudinal bulkheads. For transversely framed ships, a transverse section includes adjacent frames and their end connections in way of transverse sections.

2.19 Confined Space

Confined space means a space that has any of the following characteristics:

- Limited openings for entry and exit
- Unfavourable natural ventilation
- Not designed for continuous worker occupancy

It may include, but is not limited to: boilers, pressure vessels, cargo spaces (cargo holds, or cargo tanks), cargo space stairways, ballast tanks, double bottoms, double hull spaces, fuel oil tanks, lube oil tanks, sewage-tanks, pump-rooms, compressor rooms, cofferdams, void spaces, duct keels, inter-barrier spaces, engine crankcases, excavations and pits.

For confined space safe entry requirements, IACS PR37 is to be applied.

3. Survey Procedure

3.1 General

3.1.1 The objective of a survey is to be to ascertain that the ship are in compliance with the rules and suitable for continued safe operation.

3.1.2 A survey may consist of an overall examination of the ship, checking selected items, attending required tests and trials.

3.1.3 When a survey results in the identification of significant corrosion, structural defects or damage

which, in the opinion of the surveyor, affect the ship's class, remedial measures are to be taken before the ship continues in service.

3.1.4 TL, may extend the scope of survey stated in Section 3, whenever and so far as considered necessary, or modify them for the special ship types or systems.

3.1.5 The extent of any survey also depends on the condition of the ship. If the surveyor has any doubt as to the condition of the ship, or be advised of any deficiency or damage which may affect class, then further examination and testing may be conducted.

3.2 Postponement of survey and extension of certificate

3.2.1 TL reserves the right to extent the class certificate by postponing the survey, taking into account particular circumstances.

3.2.2 When a survey becomes overdue during a voyage or not in a port in which the ship is to be surveyed, the following procedure is to be applied.

3.2.2.1 In the case of annual and intermediate surveys, no postponement is granted. Such surveys are to be performed within their prescribed time window.

3.2.2.2 In the case of a class renewal survey, TL may grant an extension of class to allow for completion of the class renewal survey, provided that there is documented agreement to such an extension prior to the expiry date of the class certificate and provided that positive arrangements have been made for attendance of the Surveyor at the first port of call, and provided that the Society is satisfied that there is technical justification for such an extension. Such an extension is to be granted only until arrival at the first port of call which the ship can be surveyed after the expiry date of the class certificate.

No certificate shall be extended for a period longer than three months, and a ship to which an extension is granted shall not, on its arrival in the port in which it is to

be surveyed, be entitled by virtue of such extension to leave that port without having a new certificate. Validity of class certificates are laid down in 4.3.2.2.

However, if owing to "exceptional circumstances" the class renewal survey cannot be completed at the first port of call, 3.2.3 may be followed, but the total period of extension shall in no case be longer than three months after the original due date of the class renewal survey.

3.2.3 Under "exceptional circumstances" as defined in 2.8, TL may grant an extension not exceeding three (3) months to allow for completion of the Class Renewal Survey provided that the vessel is attended and the attending Surveyor(s) so recommend(s) after the following has been carried out:

- Annual survey;
- Re-examination of recommendations;
- Progression of the Class Renewal Survey as far as practicable;
- In the case where dry docking is due prior to the end of the class extension, an underwater examination is to be carried out by an approved diving company. An underwater examination by an approved company may be dispensed with in the case of extension of dry-docking survey not exceeding 36 months interval provided the ship is without outstanding recommendation regarding underwater parts.

4. Class Certificate

4.1 Issue of class certificate

4.1.1 For all classed ship, a class certificate, bearing the class notation and an expiry date, is to be issued.

This certificate is also provided with annexes giving information necessary for the management of the certificate and for performing the class surveys.

4.1.2 The class certificate and its annexes are to be made available to TL surveyors upon request.

4.2 Validity of class certificate

4.2.1 During the class period, a class certificate is valid when it is not expired.

The class is maintained during a certain period or at a given date, when during the said period or at such date the condition for suspension or withdrawal of class are not met.

4.2.2 At the request of the owner, a statement confirming the maintenance of class may be issued by TL based on the information in its records.

4.3 Endorsement and renewal of the class certificate

4.3.1 Endorsement of the class certificate

4.3.1.1 The class certificate is to be endorsed with the relevant entries in the appropriate annexes upon satisfactory completion of annual, intermediate and class renewal surveys.

4.3.1.2 Each endorsement consists of sections for the description of:

- The surveys held,
- The imposed, deleted and postponed recommendations,
- The unchanged existing recommendation.

4.3.2 Renewal of the class certificate

4.3.2.1 A new class certificate will replace the existing class certificate when class renewal survey has been satisfactory completed and TL is satisfied that the requirements for retention of class have been met.

4.3.2.2 The new class certificate is to be valid to a date not exceeding 5 years from:

- The expiry date of the existing certificate when the class renewal survey has been completed within 3 months before the expiry date of the existing class certificate, or

- The expiry date of the existing certificate when the class renewal survey has been completed after the expiry date of the existing class certificate, or

- The completion date of the class renewal survey when the class renewal survey has been completed more than three months before the expiry date of the existing certificate, or

- The completion date of the class renewal survey when the class renewal survey has been commenced more than 15 months before the expiry date of the existing certificate.

4.3.2.3 In cases where postponement of a class renewal survey has been granted, the new class certificate is to be valid to a date not exceeding 5 years from the expiry date of the existing certificate before the postponement was granted.

4.3.2.4 In cases where the class renewal surveys carried out concurrently with a conversion, the validity of the new certificate is to be 5 years from the date of completion of the conversion, if so decided by TL.

5. Suspension, Reinstatement and Withdrawal of Class

5.1 General

5.1.1 Class may be withdrawn at any time if TL finds it justified.

5.1.2 TL may suspend or withdraw a ship's class where the condition for retention of class has been violated.

5.1.3 The decision to suspend or withdraw a ship's class is made by TL. However, in cases of automatic suspension, no individual evaluation is made.

5.1.4 Suspension or withdrawal of class may take effect immediately or after a specified period of time.

5.1.5 If the violation only affects requirements related to additional class notations, the suspension or withdrawal may be limited to these class notations only.

5.1.6 When the class is suspended or withdrawn, **TL** will notify the client and flag state in writing, make an entry to this effect in its register and make the information of the implicitly invalidated statutory certificates by the suspension / withdrawal publicly available.

5.1.7 In the case of class suspension, a time limit will be given for when the class will be withdrawn.

5.1.8 The surveys to be carried out are to be based upon the survey requirements at the original date due and not on the age of the vessel when the survey is carried out. Such surveys are to be credited from the date originally due.

5.2 Suspension of class

5.2.1 The class may either be suspended automatically or following the decision of **TL**. In both cases, the ship is to be considered as not retaining its class beginning from the date of suspension until the date when class is reinstated.

5.2.2 The class will automatically be suspended in the event that the Renewal Survey has not been completed and no postponement has been granted or is not under attendance for completion prior to resuming trading, by the due date when the 5-year Class Certificate expires or by the expiry date of any extension granted in C.2.9.

5.2.3 If the annual survey has not been completed within three (3) months of the due date of the annual survey or intermediate survey has not been completed within three (3) months of the due date of the third annual survey in each periodic survey cycle or if continuous survey item(s) due or overdue at time of annual survey are not surveyed or postponed by agreement; the class is automatically suspended with immediate effect, unless the ship is under attendance for completion of the relevant survey.

If recommendations revealed during the surveys given above are not dealt with, or postponed by agreement by the due date, then vessel is subject to suspension procedure.

5.2.4 **TL** may decide to suspend a ship's class if the ship is deemed to be unable to continue safe operation.

5.2.5 If, due to circumstances reasonably beyond the owner's or **TL**'s control, the vessel is not in a port where the overdue surveys can be completed at the expiry of the periods allowed above, **TL** may allow the vessel to sail, in class, directly to an agreed discharge port, and if necessary, hence, in ballast, to an agreed port at which the survey will be completed, provided **TL**:

- Exams the ship's records,
- Carries out the due and/or overdue surveys and examination of recommendations at the first port of call when there is an unforeseen inability of the **TL** to attend the vessel in the present port, and
- Has satisfied itself that the vessel is in condition to sail for one trip to a discharge port and subsequent ballast voyage to a repair facility if necessary. (Where there is unforeseen inability of the **TL** to attend the vessel in the present port, the master is to confirm that his ship is in condition to sail to the nearest port of call.)

If class has already been automatically suspended in such cases, it may be reinstated subject to the conditions prescribed in this item.

5.2.6 If any outstanding debt owed to **TL** is not paid within a notified date, **TL** may suspend the ship's class with immediate effect.

In addition to the conditions laid down in 5.2.1 to 5.2.3, a ship's class may be suspended with immediate effect in cases where:

- Repair of deficiencies has not been carried out or otherwise dealt with in an appropriate manner, or
- Repair of deficiencies has not been surveyed and accepted by the surveyor,

5.3 Reinstatement following class suspension

5.3.1 If the overdue surveys and recommendations leading to class suspension as given in items 5.2.2, 5.2.3, 5.2.4 and 5.2.5 are carried out within the specified time, the class is to be reinstated provided the following,

is met:

- The results of the survey are such that all observed deficiencies are satisfactory rectified. TL may, after consideration, accept that minor deficiencies are pending to be carried out;
- No overdue periodical surveys or overdue recommendations at that time.

5.3.2 TL reserves the right to reject an application for reinstatement of class.

5.3.3 When the class is reinstated, TL will confirm this in writing with the information of reinstated statutory certificates which were implicitly invalidated by the suspension / withdrawal to the client and to the flag state.

5.3.4 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 is no other reason for suspension.

5.4 Withdrawal of class

5.4.1 The class is to be withdrawn at the client's request.

5.4.2 When class of a vessel has been suspended for a period of six (6) months due to overdue surveys and/or recommendations, the class is to be withdrawn. A longer suspension period may be granted when the vessel is not trading as in cases of layup, awaiting disposition in case of a casualty or attendance for reinstatement.

5.4.3 When a ship proceeds to sea without having rectified a recommendation which was required to be dealt with before leaving port, the class will be withdrawn with immediate effect.

5.4.4 If any outstanding debt owed to TL is not paid within a notified date, TL may withdraw the ship's class with one month's written notice.

5.4.5 Where a ship has been detained following a Flag State or Port State Control inspection on one or

more occasions with serious deficiencies found, or been subject to a non-programmed survey with serious deficiencies found, the class will be liable to be suspended or withdrawn, at the discretion of TL Technical Committee. In these cases, a period of notice, but not exceeding 3 months, may be given to owner prior to any suspension or withdrawal of class.

5.4.6 TL, also, will withdraw the class, when the ship is reported as a constructive total lost, when the ship is lost and when the ship is reported scrapped.

5.4.7 When the withdrawal of class of a ship comes into effect, TL will forward the client and the flag state written notice, delete the ship from its register and make the information publicly available.

5.5 Re-assignment of class following class withdrawal

5.5.1 If the circumstances leading to withdrawal of class no longer exist, a ship may be re-assigned class upon written request. The extent of survey is to be decided by TL.

5.5.2 TL reserves the right to reject an application for re-assignment of class.

5.5.3 A new class certificate is to be issued when the survey has been satisfactory completed and TL is satisfied that the requirements for retention of class have been met.

5.5.4 When the ship is re-assigned class, TL will confirm this in writing with the information of reinstated statutory certificates which were implicitly invalidated by the suspension / withdrawal to the client and to the flag state and make the information publicly available.

5.6 Suspension and reinstatement of class of dual classed vessels

5.6.1 When a vessel is dual classed and in the event that Türk Loydu takes action to suspend the class of the vessel for technical reasons, Türk Loydu will advise the other Society of the reasons for such action and the full circumstances within five (5) working days.

5.6.2 Türk Loydu will, upon receipt of this advice, also suspend the class of the vessel, unless it can otherwise document that such suspension is incorrect.

5.6.3 When Türk Loydu decides to reinstate class, it is to inform the other Society.

5.6.4 Requirements pertaining to adding, maintaining or withdrawing of a dual class are to be in accordance with the IACS PR 1B and PR 1 Annex.

6. Change of Ownership

In the case of change of ownership, the ship retains its current class provided that **TL** is informed of the change in advance to carry out any survey deemed appropriate and the new owner signs the request involving acceptance of **TL**'s general condition and rules.

7. Lay-up and Re-commissioning

7.1 General

A ship put out of commission may be subjected to specific requirements for maintenance of class provided that the owner notifies **TL** of the situation.

If the owner does not notify **TL** of the laying-up of the ship or does not implement the lay-up plan, the ship's class may be suspended and/or withdrawn when the due surveys are not performed by their limit dates.

For **TL** recommendations about laying-up processes, survey items, maintenance and preservation methods during lay-up refer to "**TL** Guidelines for Laid-Up Vessels".

7.2 Lay-up plan

7.2.1 The lay-up plan provides for a laying-up survey to be performed at the beginning of lay-up and subsequent annual lay-up condition surveys to be performed in lieu of the normal annual surveys which are no longer required to be performed as long as the ship remains laid-up. The other periodical surveys which become overdue during lay-up period may be postponed until the re-commissioning of the ship.

7.2.2 Where the ship has an approved lay-up plan and its period of class expires, the period of class is extended until it is recommissioned, subject to the satisfactory completion of the annual lay-up condition survey as described in 7.2.1.

7.3 Periodical surveys

The periodical surveys performed during the lay-up period may be credited, either fully or in part, at the discretion of **TL**, having particular regard to their extent and dates. These surveys are to be taken into account for the determination of the extent of surveys required for the re-commissioning of the ship and/or the expiry dates of the next periodical surveys of the same type.

7.4 Re-commissioning

7.4.1 When a ship is re-commissioned, the owner is to notify **TL** and make provisions for the ship to be submitted to the following surveys.

7.4.1.1 An occasional survey prior to re-commissioning, the scope of which depends on the duration of the lay-up period.

7.4.1.2 All periodical surveys which have been postponed in accordance with 7.2.1, taking into account the provision of 7.3.

7.4.2 Where the previous period of class expired before the re-commissioning and was extended as stated in 7.2.2, a complete class renewal survey is to be carried out prior to re-commissioning. Those items which have been surveyed in compliance with the class renewal survey requirements during the 15 months preceding the re-commissioning may be credited. A new period of class is assigned from the completion of this class renewal survey.

7.5 Vessels laid-up in accordance with item 7.1 prior to surveys becoming overdue, need not be suspended when surveys addressed in item 5.2 become overdue. However, vessels which are laid-up after being suspended as a result of surveys going overdue, remain suspended until the overdue surveys are completed.

7.6 When a vessel is intended for a demolition voyage with any periodical survey overdue, the vessel's class suspension may be held in abeyance and consideration may be given to allow the vessel to proceed on a single direct ballast voyage from the lay up or final discharge port to the demolition yard. In such cases a short term Class Certificate with conditions for the voyage noted may be issued provided the attending surveyor finds the vessel in satisfactory condition to proceed for the intended voyage.

7.7 When a vessel is intended for a single voyage from laid-up position to repair yard with any periodical survey overdue, the vessel's class suspension may be held in abeyance and consideration may be given to allow the vessel to proceed on a single direct ballast voyage from the site of lay up to the repair yard, upon agreement with the Flag State, provided the **TL** finds the vessel in satisfactory condition after surveys, the extent of which are to be based on surveys overdue and duration of lay-up. A short term Class Certificate with conditions for the intended voyage may be issued. This is not applicable to vessels whose class was already suspended prior to being laid-up.

D. Classification Notations

1. General

1.1 Classification notations are assigned in order to determine applicable rule requirements for assignment and retention of class. Within the scope of classification, the characteristics of hull, machinery and equipment are reflected in the classification notations.

1.2 Classification notations cover mandatory and optional class notations as summarized below:

2. Mandatory Class Notations

2.1 General

All ships classed by **TL** are to be given a class notation consisting of a construction symbol, character of class, service area restriction notation (if any), ship type notation, survey scheme notation and damage stability notation.

Notation Nature	Definition	Relevant Rules / Tables
Mandatory Notations	Construction symbol	Section 2 D.2.2
	Main character of class	Section 2 D.2.3
	Service area restriction	Section 2 D.2.4
	Main ship types	Table 2.1 ÷ 2.11 and Table 2.13, 2.16, 2.17
	Special service vessel types	Table 2.12
	Survey scheme	Table 2.14
	Damage stability	Table 2.15
Optional Notations	Related to cargo	Table 2.18 ÷ 2.23
	Related to service area	Table 2.24, 2.25, 2.26
	Related to survey scheme	Table 2.27
	Related to design features	Table 2.28 ÷ 2.32
	Related to equipment and systems	Table 2.33 ÷ 2.46
	Other optional notations	Table 2.47 ÷ 2.52

2.2 Construction symbols

The construction symbols are to be given as follows:

2.2.1 The construction symbol **+** is to be given to hull, machinery and/or special equipment (e.g. refrigerating installation) have been constructed under **TL** supervision and in accordance with the **TL** Rules and with **TL** certification of components and materials requiring inspection, subject to the **TL** Construction Rules.

2.2.2 The construction symbol **(+)** is to be given to hull, machinery and/or special equipment (e.g. refrigerating installation) have been constructed under **TL** supervision and without **TL** certification of components and materials requiring inspection, subject to the **TL** Construction Rules

Note:

This notation is only applicable to machinery of all non-SOLAS ships and passenger ships of length less than 24 m which are engaged in domestic voyage.

2.2.3 The construction symbol **[+]** is to be given to hull, machinery installation or special equipment have been constructed under the supervision of and in accordance with the rules of another recognized Classification Society and have later on been classed by **TL**. For such ships the class notations which **TL** considers to have the equivalent intent is to be assigned. Deviations from the **TL** Rules may be accepted.

2.2.4 **+**, **(+)** or **[+]** notations are not present in front of main class notations in case hull, machinery and/or special equipments are not constructed under supervision of **TL** or another recognised classification society but later assigned class by **TL**

2.3 Character of class

2.3.1 Hull

2.3.1.1 The character of class **1A5** is to be given to ships with its hull found to be in compliance with the requirements of **TL** construction rules or other rules considered to be equivalent. The figure 5 indicates the duration of the class period in years.

2.3.1.2 The character of class **1A3, 1A2, 1A1** is to be given to ships with its hull does not comply or no longer fully complies with the requirements of **TL** construction rules, however, the class may be maintained for a shorter period, with shorter survey intervals.

The figures 3,2,1 indicate the duration of the period of class, in years.

2.3.2 Machinery

2.3.2.1 The character of class **M** is to be given to ships with its machinery including electrical installations found to be in compliance with the requirements of **TL** construction rules or other rules considered to be equivalent.

2.3.2.2 The character of class **T-M** is to be given to Non-self-propelled vessels and floating units with its machinery including electrical installations found to be in

compliance with the requirements of **TL** construction rules or other rules considered to be equivalent.

2.3.2.3 The character of class **[M]** or **[T-M]** is to be given to ships and floating units with its machinery including electrical installations does not fully comply with the requirements of **TL** construction rules, but functional safety and seaworthiness are ensured for the envisaged service.

2.4 Service area notations

2.4.1 Seagoing ships

The Notations may possibly be assigned on the basis of the seaway conditions prevailing in the respective service area (e. g. official seaway statistics).

Observance of the range of service boundaries is a prerequisite for validity of the Class. The service area restrictions as related to the assigned service area notation shall be included in the Class Certificate.

If requested, **TL** may agree to the range of service being extended for a limited period and/or with certain reservations. This will have to be documented.

An extended navigation notation may in no case be assigned to ships that are only suitable for trading in defined waterways as restricted by their overall design even if the strength of the hull is sufficient for a wider range of service.

The following service area notations are to be given to ships complying with the construction rule requirements for a restricted range of service only:

2.4.1.1 Restricted International Service - Y

This range of service is limited, in general, to trade along the coast, provided that the distance to the nearest port of refuge and the offshore distance do not exceed 200 nautical miles, as well as to trade in the North Sea and within enclosed seas, such as the Mediterranean, the Black Sea and waters with similar seaway conditions.

2.4.1.2 Coastal Service - K50/K20

This range of service is limited, in general, to trade along the coasts, provided that the distance to the nearest port of refuge and the offshore distance do not

exceed 50/20 nautical miles, respectively, as well as to trade within enclosed seas, such as the Baltic Sea, Marmara Sea and gulfs with similar seaway conditions.

2.4.1.3 Coastal Service – K6

This range of service is limited for passenger vessels to trade along the coasts, provided that the distance to the nearest port of refuge and the offshore distance do not exceed 6 nautical miles. This area of service is restricted to trade in shoals, bays, haffs and firths or similar waters, where heavy seas do not occur.

2.4.1.4 Harbour Service - L1/L2

Additional class notation for ship operates within the domestic waters.

L1 This range of service is limited to trade in harbours which their boundaries fixed by flag state, provided that to stay in the range of L2.

L2 This range of service is limited to trade in harbours not exceeding 10 nautical miles from safe anchorage and not exceeding 100 nautical miles from the port of departure.

2.4.2 Inland vessels

2.4.2.1 Inland Waterway Service - I

This notation applies to inland vessels, i.e. vessels intended for navigation in inland waters only and complying with the **TL** Rules, Chapter 19 – Inland / Coastal Ships.

Inland waters shall comprise:

- All inland waterways,
- All semi-maritime stretches of water up to wave height of 2 m
- Other waters showing comparable conditions.

Some lakes may present very similar navigation conditions to sea. Owner may prefer to state in each particular case if he wishes that the vessel is assigned an inland navigation notation or one of the navigation notations listed in D.2.4.1.

For inland vessels which proceed beyond the sea boundary within closely confined limits and which are consequently employed in areas exposed to seaway hazards, the range of service of the class may be extended subject to the conditions stated in the Construction Rules.

For ships trading in defined river systems or waters only, deviations from the rule requirements for the equipment may be either admitted by the authorities or required by them.

In such cases, the range of service symbol will be supplemented by indication of the respective area or river system, e.g. **KEBAN** or **DANUBE**.

2.4.3 Yachts

2.4.3.1 Unrestricted Service Area

UN (unrestricted navigation) service area notation is assigned to yachts intended to navigate at any time of the year and within any zone.

2.4.3.2 Restricted Service Area

For yachts of less than 24 m, **LN-B** (Limited Navigation –Design Category B) notation is assigned to yachts whose design category is assigned as B and **LN-C** (Limited Navigation –Design Category C) notation is assigned to yachts whose design category is assigned as C according to essential requirements of Recreational Craft Directive 94/25/EC and 2003/44/EC

2.5 Ship types

Ships of a special type, design or construction, or designed to carry defined cargoes, are to be given relevant descriptive notation affixed to their characters of classification, as shown in the following examples. Ship Type notations are given through Table 2.1 to 2.13.

For cargo vessels of non conventional size (i.e. less than 500 GT), the suffix “< 500GT” is to be attached to ship type notation (e.g. **GENERAL CARGO SHIP < 500 GT**). For such ships, “**TL** Rule Part C Chapter 35 Tentative Rules for Ships less than 500 GT” is to be applied.

Table 2.1 Ship type notations for passenger ships / vessels

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
PASSENGER SHIP	Ships which carry more than 12 passengers.	Passenger Ships	<ul style="list-style-type: none"> - Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Part A Chapter 1 Section 30 - Chapters II-1 and II-2 of the SOLAS Convention - Exemptions from these requirements may be granted only within the framework of options given therein and are subject of approval by the competent flag state. 	Classification and Surveys Section 3
RO-RO PASSENGER SHIP	Ships complying with the construction and safety rules for carriage of passengers and specially equipped to carry wheeled vehicles or trains	Ro-Ro Passenger Ships	<ul style="list-style-type: none"> - Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Part A Chapter 1 Section 30 	Classification and Surveys Section 3
TR-DOMESTIC SERVICE, RO-RO PASSENGER SHIP/PASSENGER SHIP, CLASS A/B/C/D	For Ro-Ro Passenger ships/passenger ships intended to operate within domestic waters of Turkey	Passenger Ships	<ul style="list-style-type: none"> - Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Part A Chapter 1 Section 30 - TR Directive “Yolcu Gemilerinin Emniyetine Ve Gemilerdeki Yolcuların Kayıt Altına Alınmasına İlişkin Yönetmelik” Annex-I Chapter I, Chapter II-1 and II-2, and only the parts of Chapter III effecting Chapters II-1 and II-2 	Classification and Surveys Section 3
CAR FERRY	Ships designed for the transportation of motor vehicles (and possibly also passengers)engaged in ferry services	Car Ferries	<ul style="list-style-type: none"> - Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - All requirements related to the notation RO-RO PASSENGER SHIP 	Classification and Surveys Section 3

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
TRAIN FERRY	Ships designed for the transportation of railway wagons or locomotives (and possibly also passengers) engaged in ferry services	Train Ferries	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - All requirements related to the notation RO-RO PASSENGER SHIP	Classification and Surveys Section 3
(...) PASSENGER VESSEL	Ships constructed of non-steel materials according to the current rules related with accommodation and carriage of more than 12 passengers safely. Ships engaged in national trade subject to the corresponding national regulations.	Passenger Vessels	- Part C Chapter 9 Construction and Classification of Yachts - Part C Chapter 9 Construction and Classification of Yachts Section 3 (for Wooden), 4 (for FRP), 6 (for Aluminium) - Part C Chapter 27 Construction of Wooden Passenger Vessels Less than 24 m. in Length - Part C Chapter 27 Construction of Wooden Passenger Vessels Less than 24 m. in Length Section 2 (for Wooden) - National Regulations	Classification and Surveys Section 3
<p>(1) Refer to following TL Technical Circulars as applicable; <i>S-P 03/14 Damage Control Plans and Booklets</i> <i>S-P 18/13 Retrospective Application for Side Shell Doors and Stern Doors of Existing Ro-Ro Passenger Ships</i> <i>S-P 19/13 Retrospective Application of UR S8, as amended 1995, to existing Ro-Ro Passenger Ships - Bow Doors and Inner Doors</i> <i>S-P 33/13 Doors in Watertight Bulkheads of Cargo Ships and Passenger Ships</i></p>				

Table 2.2 Ship type notations for dry cargo ships (mainly for transportation dry cargo other than bulk)

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
GENERAL CARGO SHIP	Ships constructed for the carriage of general dry cargo which are not carried in containers	General cargo ships	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations),	Classification and Surveys Section 3
CONTAINER SHIP	Ships intended exclusively for the carriage of containers and equipped with appropriate facilities	Container ships	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), Part D Chapter 51	Classification and Surveys Section 3
EQUIPPED FOR CARRIAGE OF CONTAINERS	Ships carrying containers occasionally or as part cargo only and equipped with the appropriate facilities	Ships equipped for carriage of containers	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations)	Classification and Surveys Section 3

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
OPEN TOP	Hatchcoverless container ships equipped with the appropriate facilities	Hatchcover less container ships	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations)	Classification and Surveys Section 3
EQUIPPED FOR CARRIAGE OF CARS	Ships provided with special equipment for carriage of (non-loaded) motor vehicles	Ships equipped for carriage of cars, floating decks	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations)	Classification and Surveys Section 3
RO-RO SHIP	Ships equipped with ramps and possibly shell doors and strengthened and designed for the transportation of motor vehicles (without passengers) in accordance with relevant TL rules	Ro-Ro cargo ships	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations)	Classification and Surveys Section 3
MULTI-PURPOSE DRY CARGO SHIP	Ships constructed for the carriage of general and bulk cargo	Cargo ships	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations)	Classification and Surveys Section 3
<p>(1) Refer to following TL Technical Circulars as applicable; <i>S-P 07/14 Revised guidelines for cargo securing manual and code of safe practice for cargo stowage and securing - scope of application</i> <i>S-P 06/14 Code of safe practice for cargo stowage and securing – Annex 14</i> <i>S-P 03/14 Damage Control Plans and Booklets</i> <i>S-P 33/13 Doors in Watertight Bulkheads of Cargo Ships and Passenger Ships</i> <i>S-P 32/13 Retroactive Application for Strength Requirements for Fore Deck Fittings and Equipment for Ships that are Contracted for Construction prior to 1 January 2004</i> <i>S-P 31/13 Retroactive Application for Strength and Securing of Small Hatches on the Exposed Fore Deck for ships that are contracted for construction prior to 1 January 2004</i></p>				

Table 2.3 Ship type notations for livestock carriers

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
LIVESTOCK CARRIER	Ships constructed and equipped for the carriage of livestock	Livestock carriers	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations),	Classification and Surveys Section 3

Table 2.4 Ship type notations for bulk carriers

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
CSR	CSR class notation is assigned to ships contracted for construction on or after 1 st April 2006 and complying with the Rules of “IACS Common Structural Rules for Bulk Carriers and Oil Tankers” that are applied for structural design of bulk carriers with a length of 90 m or above.	CSR Bulk Carriers	-CSR Part 1 and Part 2 Chapter 1 - Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Relevant requirements given in Part A Chapter 1 Hull that are not covered by IACS Common Structural Rules for Bulk Carriers and Oil Tankers	CSR Part 1 Chapter 13
BULK CARRIER	Ships with L < 90 m intended primarily to carry dry cargo in bulk and not subject to the IACS Common Structural Rules. Entries will be made into the Certificate as to whether specified cargo holds may be empty in case of alternating loading. Additional indications of the types of cargo for which the ship is strengthened may be entered into the Certificate. For bulk carriers with L ≥ 90 m according to the Common Structural Rules the further Notation CSR will be assigned	Bulk carriers	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Part A Chapter 1 Hull, Section 27	Classification and Surveys Section 3 and Section 3, L
BC-C (2)	Bulk carriers designed to carry dry bulk cargoes of cargo density less than 1.0 t/m ³		<u>For Non-CSR Ships:</u> - Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Part A Chapter 1 Hull, Section 27 <u>For CSR Ships:</u> - Part A (Chapter 1 – Hull,	

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
			Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - IACS Common Structural Rules for Bulk Carriers and Oil Tankers - Relevant requirements given in Part A Chapter 1 Hull that are not covered by IACS Common Structural Rules for Bulk Carriers and Oil Tankers	
BC-B (2)	Bulk carries designed to carry dry bulk cargoes of cargo density of 1,0 t/m ³ and above with all cargo holds loaded in addition to BC-C conditions			
BC-A (2)	Bulk carries designed to carry dry bulk cargoes of cargo density of 1,0 t/m ³ and above with specified holds empty at maximum draught in addition to BC-B conditions			
{no MP}	For bulk carrier notations BC-A , BC-B and BC-C not designed for loading and unloading in multiple port			
{maximum cargo density ... t/m³}	Bulk carrier notations BC-A and BC-B designed for a maximum cargo density 3,0 t/m ³			
{holds a,b,... may be empty}	For bulk carrier notation BC-A			
GRAB [X]	For ships with the notation CSR and with holds designed for loading /discharging by grabs. In the notation X is replaced by the unloaded grab weight. For ships with the notation CSR and BC-A or BC-B			

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
	<p>the notation GRAB [X], with an unladen grab weight X equal to or greater than 20 tons is mandatory.</p> <p>For ships with the notation CSR and other related notations than BC-A or BC-B the Notation GRAB [X] is voluntary.</p> <p>For ships without the notation CSR and with holds designed for loading/discharging by grabs, G Notation is assigned.</p>			
<p>(1) Refer to following TL Technical Circulars as applicable;</p> <p><i>S-P 02/14 Retrospective IACS Unified Requirements For Non-CSR Bulk Carriers</i></p> <p><i>S-P 32/13 Retroactive Application for Strength Requirements for Fore Deck Fittings and Equipment for Ships that are Contracted for Construction prior to 1 January 2004</i></p> <p><i>S-P 31/13 Retroactive Application for Strength and Securing of Small Hatches on the Exposed Fore Deck for ships that are contracted for construction prior to 1 January 2004</i></p> <p><i>S-P 30/13 Retroactive Implementation of IACS Unified Requirements S19 and S22 for Existing Single Side Skin Bulk Carriers</i></p> <p><i>S-P 29/13 Retroactive Provision of Detailed Information on Specific Cargo Hold Flooding Scenarios (SOLAS XII/9.3)</i></p> <p><i>S-P 26/13 Bulk carriers not complying with SOLAS XII/9 as of 1 January 2004 (Chapter XII, Regulation 9)</i></p> <p><i>S-P 24/13 Retrospective Application for Additional Requirements for Loading Conditions, Loading Manuals and Loading Instruments for Bulk Carriers, Ore Carriers and Combination Carriers</i></p> <p><i>S-P 22/13 Retrospective Application for Cargo Hatch Cover Securing Arrangements for Bulk Carriers not Built in accordance with UR S21 (Rev.3)</i></p> <p><i>S-P 21/13 Retroactive Application for Evaluation of Allowable Hold Loading of Cargo Hold No. 1 with Cargo Hold No. 1 Flooded, for Existing Bulk Carriers</i></p> <p><i>S-P 20/13 Retrospective Application for Evaluation of Scantlings of the Transverse Watertight Corrugated Bulkhead between Cargo Holds Nos. 1 and 2, with Cargo Hold No. 1 Flooded, for Existing Bulk Carriers</i></p> <p><i>S-P 12/13 Double-side skin construction on bulk carriers</i></p> <p><i>S-P 11/13 SOLAS XII/6.5.3 in terms of redundancy of stiffening structural members for vessels not designed according to CSR for Bulk Carriers</i></p> <p>(2) These notations are assigned to bulk carriers with length of 150 m or longer contracted for construction on 1 July 2003 or later.</p>				

Table 2.5 Ship type notations for ore carriers

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
ORE CARRIER	Ships designed for carriage of bulk cargo and ore cargo respectively and strengthened in accordance with TL rules Entries will be made into the Certificate as to whether specified cargo holds may be empty in case of alternating loading. Additional indications of the types of cargo for which the ship is strengthened may be entered into the Certificate.	Ore carriers	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Part A Chapter 1 Section 27	Classification and Surveys Section 3
<p>(1) Refer to following <i>TL Technical Circulars</i> as applicable;</p> <p><i>S-P 32/13</i> Retroactive Application for Strength Requirements for Fore Deck Fittings and Equipment for Ships that are Contracted for Construction prior to 1 January 2004</p> <p><i>S-P 31/13</i> Retroactive Application for Strength and Securing of Small Hatches on the Exposed Fore Deck for ships that are contracted for construction prior to 1 January 2004</p> <p><i>S-P 24/13</i> Retrospective Application for Additional Requirements for Loading Conditions, Loading Manuals and Loading Instruments for Bulk Carriers, Ore Carriers and Combination Carriers</p>				

Table 2.6 Ship type notations for cement carriers

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
CEMENT CARRIER	Ships designed for the carriage of cement and equipped with corresponding cargo loading and unloading equipment	Cement carriers	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Part A Chapter 1 Section 27	Classification and Surveys Section 3

Table 2.7 Ship type notations for tankers, general

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
CSR	CSR class notation is assigned to ships contracted for construction on or after 1 st April 2006 and complying with Rules of “IACS Common Structural Rules for Bulk Carriers and Oil Tankers” that are applied for structural design of tankers with a length of 150 m or above	CSR Oil Tankers	-CSR Part 1 and Part 2 Chapter 2 - Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Relevant requirements given in Part A Chapter 1 Hull that are not covered by IACS Common Structural Rules for Bulk Carriers and Oil Tankers	CSR Part 1 Chapter 13
OIL TANKER	Ships intended for transport of oil in bulk	Oil tankers	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Part A Chapter 1 Section 28	Classification and Surveys Section 3
PRODUCT TANKER	Ships intended for transport of all type of oil product in bulk except crude oil	Product Tankers	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Part A Chapter 1 Section 28	Classification and Surveys Section 3
CRUDE OIL TANKER	Ships intended for transport of crude oil	Crude Oil Tankers	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Part A Chapter 1 Section 28	Classification and Surveys Section 3
CHEMICAL TANKER TYPE 1/2/3	Ships intended for transport of all types of liquid chemicals in bulk	Chemical Tankers	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Part C Chapter 8	Classification and Surveys Section 3

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
LIQUEFIED GAS TANKER TYPE 1G/2G/2PG/3G	Ships intended for carriage of liquefied gas cargoes in bulk	Liquefied Gas Tankers	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Part C Chapter 10	Classification and Surveys Section 3
<p>(1) Refer to following TL Technical Circulars as applicable;</p> <p><i>S-P 04/14 All tankers to be fitted with a stability instrument capable of verifying compliance with the relevant intact and damage stability requirements</i></p> <p><i>S-P 01/14 Amendments to the revised standards for the design, testing and location of devices to prevent the passage of flame into cargo tank in tankers</i></p> <p><i>S-P 35/13 Sludge Tank Discharge Piping</i></p> <p><i>S-P 14/13 Unified Interpretations for BCH Code 2008 as amended</i></p> <p><i>S-P 07/13 Tests of Piping Components and Pumps Prior to Installation On Board for Liquefied Gas Carriers</i></p> <p><i>S-P 05/13 Tests of Piping Components and Pumps Prior to Installation On Board for Liquefied Gas Carriers</i></p> <p><i>S-P 04/13 UI SC226 Rev.1 – Dec 2012- IACS Unified Interpretations (UI) on the application of SOLAS regulations to conversions of Single-Hull Oil Tankers to Double-Hull Oil Tankers or Bulk Carriers</i></p> <p><i>S-P 03/13 Application of Load Line Requirements to Conversions of Single-Hull Oil Tankers to Double-Hull Oil Tankers or Bulk Carriers</i></p>				

Table 2.8 Ship type notations for tankers, for special cargoes

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
ASPHALT TANKER	Tankers for special cargoes and complying with the relevant rules	Asphalt Tankers	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Part A Chapter 1 Section 28	Classification and Surveys Section 3
SPECIAL TANKER		Special Tankers		
EDIBLE OIL TANKER		Edible Oil Tankers		
WINE TANKER		Wine Tankers		
WATER TANKER		Water Tankers		
FRUIT JUICE TANKER		Fruit Juice Tankers		

Table 2.9 Ship type notations for combination carriers

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
BULK CARRIER / PRODUCT TANKER	Ships intended to alternatively carry dry cargo or liquids in bulk and complying with the relevant rules are to be given, e.g., one of these notations.	Combination carriers	<ul style="list-style-type: none"> - Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Part A Chapter 1 Section 27, 28 	Classification and Surveys Section 3
BULK CARRIER / OIL TANKER				
ORE CARRIER / PRODUCT TANKER				
ORE CARRIER / OIL TANKER				
<p>(1) Refer to following TL Technical Circulars as applicable; <i>S-P 32/13 Retroactive Application for Strength Requirements for Fore Deck Fittings and Equipment for Ships that are Contracted for Construction prior to 1 January 2004</i> <i>S-P 31/13 Retroactive Application for Strength and Securing of Small Hatches on the Exposed Fore Deck for ships that are contracted for construction prior to 1 January 2004</i> <i>S-P 24/13 Retrospective Application for Additional Requirements for Loading Conditions, Loading Manuals and Loading Instruments for Bulk Carriers, Ore Carriers and Combination Carriers</i> <i>S-P 23/13 Retrospective Application for Renewal Criteria for Side Shell Frames and Brackets in Single Side Skin Bulk Carriers and Single Side Skin OBO Carriers not Built in accordance with UR S12 Rev.1 or subsequent revisions</i></p>				

Table 2.10 Ship type notations for fishing vessels

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
FISHING VESSEL	Notation assigned to the ships complying with relevant TL Rules	Fishing vessels	Part C Chapter 14 Fishing Vessels	Classification and Surveys Section 3 and Section 3, K.5

Table 2.11 Ship type notations for floating docks

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
FLOATING DOCK Lifting capacity ... t	Notation assigned to the ships complying with relevant TL Rules and indicating lifting capacity in tonnes.	Floating docks	<ul style="list-style-type: none"> - Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Part A Chapter 1 Section 35 	Classification and Surveys Section 3 and Section 3, K.2

Table 2.12 Ship type notations for special service vessels

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
BARGE	Barges are unmanned or manned vessels, normally without self-propulsion, sailing in pushed or towed units and their cargo holds are suitable for the carriage of dry or liquid cargo. Barges built for the carriage of special cargo (e.g. liquid or ore cargo) are to be assigned the respective class notations (e.g. Oil Barge, Deck Cargo Barge, etc.).	Barges	Part A Chapter 1 Section 33	Classification and Surveys Section 3 and Section 3 K.4
HOPPER BARGE	Barges specially designed for carrying spoils or dredged material	Hopper Barges	Part A Chapter 1 Section 33	Classification and Surveys Section 3
HOPPER DREDGER	Ships specially equipped for dredging activities and carrying spoils or dredged material	Hoppers Dredgers	Part A Chapter 1 Section 34	Classification and Surveys Section 3
PUSHER/BARGE	Ships specially intended for pushing and carriage	Pusher/Barges	Part C Chapter 17 Pusher, Pusher/Barge Units	Classification and Surveys Section 3
PUSHER	Ships specially intended for pushing	Pushers	Part C Chapter 17 Pusher, Pusher/Barge Units	Classification and Surveys Section 3
FLOATING CRANE	This notation is assigned to a crane with an undercarriage and used for water work and for work on waterfronts	Floating Cranes		Classification and Surveys Section 3 and Section 3 K.4
PONTOON CRANE	This notation is assigned to a crane that is permanently fitted on a pontoon and crane of which is certified	Pontoon Cranes	Part A Chapter 1 Section 33, H	Classification and Surveys Section 3
HYDROFOIL	This notation is assigned to boats with its hull fitted underneath with foils which lift the hull clear of the water at speed.	Hydrofoils		Classification and Surveys Section 3
ICE-BREAKER	For ships having an operational profile that includes escort or ice management functions and having powering and dimensions that allow it to undertake aggressive operations in ice-covered waters	Ice-Breakers		Classification and Surveys Section 3

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
PILOT BOAT		Pilot Boats		
PONTOON	This notation is assigned to non propelled units intended to carry cargo and/or equipment on deck only.	Pontoons	Part A Chapter 1 Section 33	Classification and Surveys Section 3 and Section 3 K.4
RESCUE VESSEL	This notation is assigned to vessels used in rescuing.	Rescue Vessels		Classification and Surveys Section 3
RESEARCH VESSEL	This notation is assigned to ships designed and equipped to perform research activities at sea	Research Vessels		Classification and Surveys Section 3
SPECIAL PURPOSE SHIP	Ships as defined in the Code of Safety for Special Purpose Ships (2008 SPS Code), as amended	Special Purpose Ships	- Relevant sections of Part A Chapter 1 Hull - Structural fire protection and stability are to comply with 2008 IMO SPS Code - Code of Safety for Special Purpose Ships, as amended	Classification and Surveys Section 3
DREDGER	Dredger is a self-propelled vessel capable of loading dredging at sea and fitted with bottom doors or similar means for discharging or dumping the dredging to sea.	Dredgers	Part A Chapter 1 Section 34	Classification and Surveys Section 3
SUCTION DREDGER	This notation is assigned to ships designed for dredging loose material such as sand with its suction tubes.	Suction Dredgers	Part A Chapter 1 Section 34	Classification and Surveys Section 3
BUCKET DREDGER	This notation is assigned to dredgers that are equipped with a continuous chain of buckets, which are carried through a ladder	Bucket Dredger	Part A Chapter 1 Section 34	Classification and Surveys Section 3
CUTTER SUCTION DREDGER	This notation is assigned to ships equipped with a rotating cutter head cutting hard soil into fragments	Cutter Suction Dredgers	Part A Chapter 1 Section 34	Classification and Surveys Section 3
BACKHOE DIPPER DREDGER	This notation is assigned to ships having hydraulic excavators, carrying out dredging operations, mounted on a pontoon stabilized by means of spuds	Backhoe Dipper Dredgers	Part A Chapter 1 Section 34	Classification and Surveys Section 3
TUG	Ships intended for towing	Tugs	Part A Chapter 1 Section 29,	Classification and Surveys Section 3
ESCORT TUG (p,V)	Tugs providing services including steering, braking and otherwise controlling	Escort Tugs	- Part A Chapter 1 Section 29 - Part C Chapter 13 Escort Tugs	Classification and Surveys Section 3

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
	the assisted vessel			
SALVAGE TUG	Ships specially equipped for towing and/or pushing having specific equipment for salvage	Salvage Tugs	Part A Chapter 1 Section 29, Table 29.3	Classification and Surveys Section 3
SUBMERSIBLE	Manned, non-military submersibles	Submersibles	Part D Chapter 53 Submersibles	Classification and Surveys Section 3 and Section 3 K.10
WASTE COLLECTION VESSEL	Vessels undertaking waste collection services	Waste Collection Vessels		Classification and Surveys Section 3
SEMI-SUBMERSIBLE PASSENGER SHIP	Passenger ship, non-military	Semi submersible	Part D Chapter 53 Submersibles, Part A Chapter 1 Section 30, Part B Chapter 4 and 5, Part C Chapter 9	Classification and Surveys Section 3 and Section 3 K.10
OIL RECOVERY VESSEL	Seagoing and inland waterway steel vessels with and without their own means of propulsion which are intended for service in the event of accidental oil spills.	Oil Recovery Vessels	Part C Chapter 12 Oil Recovery Vessels	Classification and Surveys Section 3 and Section 3, K.3
CHEMICAL RECOVERY VESSEL	Seagoing and inland waterway steel vessels with and without their own means of propulsion which are intended for service in the event of accidental chemical material spills.	Chemical Recovery Vessels	Part C Chapter 24 Chemical Recovery Vessels	Classification and Surveys Section 3
SERVICE BOAT		Service Boats		
ROV	For remotely operated, unmanned vehicles	Rovs		Classification and Surveys Section 3
LIVE FISH CARRIER	Assigned to vessels designed and equipped for carriage of live fish	Live Fish Carriers		Classification and Surveys Section 3
FISH FARM SUPPORT VESSEL	Ships engaged in fish farm support operations	Fish Farm Support Vessels		Classification and Surveys Section 3
SELF ELEVATING UNIT	This notation is assigned to mobile platforms fitted with movable legs for raising the hull over the surface of the sea	Mobile platforms		Classification and Surveys Section 3
SUPPLY VESSEL	This notation is assigned to ships specially intended for the carriage and/or storage of special material and	Supply Vessels	Part A Chapter 1 Section 32	Classification and Surveys Section 3

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
	equipment which are used to provide facilities and assistance for the performance of specified activities, such as offshore, research and underwater activities.			
OFFSHORE SUPPLY VESSEL	This notation is assigned to vessels which are primarily engaged in the transport of store, materials and equipment to offshore installations as well as offshore construction	Offshore Supply Vessels	Part C Chapter 36	Classification and Surveys Section 3
WELL STIMULATIONS VESSEL	This notation is assigned to offshore support vessels designed for carrying well stimulation substances and operating well stimulation substances	Well Stimulation Vessels		Classification and Surveys Section 3
STANDBY VESSEL	Especially designed to carry out rescue and standby services to offshore installations	Standby Vessels	Part C Chapter 36	Classification and Surveys Section 3
SAR BOAT	The notation is assigned to ships engaged in Search and rescue (SAR) operations with its equipment and design suitable for such kind of operations	Search and Rescue Boats		Classification and Surveys Section 3
CABLE LAYING VESSEL	Specially intended for laying cables on the sea bottom	Cable Laying Vessels	Part C Chapter 20 Cable Laying Vessels	Classification and Surveys Section 3
PIPE LAYING VESSEL	Specially intended for laying pipelines on the sea bottom	Pipe Laying Vessels	Part C Chapter 16 Pipe Laying Vessels	Classification and Surveys Section 3
PATROL BOAT	This notation is only valid for small watercraft from 6 to 24 m in length	Patrol Boats	Part C Chapter 34 Tentative Rules for the Classification of Special Crafts - Patrol Boat	Classification and Surveys Section 3
PATROL	This notation is assigned to vessels or ships above 24 m in length	Patrol Boats	Part C Chapter 34 Tentative Rules for the Classification of Special Crafts - Patrol Boat	Classification and Surveys Section 3
CREW BOAT		Crew Boats		
POWER PLANT SHIP	Ships specially equipped for power generation	Power plant ship	Case by case	Case by case

(1) In addition to given requirements in this column, Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations) shall further be complied with where reference in this column does not involve comprehensive construction, machinery, material, welding or automation requirements.

Table 2.13.a Ship type notations for high-speed crafts

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
HSC-PASSENGER A	High-speed crafts (up to 450 passengers) meeting the requirements of category A	High-speed crafts	Part C Chapter 7 High Speed Crafts	Classification and Surveys Section 3
HSC-PASSENGER B	High-speed crafts (over 450 passengers) meeting the requirements of category B	High-speed crafts	Part C Chapter 7 High Speed Crafts	
HSC-CARGO	High-speed cargo crafts meeting the requirements of the cargo craft category	High-speed cargo crafts	Part C Chapter 7 High Speed Crafts	
HSDE	High-speed crafts constructed in essential parts according to TL Rule Chapter 7 and which are not subject to the IMO HSC Code	High-speed crafts	Part C Chapter 7 High Speed Crafts	
DSC	Ships which were built before 1994 and complying the main parts of TL Rules, Chapter 7 - High Speed Vessels (1993) and subject to the IMO DSC Code	High-speed crafts	Part C Chapter 7 High Speed Crafts, IMO DSC Code	
<p>(1) Refer to following TL Technical Circulars as applicable; <i>S-P 13/13 Unified Interpretations for HSC Code 1994 as amended</i></p>				

Table 2.13.b Maximum permitted operating conditions for high speed crafts

Class Notation (1), (2), (3)	Description (4)	Application	Rule Requirement, Design	Rule Requirement, Survey
OC1	Smooth sea service Hs ≤ 0.5 m	High-speed crafts	Part C Chapter 7 High Speed Crafts	Classification and Surveys Section 3
OC2	Moderate environment service: Hs < 2.5 m			
OC3	Restricted open sea service: Hs < 4.0 m			
OC4	Open sea service Hs ≥ 4.0 m			
<p>(1) Ships, which date of contract for construction before 01st July 2015, notations for maximum permitted operating conditions expressed in terms of significant wave height are added to the notations HSC-PASSENGER A, HSC-PASSENGER B, HSC-CARGO and HSDE</p> <p>(2) Ships, which date of contract for construction on or after 01st July 2015, maximum permitted operating conditions expressed in terms of significant wave height and speed are inserted to the class certificate of ships with HSC-PASSENGER A, HSC-PASSENGER B, HSC-CARGO and HSDE notations.</p> <p>(3) Fast ships not subject to IMO-Res. MSC.36(63), but examined in accordance with the Construction Rules Chapter 7 - High Speed Craft, Section 3, are assigned the class notations OC1 to OC4 only.</p> <p>(4) Hs = Significant wave height.</p>				

2.6 Survey scheme

All oil tanker, product tanker, crude oil tanker, chemical tanker and bulk carrier (≥ 500 GT) notations are always completed by the additional class notation **ESP**, which means that the ship's hull and piping in way of cargo area is to be surveyed according to enhanced survey program (See also UR Z11).

Table 2.14 Notations for survey scheme

Class Notation		Description	Application	Rule Requirement, Design	Rule Requirement, Survey
OIL TANKER	ESP	The ship type notation OIL TANKER , or equivalent, and the notation ESP shall be assigned to sea going self-propelled ships which are constructed generally with integral tanks and intended primarily to carry oil in bulk. This type notation shall be assigned to tankers of both single and double hull construction, as well as tankers with alternative structural arrangements, e.g. mid-deck designs. (1), (4)	Oil Tankers	-	Classification and Surveys Section 3 A.4.14
BULK CARRIER	ESP	The ship type notation BULK CARRIER , or equivalent, and the notation ESP shall be assigned to sea going self-propelled ships which are constructed generally with single deck, double bottom, hopper side tanks and topside tanks and with single or double side skin construction in cargo length area and intended primarily to carry dry cargoes in bulk. (4)	Bulk Carriers	-	Classification and Surveys Section 3 A.4.14
ORE CARRIER	ESP	The ship type notation ORE CARRIER , or equivalent, and the notation ESP shall be assigned to sea going self-propelled ships which are constructed generally with single deck, two longitudinal bulkheads and a double bottom throughout the cargo length area and intended primarily to carry ore cargoes in the centre holds only.	Ore Carriers	-	Classification and Surveys Section 3 A.4.14

Class Notation		Description	Application	Rule Requirement, Design	Rule Requirement, Survey
ORE/OIL CARRIER	ESP	The ship type notation ORE/OIL CARRIER , or equivalent, and the notation ESP shall be assigned to sea going self-propelled ships which are constructed generally with single deck, two longitudinal bulkheads and a double bottom throughout the cargo length area and intended primarily to carry ore cargoes in the centre holds or of oil cargoes in centre holds and wing tanks (2)	Ore/Oil Carriers	-	Classification and Surveys Section 3 A.4.14
OIL/BULK/ORE (OBO) CARRIER	ESP	The ship type notation OIL/BULK/ORE (OBO) CARRIER , or equivalent, and the notation ESP shall be assigned to sea going self-propelled ships which are constructed generally with single deck, double bottom, hopper side tanks and topside tanks, and with single or double side skin construction in the cargo length area, and intended primarily to carry oil or dry cargoes, including ore, in bulk. (3)	Oil/Bulk/Ore (OBO) Carriers	-	Classification and Surveys Section 3 A.4.14
SELF-UNLOADERS	ESP	The ship type notation SELF-UNLOADERS , or equivalent, and the notation ESP shall be assigned to sea going self-propelled ships which are constructed generally with single deck, double bottom, hopper side tanks and topside tanks and with single or double side skin construction in cargo length area and intended to carry and self-unload dry cargoes in bulk.	Self Unloading Bulk Carriers	-	Classification and Surveys Section 3 A.4.14
CHEMICAL TANKER	ESP	The ship type notation CHEMICAL TANKER , or equivalent, and the notation	Chemical Tankers	-	Classification and Surveys Section 3

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
	ESP shall be assigned to sea going self-propelled ships which are constructed generally with integral tanks and intended primarily to carry chemicals in bulk. This type notation shall be assigned to tankers of both single or double hull construction, as well as tankers with alternative structural arrangements.			A.4.14
<p>(1) Oil Tankers that do not comply with MARPOL I/19 may be subject to International and/or National Regulations requiring phase out under MARPOL I/20 and/or MARPOL I/21.</p> <p>(2) ORE/OIL carriers that do not comply with MARPOL I/19 may be subject to International and/or National Regulations requiring phase out.</p> <p>(3) OIL/BULK/ORE carriers that do not comply with MARPOL I/19 may be subject to International and/or National Regulations requiring phase out.</p> <p>(4) “Combination carrier” is a general term applied to ships intended for the carriage of both oil and dry cargoes in bulk; these cargoes are not carried simultaneously, with the exception of oily mixture retained in slop tanks.</p>				

2.7 Damage stability

Table 2.15 Notations for damage stability

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
FS	Ships which proof of subdivision and damage stability is required	Applicable ships	Part A Chapter 1 Section 26	-

2.8 Yachts

Table 2.16 Ship type notations for yachts

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
SAILING YACHT	Yachts propelled by sail in addition to internal combustion engine and whose sail area as defined in ISO 8666 satisfy following inequality: $A_s \geq 0,07 (D_{max})^{2/3}$ (1)	Sailing yachts	Part C Chapter 9 Construction and Classification of Yachts	Part C Chapter 9 Construction and Classification of Yachts Section 1

MOTOR YACHT	Yachts propelled by internal combustion engines	Motor yachts	Part C Chapter 9 Construction and Classification of Yachts	Part C Chapter 9 Construction and Classification of Yachts Section 1
(1) D_{max} is maximum displacement in metric tonnes.				

2.9 Multi-point mooring system

Table 2.17 Notations for multi-point mooring systems

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
MULTI-POINT MOORING SYSTEM	Multi point mooring systems built in accordance with TL Rules and under TL survey	Mooring Systems	Part D Chapter 70 Multi-Point Mooring System	Classification and Surveys Section 3 and Section 3 K.13

3. Optional Class Notations

3.1 General

Ships classed by TL may be given optional class notation related to cargo, service area, design features, survey schemes, equipment or systems meeting corresponding rule requirements.

At the request of the owner, optional Notations used for naval ships may be assigned in agreement with TL instead of or in addition to the Notations defined in D, see TL – Part E, Chapter 101, Classification and Surveys, Section 2, D. The requirements for such assigned Notations are to be according to Part E, Naval Ship Technology Rules.

3.2 Class notations related to cargo

3.2.1 Carriage of dangerous goods

Table 2.18 Notations for carriage of dangerous goods

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
DG	For ships equipped for the carriage of dangerous goods	Cargo ships	Relevant TL rules and SOLAS II-2, Reg. 19	
DG (HSC Code 7.17)	For high speed crafts equipped for the carriage of dangerous goods	High Speed Crafts	Relevant TL rules and HSC Code 7.17	
DBC	For ships equipped for the carriage of solid bulk cargoes	Bulk Carriers	Relevant TL rules and IMSBC Code <i>Refer also to S-P 34/13 Fixed Fire Extinguishing Systems in Cargo Spaces of Ships Carrying Self-Heating Products</i>	
INF 1	For ships equipped for the	Cargo ships	INF Code	

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
INF 2	carriage of packaged irradiated nuclear fuel, plutonium and high level radioactive goods			
INF 3				
NLS	For oil tankers complying with MARPOL Annex II requirements for Noxious Liquid Substance (NLS) certificate	Oil tankers	MARPOL Annex II	
NOT SUITABLE FOR CARGO WITH FLASH POINT ≤ 60 °C	For tankers which are intended to carry liquids having a flash-point (closed cup test) above 60 °C only.	Tankers		
HNLS	Transport Handling of Limited Amounts of Hazardous and Noxious Liquid Substances in Bulk in Offshore Support Vessels	Offshore Supply vessels, Offshore Service Vessels	IMO Resolution A.673(16) as amended by IMO Resolution MSC.236(82) and MEPC.158(55)	

3.2.2 Special strengthening

3.2.2.1 Heavy cargo

Table 2.19 Notations for carriage of heavy cargo

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
STRENGTHENED FOR HEAVY CARGO	For ships provided with strengthening recommended by TL unless complying with the requirements of the notations "bulk carrier" or "ore carrier"	Cargo ships	Chapter 1 Hull Section 27, A	Classification and Surveys Section 3

3.2.2.2 Use of grabs

Table 2.20 Notations for use of grabs

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
G	For ships with inner bottoms and/or coamings and longitudinal bulkheads strengthened for the use of grabs. Strengthening within the working range of grabs shall be in accordance with Chapter 1 Hull Section 27.	Bulk Carriers, Ore Carriers	- Chapter 1 Hull Section 27 - Chapter 1 Hull Section 27, A.1.3, B.10	

3.2.3 Cargo refrigerating installations (cargo ships)

Table 2.21 Notations for cargo refrigerating installations (cargo ships)

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
YST	For ships having the cargo refrigerating installation complying with the requirements of TL rules both in respect of hull and machinery	Cargo ships	Part C Chapter 15 Refrigerating Installations	Classification and Surveys Section 3, Section 3 A.5.10.4
[YST]	For ships having the cargo refrigerating installation does not in all respects comply with the requirements of TL Rules, but functional safety and seaworthiness are ensured for the envisaged service			
RC	For ships with refrigerated cargo installations in cargo areas for the carriage of refrigerated cargo in controlled atmosphere			
RC MOB	For ships with refrigerated cargo installations in cargo areas for the carriage of refrigerated cargo in controlled atmosphere using mobile gas generating systems			
M1	To reach up to 3% of the scope of possible condition monitoring system, (2)			

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
CM2	To reach up to 10% of the scope of possible condition monitoring system, (2)			
CM3	To reach up to 20% of the scope of possible condition monitoring system, (2)			
CM4	To reach over 20% of the scope of possible condition monitoring system. (2)			
<p>(1) Refer to following TL Technical Circulars as applicable; <i>S-P 17/13 Use of Ammonia as a Refrigerant</i></p> <p>(2) For ships having refrigerated cargo installations which condition monitoring system is used to reliably determine the condition of their components. Objective percentages given in <i>CM1 ÷ CM4</i> define the appropriate notation to be assigned to ship.</p>				

3.2.4 Cargo refrigerating installations (fishing vessels)

Table 2.22 Notations for cargo refrigerating installations (fishing vessels)

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
BST	For fishing vessels having the cargo refrigerating installation complying with the requirements of TL rules both in respect of hull and machinery.	Fishing vessels	Part C Chapter 14	Part C Chapter 14 Section 1
[BST]	For fishing vessels having the cargo refrigerating installation does not in all respects comply with the requirements of TL Rules, but functional safety and seaworthiness are ensured for the envisaged service			
QUICK FREEZING	For fishing vessels having refrigerating installation fitted with equipment for quick freezing of wet fish			

3.2.5 Cargo refrigerating systems (container ships)

Table 2.23 Notations for cargo refrigerating systems (container ships)

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
RCP x/y (1)	For ships complying with the requirements of TL rules relating to carriage of refrigerated containers	Container ships	Part C Chapter 29	Classification and Surveys Section 3
<p>(1) RCP is supplemented by two figures. The first figure (x) stands for the total number of certified refrigerated container stowage positions on deck and in container holds and is related to FEU (forty foot equivalent units). The second figure (y) indicates the percentage of containers carrying fruit/ chilled cargoes for which the ship is certified. Details concerning container size stowage positions and special conditions will be indicated in the Register, if required.</p>				

3.3 Class notations related to service area

3.3.1 Ice strengthening

3.3.1.1 Strengthening for navigation in ice

Table 2.24 Notations for strengthening for navigation in ice

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
ICE-B4	Ships with their hull and machinery complying with the requirements of TL rules relating to strengthening for navigation in ice (1), (2), (3), (4)	Ships navigating in ice	Part A Chapter 1 Section 14	Classification and Surveys Section 3
ICE-B3				
ICE-B2				
ICE-B1				
ICE-B				
<p>(1) Index 4 represents the highest notation. (2) Notations ICE-B4 to ICE-B1 corresponding to ice classes IA Super to IC of the Finnish/ Swedish Ice Class Rules as amended. (3) Ships assigned with the class notation ICE-B are intended to navigate in light and very light localised drift ice in mouths of rivers and coastal areas. (4) Class notation ICE-B may be assigned to hull and machinery installation or only to the hull on request.</p>				

3.3.1.2 Strengthening for navigation in polar ice-covered waters

Table 2.25 Notations for strengthening for navigation in polar ice-covered waters

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
PC1	Ships complying with the requirements of TL rules relating to navigation in polar ice-covered waters (1), (2)	Polar Class Ships (Ice breakers, cargo ships with ice breaking ability etc.)	Part C Chapter 33	Classification and Surveys Section 3
PC2				
PC3				
PC4				
PC5				
PC6				
PC7				

(1) Index 1 represents the highest notation.
(2) Notations PC1 to PC7 are based on the IACS Unified Requirements for Polar Ships.

3.3.2 Navigation In Waters around and/or Comparable to Greenland and Labrador Ice

Table 2.26 Notations for navigation in waters around and/or comparable to Greenland and Labrador ice

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
BF	Fishing vessels complying with the requirements of TL rules relating to hull and machinery installations for navigation in waters around and/or comparable to Greenland and Labrador ice	Fishing Vessels	Part C Chapter 14 Section 16, Section 33, Section 35	Part C Chapter 14 Section 1

3.4 Class notations related to survey schemes

Table 2.27 Notations for survey schemes

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
IWS	For ships with its hull is specially prepared and equipped for in-water surveys		-	Classification and Surveys Section 3 A.4.8
CM-PS	For ships complying with the relevant TL rules with its propeller shaft runs within the stern tube in oil, the possibility exists, to prolong the intervals		Part B Chapter 4 Machinery Section 5 C.6.6	Classification and Survey Section 3 B.4.1.1

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
	between shaft withdrawals			
HP	For ships complying with "Türk Loydu Rules for Hull Inspection and Maintenance Program"		Türk Loydu Rules for Hull Inspection and Maintenance Program	

3.5 Class notations related to design features

3.5.1 Material

Table 2.28 Notations for construction material other than ordinary hull structural steel

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
HIGHER STRENGTH HULL STRUCTURAL STEEL	For ships constructed of materials other than ordinary hull structural steel	Ships constructed of materials other than ordinary hull structural steel	- Part A Chapter 1 –Hull – Section 3, A - Part A Chapter 2 – Material – Section 3, B	Classification and Surveys Section 3
ALUMINIUM			Part C Chapter 9 Construction and Classification of Yachts Section 6	Part C Chapter 9 Section 1
FRP			Part C Chapter 9 Construction and Classification of Yachts Section 4	
WOODEN			Part C Chapter 9 Construction and Classification of Yachts Section 3	
HDPE			Tentative Rules for Polyethylene Crafts	Classification and Surveys Section 3

3.5.2 Bridge design on seagoing ships

Table 2.29 Notations for bridge design on seagoing ships

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
NAV-O	Ocean Area (2)		Part C Chapter 21	
NAV-OC	Ocean Areas and Coastal Waters (2)		Part C Chapter 21	
NAV	Technical requirements for an ergonomic bridge design (3)		- Part C Chapter 21 (design), Chapter 21, Section 4, B.1 (equipment) - SOLAS V/15,	

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
			- MSC/Circ. 982 - IACS Recommendation 95	
NAV-INS	Integrated Navigation Systems. In addition to the notation NAV , special focus is laid on increased availability and consistency of the bridge equipment.(3)		Part C Chapter 21 (design), Chapter 21, Section 4, B.2, and C (equipment)	
<p>(1) Refer to following TL Technical Circulars as applicable; S-P 15/13 One man bridge operated (OMBO) ships</p> <p>(2) Assigned to ships, date of contract for construction of which is before 1st February 2013 and which are designed in compliance with the rules for Chapter 21.</p> <p>(3) Assigned to ships, date of contract for construction of which is on or after 1st February 2013, and designed in compliance with the rules for and Chapter 21.</p>				

3.5.3 Environmental standards

Table 2.30 Notations for environmental standards

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
EP	For ships complying with the requirements of TL rules Chapter 76 - Environmental Service System		Part D Chapter 76 Environmental Service System Part C Chapter 36	

3.5.4 Fuel cell systems

Table 2.31 Notations for fuel cell systems

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
FC-xxx	For ships with fuel cell systems the nominal power of which is equal or exceeds 10% of the total nominal power of the machinery installation (excluding the emergency supply power) (1)		Part C Chapter 26	

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
with FC	For ships with fuel cell systems the nominal power of which is below 10% of the nominal power of the machinery installation		Part C Chapter 26	
(1) "xxx" means the percentage of the fuel cell system related to the nominal power of the machinery installation.				

3.5.5 Novel designs

Table 2.32 Notations for novel designs

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
EXP	For ships, machinery installations or essential parts constructed in accordance with a design, for which sufficient experience is not available (1), (2)			
(1) TL will decide at what intervals the required periodical surveys will have to be carried out.				
(2) Where experience over a prolonged period of time had proved the efficiency of the design, the notation EXP may be cancelled.				

3.6 Class notations related to equipment and systems

3.6.1 Ballast Water management

Table 2.33 Notations for ballast water management

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
BWM-E(s)	For ships complying with the Guidelines on Ballast Water Management	Ships subject to sequential water exchange	International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004, as amended and related guidelines (G1-G14) Additional Rule for Installation of Ballast Water Management Systems (as applicable)	Classification and Surveys Section 3
BWM-E(f)		Ships subject to water exchange by flow-through method		
BWM-E(d)		Ships subject to water exchange by dilution method		
BWM-T		Ships subject to ballast water treatment		

Table 2.34 Notations for automation

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
AUT	For ships having machinery installation fitted with equipment for unattended machinery spaces, so that it does not require to be operated and/or maintained for periods of at least 24 hours		Part B Chapter 4-1	Classification and Surveys Section 3
AUT-nh	For ships having machinery installation, the period during which attendance to and maintenance of equipment is not required, is less than 24 hours (1)			
AUT-C	For ships having machinery installation operated with the engine control room permanently attended (centralized control) and is equipped with a system for remote control of the main propulsion plant from the bridge or arrangements for manoeuvring from the engine control room			
R	For ships provided with a system for remote control of the main propulsion plant from the bridge			

(1) *nh indicates that machinery spaces may be unattended for n hours.*

3.6.2 Automation

Ships having machinery installations which comply with the requirements of **TL** rules for automation are to be given one of the following notations:

3.6.3 Dynamic positioning system

Ships complying with the requirements of **TL** rules Chapter 22 - Dynamic Positioning Systems, depending on the desired system reliability and on the basis of a risk analysis, are to be given one of the following notations.

Table 2.35 Notations for dynamic positioning system

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
DK1	Non-redundant		Part C Chapter 22 Part C Chapter 36	Classification and Surveys Section 3 and Section 3 K.8
DK2	Redundant			
DK3	Redundant, separate compartments			

3.6.4 Inert gas systems

Table 2.36 Notations for inert gas systems

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
INERT	For ships equipped with an inert gas system in accordance with the relevant TL rules, or with a system recognized as being equivalent in design	Tankers	Part B Chapter 4 Section 20, D	

3.6.5 Fire fighting

Ships fitted with equipment complying with the **TL** rules

for Fire-Fighting Ships are, depending on the size and purpose of the equipment provided, to be given one of the following notations:

Table 2.37 Notations for Fire fighting

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
FF0	For ships when the characteristics of the fire-fighting system are not those required for the assignment of the additional service features FF1 , FF2 or FF3 , and when the system is specially considered by TL	Fire fighting ships	Part C Chapter 11 Part C Chapter 36	Classification and Surveys Section 3, Section 3 A.4.13.4
FF1	For ships provided with equipment for fighting fires in the initial stage and performing rescue operations in the immediate vicinity of the installation on fire			

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
FF2	For ships provided with equipment for sustained fighting of large fires and for cooling parts of the installation on fire			
FF3	For ships provided with equipment corresponding to FF2 , but with greater fire-extinguishing capacity and more comprehensive fire-extinguishing equipment			
FF1/2	For ships provided with equipment corresponding to FF2 and additionally suited for rescue operations as per FF1			
FF1/3	For ships provided with equipment corresponding to FF3 and additionally suited for rescue operations as per FF1			

3.6.6 Redundant propulsion and steering system

Ships with propulsion and steering systems which meet the redundancy requirements of **TL** for these systems

are to be given one of the following notations.

Note: The additional index x% in the table below denotes what percentage of the main propulsion power of the ship is provided by the redundant ship's propulsion system

Table 2.38 Notations for redundant propulsion and steering system

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
RP1x%	Ships having at least two propulsion machines, which are independent or can be separated from each other (1)			
RP2x%	Ships having at least two propulsion systems and two steering systems, each of which are independent or can be separated from each other (2)		Part C Chapter 23	- Part C Chapter 23 – Section 2 - Classification and Surveys Section 2, Section 3

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
RP3x%	Ships having at least two propulsion systems and two steering systems, each of which are independent or can be separated from each other and are installed in separate compartments (3)			
<p>(1)This also applies to the auxiliary systems which are needed to operate the propulsion machines. No redundancy of propeller, shaft line, gearbox and steering system is required.</p> <p>(2)This also applies to each of the auxiliary systems which are needed to operate the propulsion and/or steering systems.</p> <p>(3)This also applies to each of the auxiliary systems which are needed to operate the propulsion and/or steering systems.</p>				

3.6.7 Anchor handling

Table 2.39 Notations for anchor handling

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
AH	Assigned to ships intended to be used for anchor handling in open sea facilities in compliance with TL Rules		Part A Chapter 1 Section 32,F Part C Chapter 36 Section 6	

3.6.8 Hatchcover tightness system

Table 2.40 Notations for hatchcover tightness system

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
AHTS	For ships equipped with an approved additional hatchcover tightness system		Part C Chapter 28 Section 1, J	- Classification and Surveys Section 3 - Part C Chapter 28 Section 1, J.4

3.6.9 Diving systems

Table 2.41 Notations for diving systems

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
TAZ	For diving system complies with the requirements of TL rules		Part D Chapter 52	Classification and Surveys Section 3 and Section 3 K.9

3.6.10 Cargo reliquefaction installations (liquefied gas tankers)

Table 2.42 Notations for cargo reliquefaction installations (liquefied gas tankers)

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
GST	For ships carrying liquefied gases and equipped with systems for cooling (reliquefaction) of their cargoes	Liquefied gas tankers	Part C Chapter 10 Section 7.2	

3.6.11 Emergency Response Service

Table 2.43 Notations for emergency response service systems

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
ERS	For ships, the geometry and structural data of which are made available in a database to provide the assistance necessary for limiting damages in case of average with the aid of special computer programs		-	Classification and Surveys Section 3

3.6.12 Bow rudder

Table 2.44 Notations for bow rudders

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
EQUIPPED WITH BOW RUDDER	For ships equipped with bow rudder			

3.6.13 Vapour return installations

Table 2.45 Notations for vapour return installations

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
VEC	For tankers equipped with vapour return installations for the return of volatile organic compounds to shore during loading operations	Tankers	IMO MSC/Circ.585 Standards for vapour emission control systems	

3.6.14 Yachts

Notation for yachts to be given upon application by the owners is as follows:

Table 2.46 Notations for yachts

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
YAUT	For yachts having machinery installation fitted with equipment for unattended machinery spaces, so that it does not require to be operated and/or maintained for periods of at least 24 hours	Yachts	Part C Chapter 9 Section 8	
YR	For yachts provided with a system for remote control of the main propulsion plant from the bridge		Part C Chapter 9 Section 8	
YSS	For yachts provided with permanent means of total buoyancy or constructional		Part C Chapter 9 Section 8	

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
	characteristics such as to allow the vessel to float in case of entering water into the vessel			
YFS	For yachts which proof of subdivision and damage stability is required		Part C Chapter 9 Section 12, B.6	
YDA	For sailing yachts having masts and rigging constructed according to the related TL rules and classed as special equipment		Part C Chapter 9 Section 8	

3.7 Class notations related to helicopter operations

Table 2.47 Notations related to helicopter operations

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
HELIW	Additional class notation for ships equipped for helicopter winch operation.			
HELIL	Additional class notation for ships equipped with helicopter landing deck.		- Part A Chapter 1 Section 7, D.8 Section 21, B.15 - Part B Chapter 4 Section 18, O - Part C Chapter 36 Section 21	
HELILF	Additional class notation for ships equipped with helicopter landing deck and ability to supply fuel.			

3.8 Class notations related to habitability

Table 2.48 Notations related to habitability

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
ACCOM	Additional class notations assigned to ships complying with TL Rules,		Chapter 1 - Hull, Section 2. (Including MLC 2006)	
ACCOM +	Additional class notations assigned to ships complying with TL Rules,		Chapter 1 - Hull, Section 2. (Including MLC 2006)	

3.9 Laid-Up Ships

Table 2.49 Notations for laid-up ships

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
LAI-UP SHIP	Class notation indicating that ship is laid up temporarily.	Laid-Up Ships	TL Guidelines for Laid-Up Vessels	Classification and Surveys Section 2, C.7, Section 3

3.10 Domestic Service

Table 2.50 Notations for domestic service

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
...-Domestic Service	Class notation indicating service range for the ships constructed according to directives published for the ships operating within only domestic waters of relevant flag state or having exemptions to operate in domestic service granted by flag state. (e.g. TR-Domestic service).		Directives of flag states	

3.11 Maximum permissible draught

Table 2.51 Notations clarifying maximum permissible draught

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
with freeboard ... m	Additional class notation assigned to ships whose hull is dimensioned for a draught of less than the maximum draught permissible.		Load Line Convention	

3.12 Compliance with relevant rules or directives

Table 2.52 Construction under control of TL and in compliance with relevant rules or directives

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
TK	Additional class notation for characteristic implements and/or equipments constructed by agreement under control of TL and in compliance with relevant rules or directives.		Relevant rules or directives	

3.13 Selective Catalytic Reduction Systems

Table 2.53 Notations for selective catalytic reduction systems

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
SCR	Class notation is assigned to ships which Selective Catalytic Reduction catalysts is designed, constructed, and tested in accordance with SCR guide.		TL Guidelines For Selective Catalytic Reduction Systems, items A. and B.	TL Guidelines For Selective Catalytic Reduction Systems, item C.

3.14 Ships Using Gases or Other Low-Flashpoint Fuels

Table 2.54 Notations for ships using gases or other low-flashpoint fuels

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
GF	For ships fitted with engine installations suitable for operation with natural gas as fuel or other low-flashpoint fuels.		TL Rules Part D Chapter 78	TL Rules Part D Chapter 78

3.15 Additional Notations (Offshore Service Vessels)

Table 2.55 Additional Notations for Offshore Service Vessels

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
ICEOPS	Equipped with machinery and systems suitable for operations at very low temperatures		Part C Chapter 36	
UES 1	Support for underwater equipment with a weight of up to 5 tons		Part C Chapter 36	
UES 2	Support for underwater equipment with a weight of up to 20 tons		Part C Chapter 36	
UES 3	Support for underwater equipment with a weight of up to 80 tons		Part C Chapter 36	
UES 4	Support for underwater equipment with a weight of more than 80 tons		Part C Chapter 36	
DSV 1	Diving support with a fixed installed diver pressure chamber		Part C Chapter 36	
DSV 2	Diving support with diving bell		Part C Chapter 36	
POSMOOR	Positional Mooring		Part C Chapter 36	
CRANE	Equipped with classified lifting appliances		Part C Chapter 36	
TOW	Towing		Part C Chapter 36	

E. Certification of Materials, Machinery and Equipment

1. General

1.1 For the classification of new constructions specified materials, machinery and equipment used in ships to be classed by **TL** are to be certified according to **TL** rules. Certification includes both plan approval (if required) and survey during production and/or of the final product.

1.2 The applicable chapters of the rules and guidelines define the extent and details of certification required for classification.

2. Requirements to be Met by the Manufacturer

2.1 Manufacturers of materials, machinery and equipment are to be considered for approval according to criteria established by **TL**.

2.2 Quality control of materials, machinery and equipment to be certified is to be traceable and documented.

3. Certification Procedure

3.1 General

3.1.1 Certification of materials, machinery and equipment is to be documented by **TL** product certificate, **TL** type approval certificate, works certificate and test report.

3.1.1.1 **TL** product certificate signed by **TL** surveyor is a certificate stating conformity with rule requirements that tests are carried out on the certified product itself, that tests are made on samples taken from the certified product itself and that tests are performed in presence of the surveyor or in accordance with special agreements.

3.1.1.2 **TL** type approval certificate is to be issued when compliance with the design requirements is confirmed. Type approval procedure is normally used for approval of standard designs and/or mass produced components. Type approval procedure may consist of plan approval, initial survey and type testing.

3.1.1.3 Works certificate signed by the manufacturer is a certificate stating conformity with rule requirements that tests are carried out on the certified product itself, that tests are made on samples taken from the certified product itself and that tests are witnessed and signed by manufacturer's quality control department.

3.1.1.4 Test report signed by the manufacturer is a document stating conformity with the rule requirements and that tests are carried out on samples from the current production.

3.1.2 Where work certificate or test report is required, the surveyor may, at any time, require the tests to be carried out in his presence.

3.1.3 Certified products are to be properly marked for identification and traceability.

3.2 Plan approval

3.2.1 Plan approval of materials, machinery and equipment is to be carried out to verify their compliance with **TL** rules and/or internationally accepted standards.

3.2.2 Upon approval of drawings and/or documents, a letter or design verification report is to be issued by **TL**.

3.3 Survey

Survey is to be performed on the basis of approved design documentation for the actual application and as required in the applicable **TL** rules. Compliance with the approved design documentation and applicable requirements is to be documented by certificates issued by **TL**.

3.4 Suspension and withdrawal of certificates

3.4.1 Product certificates, type approval certificates or approval of manufacturer certificate may be suspended or withdrawn if **TL** finds it justified.

3.4.2 Suspension or withdrawal of a certificate may take effect immediately or after a specified period of time.

3.4.3 When a certificate is suspended or withdrawn **TL** is to notify the client in writing and make the information publicly available.

In the case of suspension, a time limit is to be given for when the certificate will be withdrawn.

F. Alternative Certification Scheme (ACS)

1. General

ACS is a certification scheme involving a manufacturer (and associated sub-suppliers, if needed) in the inspection, testing and certification of the manufacturer's products.

An ACS will clarify:

- The extent of the required inspection and testing.
- To which extent and under which conditions the manufacturer may perform all or parts of the required inspection and testing without the presence of a **TL**-Surveyor a **TL**-Certificate is required.

The extent to which the manufacturer is given permission to carry out inspections and testing without the presence of a Surveyor is to be agreed on a case by case basis, e.g. for a specific product production line or for specific parts.

2. Scope

1. An ACS may be arranged with product manufacturers and/or sub-suppliers.

2. An ACS with a manufacturer must define the handling of subcontracted parts (those that require TL or work certificates or in any other way are addressed in the Rules).

The sub-supplier may be included in the ACS of the manufacturer or have his own ACS or deliver parts that are inspected and certified by **TL**.

3. An ACS that permits the manufacturer to carry out all or parts of required inspection and testing without the presence of a Surveyor may be arranged in two versions with regard to traceability:

- The ACS describes inspection, testing and certification additional to the manufacturer's standard quality control in order to meet the Rules. The components are to be stamped with a special stamp supplied by **TL** or identified as required by **TL**.
- The manufacturer has a standard quality control that covers all required inspection, testing and certification in compliance with the Rules. Traceability and the required type of product document for components or products will be defined in the ACS.

3. Conditions

3.1 The conditions for the manufacturer to be granted the permission to carry out inspection and testing without the presence of a Surveyor are that:

- The manufacturer has an implemented Quality System according to a national or international Standard approved by an accredited certification body or recognised by **TL**.
- The manufacturer has a quality control system, current drawings, and Rules and standards that cover the product to be certified.
- The inspection and testing required by the Rules are either standard procedures in the Quality System and recognized by **TL** or specified in detail in the ACS.
- **TL** initially ascertains the manufacturer's compliance with the ACS requirements by verifying the required product and process approvals and performing an initial audit. Follow-up and renewal audits are conducted by **TL** on a regular basis to verify that conditions of the ACS are continuously maintained by the manufacturer.
- If work certificates (W) or test reports (TR) are found not to fulfill the standards agreed with **TL**, the component may not be accepted.
- The agreed ACS may be suspended or cancelled when / if found justified by **TL**.
- **TL** may carry out unscheduled inspections at the manufacturer and/or subcontractor at its own discretion.
- The manufacturers (and designers, if producing under license) commit themselves to involve **TL** when changes to the design, manufacturing process or testing are made as well as when any major production problems or any major product delivery problems have occurred.

- The validity of an ACS is to be a maximum of 5 years. The ACS may be renewed subject to an audit. The scope of the renewal audit shall:
- Verify the conditions of the ACS are still met
- Verify that the current products and processes are appropriately controlled

4. Information to be Submitted

4.1 For admission to an alternative certification scheme for a product, the manufacturer is to submit an application enclosing the following documentation:

- Product details.
- Existing class approvals of the manufacturer's products as far as required.
- The procedures relevant to the manufacturing process.
- A list of material suppliers with an indication of their class approval (as far as required by the Rules) and the type of material certification in each case.
- Quality control plans relevant to the products and relevant components to be certified through the alternative certification scheme Said plans are to detail the inspections and tests required by the Rules with an indication of which inspections and tests are delegated to the manufacturer and which are to be done in the presence of a **TL**-surveyor.
- The procedures relevant to the quality control and inspections, their methods, frequency and certification.

- The list of suppliers of materials and main components of the product, including certificates.
- The quality system details.
- List of nominated personnel for:
- Marking/stamping of products
- Tests and Inspection (responsible)
- Provision of data and information (e.g. declaration of conformity, test reports etc.)
- Any other additional documents that **TL** may require in order to evaluate the manufacturing processes and product quality control.

5. Audit Procedure

5.1 Upon satisfactory examination of the complete documentation for application an initial audit shall be carried out at the manufacturer's works. This audit is to verify that the manufacture of the product and the relevant controls are performed in accordance with the documents submitted and are in compliance with the requirements laid down in the ACS documentation and the **TL** Rules.

5.2 Upon satisfactory outcome of the audits, the extent, duration and conditions of the ACS are documented.

5.3 At least one intermediate audit during the period of validity of the ACS is to be carried out. Additional audits may be required at the discretion of **TL**.

SECTION 3

SURVEYS

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A. General Requirements**1. Definitions**

1.1 Allowable corrosion limit is the acceptable corrosion limit for the ship's structure in the area in question.

1.2 Bay is the area between adjacent transverse frames from longitudinal bulkhead to longitudinal bulkhead (or side shell).

1.3 Bulk carrier is a ship intended primarily to carry dry cargo in bulk and constructed generally with single deck, double bottom, topside tanks and hopper tanks in cargo spaces.

A Double Skin Bulk Carrier is a ship which is constructed generally with single deck, double bottom, top-side tanks and hopper side tanks in cargo spaces, and is intended primarily to carry dry cargo in bulk, including such types as ore carriers and combination carriers, in which all cargo holds are bounded by a double-side skin (regardless of the width of the wing space)

1.4 A Chemical Tanker is a ship constructed or adapted and used for the carriage in bulk of any liquid product listed in Chapter 17 of the International Code For The Construction And Equipment Of Ships Carrying Dangerous Chemicals In Bulk, IBC Code.

1.5 Gas tanker is a ship intended to carry liquefied natural or petroleum gases in bulk.

1.6 Combined cargo/ballast tank is a tank used for the carriage of cargo or ballast water as a routine part of the ship's operation and will be treated as a ballast tank. Cargo tanks in which water ballast might be carried only in exceptional cases per MARPOL I/18(3) are to be treated as cargo tanks.

1.7 Integral tank form a part of the ship's hull and are influenced in the same manner and by the same loads which affect the adjacent hull structure.

1.8 Independent tank does not form part of the ship's hull. An independent tank is constructed and

installed in such a way that the influence on the tank by the hull's deformation and stress is minimised. An independent tank does not contribute to the hull strength.

1.9 Machinery area comprises the engine rooms with propulsion and power generation machinery, all spaces containing boilers, other oil fired units and oil fuel units, all spaces containing steam and internal combustion engines, generators and major electric machinery, oil filling stations, refrigerated, stabilizing, ventilation and air conditioning machinery and trunks to the above spaces.

1.10 An Oil Tanker is a ship which is constructed primarily to carry oil in bulk and includes ship types such as combination carriers (Ore/Oil ships etc.).

A Double Hull Oil Tanker is a ship which is constructed primarily for the carriage of oil (MARPOL Annex I cargoes) in bulk, which have the cargo tanks protected by a double hull which extends for the entire length of the cargo area, consisting of double sides and double bottom spaces for the carriage of water ballast or void spaces.

1.11 Prompt and thorough repair is a permanent repair completed at the time of survey to the satisfaction of the surveyor, therein removing the need for the imposition of any associated recommendation.

1.12 Spaces are separate compartments within the hull and superstructures including holds, tanks, cofferdams, and void spaces bounding cargo holds, decks and the outer hull.

1.13 Special consideration or specially considered (in connection with close-up surveys and thickness measurements) means sufficient close-up inspection and thickness measurements are to be taken to confirm the actual average condition of the structure.

1.14 Significant repair is a repair where machinery is completely dismantled and re-assembled. This repair is to be carried out after serious damage to machinery.

1.15 Ro-Ro ship is a ship which utilizes a loading ramp to enable wheeled vehicles to be rolled-on and rolled-off the ship.

1.16 Ro-Ro passenger ship - a passenger ship with Ro-Ro spaces or special category spaces.

1.17 Ro-Ro spaces - spaces not normally subdivided in any way and normally extending to either a substantial length or the entire length of the ship, in which motor vehicles with fuel in their tanks for their own propulsion and / or goods (packaged or in bulk, in or on rail or road cars, vehicles (including road or rail tankers), trailers, containers, pallets, demountable tanks or in or on similar stowage units or, other receptacles) can be loaded and unloaded normally in a horizontal direction.

1.18 Special category spaces - those enclosed vehicle spaces above or below the bulkhead deck, into and from which vehicles can be driven and to which passengers have access. Special category spaces may be accommodated on more than one deck provided that the total overall clear height for vehicles does not exceed 10m.

1.19 Securing device - a device used to keep the door closed by preventing it from rotating about its hinges.

1.20 Supporting device - a device used to transmit external or internal loads from the door to a securing device and from the securing device to the ship's structure, or a device other than a securing device, such as a hinge, stopper or other fixed device, that transmits loads from the door to the ship's structure.

1.21 Locking device - a device that locks a securing device in the closed position.

1.22 Additional requirements for General Dry Cargo ships defined in B 3.3, C3.2, and D 2.3 are to be applied for all self-propelled General Dry Cargo Ships of 500gt and above carrying solid cargoes other than;

- Ships subject to UR Z10.2 or UR Z10.5;
- Dedicated container carriers;
- Ro-ro cargo ships;
- Refrigerated cargo ships;

- Dedicated wood chip carriers;
- Dedicated cement carriers;
- Livestock carriers;
- Deck cargo ships (carrying cargo exclusively above deck without any access for cargo below deck);
- General dry cargo ships of double side-skin construction, with double side-skin extending for the entire length of the cargo area, and for the entire height of the cargo hold to the upper deck.

The requirements apply to surveys of hull structure and piping systems in way of cargo holds, cofferdams, pipe tunnels, void spaces and fuel oil tanks within the cargo area and all ballast tanks. The requirements are additional to the classification requirements applicable to the remainder of the ship. Refer to UR Z7.

The requirements contain the minimum extent of examination, thickness measurements and tank testing. The survey is to be extended when Substantial Corrosion and/or structural defects are found and include additional Close-up Survey when necessary. Definitions in Section 2, C.2 are also applied.

2. Periodical Surveys

2.1 All ships are to be subjected to periodical surveys to confirm that the hull, machinery and equipment remain in satisfactory condition.

2.2

For retention of class, periodical and extraordinary surveys of hull, machinery and equipment must be performed.

Periodical surveys will belong to one of the following three categories:

- Annual survey,
- Intermediate survey,
- Class renewal survey,

The following specific surveys may be scheduled according to one or more of the above categories:

- Bottom survey,
- Propeller shaft survey,
- Boiler survey,
- Thermal oil heater survey,
- Pressure Vessel survey.

2.3 Periodical surveys are to be carried out at prescribed intervals and within applicable time windows. A survey may be splitted in different parts, commenced and progressed within the time window provided all the requirements of the survey are completed by the end of the time window.

2.4 The due date of a periodical survey is to be established depending upon the survey interval, measured from the date of class assignment or due date of the previous corresponding survey or date of completion of the previous corresponding survey, whichever is relevant.

A survey may be commenced prior to the defined time window at owner's request. In such a case the due date of subsequent surveys are to be adjusted accordingly.

2.5 The scope of survey may be extended when compliance with applicable rules can not be satisfactorily confirmed or the surveyor suspects that the ship is not maintained in accordance with the basis for retention of class.

2.6 Except for annual and intermediate surveys, **TL** may accept to postpone periodical surveys in exceptional circumstances and upon consideration in each case.

For ships equipped to take more than 12 passengers, any postponement beyond the due date is in principle impossible. An application for a brief deferment is to be made directly by the ship owner to Head Office.

Postponement conditions of surveys are laid down in relative survey schedules in 4.

2.7 The surveyors are to have access to classed ships at all reasonable times. The class certificate and other documents related to classification are to be made available to the surveyor upon request.

2.8 Surveys conducted during a voyage may be agreed and credited to periodical surveys due (e.g. inspection of large holds by boat). The prerequisites, procedures and specific (e.g. weather) conditions to be met will be fixed from case to case. The decision as to feasibility of the survey can only be taken in agreement with the Surveyor.

2.9 **TL** will inform the owner or operator about the status of class, indicating the last recognized surveys and the next due dates. However, even if not provided with such information, the operator is obliged to have the surveys stipulated by the present Rules performed.

2.10 **TL** reserve the right to extend the scope of survey and/or inspection for given reasons, e.g. in the light of special experience gained during operation.

2.11 **TL** reserve the right to demand surveys to be held between the due dates of regular surveys, if this is considered necessary.

2.12 If a ship has to be surveyed in a port beyond the reach of a **TL** Surveyor (also in the events of force majeure or of armed conflicts), **TL** Head Office will have to be notified. Upon checking of the facts, the further procedure will then be decided on.

On principle, in extraordinary cases and with **TL** Head Office agreement, it is possible to call for an external expert, whose report is, however, subject to examination by **TL**, who will decide on whether or not the ship will have to be re-surveyed.

2.13 **TL** may require a non-programmed survey about the condition of a ship and/or the equipment at any time to determine the actual condition.

3. Documentation

3.1 The records of each survey, as well as special requirements upon which the maintenance of class has been made conditional, will be entered in the relevant Survey Statement. By his signature in the certificate and other documents the surveyor only certifies what he saw by himself and checked at the moment the survey was held.

3.2 The reports prepared by the Surveyor will be checked at TL Head Office. If there are no objections, the results will be recorded.

3.3 In the Register the dates of the surveys will be indicated, such as Class renewals, annual survey, intermediate survey, continuous class renewal, bottom and propeller shaft survey. Records on periodical repeat tests on steam boilers and thermal oil heaters will be also entered in special Test Certificates, which are to be kept on board.

3.4 A confirmation of class affected by the Surveyor relates to the kind of survey referred to in the report and is valid under the reservation that examination will not give cause for any objections.

3.5 On request, the class may be confirmed in writing by a separate Certificate. However, such Certificates are valid only if issued by TL Head Office or if, in exceptional cases, Head Office has expressly authorized the field service representatives to do so.

3.6 Where defects are repaired provisionally only, or where the Surveyor does not consider immediate repairs or replacements necessary, the vessel's class may be confirmed for a limited period by making an entry in the survey statement to the Certificate of Classification. Cancellation of such limitations will also have to be indicated in the Survey Statement.

4. Survey Schedules

4.1 Annual surveys

Annual survey schedule is as follows:

4.1.1 Annual Surveys are to be held within 3

months before and after anniversary date from the date of the initial classification survey or of the date credited for last Class Renewal Survey.

4.1.2 In case a class annual survey is commenced prior to the defined time window, the survey must be completed not more than 6 months after the date of commencement.

4.1.3 An additional class annual survey may be required when the anniversary date has been advanced.

Note: Ships with the notations SAILING YACHT or MOTOR YACHT are not subject for an annual survey.

4.2 Intermediate surveys

Intermediate survey schedule is as follows:

4.2.1 The Intermediate Survey is to be held at or between either the 2nd or 3rd Annual Survey.

4.2.2 Those items which are additional to the requirements of the Annual Surveys may be surveyed either at or between the 2nd and 3rd Annual Survey.

4.2.3 A survey planning meeting is to be held prior to the commencement of the survey.

4.2.4 Concurrent crediting to both Intermediate Survey and Class Renewal Survey for surveys and thickness measurements of spaces are not acceptable.

4.3 Class renewal surveys

Class renewal survey schedule is as follows:

4.3.1 The due date is set at 5 years interval and corresponds to the expiry date of the class certificate.

4.3.2 The survey is normally being carried out within a time window of 3 months before the due date.

For surveys completed within 3 months before the expiry date of the class renewal survey, the next period of class will start from the expiry date of the class renewal survey. For surveys completed more than 3 months before the expiry date of the class renewal

survey, the period of class will start from the survey completion date. In cases where the vessel has been laid up or has been out of service for a considerable period because of a major repair or modification and the owner elects to only carry out the overdue surveys, the next period of class will start from the expiry date of the class renewal survey. If the owner elects to carry out the next due class renewal survey, the period of class will start from the survey completion date.

4.3.3 The survey may be commenced at the fourth annual survey or between the fourth and fifth annual surveys.

4.3.4 In case the survey is commenced more than 15 months before the expiry date of the class certificate, the due date of the survey will be advanced to a date not later than 15 months after the commencement.

4.3.5 The class renewal survey is to be completed concurrently with the last class annual survey in each period of the class certificate.

4.3.6 Postponement of the class renewal survey may be granted only upon the owner's request in exceptional circumstances and is not to exceed 3 months provided that the maximum interval between two successive bottom surveys is not to exceed 36 months in any case. For the postponement conditions of bottom survey, A.4.7.2 applies. The postponement of class renewal survey will not affect the survey's next due date. In this case, the next period of class will start from the expiry date of the Renewal Survey before the postponement was granted. Conditions in Section 2, C.3.2 applies.

4.3.7 A survey planning meeting is to be held prior to the commencement of the survey.

4.3.8 Concurrent crediting to both Intermediate Survey and Class Renewal Survey for surveys and thickness measurements of spaces are not acceptable.

4.4 Continuous class renewal surveys

Owner's hull inspection and maintenance schemes shall be encouraged as means for maintaining compliance

with classification and statutory requirements between the surveys. However, these schemes are not to be accepted as an alternative to, or a substitute for, the performance of required classification and/or statutory surveys of the hull by the Surveyors of **TL** or of an IACS-member class society with which the ship is dually classed.

Note:

The Surveyors may be assisted, where appropriate, by service suppliers as defined in UR Z17.

For ships other than, General Dry Cargo Ships, Single and Double Hull Oil Tankers, Single and Double Skin Bulk Carriers, and Chemical Tankers;

4.4.1 At owner's application, the surveys required for class renewal may be split, according to a schedule to be agreed, such as to extend over the entire period of class so that abt. 20% of all surveys required for class renewal is to be completed every year. This means that all areas subject to survey as defined by **TL** Head Office are to be surveyed at least once per class period. The period between two subsequent surveys of each area must not exceed 5 years.

For ships more than 10 years of age, the ballast tanks are to be internally examined twice in each five-year class period, i.e. once within the scope of the intermediate survey and once within the scope of the continuous Class Renewal Survey (hull).

The survey in dry-dock for Continuous Class Renewal (hull) may be held at any time within the five-year Class period provided all the requirements of bottom surveys are also complied with.

4.4.2 Continuous class renewal may be applied for separately for the hull, the machinery, and the special equipment.

4.4.3 Regarding the duration of the period of class and due dates of surveys, the requirements as per 4.3 continue to be applicable.

4.4.4 At the end of a period of class, for the purpose of class renewal, a final survey at least in the scope of an Annual Survey will be performed, during

which the Surveyor will satisfy himself as to whether all areas required to be surveyed have in fact been surveyed throughout, with satisfactory results. If there are special reasons, the Surveyor may inspect individual parts again.

4.4.5 Ships surveyed subject to the continuous class renewal system are not exempted from other periodical surveys (such as annual and intermediate surveys) prescribed.

4.4.6 The surveyor may extend the inspection at his discretion, to other items if the inspections carried out revealed any defects.

4.4.7 The agreement for surveys to be carried out on a Continuous Survey System basis may be withdrawn at discretion of the Society concerned.

4.5 Continuous class renewal surveys based on preventive maintenance systems

4.5.1 On owners' application, an optimized continuous class renewal system may be agreed on as outlined below for ships the machinery of which is maintained with the aid of an approved, computer-assisted maintenance system.

4.5.2 Owners will introduce a preventive maintenance system (Planned Maintenance System) comprising at least the survey scopes/systems as covered by the normal continuous class renewal system.

4.5.3 This maintenance system will have to be approved by **TL**, to this effect; owners will submit the following documentation, in English or Turkish:

- Detailed description of the system, indicating the information flows,
- List of components/systems to be covered by the optimized continuous class renewal system (Inventory Content),
- Indication of intervals for each of the maintenance measures in general,

- List of maintenance intervals and of the expected lifetime of the main and auxiliary machinery components essential for operation, taking into account manufacturers' recommendations and specific operational requirements,
- List of instructions (Maintenance Procedures) underlying the maintenance concept,
- Maintenance documentation (reports containing important operational information, component condition, offset sheets, measures carried out),
- Documentation on the maintenance strategy applied prior to filing of the application.

4.5.4 Within the scope of a shipboard survey the **TL** Surveyor will have to confirm that:

- The current maintenance system complies with the approved documentation,
- The current maintenance system takes into account, without reservation, the specific service conditions,
- The maintenance documentation permits conclusions to be drawn as to the construction condition and operability of the machinery,
- The personnel in charge of operation of the machinery are properly qualified and hold the necessary qualification certificates.

4.6 Surveys based on condition monitoring systems

Machinery or equipment, which is subject to a Condition Monitoring System, may be surveyed in line with the requirements and prerequisites described in "Machinery Condition Monitoring". Prerequisite for this Class Renewal Survey Arrangement CM is the existence of a computerized Planned Maintenance System (PMS). The elements of the PMS considering the machinery components or part of them covered by Condition Monitoring are to be approved by **TL**. For more details about "Planned Maintenance Scheme (PMS)" see also IACS UR Z20.

The Condition Monitoring System is not limited to the equipment used to determine the machinery's condition, but also in addition consists of the applied procedures and schedules for data collection and analysis.

If the Condition Monitoring information are giving evidence to the Surveyor that the machinery, or part of it, is in an acceptable running condition, he may grant a waiver from dismantling of machinery, or part of it, for direct inspection.

Any item of the installation or machinery not covered by Condition Monitoring is to be surveyed and credited in the conventional way.

4.7 Bottom surveys

Bottom survey schedule is as follows:

4.7.1 The due date is set at intervals in accordance with the following:

- Two bottom surveys are required during each five year period of the class certificate except where SOLAS I Reg. 14 (e) or (f) is applicable.
- The intervals between any two successive bottom surveys are in no case to exceed 36 months.

4.7.2 An extension of the bottom survey may be granted in accordance with relevant provisions of Section 2 item C.3.2 under exceptional circumstances such as unavailability of dry-dock or repair facilities, unavailability of essential materials, equipment or spare parts or delays incurred by action taken to avoid severe weather conditions. The extension is not to exceed 3 months.

4.7.3 One bottom survey is to be carried out in conjunction with the class renewal survey.

4.7.4 One bottom survey is to be carried out in conjunction with the class intermediate survey in case of bulk carriers and tankers with class notation ESP when exceeding 10 years of age and general cargo ships subject to extended hull survey requirements when exceeding 15 years of age.

4.7.5 For passenger ships, the bottom survey is to be carried out annually.

4.7.6 The interval between examinations of the outside of the ship's bottom and related items for ships operating in fresh water and for certain harbour or non-self-propelled craft may be greater than that given in 4.7.1.

4.7.7 Bottom surveys at an "Extended Dry-docking Scheme" can be credited as in-water survey during Intermediate and Class Renewal surveys in terms of the 7.5 years interval, see A 4.14.

Note:

Compliance with 4.7 does not absolve the Owner from compliance with the requirements of SOLAS as amended, especially when shorter intervals between examination of the ship's bottom for certain types of ship are required.

4.8 In-water surveys

The Owner is to notify the **TL** whenever the outside of the ship's bottom and related items can be examined in drydock or on a slipway.

4.8.1 For ships assigned the class notation **IWS**, an in-water survey performed with the assistance of an approved diving firm may be recognized as a substitute for every second periodical dry docking survey. Exemption from above is applied for ships enrolled in "Extended Dry-docking Scheme", see A 4.14.

4.8.2 The In-water Survey is to provide the information normally obtained from a docking survey. special consideration shall be given to ascertaining rudder bearing clearances and stern bush clearances of oil stern bearings based on a review of the operating history, on board testing and stern oil sample reports.

These considerations are to be included in the proposals for In-water Survey which are to be submitted in advance of the survey so that satisfactory arrangements can be agreed with **TL**.

4.8.3 On application an in-water survey in lieu of every second periodical dry docking survey may be carried out for ships without the class notation IWS with

the assistance of an approved diving firm. The final permission will be given by TL Head Office.

4.8.4 In general, bottom survey for seagoing ships with accommodation for more than 12 passengers is to be carried out in dry-dock. The final permission for substitution with an In-water survey is subject to TL Head Office approval and is valid for one substitution only. More extensive Flag State Requirements regarding the substitution of the bottom survey in dry-dock shall be observed.

4.8.5 Special consideration should be given to vessels of 15 years of age or over prior to permission being granted to carry out an in-water survey in lieu of a dry docking survey. For ESP ships of 15 years of age and over, such examinations are to be carried out with the ship in drydock.

4.8.6 The equipment, procedure for observing and reporting the survey are to be discussed with the parties involved prior to the In-water Survey, and suitable time is to be allowed to permit the diving company to test all equipment beforehand.

4.9 Propeller shaft surveys

For retention of the class, periodical surveys and tests of propeller shafts and tube shafts, propellers, vane wheels and other systems of are to be carried out.

4.9.1 Propeller shafts and tube shafts

The periodical surveys and tests of propeller shafts and tube shafts are defined in F.

4.9.2 Propellers

During surveys of the propeller shafts and tube shafts, the propellers as well as the remote and local control gear of controllable pitch propellers are to be surveyed at the Surveyor's discretion, depending on the findings.

4.9.3 Other systems

Other systems for main propulsion purposes, such as rudder and steering propellers, pod propulsion systems,

pump jet units, etc., are subject to the same survey intervals as propeller shafts and tube shafts.

4.10 Boiler survey

4.10.1 Steam boilers are to be subjected to the following examinations and tests at regular intervals.

The term "steam boilers" includes exhaust gas boilers warm water and hot water generators (except where they are heated by steam or liquids).

4.10.2 External inspection

Boilers are to be subjected at annual intervals to an external inspection in accordance with the TL inspection programme.

For the external inspection a time window of ± 3 months is admissible.

4.10.3 Internal inspection

Steam boilers are to be subjected to an internal survey twice in every 5-year class period. The first internal survey has to be carried out on the occasion of the 2nd but not later than the 3rd regular annual survey. The maximum interval between internal surveys should not exceed 3 years. An extension of examination of the boiler of up to 3 months beyond the due date can be granted in exceptional circumstances. For "exceptional circumstances" refer to Sec. 2, C For ships with one main boiler only, internal inspections are to be performed every 2.5 years until 10 years after commissioning and every year thereafter. Boiler installations with only one main boiler and one auxiliary boiler powerful enough to operate the propulsion plant in an emergency (take-home boiler), count as multi-boiler plants.

4.10.4 An extension may be granted by TL on the basis of "G.2 - Internal Inspection", after the following is satisfactorily carried out:

- External examination of the boiler,
- Boiler safety valve relieving gear (easing gear) is to be examined and operationally tested,

- Boiler protective devices operationally tested,
- Review of the operation, maintenance, repair history and feed water analysis records since the last boiler survey.

4.10.5 Steam pipes

4.10.5.1 Steam pipes are to be examined regularly every 5 years, possibly in connection with a class renewal survey. Starting from class renewal II, the steam pipes are to be examined as to their internal and, where advisable, as to their external condition as well, employing non-destructive testing methods, where necessary.

4.10.5.2 Steam pipes with service temperatures exceeding 500°C are to be examined for expansion at 5-yearly intervals, starting from class renewal II, at the latest.

4.11 Thermal oil heater survey

4.11.1 External inspection

Thermal oil plants are to be subjected to an external inspection once a year. Proof of continued usability of the thermal oil shall be furnished by a competent testing agency.

For the external inspection, a time window of ± 3 months is admitted.

4.11.2 Internal inspection

An internal inspection, including a tightness test of the whole plant, is to be performed at intervals of 5 years, counting from commencement of initial operation, and possibly in connection with a class renewal survey.

4.12 Pressure vessel survey

4.12.1 Pressure vessels which are subject to survey by TL according to the Construction Rules, are to be examined internally and externally every 5 years, possibly in connection with a class renewal survey.

4.12.2 Pressure vessels having a product of pressure by cubic capacity of $p\ell \leq 200$ (p in bar, ℓ in litre) are to be surveyed on the occasion of checking of

the pertinent piping system.

4.12.3 Periodical tests of CO₂ gas cylinders and gas cylinders for fire-extinguishing purposes are to be carried out at intervals not exceeding 10 years. At least 10% of the gas cylinders and bottles provided are to be subjected to an internal inspection and hydrostatic test.

If one or more gas cylinders fail, a total of 50% of the gas cylinders provided are to be subjected to an internal inspection and hydrostatic test. If further gas cylinders fail at the extended test, all gas cylinders are to be subjected to foregoing tests. In any case, all gas cylinders having failed must be replaced by new ones.

Halone containers of existing fixed Halone fire-extinguishing systems are exempted from this requirement.

Irrespective thereof, on the occasion of recharging CO₂ cylinders, Halone containers and other gas cylinders are to be tested, if the last test dates back 10 years or more.

4.12.4 CO₂ cylinders and other gas bottles of permanent gas fire extinguishing systems are subject to level checks every 2 years. These checks may also be performed by the crew and are then to be recorded in the form of a report and an entry in the ship's log. If the loss of CO₂ exceeds 10% or other gases 5%, refilling is to be undertaken. Refill of HALON receivers is not accepted, receivers should be replaced by other fire extinguishing means should the level drop by 5%.

4.12.5 Low pressure CO₂ bulk storage containers are subject to internal survey if the content has been released and the container is more than 5 years old but not more frequently than once within five years.

4.12.6 In the case of vessels for powder extinguishing agents, periodical pressure tests may be dispensed with, provided that their internal inspection does not reveal any deficiencies.

4.12.7 Receivers in hydraulic or pneumatic control systems are to be examined during maintenance and repairs at the system; air receivers with a product of pressure by cubic capacity $p\ell \geq 1000$ (p=bar, ℓ=litre), are to be subjected to an internal inspection at least

once during each class period and/or at intervals not exceeding 5 years.

4.12.8 The intervals between surveys as referred to may be reduced, depending on the findings.

4.13 Extraordinary surveys

4.13.1 Damage and repair surveys

Damage and repair surveys fall due if checks of the ship's hull, machinery or electrical installations and/or some special equipment classed have revealed that they no longer comply with TL's Construction Rules, or if damage may be assumed in consequence of an average or some other event.

4.13.2 Voyage repairs and maintenance

Where repairs to hull, machinery or equipment, which affect or may affect classification and which are to be carried out by a riding crew during a voyage they are to be planned in advance. A complete repair procedure including the extent of proposed repair and the need for Surveyor's attendance during the voyage is to be submitted to and agreed upon by TL reasonably in advance. Failure to notify TL, in advance of the repairs, may result in suspension of the vessel's class.

Where 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 TL for use in determining further survey requirements.

The above is not intended to include maintenance and overhaul to hull, machinery and equipment in accordance with the recommended manufacturer's procedures and established marine practice and which does not require TL's approval, however, any repair as a result of such maintenance and overhauls which affects or may affect classification is to be noted in the ship's log and submitted to the attending Surveyor for use in determining further survey requirements.

IACS UR Z13 can be referred for "Guidelines for the Survey of Voyage Repairs".

4.13.3 Conversion surveys

In the case of conversions of a ship's hull or machinery surveys are to be conducted in accordance with the relevant approved particulars, as in the case of newbuildings.

4.13.4 Surveys of special equipment

Periodical surveys and checkings of special equipment covered by the class, such as diving installations, fire-fighting installations, incinerators or sea-water desalination systems, are to be carried out in accordance with the respective programmes fixed or to be fixed by TL for such special equipment characteristic of a particular type of ship.

4.13.5 Surveys of additional safety measures

For all ships the strength of the small hatches and their securing devices fitted on the exposed fore deck, are to comply with additional requirements **(1)** for these structures.

The strength requirements to resist sea forces of items, such as air and ventilator pipes and their closing appliances, and the securing of windlasses located within the forward quarter length are to comply with additional requirements **(2)** for fore deck fittings and equipment.

4.14 Extended Dry-docking Scheme

Subject to provisions outlined below, IACS Recommendation 133, and any additional specific Flag Administration requirements, the dry-docking interval can be extended with the approval of the ship's Flag Administration to 7.5 years.

At the 7.5 years interval it is possible to perform the first two forthcoming bottom surveys as underwater survey in the scope of an in-water survey provided that these should be carried out during the renewal period of five years and the intervals between any two inspections shall not exceed 36 months (see also 4.7).

(1) Additional requirements see UR S 26 of IACS.

(2) Additional requirements see UR S 27 of IACS.

The third bottom survey at 7.5 years has to be performed in dry-dock. No extensions are to be granted for the dry-docking required at the end of each extended dry-dock interval.

The dry-docking scheme will operate based upon the ship's age when entering the scheme. The Extended Dry-docking Scheme may be implemented at any time until a ship reaches 10 years of age.

The Extended Dry-docking Scheme generally applies to container ships excluding the following ships and ship types:

- Passenger Ships;
- Ships subject to the Enhanced Survey Program (ESP);
- Ships subject to the Hull Survey Requirements listed in IACS UR Z 7.1 (See also A 1.22);
- Ships fitted with propulsion thrusters;
- Ships where the propeller connection to the shaft is by means of a keyed taper;
- High Speed Craft (HSC).

Prior to acceptance into "Extended Dry-docking Scheme", following necessary requirements are to be complied:

Class Notation **IWS** or equivalent, hull, rudder and shafting systems to be inspectable during in-water survey;

- Protective coating in double bottom/double side ballast tanks, void spaces and all other spaces adjacent to the shell should be maintained in GOOD condition;
- Class Notation **CM-PS** or equivalent, shaft bearing and sealing system of approved design and regular monitoring procedures implemented;

- Planned Maintenance System Machinery according to A.4.5.
- Hull Maintenance Scheme according to **HP** class notation in accordance with ISM requirements.

Upon the Owner's request, the extended interval for each ship will be considered on a case by case basis by **TL**. The Extended Dry-docking Scheme is in any case subject to approval by the relevant Flag State.

All ships in an Extended Dry-docking Scheme shall be disenrolled once the ship reaches 15 years of age. The Extended Dry-docking Scheme will be terminated in cases of change of the ship's owner, management or Flag Administration.

TL may disenroll a ship from an Extended Dry-docking Scheme at any time should it be found that the conditions for maintaining this Extended Dry-docking Scheme are not fulfilled anymore.

Once the conditions for the scheme are no longer present, the ship will return to the normal docking interval and any due dock survey shall be carried out by the due date.

5. Conditions and Preparations for Surveys and Maintenance of Surveys

5.1 Before Türk Loydu starts work, the Client shall inform Türk Loydu about relevant safety issues and take all necessary safety-related measures (including boat transfers in compliance with IACS Rec. 134) to ensure a safe work environment in accordance with the IACS PR37 for the persons carrying out the work for Türk Loydu and shall comply with all legal and other safety regulations.

5.2 Cargo holds, tanks and other spaces are to be safe to access. These spaces are to be gas freed, properly ventilated and illuminated and prepared for the surveyor to examine the structure in a safe way. (See 6)

Prior to entering a tank or other enclosed space, it is to be verified that the atmosphere in the tank is free from hazardous gas and contains sufficient oxygen.

5.3 In preparation for survey and thickness measurements and to allow for a thorough examination, all spaces are to be cleaned including removal of all loose scale from surfaces. Spaces (including machinery components and related spaces) are to be sufficiently clean and free from water, scale, dirt, oil residues, etc. and sufficient illumination is to be provided to reveal corrosion, deformation, fractures, damages or other structural deterioration. However, those areas of structure whose renewal has already been decided by the owner need only be cleaned and descaled to the extent necessary to determine the limits of the areas to be renewed.

5.4 Where soft or semi-hard coating have been applied, safe access is to be provided to verify the effectiveness of the coating and to carry out an assessment of the conditions of internal structures which may include spot removal of the coating. When safe access cannot be provided, the soft or semi-hard coating is to be removed.

5.5 For survey in dry-dock or on a slipway, the ship is to be placed on blocks of sufficient height and with necessary staging to allow the examination.

5.6 Explosimeter, oxygen-meter, breathing apparatus, lifelines, riding belts with rope and hook and whistles are to be made available during the survey.

5.7 Adequate protective clothing is to be made available and used during the survey.

5.8 Surveys of tanks or applicable holds by means of boats or rafts may only be undertaken with the agreement of the surveyor, provided the expected rise of water within the tank does not exceed 0.25 m.

5.9 When rafts or boats are used for close-up surveys, the following conditions are to be observed:

5.9.1 Only rough duty, inflatable rafts or boats, having satisfactory residual buoyancy and stability even if one chamber is ruptured, are to be used.

5.9.2 The boat or raft is to be tethered to the access ladder and additional person is to be stationed down the access ladder with a clear view of the boat or raft.

5.9.3 Appropriate life-jackets are to be available for all participants.

5.9.4 The surface of the water in the tank or hold is to be calm (the expected rise of water within the tank or hold is not to exceed 0.25 m.) and the water level either stationary or falling.

5.9.5 The tank, hold or other space must contain clean ballast water only. Even a thin layer of oil on the water is not acceptable.

5.9.6 At no time is the water level to be allowed to be within 1 m. of the deepest under deck web face so that the survey team is not isolated from a direct escape route to the tank hatch.

5.9.7 Rafts or boats alone may be allowed for inspection of the under deck areas for tanks and spaces, if the depth of the web is 1.5 m. or less.

If the depth of the webs is more than 1.5 m., rafts or boats alone may be allowed only:

- When the coating of the under deck structure is in good condition and there is no evidence of wastage, or
- If a permanent means of access is provided in each bay to allow safe entry and exit. This means :

Access direct from the deck via a vertical ladder and a small platform fitted approximately 2 m below the deck in each bay, or

Access to deck from a longitudinal permanent platform having ladders to deck in each end of the tank. The platform is, for the full length of the tank, to be arranged in level with, or above, the maximum water level needed for rafting of under deck structure.

If neither of the above conditions are met, then staging or another equivalent means is to be provided for the survey of the under deck areas.

5.10 When examination of associated structure is required, the following applies:

5.10.1 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.

5.10.2 Cement or other protective material is to be removed when there is any doubt as to the condition of the plating underneath.

5.10.3 In the case of solid ballast spaces, the solid ballast is to be partially removed for examination of the condition of the structure in way. If doubts arise, the surveyor may require more extensive removal of the solid ballast.

5.10.4 In refrigerated cargo spaces the condition of the coating behind the insulation is to be examined at representative locations. The examination may be limited to verification that the protective coating remains effective and that there are no visible structural defects. Where poor coating condition is found, the examination is to be extended as deemed necessary by the Surveyor. The condition of the coating is to be reported. If indents, scratches, etc., are detected during surveys of shell plating from the outside, insulations in way are to be removed as required by the Surveyor, for further examination of the plating and adjacent frames.

5.11 In every ship a maintenance system should be implemented. The maintenance system is to ensure that inspections and maintenance are carried out at defined intervals, any non-conformity is reported with its possible cause, appropriate corrective action is taken and records of these activities are maintained.

5.12 When machinery components are renewed, such components are to be delivered in accordance with requirements of valid rules at the time of newbuilding.

6. Access to structures

6.1 For overall survey, means are to be provided to enable the surveyor to examine the hull structure in a safe and practical way.

6.2 For close-up survey, one or more of the following means of access, acceptable to the surveyor, is to be provided:

- Permanent staging and passages through structures,
- Temporary staging and passages through structures,
- Lifts and movable platforms,
- Hydraulic arm vehicles (cherry pickers),
- Boats or rafts,
- Portable ladders,
- Other equivalent means.

6.3 For close-up examination of the cargo hold frames of bulk carriers, the following additional requirements are to be met:

- For examination of lower parts of cargo hold frames and brackets, portable ladders may be accepted provided the ladder length is not to exceed 5 m.
- For examination of middle and upper parts of hold frames hydraulic arm vehicle is necessary.

7. Work at Height

7.1 Work at height means work in any place where, if precautions are not taken, a person could fall and be injured. This includes working at or below ground level if a fall is still possible such as a fall from an edge or through an opening. This encompasses working:

- from a ladder or on scaffolding, and other means of access;

- alongside an open hatch or other opening in a ship's structure;
- in close proximity to, or supported from, a ship's side;
- in or entering or exiting spaces, such as ballast tanks, cargo holds, deep tanks, etc.;
- on or from a permanent stairway, gangway, accommodation ladder or companionway in or on a ship;
- in or on structures under fabrication, such as subassemblies, hull sections or hull blocks.

7.2 Responsibilities

7.2.1 Responsibility for the provision of the means of access, working platforms and related equipment lies with the shipyard / ship owner / crew / repairer / industrial unit or other party as applicable. A Responsible Person means an authorized representative of the ship owner/manager or facility's management who is authorized to permit work at height. All surveyors who are expected to work at height should be trained in safety requirements for such activities according to Classification Society's internal procedures and IACS Recommendation No.136 "Guidelines for Working at Height" may be taken as a reference.

7.2.2 Safety measures, including the following, should be taken by a responsible person prior to survey / inspection to the satisfaction of the attending surveyor:

- The equipment's range of use should be agreed with the operator before using the equipment;
- Permissible load and reach limitations should not be exceeded.

Class rules normally require that Owners' / site managers' 'Responsible Person(s)' are responsible for providing means of access which are suitable and safe for the work to be carried out. The equipment, where applicable, should be operated/erected by qualified personnel. Evidence should be provided that the equipment has been properly maintained and inspected before each use; that formal inspections have been held

annually, as a minimum; that re-inspections have been completed if any modifications from the original configuration have been carried out.

7.2.3 It should be demonstrated by the Responsible Person that the equipment provided has been inspected, maintained and operated by trained and qualified persons. These should be demonstrated to the surveyors by the production of applicable documents, prior to the equipment being used.

8. Survey Extent

8.1 The survey consists of examination, measurement and tests for the purpose of ensuring the hull, equipment and machinery of the ship are in satisfactory condition with respect to corrosion, deformation, fractures, damages or other structural deterioration.

8.2 During examination or overall examination, the structure or equipment is visually examined. In such cases the general maintenance, coating condition, rust deposits, leakages and structural detachment and damages may be detected and the surveyor may extend the survey as considered necessary.

8.3 When close-up examination is required, the structure or equipment is visually examined from a distance normally within reach of hand.

8.4 The surveyor may require thickness measurements in any part of the structure where signs of wastage are evident or in areas where wastage is normally found.

The surveyor may extend the scope of the thickness measurements if considered necessary.

8.5 When thickness measurements are specified by the rules or required by the surveyor, the measurements are to be carried out to an extent sufficient to determine both general and local corrosion levels.

Thickness measurements are carried out by a qualified company approved by TL and witnessed by the surveyor. This requires the surveyor to be on board,

while the gaugings are taken, to the extent necessary to control the process and this also applies to thickness measurements taken during voyages (Refer also IACS PR19 and Rec 77)

In any kind of survey, i.e. class renewal, intermediate, annual or other surveys having the scope of the foregoing ones, thickness measurements, when required in general by Table 3.3 or according to ship type by Table 3.6, Table 3.26, Table 3.10, Table 3.13, Table 3.18, Table 3.23, Table 3.17 of structures in areas where close-up surveys are required, shall be carried out simultaneously with close-up surveys.

For structure built with a material other than steel, alternative thickness measurement requirements may be developed and applied as deemed necessary by **TL**.

8.6 Where substantial corrosion is found, additional thickness measurements are to be carried out to confirm the extent of substantial corrosion.

8.7 The examination may be extended also in cases when information is available of defects suffered on similar structure or details in similar tanks/holds or on similar ships and the structure under survey has been approved with reduced scantlings due to an approved corrosion control system.

8.8 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.

9. Repair of Structural Damage

9.1 Any damage or excessive wastage beyond allowable limits to side shell frames, their end attachments and/or adjacent shell plating, the deck structure, the bottom structure and bottom plating, the

watertight or oiltight bulkheads and the hatch covers or hatch coamings that affects the ship's structural integrity or watertightness and also affects a vessel's class, is to be permanently repaired immediately after the survey.

For locations where adequate repair facilities are not available, consideration may be given to allow a vessel to proceed directly to a repair yard. This may require discharging of the cargo and/or temporary repairs for the intended voyage.

Damages or excessive wastage at the areas noted above and not immediately affecting the vessel's structural or watertight/weathertight integrity may be temporarily repaired for a period to be defined.

9.2 In exceptional cases, following inspection of hull and machinery, performance of the repairs required for maintenance of the original class may be dispensed with, if owners agree to the class and/or the range of service being restricted, or possibly a higher freeboard being assigned.

9.3 Where parts are damaged or worn to such an extent that they no longer comply with the requirements of **TL**, they are to be repaired or replaced.

9.4 Maintenance work, repairs and conversions of classed ships and special equipment have to be carried out under the supervision of **TL** to ensure maintenance or reassignment of class.

Materials and special equipment to be used in maintenance works, repairs and conversions shall be certified.

9.5 The areas affected by the repair and conversion are to be treated in the same way as newbuildings, irrespective of whether the hull, the machinery including the electrical installation, the inert gas system, automated systems or other equipment classed are concerned.

9.6 If following major conversions a new character of class and/or new notations are assigned so that new certificates have to be issued, commencement of a new period of class may be agreed upon.

10. Surveys in Accordance With Flag State Regulations

10.1 Where surveys are required on account of international conventions and of corresponding laws/official ordinances of a flag state, **TL** will undertake them on application, or by official order, acting on behalf of the authorities concerned, based on the respective provisions; this includes surveys according to:

- The International Convention on Load Lines,
- The International Convention for the Safety of Life at Sea (SOLAS),
- The International Convention for the Prevention of Pollution from Ships (MARPOL),
- The IMO Codes, e.g. on Chemical and Gas Tankers,
- The related Conventions of the International Labour Office (ILO).

Where possible, such surveys will be carried out simultaneously with the class surveys.

10.2 **TL** will also undertake on request other surveys and checks stipulated by additional regulations and requirements of the flag state. Such surveys are subject to agreements made in each individual case and/or to the regulations of the country concerned.

10.3 All activities as outlined in 10.1 and 10.2 and, where applicable, issuance of relevant certificates are likewise subject to the general conditions of Section 1.

10.4 If for some reason a vessel's class has expired or has been withdrawn by **TL**, all statutory certificates issued by **TL** will automatically become void. If subsequently the class is renewed or reassigned, validity of these certificates will within the scope of its original period of validity be revived, provided that all surveys meanwhile having fallen due have been carried out.

11. External Service Suppliers

11.1 General

11.1.1 To approve firms providing services, such as measurements, tests or maintenance of safety systems and equipment, **TL** applies procedures provided in IACS UR Z17 with application scope provided in 11.2.

11.2 Application

11.2.1 The procedures defined in 11.1.1 based on UR Z17 are applied to the approval of the following categories of service suppliers:

11.2.1.1 Statutory services

- Firms engaged in servicing inflatable liferafts, Inflatable lifejackets, hydrostatic release units, inflatable rescue boats, marine evacuation systems
- Firms engaged in surveys and testing of radio communication equipment
- Firms engaged in surveys and maintenance of self contained breathing apparatus
- Firms engaged in annual performance testing of Voyage Data Recorders (VDR) and simplified Voyage Data Recorders (S-VDR)
- Firms engaged in sound pressure level measurements of public address and general alarm systems on board ships
- Firms engaged in surveys of low location lighting systems using photo luminescent materials and evacuation guidance systems used as an alternative to low-location lighting systems
- Firms engaged in the servicing and maintenance of lifeboats, launching appliances, on-load release gear and david-launched liferaft automatic release hooks

- Firms engaged in inspection, performance testing and maintenance of Automatic Identification Systems (AIS).

11.2.1.2 Classification and/or Statutory Services

- Firms engaged in thickness measurements on ships except
 - (1) non-ESP ships less than 500 gross tonnage and
 - (2) all fishing vessels.
- Firms carrying out in-water survey of ships and mobile offshore units
- Firms engaged in surveys and maintenance of fire extinguishing equipment and systems
- Firms engaged in tightness testing of closing appliances such as hatches, doors, etc. with ultrasonic equipment.
- Firms engaged in measurements of noise level on board ships

Firms engaged in examination of Ro-Ro ship's bow, stern, side and inner doors

- Firms engaged in testing of coating systems in accordance with IMO Resolution MSC.215 (82), as amended by IMO Resolution MSC.341(91) and MSC.1/Circ.1381 and IACS UI SC 223 and/or MSC.288 (87), as amended by Resolution MSC.342(91) and MSC.1/Circ.1381.
- Firms engaged in tightness testing of primary and secondary barriers of gas carriers with membrane cargo containment systems for vessels in service.

11.2.2 Where the results of the following service providers are used by a Surveyor of **TL** in making decision affecting classification then that service provider must be approved by **TL**.

1. Firms engaged in thickness measurements on ships except

1. non-ESP ships less than 500 gross tonnage and all fishing vessels.

- Firms carrying out in-water surveys of ships and mobile offshore units
- Firms engaged in tightness testing of closing appliances such as hatches, doors, etc. with ultrasonic equipment.

11.2.3 Where such services are used by Surveyors in making decisions affecting statutory certifications, the firms are subject to approval by **TL** where **TL** is authorised by the relevant flag Administration (i.e. the flag of the ship on which the servicing is to be done or the service equipment is to be used). For such services **TL** may accept approvals done by:

- i. the flag Administration itself,
- ii. duly authorized organizations acting on behalf of the flag Administration, or
- iii. other organizations those are acceptable to the flag Administration (e.g. other governments, etc.).

11.2.4 Use of the approved service suppliers is not mandatory for the following services, unless instructed otherwise by the flag Administration with respect to statutory certification.

- Firms engaged in surveys of low location lighting systems using photo luminescent materials and evacuation guidance systems used as an alternative to low-location lighting systems
- Firms engaged in sound pressure level measurements of public address and general alarm systems on board ships
- Firms engaged in measurements of noise level on board ships
- Firms engaged in testing of coating systems in accordance with IMO Resolution MSC. 215(82) as amended and IACS UI SC 223 and/or MSC. 288(87) as amended

- Firms engaged in examination of Ro-Ro ships bow, stern, side and inner doors

12. Calibration of measuring equipment

The inspection, measuring and test equipment used in workshops, shipyards and on board ships, which may form the basis for Surveyor's decisions affecting Classification or statutory work, shall be appropriate for the services to be performed. The firms shall individually identify and calibrate each unit of such equipment to a recognized national or international standard (3).

13. Survey Programme

Prior to each class renewal as well as intermediate survey of ships of 10 years and older, a survey programme in scope of ESP surveys, in compliance with UR Z10.1 (for oil tankers), UR Z10.2 (for bulk carriers), UR Z10.3 (for chemical tankers), UR Z10.4 (for double hull oil tankers), UR Z10.5 (for couple skin bulk carriers) has to be worked out in cooperation of the owner and TL.

B. Annual Surveys

1. General

1.1 Annual survey is a general survey of the hull, machinery and equipment to confirm that the ship complies with the applicable requirements and is satisfactorily maintained.

1.2 Unless a dry-dock survey is due, annual survey may be carried out with the ship afloat.

1.3 For passenger ships, the annual survey must include a bottom survey. If requested by the owner, the final permission for substitution with an in-water survey is subject to flag state and TL head office approval and this is to be valid for one substitution only.

2. Review of Documentation

2.1 Approved stability information booklet / or loading manual , where required is to be verified available onboard.

This booklet / or loading manual , where required is to be the same as required when the ship was assigned class.

2.2 If a loading instrument is available on board its certificate is to be checked for validity.

It is to be documented that an annual check of the loading instrument by running one of the test conditions has been carried out. If not, the surveyor is to verify the running of the test condition onboard.

2.3 Instruction manuals for operation and maintenance are to be verified.

2.4 List of required signboards or notice plates are to be verified.

2.5 It is to be verified that records of inspection and maintenance for the implemented maintenance system for machinery are kept onboard.

2.6 For ships equipped for periodically unattended machinery space, a maintenance and testing program is to be verified kept onboard.

2.7 For ships complying with SOLAS IX/2, irrespective of the issuing authority of safety management system certificate, the surveyor will complete a list of evidence of possible safety management system failures recorded on the occasion of the annual survey.

3. Hull and Equipment

3.1 General (all ships)

3.1.1 The survey is to cover the following items:

- Examination of weather decks, ship side plating above water line visually. Cargo holds and engine rooms are to be surveyed at random, depending on the ship type and age. In case of suspected damages affecting the class, further investigations may be required.

(3) See UR Z19 of IACS.

- Checking of anchoring equipment for visible damages.
 - Examination of hatch covers on exposed weatherdeck and cargo tank openings regarding the tightness and operability.
 - Examination of opening and closing appliances of watertight doors in bulkheads, bow, side and stern doors, ventilators and air pipes, exposed machinery casings, windows and side scuttles.
 - Examination of ventilators, including closing devices, if any.
 - Examination of scuppers, discharges, side valves and freeing ports.
 - Examination of fittings and supporting structures for stowage, securing and supporting of timber deck cargoes and containers, if applicable.
 - Examination of piping on deck (pressure testing and thickness measurements of any piping system may be required if found necessary by the surveyor).
 - For tankers the survey is to include examination of cargo tank opening with pressure/vacuum valves, venting/gas freeing arrangements including masts and risers with flame screens/flame arrestors, provisions for drainage of cargo tank vent lines.
 - Examination of ballast tanks when required as a consequence of the results of the class renewal and intermediate surveys is to be carried out. When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurement is to be carried out. If the results of these thickness measurements indicate that Substantial Corrosion is found, then the extent of thickness measurements are to be increased to determine the extent of areas of substantial corrosion (see Table 3.1). These extended thickness measurements are to be carried out before the annual survey is credited as completed.
 - Suspect Areas identified at previous surveys are to be examined. Thickness measurements are to be taken of the areas of substantial corrosion and the extent of thickness measurements is to be increased to determine the extent of areas of substantial corrosion (see Table 3.1). These extended thickness measurements are to be carried out before the annual survey is credited as completed.
 - Examination of means of protection of crew, such as guard rails, bulwarks, gangways, etc.
 - Examination of the weld connection between air pipes and deck plating.
 - External examination of all air pipe heads installed on the exposed deck.
 - Examination of flame screens on vents to all bunker tanks.
- Hatch covers and coamings are to be surveyed as follows :
- Checking that no unapproved changes have been made to the hatch covers, hatch coamings and their securing and sealing devices since the last survey.
- Where mechanically operated steel covers are fitted, checking the satisfactory condition of:
- Hatch covers;
 - Tightness devices of longitudinal, transverse and intermediate cross junctions (gaskets, gaskets 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.

Where portable covers, wooden or steel pontoons are fitted, checking the satisfactory condition of:

- Wooden covers and portable beams, carriers or sockets for the portable beams, and their securing devices;
- Steel pontoons;
- Tarpaulins;
- Cleats, battens and wedges;
- Hatch securing bars and their securing devices;
- Loading pads/bars and the side plate edge
- Guide plates and chocks;
- Compression bars, drainage channels and drain pipes (if any)

Checking the satisfactory condition of hatch coamings plating.

Random checking of the satisfactory operation of mechanically operated hatch covers:

- Stowage and securing in open condition;
- Proper fit, locking and efficiency of sealing in closed condition;
- Operational testing of hydraulic and power components, wires, chains, and link drives.

3.2 Passenger ships -additional requirements-

In addition to the annual surveys prescribed for all seagoing ships and the surveys to be conducted during dry docking, every year, all closures on the weather deck, the watertight bulkheads, including all closures, all

shell ports, fire doors and similar closures, the escapes and any cross-flooding arrangements are to be checked as to their general condition and operability.

Table 3.1 Additional thickness measurements in way of substantial corrosion

Structural member	Extent of measurement	Pattern of measurement
Plating	Suspect area and adjacent plates	5 point pattern over 1 m ²
Stiffeners	Suspect area	3 measurements each in line across web and flange

3.3 General dry cargo ships -additional requirements-

Note:

For details of surveys, assessment and repair of hull structure of general dry cargo ships, see IACS Rec. 55.

3.3.1 Examination of the hull

3.3.1.1 Examination of the hull plating and its closing appliances as far as can be seen.

3.3.1.2 Examination of watertight penetrations as far as practicable.

3.3.2 Examination of hatch covers and coamings

The survey is to cover the following items:

Checking the satisfactory condition of hatch coaming plating and their stiffeners including close-up survey.

- Where mechanically operated steel hatch covers are fitted, close-up examination of hatch cover plating.

3.3.3 Examination of cargo holds

3.3.3.1 For ships 10-15 years of age, the following is to apply:

3.3.3.1.1 Overall survey of one forward and one after cargo hold and their associated tween deck spaces.

3.3.3.1.2 When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurement is to be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, then the extent of thickness measurements is to be increased to determine the extent of areas of substantial corrosion. Table 3.1 may be used as guidance for these additional measurements. These extended thickness measurements are to be carried out before the annual survey is credited as completed.

3.3.3.2 For ships over 15 years of age, the following is to apply:

3.3.3.2.1 Overall survey of all cargo holds and tween deck spaces.

3.3.3.2.2 Close-up examination of sufficient extent, minimum 25% of frames, to establish the condition of the lower region of the shell frames including approximately lower one third length of side frame at side shell and side frame end attachment and the adjacent shell plating in a forward lower cargo hold and one other selected lower cargo hold. Where this level of survey reveals the need for remedial measures, the survey is to be extended to include a close-up survey of all of the shell frames and adjacent shell plating of those cargo holds and associated tween deck spaces (as applicable) as well as a close-up survey of sufficient extent of all remaining cargo holds and tween deck spaces (as applicable).

3.3.3.2.3 When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurement is to be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, then the extent of thickness measurements is to be increased to determine the extent of areas of substantial corrosion. Table 3.1 may be used as guidance for these additional measurements.

These extended thickness measurements are to be carried out before the annual survey is credited as completed.

3.3.3.2.4 Where the protective coating in cargo

holds, as applicable, is found to be in good condition the extent of close-up surveys may be specially considered.

3.3.3.2.5 All piping and penetrations in cargo holds, including overboard piping, are to be examined.

3.3.4 Additional requirements for single hold cargo ships after determining compliance with SOLAS II-1/23-3 and II-1/25

For ships complying with the requirements of SOLAS II-1/23-3 and II-1/25 for hold water level detectors, the annual survey is to include an examination and a test, at random, of the water ingress detection system and of their alarms.

3.4 Single skin bulk carriers -additional requirements-

The examination of hull surveys is to cover:

Examination of the hull plating and its closing appliances as far as can be seen.

Examination of watertight penetrations as far as practicable.

Note:

Additional requirements given in UR Z10.2 shall also be applied.

3.4.1 Examination of hatch covers and coamings

The survey is to cover the following items:

A thorough survey of cargo hatch covers and coamings is only possible by examination in the open as well as closed positions and should include verification of proper opening and closing operation. As a result, the hatch cover sets within the forward 25% of the ship's length and at least one additional set, such that all sets on the ship are assessed at least once in every 5-year period, are to be surveyed open, closed and in operation to the full extent on each direction at each annual survey, including:

- Stowage and securing in open condition;

- Proper fit and efficiency of sealing in closed condition; and
- Operational testing of hydraulic and power components, wires, chains, and link drives.

The closing of the covers is to include the fastening of all peripheral, and cross joint cleats or other securing devices. Particular attention is to be paid to the condition of the hatch covers in the forward 25% of the ship's length, where sea loads are normally greatest.

If there are indications of difficulty in operating and securing hatch covers, additional sets above those required are to be tested in operation at the discretion of the surveyor.

Where the cargo hatch securing system does not function properly, repairs are to be carried out under the supervision of the TL.

For each cargo hatch cover set, at each annual survey, the following items are to be surveyed:

- Cover panels, including side plates, and stiffener attachments that may be accessible in the open position by close-up survey (for corrosion, cracks, deformation);
- Sealing arrangements of perimeter and cross joints (gaskets for condition and permanent deformation, flexible seals on combination carriers, gasket lips, compression bars, drainage channels and non return valves);
- Clamping devices, retaining bars, cleating (for wastage, adjustment, and condition of rubber components);
- Closed cover locating devices (for distortion and attachment);
- Chain or rope pulleys;
- Guides;
- Guide rails and track wheels;
- Stoppers;

- Wires, chains, tensioners, and gypsies;
- Hydraulic system, electrical safety devices and interlocks; and
- End and interpanel hinges, pins and stools where fitted.

At each hatchway, at each annual survey, the coamings, with panel stiffeners and brackets are to be checked for corrosion, cracks and deformation, especially of the coaming tops, including close-up survey.

Where considered necessary, the effectiveness of sealing arrangements may be proved by hose or chalk testing supplemented by dimensional measurements of seal compressing components.

3.4.2 Examination of cargo holds

3.4.2.1 For single skin bulk carriers 10-15 years of age, the following is to apply:

- Overall survey of all cargo tanks
- Close-up survey of sufficient extent, minimum 25% of frames, to establish the condition of the lower region of the shell frames including approximately lower one third length of side frame at side shell and side frame end attachment and the adjacent shell plating in the forward cargo hold. Where this level of survey reveals the need for remedial measures, the survey is to be extended to include a close-up survey of all of the shell frames and adjacent shell plating of that cargo hold as well as a close-up survey of sufficient extent of all remaining cargo holds.
- Where the protective coating in cargo holds is found to be in good condition, the extent of close-up surveys and thickness measurements may be specially considered.
- All piping and penetrations in cargo holds, including overboard piping, are to be examined.
- When considered necessary by the surveyor, or where extensive corrosion exists, thickness

measurement is to be carried out. If the results of these thickness measurements indicate that Substantial Corrosion is found, the extent of thickness measurements is to be increased in accordance with Table 3.11. These thickness measurements are to be carried out before the annual survey is credited as completed. Suspect Areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to have thickness measurements taken.

For vessels built under the IACS Common Structural Rules, the annual thickness gauging may be omitted where a protective coating has been applied in accordance with the coating manufacturer's requirements and is maintained in good condition

3.4.2.2 For single skin bulk carriers over 15 years of age, the following is to apply (in addition to the requirements in 3.4.2.1):

- Close-up survey of one other selected cargo hold to the same extent as required for the forward cargo hold.

3.4.2.3 Additional annual survey requirements for the foremost cargo hold of ships subject to SOLAS XII/9.1

For single skin bulk carriers constructed with an insufficient number of transverse watertight bulkheads to satisfy the requirements for damage stability, the survey in the foremost cargo hold is to be extended as follows:

3.4.2.3.1 For bulk carriers of 5-15 years of age:

- An overall survey of the foremost cargo hold, including close-up survey of sufficient extent, minimum 25% of frames are to be carried out to establish the condition of shell frames including their upper and lower end attachments, adjacent shell plating, and transverse bulkheads, suspect areas identified at previous surveys.
- Where considered necessary by the surveyor as a result of the overall and close-up survey, the

survey is too extended to include a close-up survey of all of the shell frames and adjacent shell plating of the cargo hold.

3.4.2.3.2 For bulk carriers exceeding 15 years of age:

- An overall survey of the foremost cargo hold, including close-up survey is to be carried out to establish the condition of all shell frames including their upper and lower and attachments, adjacent shell plating, and transverse bulkheads, suspect areas identified at previous surveys.

3.4.2.3.3 Thickness measurement is to be carried out to an extent sufficient to determine both general and local corrosion levels at areas subject to close-up survey

The minimum requirement for thickness measurements are suspect areas identified at previous surveys. Where Substantial Corrosion is found, the extent of thickness measurements should be increased with the requirements of Table 3.11

The thickness measurement may be dispensed with provided the surveyor is satisfied by the close-up survey, that there is no structural diminution and the protective coating where fitted remains effective.

3.4.2.3.4 Where the protective coating in the foremost cargo hold, is found to be in good condition, the extent of close-up surveys and thickness measurements may be specially considered.

3.4.3 Examination of Ballast Tanks

Examination of ballast tanks when required as a consequence of the results of the class renewal and intermediate survey is to be carried out. When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurements are to be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with Table 3.11. These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect Areas identified at previous surveys are to be examined.

Areas of substantial corrosion identified at previous survey are to have thickness measurements taken.

For vessels built under the IACS Common Structural Rules, the annual thickness gauging may be omitted where a protective coating has been applied in accordance with the coating manufacturer's requirements and is maintained in good condition.

3.4.4 Additional annual survey requirements after determining compliance with SOLAS XII/12 and XII/13

3.4.4.1 For ships complying with the requirements of SOLAS XII/12 for hold, ballast and dry space water level detectors, the annual survey is to include an examination and a test, at random, of the water ingress detection systems and of their alarms.

3.4.4.2 For ships complying with the requirements of SOLAS XII/13 for the availability of pumping systems, the annual survey is to include an examination and a test, of the means for draining and pumping ballast tanks forward of the collision bulkhead and bilges of dry spaces any part of which extends forward of the foremost cargo hold, and of their controls.

3.5 Double skin bulk carriers –additional requirements-

The examination of hull surveys is to cover:

Examination of the hull plating and its closing appliances as far as can be seen.

Examination of watertight penetrations as far as practicable.

For examination of hatch covers and coamings, additional requirements defined in 3.4.1 are also applicable.

Note:

Additional requirements given in UR Z10.5 shall also be applied.

3.5.1 Examination of cargo holds

3.5.1.1 For double skin bulk carriers 10-15 years of age, the following is to apply:

- Overall survey of two selected cargo holds.
- When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurement is to be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with Table 3.14. These extended thickness measurements are to be carried out before the annual survey is credited as complete. Suspect Areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to have thickness measurements taken.

For vessels built under the IACS Common Structural Rules, the annual thickness gauging may be omitted where a protective coating has been applied in accordance with the coating manufacturer's requirements and is maintained in good condition.

- All piping and penetrations in cargo holds, including overboard piping, are to be examined.

3.5.1.2 For double skin bulk carriers over 15 years of age, the following is to apply:

- Overall survey of all cargo holds.
- When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurement is to be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with Table 3.14. These extended thickness measurements are to be carried out before the annual survey is credited as complete. Suspect Areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to have thickness measurements taken.
- For vessels built under the IACS Common Structural Rules, the annual thickness gauging may be omitted where a protective coating has been applied in accordance with the coating

manufacturer's requirements and is maintained in good condition.

- All piping and penetrations in cargo holds, including overboard piping, are to be examined

3.5.2. Examination of Ballast Tanks

Examination of ballast tanks when required as a consequence of the results of the class renewal and intermediate survey is to be carried out. When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurements are to be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with Table 3.14. These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect Areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous survey are to have thickness measurements taken.

For vessels built under the IACS Common Structural Rules, the annual thickness gauging may be omitted where a protective coating has been applied in accordance with the coating manufacturer's requirements and is maintained in good condition.

3.5.3 Additional annual survey requirements after determining compliance with SOLAS XII/12 and XII/13

3.5.3.1 For ships complying with the requirements of SOLAS XII/12 for hold, ballast and dry space water level detectors, the annual survey is to include an examination and a test, at random, of the water ingress detection systems and of their alarms.

3.5.3.2 For ships complying with the requirements of SOLAS XII/13 for the availability of pumping systems, the annual survey is to include an examination and a test, of the means for draining and pumping ballast tanks forward of the collision bulkhead and bilges of dry spaces any part of which extends forward of the foremost cargo hold, and of their controls.

3.6 Oil and chemical tankers -additional requirements-

Note:

Additional requirements given in UR Z10.4 shall also be applied.

3.6.1 General

The examination of hull surveys is to cover:

Examination of the hull plating and its closing appliances as far as can be seen.

Examination of watertight penetrations as far as practicable.

3.6.2 Examination of weather decks

3.6.2.1 Examination of cargo tank openings including gaskets, covers, coaming and flame screens.

3.6.2.2 Examination of cargo tanks pressure / vacuum valves and flame screens.

3.6.2.3 Examination of flame screens on vents to all bunker tanks.

3.6.2.4 Examination of cargo, crude oil washing, bunker and vent piping systems, including vent masts and headers.

3.6.3 Examination of cargo pump rooms and pipe tunnels if fitted

3.6.3.1 Examination of all pump room bulkheads for signs of oil/chemical leakage or fractures and, in particular, the sealing arrangements of all penetrations of pump room bulkheads.

3.6.3.2 Examination of the condition of all piping systems.

3.6.4 Examination of Ballast Tanks

Examination of ballast tanks when required as a consequence of the results of the class renewal and intermediate survey is to be carried out. When

considered necessary by the surveyor, or where extensive corrosion exists, thickness measurements are to be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with Table 3.19 for oil tankers, Ore/Oil Ships, Table 3.20 for double hull oil tankers, Table 3.24 for chemical tankers. These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous survey are to have thickness measurements taken.

For vessels built under IACS Common Structural Rules, the identified substantial corrosion areas are required to be examined and additional thickness measurements are to be carried out.

3.7 Liquefied gas tankers -additional requirements-

The annual survey is preferably to be carried out during a loading or discharging operation. Access for cargo tanks or inerted hold spaces, necessitating gas-freeing/aerating will normally not be necessary unless deemed necessary by the surveyor.

The examination of hull surveys is to cover the requirements provided in 3.6.1, 3.6.2 and 3.6.3.

3.7.1 Cargo handling systems

3.7.1.1 The cargo handling piping and cargo process piping is to be examined, with special attention to insulation on piping.

3.7.1.2 The sealing arrangements for tanks or tank domes penetrating decks or tank covers are to be examined.

3.7.1.3 Portable and/or fixed drip trays or insulation for deck protection in the event of cargo leakage is to be examined.

3.7.2 Closing devices, gastightness

3.7.2.1 The means for accomplishing gas tightness of the wheelhouse doors and windows is to be examined. All windows and sidescuttles within the

area required to be of the fixed type (non-opening) are to be examined for gas tightness. The closing devices for all air intakes and openings into accommodation spaces, service spaces, machinery spaces, control stations and approved openings in superstructures and deckhouses facing the cargo area or bow and stern loading/unloading arrangements, are to be examined.

3.7.2.2 All accessible gas-tight bulkhead penetrations including gas-tight shaft sealings are to be visually examined.

3.7.3 Correct functioning of any arrangements for heating of structural hull steel is to be verified.

3.8 Survey requirements for shell and inner doors of ro-ro ships

3.8.1 The survey is to consist of an examination to verify, as far as is practicable, that the bow, inner, side shell and stern doors are maintained in a satisfactory condition

3.8.2 Confirmation is to be obtained that no unapproved changes have been made to the bow inner, side shell and stern doors since the last survey.

3.8.3 Documents

If an Operating and Maintenance Manual (OMM) is required, it is to be verified that an approved copy is on board and any possible modifications are included. It is to be verified that documented operating procedures for closing and securing doors are kept on board and posted at an appropriate place. The surveyor shall examine the OMM with special attention to the register of inspections and its contents as a basis for the survey

3.8.4 Structural examination

Bow, inner, side shell and stern doors are to be examined with particular attention paid to:

- Structural arrangement of doors including plating, secondary stiffeners, primary structure, hinging arms and welding;
- Shell structure surrounding the opening of the doors and the securing, supporting and locking

- devices including shell plating, secondary stiffeners, primary structure, and welding;
- Hinges and bearings, thrust bearings;
- Hull and door side supports for securing, supporting and locking devices;
- Close-up survey of securing, supporting and locking devices including welding, for details refer to IACS UR Z 24.

Whenever a crack is found, an examination with NDT is to be carried out in the surrounding area and for similar items as considered necessary by the surveyor.

3.8.5 Measurement of clearances

Clearances of hinges, bearings and thrust bearings are to be taken, where no dismantling is required. Where the function test is not satisfactory, dismantling may be required to measure the clearances. If dismantling is carried out, a visual examination of hinge pins and bearings together with NDT of the hinge pin is to be carried out. Clearances of securing, supporting and locking devices are to be measured, where indicated in the OMM.

3.8.6 Sealing arrangement

An examination of packing material / rubber gaskets and retaining bars or channels, including welding is to be carried out.

3.8.7 Drainage arrangement

An examination of drainage arrangement, including bilge wells and drain pipes is to be carried out, where fitted. A test of the bilge system between the inner and outer doors is to be carried out

3.8.8 Function test of doors

Checking of the satisfactory operation of the bow, inner, side shell and stern doors during a complete opening and closing operation is to be made, as applicable, including:

- Proper working of the hinging arms and hinges;

- Proper engagement of the thrust bearings;
- Device for locking the door in the open position;
- Securing, supporting and locking devices;
- Proper sequence of the interlock system for the opening / closing system and the securing and locking devices;
- Mechanical lock of the securing devices;
- Proper locking of hydraulic securing devices in the event of a loss of the hydraulic fluid, according to the procedure provided by the OMM;
- Correct indication of open / closed position of doors and securing / locking devices at navigation bridge and other control stations;
- Isolation of the hydraulic securing / locking devices from other hydraulic systems;
- Confirmation that the operating panels are inaccessible to unauthorized persons;
- Verification that a notice plate giving instructions to the effect that all securing devices are to be closed and locked before leaving harbour is placed at each operating panel and supplemented by warning indicator lights;
- Examination of electrical equipment for opening, closing and securing the doors.

3.8.9 Function test of the indicator system

Checking of the satisfactory operation of the indicator system, where fitted, is to be carried out, as applicable, including:

- Proper visible indication and audible alarm on the navigation bridge panel, according to the selected function "harbour / sea voyage" and on the operating panel;
- Lamp test function on both panels;

- Verification that it is not possible to turn off the indicator light on both panels;
- Verification of fail safe performance, according to the procedure provided by the OMM;
- Confirmation that power supply for indicator system is supplied by the emergency source or other secure power supply and independent of the power supply for operating the doors;
- Proper condition of sensors and protection from water, ice formation and mechanical damage.

3.8.10 Test of water leakage detection system

Where fitted, the water leakage detection system is to be tested including proper audible alarm on the navigation bridge panel and on the engine control room panel, according to the procedure provided by the OMM.

3.8.11 Test of television surveillance system

Where fitted, the television surveillance system is to be tested including proper indication on the navigation bridge monitor and on the engine control room monitor

3.8.12 Tightness test

A hose test or equivalent is to be carried out. If the visual examination and function test have shown satisfactory results, the tightness test of shell doors on Ro-Ro cargo ships need not be carried out unless considered necessary by the attending surveyor.

3.8.13 NDT and Thickness Measurements

When considered necessary by the surveyor, NDT and thickness measurements may be required after visual examination and function test.

4. Machinery and Systems

4.1 General (all ships)

4.1.1 The survey is to cover the following items:

- Examination of spaces. Machinery area and spaces in the cargo area entered in connection

with cargo handling is to be examined for general cleanliness and maintenance and with special attention to the fire and explosion hazards.

- Examination of boilers, pressure vessels with their appliances and safety devices.
- Checking of integrity/functioning of jacketed high pressure fuel injection piping, shielding of flammable oil piping, insulation of hot surfaces exceeding 200°C and oil burning equipment on boilers, hot water heaters, incinerators and inert gas generators.
- Inspection and checking of the main and auxiliary steering gear, including their appliances and control systems. In this scope, the survey is to include the following:

External examination of the steering gear and hydraulic piping,

- Examination of oil filters,
- Testing of power units and rudder actuators,
- Testing of alarms,
- Testing of local and remote steering control system,
- Testing of emergency steering control,
- Testing of alternative power supply, if required.

- Inspection of the remote control for quick closing/stopping devices of fuel valves, fuel pumps and ventilators.
- Checking of communication systems between bridge and machinery and steering gear spaces.
- Examination of bilge systems, bilge level alarms and remote control mechanisms.
- Random checking of the remote control and automation equipment.

- Checking of electrical installation. In this scope the survey is to include the following: Examination of main power supply system with regard to general condition, fire hazard and safety,
 - Examination of emergency power supply system with regard to general condition, fire hazard and safety,
 - Examination of cable installation with regard to general condition, fire hazard and safety.
- Survey of explosion proof installations.
- Inspection/testing of fire extinguishing and fire alarm systems. The following is subject to inspection/testing:
- Fire mains system, including hoses and nozzles,
 - Gas fire extinguishing system,
 - Dry powder fire extinguishing system,
 - Foam fire extinguishing system,
 - Sprinkler system, including water mist sprinkler
 - Systems,
 - Drencher system,
 - Any other fixed fire extinguishing system,
 - Portable fire extinguishers, mobile fire extinguishers, including portable foam applicator units,
 - Fire detection and alarm systems,
 - Emergency stop for ventilating fans, boiler forced draft fans, fuel transfer pumps, fuel oil purifiers, thermal oil pumps,
- Fire closures (fire dampers, engine room skylights)
- Operational trial of the relevant equipment for ships assigned the class notation NAV, NAV-INS, NAV-O or NAV-OC.
 - For class notation CM-PS the correct performance of oil sampling, evaluation of the temperature of the stern tube bearing and the evaluation of the oil consumption as well as the results of the required measurements have to be checked.
 - Checking of further permanently installed installations to the surveyor's discretion, e.g. provision cooling plant, air conditioning plant, incinerating plant, etc.
 - As a minimum, harmonic distortion levels of main busbar on board existing ships including harmonic filters and contracted for construction before 1 July 2017, are to be measured annually under seagoing conditions as close to the periodical machinery survey as possible so as to give a clear representation of the condition of the entire plant to the surveyor. Harmonic distortion readings are to be carried out when the greatest amount of distortion is indicated by the measuring equipment. An entry showing which equipment was running and/or filters in service is to be recorded in the log so this can be replicated for the next periodical survey. Harmonic distortion levels are also to be measured following any modification to the ship's electrical distribution system or associated consumers by suitably trained ship's personnel or from a qualified outside source.
- Records of all the above measurements are to be made available to the surveyor at each periodical survey.
- 4.2 Passenger ships additional requirements-**
- The arrangement for emergency and transitional source of power is to be tested.

4.3 Ships with single cargo hold -additional requirements-

For ships with single cargo hold, an examination and testing at random of the water ingress detection system and of their alarms is to be carried out.

4.4 Bulk carriers -additional requirements-

4.4.1 For bulk carriers, an examination and testing at random of the water ingress detection system and of their alarms is to be carried out.

4.4.2 For bulk carriers an examination and testing of the control and means for draining and ballast pumping forward of the collision bulkhead including bilges of dry spaces any part of which extends forward of the foremost cargo hold is to be carried out.

4.5 Oil and chemical tankers additional requirements-

4.5.1 Surveys for oil tankers

The survey is to cover the following items:

- Examination of deck foam system,
- Examination of cargo, bilge, ballast and stripping pumps,
- Examination and testing of gas detection system in cargo pump room.
- Examination of mechanical ventilation system for cargo handling spaces and other spaces within the cargo area normally entered.
- Examination of the pressure/vacuum monitoring arrangement for cargo tanks and vapour return system.
- Testing of remote operation and shut-down devices for cargo system.

- Examination of temperature sensors in bulkhead shaft glands bearings for pumps installed in cargo pump room.
- Testing of pressure gauges on cargo discharge line,
- Testing of temperature sensors for cargo, tank washing and ballast pumps,
- Testing of oily water interface detector,
- Testing of oil discharge monitoring system.

4.5.2 Surveys for chemical tankers

The survey is to cover the following items:

- Examination of deck foam system,
- Examination of cargo, bilge, ballast and stripping pumps,
- Examination and testing of gas detection system in cargo pump room.
- Examination of mechanical ventilation system for cargo handling spaces and other spaces within the cargo area normally entered.
- Examination of the pressure/vacuum monitoring arrangement for cargo tanks and vapour return system.
- Testing of remote operation and shut-down devices for cargo system.
- Examination of temperature sensors in bulkhead shaft glands bearings for pumps installed in cargo pump room.
- Examination and testing of cargo hoses,
- Examination and testing of cargo tank level gauging system,

- Testing of cargo tank overflow control system,
- Examination of vapour detection instruments,
- Testing of cargo temperature indication system,
- Testing of leakage alarm in spaces containing independent cargo tanks,
- Examination and testing of cargo heating/cooling system sampling arrangements,
- Examination of arrangement for storage of cargo samples,
- Examination of arrangements for storage of padding gas, monitoring of ullage spaces and provision of drying elements on air inlets to cargo tanks,
- Examination of decontamination showers and eye washes,
- Examination of pump discharge pressure gauges fitted outside the cargo pump room,
- Examination of cargo pump room taking care on remote operation of the bilge system, rescue arrangements and distinctive marking of pumps, valves and pipings in pump room,

4.6 Liquefied gas tankers - additional requirements -

4.6.1 Cargo handling systems

The survey is to cover the following items:

- The cargo handling piping and machinery, e.g. cargo and process piping, cargo heat exchangers, vapourizers, pumps, compressors and cargo hoses are in general to be visually examined, as far as possible, during operation.
- The log books are to be examined with regard to correct functioning of the cargo containment and

cargo handling systems. The hours per day of the reliquefaction plants or the boil-off rate is to be considered.

4.6.2 Cargo containment venting systems

Venting systems, including protection screens if provided, for the cargo tanks, interbarrrier spaces and hold spaces are to be visually examined externally. It is to be verified that the cargo tank relief valves are sealed and that the certificate for the relief valves opening/closing pressures is onboard

4.6.3 Instrumentation and safety systems

4.6.3.1 The instrumentation of the cargo installations with regard to pressure, temperature and liquid level is to be verified in good working order by one or more of the following methods:

- Visual external examination,
- Comparing of read outs from different indicators,
- Consideration of read outs with regard to the actual cargo and/or actual conditions,
- Examination of maintenance records with reference to cargo plant instrumentation maintenance manual,
- Verification of calibration status of the measuring instruments

4.6.3.2 The logbooks are to be examined for confirmation that the emergency shutdown system has been tested.

4.6.3.3 Emergency shut-down valves at shore connections and tanks are to be tested without flow in the pipe lines. It is to be verified that operation of the emergency shut-down system will cause the cargo pumps and compressors to stop.

4.6.3.4 The fixed and portable gas detection equipment, including indicators and alarms, is to be tested for correct functioning.

4.6.4 Environmental control for cargo containment systems

4.6.4.1 Inert gas/dry air installations including the means for prevention of backflow of cargo vapour to gas-safe spaces are to be verified as being in satisfactory operating condition.

4.6.4.2 For membrane containment systems normal operation of the nitrogen control system for insulation and interbarrier spaces shall be confirmed to the Surveyor by the Master.

4.6.5 Miscellaneous

4.6.5.1 It is to be verified that all accessible cargo piping systems are electrically bonded to the hull.

4.6.5.2 Arrangements for burning methane boil-off are to be visually examined as far as practicable. The instrumentation and safety systems are to be verified as being in good working order in accordance with 4.6.3.1.

4.6.5.3 The relevant instruction and information material such as cargo handling plans, filling limit information, cooling down procedures, etc. are to be verified as being onboard.

4.6.5.4 Mechanical ventilation fans in gas dangerous spaces and zones are to be visually examined.

4.7 Periodic Survey of Fuel Installations on Ships other than Liquefied Gas Carriers utilizing gas or other low flash point fuels

4.7.1 Application

These requirements apply to ships, other than those covered by the 4.6, which utilize gas or other low flash point fuels as a fuel for propulsion prime mover/auxiliary power generation arrangements and associated systems. These requirements are in addition to the requirements of 4.1.

These survey requirements do not cover fire protection,

fire-fighting installation, and personnel protection equipment.

4.7.2 Schedule

4.7.2.1 Annual Surveys are to be held within 3 months before or after each anniversary date of the date of the initial classification survey or of the date credited for the last Class Renewal Survey.

They will normally be performed at the same time as an Annual Hull survey.

4.7.3 Scope

4.7.3.1 General

The following is to be carried out during the survey of the Fuel Storage, Fuel Bunkering System, and Fuel Supply System:

4.7.3.1.1 Logbooks/Records

The logbooks and operating records are to be examined with regard to correct functioning of the gas detection systems, fuel supply/gas systems, etc. The hours per day of the reliquefaction plant, gas combustion unit, as applicable, the boil-off rate, and nitrogen consumption (for membrane containment systems) are to be considered together with gas detection records.

4.7.3.1.2 Operating and Maintenance Instruction Manuals

The manufacturer/builder instructions and manuals covering the operations, safety and maintenance requirements and occupational health hazards relevant to fuel storage, fuel bunkering, and fuel supply and associated systems for the use of the fuel, are to be confirmed as being aboard the vessel.

4.7.3.1.3 Control, Monitoring and Safety Systems

- i) Gas detection and other leakage detection equipment in compartments containing fuel storage, fuel bunkering, and fuel supply equipment or components or associated systems, including indicators and alarms, is

to be confirmed in satisfactory operating condition. Recalibration of the gas detection systems should be verified in accordance with the manufacturers' recommendations.

- ii) Verification of the satisfactory operation of the control, monitoring and automatic shutdown systems as far as practicable of the fuel supply and bunkering systems.
- iii) Operational test, as far as practicable, of the shutdown of ESD protected machinery spaces.

4.7.3.1.4 Fuel Handling Piping, Machinery and Equipment

Piping, hoses, emergency shut-down valves, remote operating valves, relief valves, machinery and equipment for fuel storage, fuel bunkering, and fuel supply such as venting, compressing, refrigerating, liquefying, heating, cooling or otherwise handling the fuel is to be examined, as far as practicable. Means for inerting is to be examined. Stopping of pumps and compressors upon emergency shut-down of the system is to be confirmed as far as practicable.

4.7.3.1.5 Ventilating System

Examination of the ventilation system, including portable ventilating equipment where fitted, is to be made for spaces containing fuel storage, fuel bunkering, and fuel supply units or components or associated systems, including air locks, pump rooms, compressor rooms, fuel preparation rooms, fuel valve rooms, control rooms and spaces containing gas burning equipment. Where alarms, such as differential pressure and loss of pressure alarms, are fitted, these should be operationally tested as far as practicable.

4.7.3.1.6 Drip Trays

Portable and fixed drip trays and insulation for the protection of the ship's structure in the event of leakage are to be examined.

4.7.3.1.7 Hazardous Areas

Electrical equipment and bulkhead/deck penetrations including access openings in hazardous areas are to be examined for continued suitability for their intended service and installation area.

4.7.3.1.8 Electrical Bonding

Electrical bonding arrangements in hazardous areas, including bonding straps where fitted, are to be examined.

4.7.3.2 Fuel Storage, Bunkering and Supply Systems

The following are to be examined, so far as applicable. Insulation need not be removed, but any deterioration or evidence of dampness is to be investigated:

4.7.3.2.1 Fuel Storage

- i) External examination of the storage tanks including secondary barrier if fitted and accessible.
- ii) General examination of the fuel storage hold place.
- iii) Internal examination of tank connection space.
- iv) External examination of tank and relief valves.
- v) Verification of satisfactory operation of tank monitoring system.
- vi) Examination and testing of installed bilge alarms and means of drainage of the compartment.
- vii) Testing of the remote and local closing of the installed main tank valve.

4.7.3.2.2 Fuel Bunkering System

- i) Examination of bunkering stations and the fuel bunkering system.
- ii) Verification of satisfactory operation of the fuel bunkering control, monitoring and shutdown systems.

4.7.3.2.3 Fuel Supply System

Examination of the fuel supply system during working condition as far as practicable.

- i) Verification of satisfactory operation of the fuel supply system control, monitoring and shut-down systems.
- ii) Testing of the remote and local closing of the master fuel valve for each engine compartment.

C. Intermediate Surveys**1. General**

1.1 Intermediate survey is a survey of the hull, machinery and equipment to confirm that the ship complies with the applicable requirements and is satisfactorily maintained. Intermediate surveys are to be performed to the extent of annual surveys with the following additions.

1.2 Intermediate surveys are to be carried out for all seagoing ships.

2. Documentation on Board Ships**2.1 Documentation on Board for ESP Vessels**

2.1.1 For enhanced programme of inspections (ESP) during surveys for bulk carriers and oil tankers, the owner shall obtain, supply and maintain on board the ship documentation as specified in 2.1.1 and 2.1.2, which shall be readily available for the surveyor. The

executive hull summary report referred to in 2.1.1 shall include a translation into English.

The documentation shall be kept on board for the lifetime of the ship.

A Survey Report File is to be part of the documentation on board:

- Reports on structural surveys
- Executive Hull Summary
- Thickness measurements reports

The Survey Report File is to be available also in the Owners management office.

2.1.2 Main structural plans of cargo and ballast holds or tanks (for CSR ships these plans are to include for each structural element both the as-built and renewal thickness. Any thickness for voluntary addition is also to be clearly indicated on the plans. The midship section plan to be supplied on board the ship is to include the minimum allowable hull girder sectional properties for hold transverse section in all cargo holds), previous repair history, cargo and ballast history, extent of use of inert gas plant and tank cleaning procedures, records of inspections and actions by ship's personnel for structural deterioration, leakage in bulkheads and piping, condition of coating or corrosion prevention and any other information identifying critical structural areas and/or suspect areas requiring inspection.

Note: Cargo and ballast history, extent of use of inert gas plant and tank cleaning procedures and records of inspections and actions by ship's personnel for structural deterioration, leakage in bulkheads and piping, condition of coating or corrosion prevention are applicable in conjunction with Class Notation ESP.

2.1.3 Effective from 01 July 2016, for tankers and bulk carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10, the Ship Construction File (SCF), limited to the items to be retained on board, is to be available on board.

2.1.3.1 For the SCF stored on board ship, the surveyor is to examine the information on board ship.

In cases where any major event, including, but not limited to, substantial repair and conversion, or any modification to the ship structures, the surveyor is to also verify that the updated information is kept on board the ship. If the updating of the SCF onboard is not completed at the time of survey, the Surveyor records it and requires confirmation at the next periodical survey.

2.1.3.2 For the SCF stored on shore archive, the surveyor is to examine the list of information included on shore archive.

In cases where any major event, including, but not limited to, substantial repair and conversion, or any modification to the ship structures, the surveyor is to also verify that the updated information is stored on shore archive by examining the list of information included on shore archive or kept on board the ship.

In addition, the surveyor is to confirm that the service contract with of the Archive Center is valid.

If the updating of the SCF Supplement ashore is not completed at the time of survey, the Surveyor records it and requires confirmation at the next periodical survey.

2.2 Documentation on Board for All Ships Other than ESP Vessels

The Owner is to supply and maintain onboard survey and thickness measurement reports, which are to be readily available for the Surveyor. Prior to commencing Structural Hull surveys, the Surveyor is to examine the documentation onboard as a basis for the survey.

The documentation is to be kept onboard for the lifetime of the vessel.

3. Hull and Equipment

3.1 General (all ships)

3.1.1 The survey is to cover the following items:

- Examination of ballast tanks.

For ships between 5 and 10 years of age, an overall, internal examination of representative ballast tanks is to be carried out.

If there is no hard protective coating, soft or semi-hard coating, or poor coating condition, the examination is to be extended to other ballast spaces of the same type.

For ships over 10 years of age, an overall examination of all spaces used for water ballast is to be carried out.

If such examinations reveal no visible structural defects, the examination may be limited to verification that the corrosion prevention system remains effective. For ballast tanks, excluding double bottom ballast tanks, if there is no hard protective coating, soft or semi-hard coating, or poor coating condition and it is not renewed, the spaces in question are to be internally examined at annual intervals.

When such conditions are found in water ballast double bottom tanks, the spaces in question may be internally examined at annual intervals.

For those tanks subjected to survey stated above, special attention is to be given to cargo piping passing through ballast tanks, bilge and ballast piping passing through cargo and fuel oil tanks, air and sounding piping passing through cargo and ballast tanks and fuel pipes passing through ballast tanks.

- Examination of cargo holds

Depending on the ship's age and on the cargo carried, an internal examination of selected cargo holds is to be carried out in accordance with the surveyor's decision.

3.1.2 Areas where substantial corrosion is found during the survey, are to have thickness measurements extended (see, Table 3.1).

3.2 General dry cargo ships additional requirements

Note:

For details of surveys, assessment and repair of hull structure of general dry cargo ships, see IACS Rec. 55.

3.2.1 Ships 5-10 years of age**3.2.1.1 Ballast tanks**

- For tanks used for water ballast, an overall survey of representative tanks selected by the surveyor is to be carried out. If such overall survey reveals no visible structural defects, the examination may be limited to verification that the corrosion prevention system remains efficient.
- Where poor coating condition, soft or semi-hard coating, corrosion or other defects are found in water ballast tanks or where a hard protective coating was not applied from the time of construction, the examination is to be extended to other ballast tanks of the same type.
- In water ballast tanks other than double bottom tanks, where a hard protective coating is found in poor condition, and it is not renewed, where soft or semi-hard coating has been applied, or where a hard protective coating was not applied from time of construction, the tanks in question are to be examined and thickness measurements carried out as considered necessary at annual intervals.

When such breakdown of hard protective coating is found in water ballast double bottom tanks, where a soft or semi-hard coating has been applied, or where hard protective 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 are to be carried out.

3.2.1.2 Cargo holds

- An overall survey of one forward and one after cargo hold and their associated tween deck spaces is to be carried out.

- Areas found suspect at previous surveys are to be surveyed in accordance with the provisions of item B, 3.3.3.1.2.

3.2.2 Ships 10-15 years of age**3.2.2.1 Ballast tanks**

- For tanks used for water ballast, an overall survey of all tanks is to be carried out. If such overall survey reveals no visible structural defects, the examination may be limited to verification that the corrosion prevention system remains efficient.
- The requirements of last two paragraphs of 3.2.1.1 also apply.

3.2.2.2 Cargo holds

- An overall survey of all cargo holds and tween deck spaces.
- Areas found suspect at previous surveys are to be surveyed in accordance with the provisions of item B, 3.3.3.1.2.
- When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurement is to be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, then the extent of thickness measurements is to be increased to determine the extent of areas of substantial corrosion.

3.2.3 Ships over 15 years of age

- The requirements of the intermediate survey are to be to the same extent as the previous class renewal survey as required in D.2.3, except for item 2c) in column 4 of Table 3.6.

However, tank testing specified in D.2.3.7, survey of automatic air pipe heads and internal examination of fuel oil, lub oil and fresh water tanks are not required unless deemed necessary by the attending surveyor.

- In lieu of dry dock survey, an in water survey, according to the provisions of item 3.1.3 of UR Z3, may be considered as equivalent.

3.3 Single skin bulk carriers –additional requirements-

3.3.1 Bulk carriers 5-10 years of age

3.3.1.1 Ballast tanks

- For tanks used for water ballast, an overall survey of representative spaces selected by the surveyor is to be carried out. The selection is to include fore and aft peak tanks and a number of other tanks taking into account the total number and type of ballast tanks. If such overall survey reveals no visible structural defects, the examination may be limited to verification that the corrosion prevention system remains efficient.
- Where poor coating condition, corrosion or other defects are found in water ballast tanks or where a hard protective coating was not applied from the time of construction, the examination is to be extended to other ballast tanks of the same type.
- In ballast tanks other than double bottom tanks, where a hard protective coating is found in poor condition, and it is not renewed, or where soft or semi-hard coating has been applied, or where a hard protective coating was not applied from the time of construction, the tanks in question are to be examined and thickness measurements carried out as considered necessary at annual intervals. When such breakdown of hard protective coating is found in ballast double bottom tanks, or where a soft or semi-hard coating has been applied, or where a hard protective coating has not been applied, the tanks in question may be examined at annual intervals. When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurements are to be carried out.
- In addition to the requirement above, suspect areas identified at previous surveys are to be overall and close-up surveyed.

3.3.1.2 Cargo holds

- An overall survey of all cargo holds, including close-up survey of sufficient extent, minimum 25% of frames are to be carried out to establish the condition of:
 - Shell frames including their upper and lower end attachments, adjacent shell plating, and transverse bulkheads in the forward cargo hold and one other selected cargo hold.
 - Areas found suspect at previous surveys.
- When 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 of the shell frames and adjacent shell plating of that cargo hold as well as a close-up survey of sufficient extent of all remaining cargo holds.

3.3.1.3 Extent of thickness measurements

- Thickness measurements are to 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 3.3.1.2. The minimum requirement for thickness measurements are areas found to be suspect areas at previous survey.
- The extent of thickness measurement may be specially considered provided the surveyor is satisfied by the close-up survey, that there is no structural diminution and hard protective coatings are found to be in a good condition.
- Where substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with Table 3.11. These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to have thickness measurements taken.

- For vessels built under IACS Common Structural Rules, the identified substantial corrosion areas may be:
- Protected by coating applied in accordance with the coating manufacturer's requirements and examined at annual intervals to confirm the coating in way is still in good condition, or alternatively
- Required to be measured at annual intervals.

- Where hard protective coating in cargo holds is found to be in good condition, the extent of close-up surveys and thickness measurements may be specially considered.

3.3.2 Bulk carriers 10-15 years of age

- A survey programme according A.13 is to be worked out.
- The requirements of the intermediate survey are to be to the same extent as the previous class renewal survey. However, internal examination of fuel tanks and pressure testing of all tanks are not required unless deemed necessary by the attending surveyor.
- In lieu of dry dock survey, an under water survey may be considered as equivalent.

3.3.3 Bulk carriers over 15 years of age

- A surveyor programme according A.13 is to be worked out.
- The requirements of the intermediate survey are to be to the same extent as the previous class renewal survey. However, internal examination of fuel tanks and pressure testing of all tanks are not required unless deemed necessary by the attending surveyor.
- In application of first para., a survey in dry-dock is to be part of the intermediate survey. The overall

and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo holds and water ballast tanks are to be carried out in accordance with the applicable requirements for intermediate surveys, if not already performed.

Note:

Lower portions of the cargo holds and ballast tanks are considered to be the parts below light ballast water line.

3.4 Double skin bulk carriers –additional requirements-

3.4.1 Bulk carriers 5-10 years of age

3.4.1.1 Ballast tanks

- For tanks used for water ballast, an overall survey of representative tanks selected by the surveyor is to be carried out. The selection is to include fore and aft peak tanks and a number of other tanks, taking into account the total number and type of ballast tanks. If such overall survey reveals no visible structural defects, the examination may be limited to verification that the corrosion prevention system remains efficient.
- Where poor coating condition, corrosion or other defects are found in water ballast tanks or where a hard protective coating was not applied from the time of construction, the examination is to be extended to other ballast tanks of the same type.
- In ballast tanks other than double bottom tanks, where a hard protective coating is found in poor condition, and it is not renewed, or where soft or semi-hard coating has been applied, or where a hard protective coating was not applied from the time of construction, the tanks in question are to be examined and thickness measurements carried out as considered necessary at annual intervals. When such breakdown of hard protective coating is found in ballast double bottom tanks, or where a soft or semi-hard coating has been applied, or where a hard protective coating has not been applied, the tanks in question may be examined at annual intervals. When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurements are to be carried out.

- In addition to the requirements above, suspect areas identified at previous surveys are to be overall and close-up surveyed.

3.4.1.2 Cargo holds

- An overall survey of all cargo holds is to be carried out.
- When considered necessary by the surveyor as a result of the overall survey, the survey is to be extended to include a close-up survey of those areas of structure in the cargo holds selected by the surveyor.

3.4.1.3 Extent of Thickness Measurements

- Thickness measurements are to be carried out to an extent sufficient to determine both general and local corrosion levels at areas subject to close-up survey, where required as per 3.4.1.2, and as provided in 3.4.1.1.
- The extent of thickness measurement may be specially considered provided the surveyor is satisfied by the close-up survey that there is no structural diminution and the hard protective coatings are found to be in a good condition.
- Where substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with the requirements of Table 3.14. These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to have thickness measurements taken.
- For vessels built under IACS Common Structural Rules, the identified substantial corrosion areas may be:
 - Protected by coating applied in accordance with the coating manufacturer's requirements and examined at annual intervals to confirm the coating in way is still in good condition, or alternatively

- Required to be measured at annual intervals.

- Where hard protective coating in cargo holds is found to be in good condition, the extent of close-up surveys and thickness measurements may be specially considered.

3.4.2 Bulk carriers 10-15 years of age

- A surveyor programme according A.13 is to be worked out.

3.4.2.1 The requirements of the intermediate survey are to the same extent as the previous class renewal survey. However, internal examination of fuel oil tanks and pressure testing of all tanks are not required unless deemed necessary by the attending surveyor.

3.4.2.2 In application of 3.4.2.1, the intermediate survey may be commenced at the second annual survey and be progressed during the succeeding year with a view to completion at the third annual survey in lieu of the application of A 4.3.3 – A 4.3.4.

3.4.2.3 In application of 3.4.2.1, an under water survey may be considered in lieu of the requirement of D 2.5.

3.4.3 Bulk carriers over 15 years of age

- A surveyor programme according A.13 is to be worked out.

3.4.3.1 The requirements of the intermediate survey are to be to the same extent as the previous class renewal survey. However, internal examination of fuel oil tanks and pressure testing of all tanks are not required unless deemed necessary by the attending surveyor.

3.4.3.2 In application of 3.4.3.1, the intermediate survey may be commenced at the second annual survey and be progressed during the succeeding year with a view to completion at the third annual survey in lieu of the application of A 4.3.3 – A 4.3.4.

3.4.3.3 In application of 3.4.3.1, a survey in dry dock is to be part of the intermediate survey. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo holds and ballast tanks are to be carried out in accordance with the applicable requirements for Intermediate surveys, if not already performed.

Note:

Lower portions of the cargo holds and ballast tanks are considered to be the parts below light ballast water line.

3.5 Oil and chemical tankers -additional requirements-

3.5.1 Surveys for oil tankers

For vessels built under IACS Common Structural Rules, the identified substantial corrosion areas are required to be examined and additional thickness measurements are to be carried out.

3.5.1.1 Examination of weather deck

For weather decks, an examination as far as applicable of cargo, crude oil washing, bunker, ballast, steam and vent piping systems as well as 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.

3.5.1.2 Oil tankers 5-10 years of age

- For single hull oil tankers, all ballast tanks are to be surveyed. When considered necessary by the surveyor, thickness measurements and testing are to be carried out to ensure that the structural integrity remains effective.
- For double hull oil tankers, for tanks used for salt-water ballast, an overall survey of representative tanks selected by the surveyor is to be carried out. If such surveys reveal no visible structural defects, the examination may be limited to a verification that the hard protective coatings remain in good condition.

- A ballast tank is to be examined at subsequent annual intervals where:
 - A hard protective coating has not been applied from the time of construction, or
 - A soft or semi-hard coating has been applied, or
 - Substantial corrosion is found within the tank, or
 - the hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the surveyor.
- In addition to the requirements above, suspect areas identified at previous surveys are to be examined.

3.5.1.3 Oil tankers 10-15 years of age

- A surveyor programme according A.13 is to be worked out.

The requirements of the intermediate survey are to be to the same extent as the previous class renewal survey. However, pressure testing of cargo and ballast tanks and the requirements for longitudinal strength evaluation of hull girder are not required unless deemed necessary by the attending surveyor.
- In lieu of dry-dock survey, an under water survey may be considered as equivalent.

3.5.1.4 Oil tankers over 15 years of age

- A surveyor programme according A.13 is to be worked out.
- The requirements of the intermediate survey are to be to the same extent as the previous class renewal survey. However, pressure testing of cargo and ballast tanks and the requirements for

longitudinal strength evaluation of hull girder are not required unless deemed necessary by the attending surveyor.

- In application of first para., a survey in dry dock is to be part of the intermediate survey. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo tanks and water ballast tanks are to be carried out in accordance with the applicable requirements for intermediate surveys, if not already performed.

Note:

Lower portions of the cargo and ballast tanks are considered to be the parts below light ballast water line.

3.5.2 Surveys for chemical tankers

3.5.2.1 Examination of weather deck

- 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.

3.5.2.2 Chemical tankers 5-10 years of age

- For ballast tanks, an overall survey of representative tanks selected by the surveyor is to be carried out. If such surveys reveal no visible structural defects, the examination may be limited to a verification that the hard protective coatings remain in good condition.
- A ballast tank is to be examined at subsequent annual intervals where:

A hard protective coating has not been,

- Applied from the time of construction, or
- A soft or semi-hard coating has been applied, or

- Substantial corrosion is found within the tank, or
- The hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the surveyor.

- In addition to the requirements above, suspect areas identified at previous surveys are to be examined.

3.5.2.3 Chemical tankers 10-15 years of age

- A surveyor programme according A.13 is to be worked out.
- The requirements of the intermediate survey are to be to the same extent as the previous class renewal survey. However, pressure testing of cargo and ballast tanks is not required unless deemed necessary by the attending surveyor.
- In lieu of dry dock survey, an under water survey may be considered as equivalent.

3.5.2.4 Chemical tankers over 15 years of age

- A surveyor programme according A.13 is to be worked out.
- The requirements of the intermediate survey are to be to the same extent as the previous class renewal survey. However, pressure testing of cargo and ballast tanks is not required unless deemed necessary by the attending surveyor.
- In application of first para., a survey in dry-dock is to be part of the intermediate survey. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo tanks and water ballast tanks are to be carried out in accordance with the applicable requirements for intermediate surveys, if not already performed.

Note:

Lower portions of the cargo and ballast tanks are considered to be the parts below light ballast water line.

3.6 Liquefied gas tankers -additional requirements-

The intermediate survey is preferably to be carried out with the ship in a gas-free condition. The extent of the testing required for the intermediate survey will normally be such that the survey cannot be carried out during a loading or discharging operation.

3.6.1 Ballast tanks

- For ships between 5 and 10 years of age, an overall survey of representative ballast tanks is to be carried out. If there is no hard protective coating, soft or semi-hard coating or poor coating condition, the examination is to be extended to other ballast tanks of the same type.
- For ships over 10 years of age, an overall survey of all ballast tanks is to be carried out.
- If such examinations reveal no visible structural defects, the examination may be limited to verification that the corrosion prevention system remains efficient.
- For ballast tanks, excluding double bottom tanks, if there is no hard protective coating, soft or semi-hard coating, or poor coating condition and it is not renewed, the tanks in question are to be internally examined at annual intervals.
- When such conditions are found in double bottom ballast tanks, the tanks in question may be internally examined at annual intervals.
- The minimum requirements for close-up surveys at intermediate survey are given in Table 3.2.

4. Machinery and Systems

4.1 General (all ships)

4.1.1 The survey is to cover the following items:

- Performing of the following measurements:

- Auxiliary diesel (s) crank web deflection, where relevant,
- Main engine (s) crank web deflection,
- Axial thrust bearing clearance of shafting system,
- Axial thrust bearing clearance of main and auxiliary turbine rotors,

- Examination of electrical equipment in gas-dangerous spaces with respect to corrosion, flameproof enclosures, correct rating of lamps, earthing, function testing of pressurized equipment and of associated alarms, insulation resistance testing of power circuits.
- Operational testing of the following:
 - Emergency generating set, including emergency switchboard,
 - Emergency bilge valve,
 - Bilge, ventilation and monitoring systems for the carriage of dangerous goods,
 - Drainage appliances of starting air and control air receivers,
 - General operational test of the machinery for their unrestricted operability.

4.2 Oil and chemical tankers -additional requirements-

4.2.1 Surveys of oil tankers

- For ships over 15 years of age heating coils, tank cleaning apparatus and other equipment in cargo tanks, cofferdams and pipe tunnels within the cargo area are to be examined. Attachments of sacrificial anodes in tanks are to be examined

Table 3.2 Minimum requirements for close-up survey at hull intermediate surveys of liquefied gas tankers

10 < age ≤ 15	Age > 15
Close-up survey of: <ul style="list-style-type: none"> - all web frames and both transverse bulkheads in a representative ballast tank (1) and (2) - the upper part of one web frame in another representative ballast tank - one transverse bulkhead in another representative ballast tank (2) 	Close-up survey of: <ul style="list-style-type: none"> - all web frames and both transverse bulkheads in two representative ballast tanks (1) and (2)
<p>(1) Complete transverse web frame including adjacent structural members.</p> <p>(2) Transverse bulkhead complete, including girder system and adjacent members, and adjacent longitudinal bulkhead structure.</p> <p><i>Note:</i></p> <p>1. Ballast tanks include topside, double hull side, double bottom, hopper side, or any combined arrangement of the aforementioned, and peak tanks where fitted.</p> <p>2. For areas in tanks where protective coating is found to be in good condition, the extent of close-up survey may be specially considered by TL.</p> <p>3. For ships having independent tanks of type C, with a midship section similar to that of a general cargo ship, the extent of close-up surveys may be specially considered by TL.</p> <p>4. The extent of close-up surveys may be extended by the surveyor as deemed necessary, taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and also in the following cases:</p> <ul style="list-style-type: none"> - in particular, in tanks having structural arrangements or details which have suffered defects in similar tanks, or on similar ships according to available information, - in tanks having structures approved with reduced scantlings. 	

4.2.2 Surveys of chemical tankers

- Examination of systems for cargo heating and cooling.
- Ships over 10 years of age, examination of fittings in way of the representative cargo tanks.

For ships over 15 years of age heating coils, tank cleaning apparatus and other equipment in cargo tanks, cofferdams and pipe tunnels within the cargo area are to be examined. Attachments of sacrificial anodes in tanks are to be examined.

4.3 Liquefied gas tankers -additional requirements-

In addition to requirements listed in B 3.7 and B 4.6, the following additions are to be applied.

4.3.1 Instrumentation and safety systems

4.3.1.1 The instrumentation of the cargo installation with regard to pressure, temperature and liquid level is to be visually examined and to be tested by changing the pressure, temperature and level as applicable and comparing with test instruments. Simulated testing may

be accepted for sensors which are not accessible or for sensors located within cargo tanks or inerted hold spaces. The testing is to include testing of alarm and safety functions.

4.3.1.2 The piping of the gas detection system is to be visually inspected for corrosion and damage as far as practicable. The integrity of the suction lines between suction points and analyzing units is to be verified as far as possible. Gas Detectors are to be calibrated or verified with sample gases.

4.3.1.3 The emergency shutdown system is to be tested, without flow in the pipe lines, to verify that the system will cause the cargo pumps and compressors to stop.

4.3.2 Electrical equipment

Please refer to A.13 for survey of electrical equipment.

4.3.3 Miscellaneous

The instrumentation and safety systems for burning cargo as fuel are to be examined in accordance with the requirements of 4.3.1.1.

4.4 Periodic Survey of Fuel Installations on Ships other than Liquefied Gas Carriers utilizing gas or other low flash point fuels

4.4.1 Application

These requirements apply to ships, other than those covered by the 4.3, which utilize gas or other low flash point fuels as a fuel for propulsion prime mover/auxiliary power generation arrangements and associated systems. These requirements are in addition to the requirements of 4.1.

These survey requirements do not cover fire protection, fire-fighting installation, and personnel protection equipment.

4.4.2 Schedule

4.4.2.1 The Intermediate Survey is to be held at or between either the 2nd or 3rd Annual Survey.

4.4.2.2 Those items which are additional to the requirements of the Annual Surveys may be surveyed either at or between the 2nd and 3rd Annual Survey.

4.4.3 Scope

4.4.3.1 General

In addition to the applicable requirements of the Annual Survey, the Intermediate Survey is also to include:

4.4.3.1.1 Safety Systems

Gas detectors, temperature sensors, pressure sensors, level indicators, and other equipment providing input to the fuel safety system are to be randomly tested to confirm satisfactory operating condition. Proper response of the fuel safety system upon fault conditions is to be verified.

D. Class Renewal Surveys

1. General

1.1 Class renewal survey is a major survey including visual examinations, measurements and testing of the hull and machinery, equipment and systems of sufficient extent to ensure that the ship complies with the relevant rule requirements and is in satisfactorily maintained condition.

1.2 The required examinations, measurements and tests are to be carried out before the class renewal survey is regarded as completed.

1.3 Possible deficiencies are to normally be rectified before the renewal survey is regarded as completed.

TL may accept that minor deficiencies, recorded as recommendation, are rectified within 3 months after the survey completion date.

1.4 Class renewal surveys are to be performed to the extent of annual surveys with the following additions.

2. Hull and Equipment

2.1 General (all ships)

2.1.1 The survey is to cover the following items:

- The examination of the hull is to be supplemented by thickness measurements and testing, as stated in the following, to ensure that the structural integrity remains effective. The aim of the examination is to discover substantial corrosion, significant deformation, fractures, damages or other structural deterioration, that may be present.

Thickness measurements are to be carried out in accordance with Table 3.3. The surveyor may extend the thickness measurements as deemed necessary. When thickness measurements indicate substantial corrosion, the extent of thickness measurements is to be increased to determine areas of substantial corrosion. Table 3.1 may be used as guidance for these additional thickness measurements. These extended thickness measurements are to be carried out before the survey is credited as completed.

All bilge and ballast piping systems are to be examined and operationally tested to working pressure to attending surveyor's satisfaction to ensure that tightness and condition remain satisfactory.

All ship side valves, i.e. all suction and discharge valves, should be opened up and examined at least once in a class renewal survey period.

Upon re-assembly the valves should be tested to confirm:

- Satisfactory operation of the valves and their actuating mechanisms;
- Full closing of the valve;
- Tightness of the valve when fully seated.

Testing of actuating mechanisms should include the testing of any remote controls e.g. extended spindles, rod gearing. If the operation of the actuating mechanism is not satisfactory, the mechanism should be further examined to determine the cause, which may include the stripping and opening out of the mechanism as deemed necessary.

- Examination of underwater parts **(4)**.
- 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 class renewal survey No. 2 and subsequent class renewal surveys, chain cables are to be gauged and renewed in cases where their mean diameter is worn below the limits allowed by **TL**.
- 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, lub oil and fresh water tanks is to be carried out in accordance with Table 3.4.

(4) See IACS UR Z3.

- 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. Particular attention is to be given to the sea suction, sea water cooling pipes and overboard discharge valves and their connections to the shell plating. Where wastage is evident or suspect, thickness measurements are to be carried out, and renewals or repairs made when wastage exceeds allowable limits.
- Where provided, the condition of corrosion prevention system of ballast tanks is to be examined. For ballast tanks, excluding doublebottom tanks, where a hard protective coating is found in poor condition and it is not renewed, where soft or semi-hard coating has been applied, or where a hard protective coating was not applied from time of construction, the tanks in question are to be examined at annual intervals. Thickness measurements are to be carried out as deemed necessary by the surveyor.
- When such breakdown of hard protective coating is found in double bottom ballast tanks and it is not renewed, where a soft or semi-hard coating has been applied, or where a hard protective coating was not applied from the time of construction, the tanks in question may be examined at annual intervals. When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurements are to be carried out.
- Boundaries of double bottom, deep, ballast, peak, and other tanks, including holds adapted for the carriage of salt water ballast, are to be tested with a head of liquid to the top of air pipes or to near the top of hatches for ballast/cargo holds. Boundaries of fuel oil, lub oil and fresh water tanks are to be tested with a head of liquid to the highest point that liquid will rise under service conditions. Tank testing of fuel oil, lub oil and fresh water tanks may be specially considered based on a satisfactory external examination of the tank boundaries, and a confirmation from the master stating that the pressure testing has been carried out according to the requirements with satisfactory results. The surveyor may extend the testing as deemed necessary.
- Hatch covers and coamings are to be surveyed as follows:
 - A thorough inspection of the items listed in B, 3 for hatch covers and coamings, including close-up survey of hatch cover plating and hatch coaming plating, are to be carried out. Subject to cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey shall be done of accessible parts of hatch covers structures.
 - Checking of the satisfactory operation of all mechanically operated hatch covers is to be made, including stowage and securing in open position, proper fit and efficiency of sealing in closed conditions, operational testing of hydraulic and power components, wires, chains and link drives.
 - Checking the effectiveness of sealing arrangements of all hatch covers by hose testing or equivalent is to be carried out.
 - Checking the residual thickness of coamings, steel pontoon or hatch cover plating and stiffening members as deemed necessary by the Surveyor.
 - - For all ships except for passenger ships, automatic air pipe heads are to be completely examined (both externally and internally) as indicated in Table 3.5. For designs where the inner parts cannot be

properly inspected from outside, this is to include removal of the head from the air pipe. Particular attention is to be paid to the condition of the zinc coating in heads constructed from galvanised steel.

2.2 Passenger ships

2.2.1 For examination of structures in passenger ships generally arranged with superstructure extending over most of the ship length, having structures with discontinuities and sides penetrated by large openings, special attention to be given to the integrity of main structural members.

2.2.2 Air pipe heads are to be examined as deemed necessary by the surveyor.

2.3 General dry cargo ships -additional requirements-

Note:

For details of surveys, assessment and repair of hull structure of general dry cargo ships, see IACS Rec. 55.

2.3.1 Examination of the hull

All cargo holds, water ballast tanks, including double bottom tanks, pipe tunnels, cofferdams and void spaces bounding cargo holds, decks and outer hull are to be examined, and this examination is to be supplemented by thickness measurement (see 2.3.6) and testing (see 2.3.7) to ensure that the structural integrity remains effective.

2.3.2 Examination of piping systems

All piping systems within the spaces stated in 2.3.1 are to be examined and operationally tested to working pressure to attending surveyor's satisfaction to ensure that tightness and condition remain satisfactory.

For surveys of automatic air pipes see 2.1.1.

2.3.3 Hatch covers and coamings

Close-up survey and thickness measurements of the

hatch cover and coaming plating and stiffeners is to be carried out as given in Table 3.6 and Table 3.7

2.3.4 Dry dock survey

A survey in dry dock is to be a part of the class renewal survey. The overall and close-up surveys and thickness measurements, as applicable, of lower portions of the cargo holds and water ballast tanks are to be carried out in accordance with the applicable requirements for class renewal surveys, if not already performed.

2.3.5 Extent of overall and close-up survey

2.3.5.1 An overall survey of all tanks and spaces, excluding fuel oil, lub oil and fresh water tanks, is to be carried out at each class renewal survey.

For fuel oil, lub oil and fresh water tanks, see Table 3.4 above.

2.3.5.2 The minimum requirements for close-up surveys at class renewal survey are given in Table 3.7.

2.3.5.3 The surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of the spaces under survey, the condition of corrosion prevention system and where spaces have structural arrangements or details which have suffered defects in similar spaces or on similar ships according to available information.

2.3.5.4 For areas in spaces where hard protective coatings are found to be in a good condition, the extent of close-up surveys according to Table 3.7 may be specially considered.

2.3.6 Extent of thickness measurements

2.3.6.1 The minimum requirements for thickness measurements at class renewal surveys are given in Table 3.6.

Table 3.3 Minimum requirements for thickness measurements at class renewal survey

Class renewal survey No.1 Age ≤ 5	Class renewal survey No.2 5 < Age ≤ 10	Class renewal survey No.3 10 < Age ≤ 15	Class renewal survey No.4 and subsequent 15 < Age
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 in way of a cargo space within the amidships 0.5 L.	2) Two transverse sections within the amidships 0.5 L in way of two different cargo spaces.	2) A minimum of three transverse sections in way of cargo spaces within the amidships 0.5 L.
		3) All cargo holds hatch covers and coamings (plating and stiffeners).	3) All cargo holds hatch covers and coamings (plating and stiffeners).
		4) Internals in forepeak and after peak tanks.	4) Internals in forepeak and after peak tanks.
			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.
			10) Plating of sea chests. Shell plating in way of overboard discharges as considered necessary by the attending surveyor.

Notes:

1. Thickness measurement locations are to be selected to provide the best representative sampling of areas likely to be most exposed to corrosion, considering cargo and ballast history and arrangement and condition of protective coatings.
2. Thickness measurements of internals may be specially considered by the surveyor if the hard protective coating is in good condition.
3. For ships less than 100 m. in length, the number of transverse sections required at class renewal survey no.3 may be reduced to one (1), and the number of transverse sections required at subsequent class renewal surveys may be reduced to two (2).
4. For ships more than 100 m. in length, at class renewal survey no. 3, thickness measurements of exposed deck plating within amidships 0.5 L may be required.
5. Subject to cargo hold hatch covers of approved design which structurally have no access to the internals, thickness measurement shall be done of accessible parts of hatch covers structures.

Table 3.4 Minimum requirements for internal examination at hull class renewal surveys of fuel oil, lub oil and fresh water tanks

Tank	Class renewal survey No.1 Age ≤ 5	Class renewal survey No.2 5 < Age ≤ 10	Class renewal survey No.3 10 < Age ≤ 15	Class renewal survey No.4 and subsequent Age > 15
Fuel oil bunker tanks - Engine room - Cargo length area - If no tanks in Cargo Length Area, additional fuel tank(s) outside of Engine Room (if fitted)	None None None	None One One	One Two One	One Half, minimum 2 Two
Lub oil	None	None	None	One
Fresh water	None	One	All	All

Notes :

- These requirements apply to tanks of integral (structural) type.
- If a selection of tanks is accepted to be examined, then different tanks are to be examined at each class renewal survey, on a rotational basis.
- Peak tanks (all uses) are subject to internal examination at each class renewal survey.
- At class renewal survey No.3 and subsequent surveys, one deep tank for fuel oil in the cargo length area is to be included, if fitted.

Table 3.5 Survey requirements for automatic pipe heads at class renewal surveys

Class renewal survey No.1 Age ≤ 5	Class renewal survey No.2 5 < Age ≤ 10	Class renewal survey No.3 and subsequent 10 < > Age
- Two air pipe heads, one port and one starboard, located on the exposed decks, in the forward 0.25 L, preferably air pipes serving ballast tanks. - Two air pipe heads, one port and one starboard, on exposed decks, serving spaces aft of 0.25 L, preferably air pipes serving ballast tanks.	- All air pipe heads located on the exposed decks in the forward 0.25 L. - At least 20% of air pipe heads on the exposed decks serving spaces aft of 0.25 L, preferably air pipes serving ballast tanks.	- All air pipe heads located on the exposed decks
(1) (2)	(1) (2)	(3)

- The selection of air pipe heads to be examined is left to the attending surveyor.
- According to the results of this examination, the surveyor may require the examination of other heads located on the exposed decks.
- Exemption may be considered for air pipe heads where there is substantial evidence of replacement after the last class renewal survey.

2.3.6.2 The surveyor may extend the thickness measurements as deemed necessary. When thickness measurements indicate substantial corrosion, the extent of thickness measurements is to be increased to determine the extent of areas of substantial corrosion.

Table 3.1 may be used as guidance for these additional thickness measurements.

2.3.6.3 For areas in spaces where hard protective coatings are found to be in a good condition, the extent of thickness measurement according to Table 3.6 may be specially considered.

2.3.6.4 Transverse sections are to be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements.

2.3.7 Extent of tank testing

2.3.7.1 All boundaries of water ballast tanks and deep tanks used for water ballast within the cargo length area are to be pressure tested. For fuel oil tanks, the representative tanks are to be pressure tested.

2.3.7.2 The surveyor may extend the tank testing as deemed necessary.

2.3.7.3 Tank testing of fuel oil tanks is to be carried out with a head of liquid to the highest point that liquid will rise under service conditions. Tank testing of fuel oil tanks may be specially considered base on a satisfactory external examination of the tank boundaries, and a confirmation from the master stating that the pressure testing has been carried out according to the requirements with satisfactory results.

2.3.8 Additional requirements for single hold cargo ships after determining compliance with SOLAS II-1/23-3 and II-1/25

For ships complying with the requirements of SOLAS II-

1/23-3 and II-1/25 for hold water level detectors, the class renewal survey is to include an examination and a test, at random, of the water ingress detection system and of their alarms.

2.4 Single skin bulk carriers –additional requirements-

All cargo holds, Ballast Tanks, including double bottom tanks, pipe tunnels, cofferdams and void spaces bounding cargo holds, decks and outer hull are to be examined, and this examination is to be supplemented by thickness measurement and testing as required in 2.4.2 and 2.4.3, to ensure that the structural integrity remains effective. The aim of the examination is to discover Substantial Corrosion, significant deformation, fractures, damages or other structural deterioration, that may be present.

All piping systems within the above spaces are to be examined and operationally tested to working pressure to attending Surveyor's satisfaction to ensure that tightness and condition remain satisfactory

The survey extent of ballast tanks converted to void spaces is to be specially considered in relation to the requirements for ballast tanks.

A survey in dry dock is to be a part of the class renewal survey. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo holds and ballast tanks are to be carried out in accordance with the applicable requirements for class renewal survey, if not already performed.

Note:

Lower portions of the cargo holds and ballast tanks are considered to be the parts below light ballast water line.

Table 3.6 Minimum requirements for the thickness measurements at hull class renewal surveys of general dry cargo ships

Class renewal survey No.1 Age ≤ 5	Class renewal survey No.2 5 < Age ≤ 10	Class renewal survey No.3 10 < Age ≤ 15	Class renewal survey No.4 and subsequent 15 < Age
1. Suspect areas.	<p>1. Suspect areas.</p> <p>2. One transverse section of deck plating in way of a cargo space within the amidships 0.5 L.</p> <p>3. Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.7.</p>	<p>1. Suspect areas.</p> <p>2. Two transverse sections within the amidships 0.5 L in way of two different cargo spaces.</p> <p>3. Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.7.</p> <p>4. Within the cargo length area, each deck plate outside line of cargo hatch openings.</p> <p>5. All wind and water strakes within the cargo length area.</p> <p>6. Selected wind and water strakes outside the cargo length area.</p>	<p>1. Suspect areas.</p> <p>2. Within the cargo length area:</p> <p>a) A minimum of three transverse sections within the amidships 0.5 L.</p> <p>b) Each deck plate outside line of cargo hatch openings.</p> <p>c) Each bottom plate, including lower turn of bilge.</p> <p>d) Duct keel or pipe tunnel plating and internals.</p> <p>3. Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.7.</p> <p>4. All wind and water strakes full length.</p>

Notes:

1. Thickness measurement locations should 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.
2. For ships less than 100 m. in length, the number of transverse sections required at class renewal survey No. 3 may be reduced to one and the number of transverse sections at class renewal survey No. 4 and subsequent surveys may be reduced to two.

Table 3.7 Minimum requirements for close-up survey at hull class renewal surveys of general dry cargo ships

Class renewal survey No.1 Age ≤ 5	Class renewal survey No.2 5 < Age ≤ 10	Class renewal survey No.3 10 < Age ≤ 15	Class renewal survey No.4 and subsequent 15 < Age
<p>(A) Selected shell frames in one forward and one aft cargo hold and associated tween deck spaces.</p> <p>(B) One selected cargo hold transverse bulkhead.</p> <p>(D) All cargo holds hatch covers and coamings (plating and stiffeners).</p>	<p>(A) Selected shell frames in all cargo holds and tween deck spaces.</p> <p>(B) One transverse bulkhead in each cargo hold.</p> <p>(B) Forward and aft transverse bulkhead in one side ballast tank, including stiffening system.</p> <p>(C) One transverse webs with associated plating and framing in two representatives water ballast tanks of each type (i.e. topside, hopper side, side tank or double bottom tank).</p> <p>(D) All cargo hold hatch covers and coamings (plating and stiffeners).</p> <p>(E) Selected areas of all deck plating and under deck structure inside line of hatch openings between cargo hold hatches.</p> <p>(F) Selected areas of inner bottom plating.</p>	<p>(A) All shell frames in the forward lower cargo hold and 25% frames in each of the remaining cargo holds and tween deck spaces including upper and lower end attachments and adjacent shell plating.</p> <p>(B) All cargo holds transverse bulkheads.</p> <p>(B) All transverse bulkheads in ballast tanks, including stiffening system.</p> <p>(C) All transverse webs with associated plating and framing in each water ballast tank.</p> <p>(D) All cargo hold hatch covers and coamings (plating and stiffeners).</p> <p>(E) All deck plating and under deck structure inside line of hatch openings between cargo hold hatches.</p> <p>(F) All areas of inner bottom plating.</p>	<p>(A) All shell frames in all cargo holds and tween deck spaces including upper and lower end attachments and adjacent shell plating.</p> <p>Areas (B-F) as for Class Renewal Survey No.3.</p>
<p>(A) <i>Cargo hold transverse frames.</i></p> <p>(B) <i>Cargo hold transverse bulkhead plating, stiffeners and girders.</i></p> <p>(C) <i>Transverse web frame or watertight transverse bulkhead in water ballast tanks.</i></p> <p>(D) <i>Cargo hold hatch covers and coamings. Subject 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.</i></p> <p>(E) <i>Deck plating and under deck structure inside line of hatch openings between cargo hold hatches.</i></p> <p>(F) <i>Inner bottom plating.</i></p> <p>Note: <i>Close-up survey of cargo hold transverse bulkheads to be carried out at the following levels:</i></p> <ul style="list-style-type: none"> - <i>Immediately above the inner bottom and immediately above the tween decks, as applicable.</i> - <i>Mid-height of the bulkheads for holds without tween decks.</i> - <i>Immediately below the main deck plating and tween deck plating.</i> 			

2.4.1 Extent of overall and close-up surveys

2.4.1.1 An overall survey of all tanks and spaces is to be carried out at each class renewal survey. Fuel oil tanks in the cargo length area are to be surveyed as stated in Table 3.8.

2.4.1.2 The minimum requirements for close-up surveys at class renewal survey are given in Table 3.9.

2.4.1.3 The Surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of the spaces under survey, the condition of the corrosion prevention system and where spaces have structural arrangements or details which have suffered defects in similar spaces or on similar ships according to available information.

2.4.1.4 For areas in spaces where hard protective coatings are found to be in a good condition, the extent of close-up surveys according to Table 3.9 may be specially considered.

2.4.2 Extent of thickness measurements

2.4.2.1 The minimum requirements for thickness measurement at class renewal survey are given in Table 3.10.

For additional thickness measurement applicable to the vertically corrugated transverse watertight bulkhead

between cargo hold Nos. 1 and 2, see IACS URs S19 and S23.

For additional thickness measurement applicable to the side shell frames and brackets, see IACS UR S31.

2.4.2.2 Provisions for extended measurements for areas with substantial corrosion are given in Table 3.11. These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to have thickness measurements taken.

For vessels built under IACS Common Structural Rules, the identified substantial corrosion areas may be:

- Protected by coating applied in accordance with the coating manufacturer's requirements and examined at annual intervals to confirm the coating in way is still in good condition, or alternatively

- Required to be measured at annual intervals.

2.4.2.3 The surveyor may further extend the thickness measurements as deemed necessary.

2.4.2.4 For areas in tanks where hard protective coatings are found to be in a good condition, the extent of thickness measurement according to Table 3.10 may be specially considered.

Table 3.8 Minimum requirements for surveys of fuel oil tanks in the cargo length area at hull class renewal surveys of single and double skin bulk carriers

Class renewal survey No.1 Age ≤ 5	Class renewal survey No.2 5 < Age ≤ 10	Class renewal survey No.3 10 < Age ≤ 15	Class renewal survey No.4 and subsequent 15 < Age
None	One	Two	Half, minimum two
<p>Notes :</p> <ol style="list-style-type: none"> 1. <i>These requirements apply to tanks of integral (structural) type.</i> 2. <i>If a selection of tanks is accepted to be examined, then different tanks are to be examined at each class renewal survey, on a rotational basis.</i> 3. <i>Peak tanks (all uses) are subject to internal examination at each class renewal survey.</i> 4. <i>At class renewal survey No. 3 and subsequent class renewal surveys, one deep tank for fuel oil in the cargo area is to be included, if fitted.</i> 			

2.4.2.5 Transverse sections are to be chosen where largest reductions are suspected to occur or are revealed from deck plating measurements.

2.4.2.6 Representative thickness measurement to determine both general and local levels of corrosion in the shell frames and their end attachments in all cargo holds and water ballast tanks is to be carried out. Thickness measurement is also to be carried out to determine the corrosion levels on the transverse bulkhead plating. The extent of thickness measurements may be specially considered provided the surveyor is satisfied by the close-up survey, that there is no structural diminution, and the hard protective coating where applied remains efficient.

2.4.2.7 Close-up survey and thickness measurement (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) of the hatch cover and coaming plating and stiffeners is to be carried out as given in Table 3.9 and Table 3.10.

2.4.3 Extent of tank testing

2.4.3.1 All boundaries of water ballast tanks, deep tanks and cargo holds used for water ballast within the cargo length area are to be pressure tested. For fuel oil tanks, only representative tanks are to be pressure tested.

2.4.3.2 The surveyor may extend the testing as deemed necessary.

2.4.3.3 Boundaries of ballast tanks are to be tested with a head of liquid to the top of air pipes.

2.4.3.4 Boundaries of ballast holds are to be tested with a head of liquid to near to the top of hatches.

2.4.3.5 Boundaries of fuel oil tanks are to be tested with a head of liquid to the highest point that liquid will rise under service conditions. Tank testing of fuel oil tanks may be specially considered based on a satisfactory external examination of the tank

boundaries, and a confirmation from the master stating that the pressure testing has been carried out according to the requirements with satisfactory results.

2.4.3.6 The testing of double bottom tanks and other spaces not designed for the carriage of liquid may be omitted, provided a satisfactory internal examination together with an examination of the tank top is carried out.

2.4.4 Additional class renewal survey requirements after determining compliance with SOLAS XII/12 and XII/13

2.4.4.1 For ships complying with the requirements of SOLAS XII/12 for hold, ballast and dry space water level detectors, the class renewal survey is to include an examination and a test of the water ingress detection systems and of their alarms.

2.4.4.2 For ships complying with the requirements of SOLAS XII/13 for the availability of pumping systems, the class renewal survey is to include an examination and a test of the means for draining and pumping ballast tanks forward of the collision bulkhead and bilges of dry spaces any part of which extends forward of the foremost cargo hold, and of their controls.

2.5 Double skin bulk carriers -additional requirements-

All cargo holds, Ballast Tanks, including double bottom tanks, pipe tunnels, cofferdams and void spaces bounding cargo holds, decks and outer hull are to be examined, and this examination is to be supplemented by thickness measurement and testing as required in 2.5.2 and 2.5,3 to ensure that the structural integrity remains effective. The aim of the examination is to discover Substantial Corrosion, significant deformation, fractures, damages or other structural deterioration, that may be present.

All piping systems within the above spaces are to be examined and operationally tested to working pressure to attending Surveyor's satisfaction to ensure that tightness and condition remain satisfactory.

The survey extent of ballast tanks converted to void spaces is to be specially considered in relation to the requirements for ballast tanks.

A survey in dry dock is to be a part of the class renewal survey. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo holds and ballast tanks are to be carried out in accordance with the applicable requirements for class renewal survey, if not already performed.

Note:

Lower portions of the cargo holds and ballast tanks are considered to be the parts below light ballast water line.

2.5.1 Extent of overall and close-up surveys

2.5.1.1 An overall survey of all tanks and spaces is to be carried out at each class renewal survey. Fuel oil tanks in the cargo length area are to be surveyed as stated in Table 3.8.

2.5.1.2 The minimum requirements for close-up surveys at class renewal survey are given in Table 3.12/sheet 1 for double skin bulk carriers, excluding ore carriers and in Table 3.12/sheet 2 for ore carriers, respectively.

2.5.1.3 The Surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of the spaces under survey, the condition of the corrosion prevention system and where spaces have structural arrangements or details which have suffered defects in similar spaces or on similar ships according to available information.

2.5.1.4 For areas in spaces where hard protective coatings are found to be in a good condition, the extent of close-up surveys according to Table 3.12 may be specially considered,

2.5.1.5 Close-up survey and thickness measurement (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) of the hatch cover and coaming plating and stiffeners is to be carried out as given in Table 3.12 (Sheet 1 and Sheet 2) and Table 3.13.

2.5.2 Extent of thickness measurements

2.5.2.1 The minimum requirements for thickness measurement at class renewal survey are given in Table 3.13.

2.5.2.2 Provisions for extended measurements for areas with substantial corrosion are given in Table 3.14.

These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to have thickness measurements taken.

For vessels built under IACS Common Structural Rules, the identified substantial corrosion areas may be:

- Protected by coating applied in accordance with the coating manufacturer's requirements and examined at annual intervals to confirm the coating in way is still in good condition, or alternatively
- Required to be measured at annual intervals.

2.5.2.3 The Surveyor may further extend the thickness measurements as deemed necessary.

2.5.2.4 For areas in tanks where hard protective coatings are found to be in a good condition, the extent of thickness measurements according to Table 3.13 may be specially considered.

2.5.2.5 Transverse sections are to be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements, one of which is to be in the amidships area.

Table 3.9 Minimum requirement for close-up survey at hull class renewal surveys of single skin bulk carriers

Class renewal survey No.1 Age ≤ 5	Class renewal survey No.2 5 < Age ≤ 10	Class renewal survey No.3 10 < Age ≤ 15	Class renewal survey No.4 and subsequent 15 < Age
<p>(A) 25% of shell frames in the forward cargo hold at representative positions.</p> <p>(A) Selected frames in remaining cargo holds.</p> <p>(B) One transverse web with associated plating and longitudinals in two representative water ballast tanks of each type (i.e. topside, or hopper side tank).</p> <p>(C) Two selected cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted.</p> <p>(D) All cargo hold hatch covers and coamings (plating and stiffeners).</p>	<p>(A) All shell frames in the forward cargo hold and 25% of shell frames in each of the remaining cargo holds, including upper and lower end attachments and adjacent shell plating. For bulk carriers 100.000 dwt and above, all shell frames in the forward cargo hold and 50% of shell frames in each of the remaining cargo holds, including upper and lower end attachments and adjacent shell plating.</p> <p>(B) One transverse web with associated plating and longitudinals in each water ballast tank.</p> <p>(B) Forward and aft transverse bulkhead in one ballast tank, including stiffening system.</p> <p>(C) All cargo holds transverse bulkheads, including internal structure of upper and lower stools, where fitted.</p> <p>(D) All cargo hold hatch covers and coamings (plating and stiffeners)</p> <p>(E) All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches.</p>	<p>(A) All shell frames in the forward and one other selected cargo hold and 50% of frames in each of the remaining cargo holds, including upper and lower end attachments and adjacent shell plating.</p> <p>(B) All transverse webs with associated plating and longitudinals in each water ballast tank.</p> <p>(B) All transverse bulkheads in ballast tanks, including stiffening system.</p> <p>Areas (C), (D) and (E) as for class renewal survey No.2.</p>	<p>(A) All shell frames in all cargo holds including upper and lower end attachments and adjacent shell plating.</p> <p>Areas (B) - (E) as for class renewal survey No. 3.</p>
<p>(A) Cargo hold transverse frames.</p> <p>(B) Transverse web frame or watertight transverse bulkhead in water ballast tanks.</p> <p>(C) Cargo hold transverse bulkhead plating, stiffeners and girders.</p> <p>(D) Cargo hold hatch covers and coamings. Subject to cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers structures.</p> <p>(E) Deck plating and under deck structure inside line of hatch openings between cargo hold hatches.</p>			
<p>Note: 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 gusset (if fitted) and shedders for ships without lower stool.</p> <p>Level (b) Immediately above and below the lower stool shelf plate (for those ships fitted with lower stools), and immediately above the line of the shedder plates.</p> <p>Level (c) About mid-height of the bulkhead.</p> <p>Level (d) Immediately below the upper deck plating and immediately adjacent to the upper wing tank, and immediately below the upper stool shelf plate for those ships fitted with upper stools, or immediately below the topside tanks.</p>			

Table 3.10 Minimum requirements for the thickness measurements at hull class renewal surveys of bulk carriers

Class renewal survey No.1 Age ≤ 5	Class renewal survey No.2 5 < Age ≤ 10	Class renewal survey No.3 10 < Age ≤ 15	Class renewal survey No.4 and subsequent 15 < Age
Suspect areas.	Suspect areas.	Suspect areas.	Suspect areas.
	Within the cargo length: Two transverse sections of deck plating outside line of cargo hatch openings.	Within the cargo length: - Each deck plate outside line of cargo hatch opening - Two transverse sections, one in the amidship area, outside line of cargo hatch opening. - All wind and water strakes.	Within the cargo length: - Each deck plate outside line of cargo hatch opening - Three transverse sections, one in the amidship area, outside line of cargo hatch opening. - Each bottom plate.
	Wind and water strakes in way of the two transverse sections considered above. Selected wind and water strakes outside the cargo length area.	Selected wind and water strakes outside the cargo length area.	All wind and water strakes, full length.
	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.9.	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.9.	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.9.
		See IACS URs S19 and S23 for additional thickness measurement guidelines applicable to the vertically corrugated transverse watertight bulkhead between cargo hold Nos. 1 and 2 on ships subject to compliance with URs S19 and S23.	See IACS URs S19 and S23 for additional thickness measurement guidelines applicable to the vertically corrugated transverse watertight bulkhead between cargo hold Nos. 1 and 2 on ships subject to compliance with URs S19 and S23.
	See IACS UR S31 for additional thickness measurement guidelines applicable to the side shell frames and brackets on ships subject to compliance with UR S31.	See IACS UR S31 for additional thickness measurement guidelines applicable to the side shell frames and brackets on ships subject to compliance with UR S31.	See IACS UR S31 for additional thickness measurement guidelines applicable to the side shell frames and brackets on ships subject to compliance with UR S31

**Table 3.11 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of bulk carriers within the cargo area**

Sheet 1

SHELL STRUCTURES

Structural member	Extent of measurement	Pattern of measurement
1. Bottom and side shell plating	a. Suspect plate, plus four adjacent plates b. See other tables for particulars on gauging in way of tanks and cargo holds	a. 5 point pattern for each panel between longitudinals
2. Bottom/side shell longitudinals	Minimum of three longitudinals in way of suspect areas	3 measurements in line across web 3 measurements on flange

**Table 3.11 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of bulk carriers within the cargo area**

Sheet 2

TRANSVERSE BULKHEADS IN CARGO HOLDS

Structural member	Extent of measurement	Pattern of measurement
1. Lower stool	a. Transverse band within 25 mm. of welded connection to inner bottom b. Transverse band within 25 mm. of welded connection to shelf plate	a. 5 point between stiffeners over 1 meter length b. 5 point between stiffeners over 1 meter length
2. Transverse bulkhead	a. Transverse band at approximately mid height b. Transverse band at part of bulkhead adjacent to upper deck or below upper stool shelf plate (for those ships fitted with upper stools)	a. 5 point pattern over 1 m ² of plating b. 5 point pattern over 1 m ² of plating

**Table 3.11 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of bulk carriers within the cargo area**

Sheet 3

**DECK STRUCTURE INCLUDING CROSS STRIPS, MAIN CARGO HATCHWAYS, HATCH COVERS,
COAMINGS AND TOPSIDE TANKS**

Structural member	Extent of measurement	Pattern of measurement
1. Cross deck strip plating	Suspect cross deck strip plating	5 point pattern between underdeck stiffeners over 1 meter length
2. Under deck stiffeners	a. Transverse members b. Longitudinal member	a. 5 point pattern at each end and mid span b. 5 point pattern on both web and flange
3. Hatch covers	a. Side and end skirts, each 3 locations b. 3 longitudinal bands outboard strakes (2) and centreline strake (1)	a. 5 point pattern at each location b. 5 point measurement each band
4. Hatch coamings	Each side and end coaming, one band lower 1/3, one band upper 2/3 of coaming	5 point measurement each band i.e. end or side coaming
5. Topside water ballast tanks	a. Watertight transverse bulkheads i. lower 1/3 of bulkhead ii. upper 2/3 of bulkhead iii. stiffeners b. 2 representative swash transverse bulkheads i. lower 1/3 of bulkhead ii. upper 2/3 of bulkhead iii. stiffeners c. 3 representative bays of slope plating i. lower 1/3 of tank ii. upper 2/3 of tank d. longitudinals, suspect and adjacent	i. 5 point pattern over 1 m ² of plating ii. 5 point pattern over 1 m ² of plating iii. 5 point pattern over 1 m length i. 5 point pattern over 1 m ² of plating ii. 5 point pattern over 1 m ² of plating iii. 5 point pattern over 1 m length i. 5 point pattern over 1 m ² of plating ii. 5 point pattern over 1 m ² of plating d. 5 point pattern both web and flange over 1 m length
6. Main deck plating	Suspect plates and adjacent (4)	5 point pattern over 1 m ² of plating
7. Main deck longitudinals	Minimum of 3 longitudinals where plating measured	5 point pattern on both web and flange over 1 m length
8. Web frames/transverses	Suspect plates	5 point pattern over 1 m ²

**Table 3.11 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of bulk carriers within the cargo area**

Sheet 4

DOUBLE BOTTOM AND HOPPER STRUCTURE

Structural member	Extent of measurement	Pattern of measurement
1. Inner/double bottom plating	Suspect plate plus all adjacent plates	5 point pattern for each panel between longitudinals over 1 meter length
2. Inner/double bottom longitudinals	Three longitudinals where plates measured	3 measurements in line across web and 3 measurements on flange
3. Longitudinal girders or transverse floors	a. Suspect plates	a. 5 point pattern over about 1 m ²
4. Watertight bulkheads (WT floors)	a. Lower 1/3 of tank b. Upper 2/3 of tank	a. 5 point pattern over 1 m ² of plating b. 5 point pattern alternate plates over 1 m ² of plating
5. Web frames	Suspect plates	5 point pattern over 1 m ² of plating
6. Bottom/side shell longitudinals	Minimum of three longitudinals in way of suspect area	3 measurements in line across web 3 measurements on flange

**Table 3.11 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of bulk carriers within the cargo area**

Sheet 5

CARGO HOLDS

Structural member	Extent of measurement	Pattern of measurement
1. Side shell frames	Suspect frame and each adjacent	a. At each end and mid span: 5 point pattern of both web and flange b. 5 point pattern within 25 mm. of welded attachment to both shell and lower slope plate

2.5.2.6 Representative thickness measurement to determine both general and local levels of corrosion in the transverse web frames in all water ballast tanks is to be carried out. Thickness measurement is also to be carried out to determine the corrosion levels on the transverse bulkhead plating. The extent of thickness measurements may be specially considered provided the surveyor is satisfied by the close-up survey, that there is no structural diminution, and the hard protective coating where applied remains efficient.

2.5.3 Extent of tank testing

2.5.3.1 All boundaries of water ballast tanks, deep tanks and cargo holds used for water ballast within the cargo length area are to be pressure tested. For fuel oil tanks, only representative tanks are to be pressure tested.

2.5.3.2 The surveyor may extend the testing as deemed necessary.

2.5.3.3 Boundaries of ballast tanks are to be tested with a head of liquid to the top of air pipes.

2.5.3.4 Boundaries of ballast holds are to be tested with a head of liquid to near to the top of hatches.

2.5.3.5 Boundaries of fuel oil tanks are to be tested with a head of liquid to the highest point that liquid will rise under service conditions. Tank testing of fuel oil tanks may be specially considered based on a satisfactory external examination of the tank boundaries, and a confirmation from the master stating that the pressure testing has been carried out according to the requirements with satisfactory results.

2.5.3.6 The testing of double bottom tanks and other spaces not designed for the carriage of liquid may be omitted, provided a satisfactory internal examination together with an examination of the tank top is carried out.

2.5.4 Additional class renewal survey requirements after determining compliance with SOLAS XII/12 and XII/13

2.5.4.1 For ships complying with the requirements of

SOLAS XII/12 for hold, ballast and dry space water level detectors, the class renewal survey is to include an examination and a test of the water ingress detection systems and of their alarms.

2.5.4.2 For ships complying with the requirements of SOLAS XII/13 for the availability of pumping systems, the class renewal survey is to include an examination and a test of the means for draining and pumping ballast tanks forward of the collision bulkhead and bilges of dry spaces any part of which extends forward of the foremost cargo hold, and of their controls.

2.6 Oil and chemical tankers -additional requirements-

2.6.1 Surveys for oil tankers

2.6.1.1 Examination of hull and tanks

All cargo tanks, ballast tanks, including double bottom tanks, pump rooms, pipe tunnels, cofferdams and void spaces bounding cargo tanks, decks and outer hull are to be examined, and this examination is to be supplemented by thickness measurements to ensure that structural integrity remains effective. The aim of the examination is to discover substantial corrosion, significant deformation, fractures, damages or other structural deterioration that may be present.

2.6.1.2 Examination of cargo and ballast piping

Cargo piping on deck, including crude oil washing piping, cargo and ballast piping within the above tanks and spaces are to be examined and operationally tested to working pressure to attending surveyor's satisfaction to ensure that tightness and condition remain satisfactory. Special attention is to be given to any ballast piping in cargo tanks and cargo piping in ballast tanks and void spaces, and surveyors are to be advised on all occasions when this piping, including valves and fittings are open during repair periods and can be examined internally.

Table 3.12 Minimum requirement for close-up survey at hull class renewal surveys of double skin bulk carriers, excluding ore carriers - Sheet 1

Class renewal survey No.1 Age ≤ 5	Class renewal survey No.2 5 < Age ≤ 10	Class renewal survey No.3 10 < Age ≤ 15	Class renewal survey No.4 and subsequent 15 < Age
One transverse web with associated plating and longitudinals in two representative water ballast tanks of each type. (This is to include the foremost topside and double side water ballast tanks on either side). (A)	One transverse web with associated plating and longitudinals as applicable in each water ballast tank. (A) Forward and aft transverse bulkhead, 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). (A) 25% of ordinary transverse web frames in the foremost double side tanks. (B)	All transverse webs with associated plating and longitudinals as applicable in each water ballast tank. (A) All transverse bulkheads, including stiffening system in each water ballast tank. (A) 25% of ordinary transverse web frames in all double side tanks. (B)	All transverse webs with associated plating and longitudinals as applicable in each water ballast tank. (A) All transverse bulkheads, including stiffening system in each water ballast tank. (A) All ordinary transverse web frames in all double side tanks. (B) Areas (C) – (E) as for age interval 10 to 15 years.
Two selected cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted. (C)	One transverse bulkhead in each cargo hold, including internal structure of upper and lower stools, where fitted. (C)	All cargo holds transverse bulkheads, including internal structure of upper and lower stools, where fitted. (C)	
All cargo holds hatch covers and coamings (plating and stiffeners). (D)	All cargo holds hatch covers and coamings (plating and stiffeners). (D)	All cargo holds hatch covers and coamings (plating and stiffeners). (D)	
	All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches. (E)	All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches. (E)	
<p>(A), (B), (C), (D) and (E) are areas to be subjected to close-up surveys and thickness measurements.</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 bulkhead plating, stiffeners and girders.</p> <p>(D) Cargo hold hatch covers and coamings.</p> <p>(E) Deck plating and underdeck structure inside line of hatch openings between cargo hold hatches.</p> <p>Note: 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 gusset (if fitted) and shedders for ships without lower stool.</p> <p>Level (b) Immediately above and below the lower stool shelf plate (for those ships fitted with lower stools), and immediately above the line of the shedder plates.</p> <p>Level (c) About mid-height of the bulkhead.</p> <p>Level (d) Immediately below the upper deck plating and immediately adjacent to the upper wing tank, and immediately below the upper stool shelf plate for those ships fitted with upper stools, or immediately below the topside tanks.</p>			

Table 3.12 Minimum requirement for close-up survey at hull class renewal surveys of ore carriers - Sheet 2

Class renewal survey No.1 Age ≤ 5	Class renewal survey No.2 5 < Age ≤ 10	Class renewal survey No.3 10 < Age ≤ 15	Class renewal survey No.4 and subsequent 15 < Age
<p>One web frame ring complete including adjacent structural members in a ballast wing tank. (A)</p> <p>One transverse bulkhead lower part – including girder system and adjacent structural members- in a ballast tank. (A)</p>	<p>All web frame rings complete including adjacent structural members in a ballast wing tank. (A)</p> <p>One deck transverse including adjacent deck structural members in each remaining ballast tank (A)</p> <p>Forward and aft transverse bulkheads complete - including girder system and adjacent structural members – in a ballast wing tank. (A)</p> <p>One transverse bulkhead lower part –including girder system and adjacent structural members- in each remaining ballast tank. (A)</p>	<p>All web frame rings complete including adjacent structural members in a ballast tank. (A)</p> <p>All transverse bulkheads complete, including girder system and adjacent structural members- in each ballast tank. (A)</p> <p>One web frame ring complete including adjacent structural members in each wing void space. (A)</p> <p>Additional web frame rings in void spaces as deemed necessary by TL. (A)</p>	As for class renewal survey for age interval 10 to 15 years.
<p>Two selected cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted. (C)</p>	<p>One transverse bulkhead in each cargo hold, including internal structure of upper and lower stools, where fitted. (C)</p>	<p>All cargo holds transverse bulkheads, including internal structure of upper and lower stools, where fitted. (C)</p>	Areas (C) – (E) as for age intervals 10 to 15 years.
<p>All cargo holds hatch covers and coamings (plating and stiffeners). (D)</p>	<p>All cargo holds hatch covers and coamings (plating and stiffeners). (D)</p>	<p>All cargo holds hatch covers and coamings (plating and stiffeners). (D)</p>	
	<p>All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches. (E)</p>	<p>All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches. (E)</p>	
<p>(A), (C), (D) and (E) are areas to be subjected to close-up surveys and thickness measurements.</p> <p>(A) 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.</p> <p>(C) Cargo hold transverse bulkhead plating, stiffeners and girders.</p> <p>(D) Cargo hold hatch covers and coamings.</p> <p>(E) Deck plating and underdeck structure inside line of hatch openings between cargo hold hatches.</p> <p>Note: 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 gusset (if fitted) and shedders for ships without lower stool.</p> <p>Level (b) Immediately above and below the lower stool shelf plate (for those ships fitted with lower stools), and immediately above the line of the shedder plates.</p> <p>Level (c) About mid-height of the bulkhead.</p> <p>Level (d) Immediately below the upper deck plating and immediately adjacent to the upper wing tank, and immediately below the upper stool shelf plate for those ships fitted with upper stools, or immediately below the topside tanks.</p>			

Table 3.13 Minimum requirements for the thickness measurements at hull class renewal surveys of double skin bulk carriers

Class renewal survey No.1 Age ≤ 5	Class renewal survey No.2 5 < Age ≤ 10	Class renewal survey No.3 10 < Age ≤ 15	Class renewal survey No.4 and subsequent 15 < Age
Suspect areas.	Suspect areas.	Suspect areas.	Suspect areas.
	Within the cargo length: Two transverse sections of deck plating outside line of cargo hatch openings.	Within the cargo length: - Each deck plate outside line of cargo hatch opening - Two transverse sections, one in the amidship area, outside line of cargo hatch opening. - All wind and water strakes.	Within the cargo length: - Each deck plate outside line of cargo hatch opening - Three transverse sections, one in the amidship area, outside line of cargo hatch opening. - Each bottom plate.
	Wind and water strakes in way of the two transverse sections considered above. Selected wind and water strakes outside the cargo length area.	Selected wind and water strakes outside the cargo length area.	All wind and water strakes, full length.
	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.12/ Sheet 1 or Table 3.12/ Sheet 2, as applicable.	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.12/ Sheet 1 or Table 3.12/ Sheet 2, as applicable.	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.12/ Sheet 1 or Table 3.12/ Sheet 2, as applicable.

Table 3.14 Requirements for extent of thickness measurement at those areas of substantial corrosion of double skin bulk carriers within the cargo length area

Sheet 1

BOTTOM, INNER BOTTOM and HOPPER STRUCTURE

Structural member	Extent of measurement	Pattern of measurements
Bottom, inner bottom and hopper structure plating	Minimum of three bays across double bottom tank, including aft bay Measurements around and under all suction bell mouths.	Five point pattern for each panel between longitudinals and floors.
Bottom, inner bottom and hopper structure longitudinals	Minimum of three longitudinals in each bay where bottom plating measured.	Three measurements in line across the flange and three measurements on the vertical web.
Bottom girders, including the watertight ones.	At fore and aft watertight floors and in centre of tanks.	Vertical line of single measurements on girder plating with one measurement between each panel stiffener, or a minimum of three measurements.
Bottom floors, including the watertight ones	Three floors in the bays where bottom plating measured, with measurements at both ends and middle.	Five point pattern over 2 m ² area.
Hopper structure web frame ring	Three floors in the bays where bottom plating measured.	Five point pattern over 1 m ² of plating Single measurements on flange.
Hopper structure transverse watertight bulkhead or swash bulkhead.	- lower 1/3 of bulkhead	Five point pattern over 1 m ² of plating
	- upper 2/3 of bulkhead	Five point pattern over 2 m ² of plating
	- stiffeners (minimum of three)	For web, five-point pattern over span (two measurements across web at each end and one at centre of span). For flange, single measurements at each end and centre of span.
Panel stiffening	Where applicable	Single measurements

Table 3.14 Requirements for extent of thickness measurement at those areas of substantial corrosion of double skin bulk carriers within the cargo length area

Sheet 2

DECK STRUCTURE INCLUDING CROSS STRIPS, MAIN CARGO HATCHWAYS, HATCH COVERS, COAMINGS AND TOPSIDE TANKS

Structural member	Extent of measurement	Pattern of measurements	
Cross deck strip plating	Suspect cross deck strip plating	Five point pattern between underdeck stiffeners over 1 m. length.	
Underdeck stiffeners	Transverse members Longitudinal members	Five point pattern at each end and mid span Five point pattern on both web and flange.	
Hatch covers	Side and end skirts, each three locations Three longitudinal bands, outboard strakes (2) and centreline strake (1)	Five point pattern at each location Five point measurement each band.	
Hatch coamings	Each side and end of coaming, one band lower 1/3, and one band upper 2/3 of coaming.	Five point measurement each band i.e. end or side coaming.	
Topside ballast tanks	a) watertight transverse bulkheads: - lower 1/3 of bulkhead - upper 2/3 of bulkhead - stiffeners	Five point pattern over 1 m ² of plating Five point pattern over 1 m ² of plating Five point pattern over 1 m. length	
	b) two representative swash transverse bulkheads: - lower 1/3 of bulkhead - upper 2/3 of bulkhead - stiffeners	Five point pattern over 1 m ² of plating Five point pattern over 1 m ² of plating Five point pattern over 1 m. length	
	c) three representative bays of slope plating - lower 1/3 of tank - upper 2/3 of tank	Five point pattern over 1 m ² of plating Five point pattern over 1 m ² of plating	
	d) longitudinals, suspect and adjacent	Five point pattern on both web and flange over 1 m. length.	
	Main deck plating	Suspect plates and adjacent (4)	Five point pattern over 1 m ² of plating
	Main deck longitudinals	Suspect plates	Five point pattern on both web and flange over 1 m. length.
	Web frames/transverses	Suspect plates	Five point pattern over 1 m ² of plating

Table 3.14 Requirements for extent of thickness measurement at those areas of substantial corrosion of double skin bulk carriers within the cargo length area

Sheet 3

**STRUCTURE IN DOUBLE SIDE SPACES OF DOUBLE SKIN BULK CARRIERS
INCLUDING WING VOID SPACES OF ORE CARRIERS**

Structural member	Extent of measurement	Pattern of measurements
Side shell and inner plating: - Upper strake and strakes in way of horizontal girders - All other strakes	- Plating between each pair of transverse frames/longitudinals in a minimum of three bays (along the tank) - Plating between every third pair of longitudinals in same three bays	- Single measurement - Single measurement
Side shell and inner side transverse frames/longitudinals on: - Upper strake - All other strakes	- Each transverse frame / longitudinal in same three bays - Every third transverse frame/longitudinal in same three bays	- Three measurements across web and one measurement on flange. - Three measurements across web and one measurement on flange.
Transverse frames/longitudinals - brackets	Minimum of three at top, middle and bottom of tank in same three bays	Five point pattern over area of bracket
Vertical web and transverse bulkheads: - Strakes in way of horizontal girders - Other strakes	- Minimum of two webs and both transverse bulkheads - Minimum of two webs and both transverse bulkheads	- Five point pattern over approx. 2 m ² area - Two measurements between each pair of vertical stiffeners
Horizontal girders .	Plating on each girder in a minimum of three bays	Two measurements between each pair of longitudinal girder stiffeners
Panel stiffening	Where applicable	Single measurements

Table 3.14 Requirements for extent of thickness measurement at those areas of substantial corrosion of double skin bulk carriers within the cargo length area

**Sheet 4
TRANSVERSE BULKHEADS IN CARGO HOLDS**

Structural member	Extent of measurement	Pattern of measurements
Lower stool, if fitted	<ul style="list-style-type: none"> - Transverse band within 25 mm. of welded connection to inner bottom - Transverse band within 25 mm. of welded connection to shelf plate 	<ul style="list-style-type: none"> - Five point pattern between stiffeners over 1 m. length - Five point pattern between stiffeners over 1 m. length
Transverse bulkheads	<ul style="list-style-type: none"> - Transverse band at approximately mid height - Transverse band at part of bulkhead adjacent to upper deck or below upper stool shelf plate (for those ships fitted with upper stools) 	<ul style="list-style-type: none"> - Five point pattern over 1 m² of plating - Five point pattern over 1 m² of plating

2.6.1.3 Dry dock survey

A survey in dry dock is to be a part of the class renewal survey. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo tanks and ballast tanks are to be carried out in accordance with the applicable requirements for class renewal surveys, if not already performed.

Note:

Lower portions of the cargo and ballast tanks are considered to be the parts below light ballast water line.

2.6.1.4 Examination of tank protection

Where provided, the condition of the corrosion prevention system of cargo tanks is to be examined.

A Ballast Tank is to be examined at subsequent annual intervals where:

- Hard protective coating has not been applied from the time of construction, or

- A soft or semi-hard coating has been applied, or
- Substantial corrosion is found within the tank, or
- The hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the Surveyor.

Thickness measurements are to be carried out as deemed necessary by the surveyor.

2.6.1.5 Extent of overall and close-up survey

- An overall survey of all tanks and spaces is to be carried out at each class renewal survey.
- The minimum requirements for close-up surveys at class renewal survey are given in Table 3.15 for oil tankers, ore/oil ships, etc. and Table 3.16 for double hull oil tankers.
- The surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of the tanks under survey, the

condition of the corrosion prevention system and also in the following cases:

- In particular, tanks having structural arrangements or details which have suffered defects in similar tanks or on similar ships according to available information.
 - In tanks which have structures approved with reduced scantlings due to an approved corrosion control system.
- For areas in tanks where hard protective coating are found to be in a good condition, the extent of close-up surveys according to Table 3.15 for oil tankers, ore/oil ships, etc. and Table 3.16 for double hull oil tankers may be specially considered.

2.6.1.6 Extent of thickness measurement

- The minimum requirements for thickness measurements at class renewal survey are given in Table 3.17 for oil tankers, ore/oil ships, etc. and Table 3.18 for double hull oil tankers.
- Provisions for extended measurements for areas with substantial corrosion are given in Table 3.19 for oil tankers, ore/oil ships, etc. and Table 3.20 for double hull oil tankers, and as may be additionally specified in the survey programme.

These extended thickness measurements are to be carried out before the survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to have thickness measurements taken.

- The surveyor may further extend the thickness measurements as deemed necessary.
- For areas in tanks where hard protective coating

are found to be in a good condition, the extent of thickness measurements according to Table 3.17 for oil tankers, ore/oil ships, etc. and Table 3.18 for double hull oil tankers may be specially considered.

- Transverse sections are to be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements.
- In cases where two or three sections are to be measured, at least one is to include a ballast tank within 0.5L amidships.
- In case of oil tankers of 130 m. in length and upwards and more than 10 years of age, for the evaluation of the ship's longitudinal strength, the sampling method of thickness measurements is given 2.6.1.7.

2.6.1.7 Sampling method of thickness measurements for longitudinal strength evaluation and repair methods

2.6.1.7.1 Extent of longitudinal strength evaluation

Longitudinal strength should be evaluated within 0.4 L amidships for the extent of the hull girder length that contains tanks therein and within 0.5 L amidships for adjacent tanks which may extend beyond 0.4 L amidships, where tanks means ballast tanks and cargo tanks.

2.6.1.7.2 Sampling method of thickness measurement

- Pursuant to the requirements of item 2.6.1.6, transverse sections should be chosen such that thickness measurements can be taken for as many different tanks in corrosive environment as possible, e.g. ballast tanks sharing a common plane boundary with cargo tanks fitted with heating coils, other ballast tanks, cargo tanks permitted to be filled with sea water and other cargo tanks. Ballast tanks sharing a common

plane boundary with cargo tanks fitted with heating coils and cargo tanks permitted to be filled with sea water should be selected where present.

- The minimum number of transverse sections to be sampled should be in accordance with Table 3.17 or 3.18, as applicable. The transverse sections should be located where the largest thickness reductions are suspected to occur or are revealed from deck and bottom plating measurements and should be clear of areas which have been locally renewed or reinforced.
- At least two points should be measured on each deck plate and/or bottom shell plate required to be measured within the cargo area in accordance with the requirements of Table 3.17 or 3.18, as applicable.
- Within 0.1D (where D is the ship's moulded depth) of the deck and bottom at each transverse section to be measured in accordance with the requirements of Table 3.17 or 3.18, as applicable, every longitudinal and girder should be measured on the web and face plate, and every plate should be measured at one point between longitudinals.
- For longitudinal members other than those specified above to be measured at each transverse section in accordance with the requirements of Table 3.17 or 3.18, as applicable, every longitudinal and girder should be measured on the web and face plate, and every plate should be measured at least in one point per strake.
- The thickness of each component should be determined by averaging all of the measurements taken in way of the transverse section on each component.

2.6.1.7.3 Additional measurements where the longitudinal strength is deficient

- Where one or more of the transverse sections are found to be deficient in respect of the

longitudinal strength requirements, the number of transverse sections for thickness measurement should be increased such that each tank within the 0.5L amidships region has been sampled. Tank spaces that are partially within, but extend beyond, the 0.5L region, should be sampled.

- Additional thickness measurements should also be performed on one transverse section forward and one aft of each repaired area to the extent necessary to ensure that the areas bordering the repaired section also comply with the a.m. requirements.

2.6.1.8 Extent of tank testing

2.6.1.8.1 The minimum requirements for ballast tank testing at class renewal survey are given in 2.6.1.8.3 and Table 3.21.

The minimum requirements for cargo tank testing at class renewal survey are given in 2.6.1.8.4 and Table 3.21.

Cargo tank testing carried out by the vessel's crew under the direction of the Master may be accepted by the surveyor provided the following conditions are complied with:

- a tank testing procedure, specifying fill heights, tanks being filled and bulkheads being tested, has been submitted by the owner and reviewed by TL prior to the testing being carried out; there is no record of leakage, distortion or substantial corrosion that would affect the structural integrity of the tank;
- the tank testing has been satisfactorily carried out within class renewal survey window not more than 3 months prior to the date of the survey on which the overall or close up survey is completed;
- the satisfactory results of the testing is recorded in the vessel's logbook;

- the internal and external condition of the tanks and associated structure are found satisfactory by the surveyor at the time of the overall and close up survey.

2.6.1.8.2 The surveyor may extend the tank testing as deemed necessary.

2.6.1.8.3 Boundaries of ballast tanks are to be tested with a head of liquid to the top of air pipes.

2.6.1.8.4 Boundaries of cargo tanks are to be tested to the highest point that liquid will rise under service conditions.

2.6.1.8.5 For double hull oil tankers the testing of double bottom tanks and other spaces not designed for the carriage of liquid may be omitted, provided a satisfactory internal examination together with an examination of the tank top is carried out.

2.6.2 Surveys for chemical tankers

2.6.2.1 Examination of hull and tanks

All cargo tanks, ballast tanks, including double bottom tanks, pump rooms, pipe tunnels, cofferdams and void spaces bounding cargo tanks, decks and outer hull are to be examined, and this examination is to be supplemented by thickness measurements to ensure that structural integrity remains effective. The aim of the examination is to discover substantial corrosion, significant deformation, fractures, damages or other structural deterioration that may be present.

2.6.2.2 Examination of cargo and ballast piping

Cargo piping on deck and cargo and ballast piping within the above tanks and spaces are to be examined and operationally tested to working pressure to attending surveyor's satisfaction to ensure that tightness

and condition remain satisfactory. Special attention is to be given to any ballast piping in cargo tanks and cargo piping in ballast tanks and void spaces, and surveyors are to be advised on all occasions when this piping, including valves and fittings are open during repair periods and can be examined internally.

2.6.2.3 Dry dock survey

A survey in dry dock is to be a part of the class renewal survey. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo tanks and ballast tanks are to be carried out in accordance with the applicable requirements for class renewal surveys, if not already performed.

Note:

Lower portions of the cargo and ballast tanks are considered to be the parts below light ballast water line.

2.6.2.4 Examination of tank protection

Where provided, the condition of the corrosion prevention system of cargo tanks is to be examined. A Ballast Tank is to be examined at subsequent annual intervals where:

- Hard protective coating has not been applied from the time of construction, or
- A soft or semi-hard coating has been applied, or
- Substantial corrosion is found within the tank, or
- The hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the Surveyor.

Thickness measurements are to be carried out as deemed necessary by the surveyor.

Table 3.15 Minimum requirements for close-up survey at hull class renewal surveys of oil tankers ore/oil ships and etc.

Class renewal survey No.1 Age ≤ 5	Class renewal survey No.2 5 < Age ≤ 10	Class renewal survey No.3 10 < Age ≤ 15	Class renewal survey No.4 and subsequent 15 < Age
<p>(A) One web frame ring in a ballast wing tank, if any, or a cargo wing tank used primarily for water ballast.</p> <p>(B) One deck transverse in a cargo oil tank.</p> <p>(D) One transverse bulkhead in a ballast tank</p> <p>(D) One transverse bulkhead in a cargo oil wing tank.</p> <p>(D) One transverse bulkhead in a cargo oil centre tank.</p>	<p>(A) All web frame rings in a ballast wing tank, if any, or a cargo wing tank used primarily for water ballast.</p> <p>(B) One deck transverse in each of the remaining ballast tanks, if any.</p> <p>(B) One deck transverse in a cargo wing tank.</p> <p>(B) One deck transverse in two cargo centre tanks.</p> <p>(C) Both transverse bulkheads in a wing ballast tank, if any, or a cargo wing tank used primarily for water ballast.</p> <p>(D) One transverse bulkhead in each remaining ballast tank.</p> <p>(D) One transverse bulkhead in a cargo oil wing tank.</p> <p>(D) One transverse bulkhead in two cargo centre tanks.</p>	<p>(A) All web frame rings in all ballast tanks</p> <p>(A) All web frame ring in a cargo wing tank.</p> <p>(A) A minimum of 30% of all web frame rings in each remaining cargo wing tank (see note).</p> <p>(C) All transverse bulkheads in all cargo and ballast tanks.</p> <p>(E) A minimum of 30% of deck and bottom transverses including adjacent structural members in each cargo centre tank.</p> <p>(F) As considered necessary by the surveyor.</p>	<p>As class renewal survey No. 3.</p> <p>Additional transverses included as deemed necessary by TL.</p>
<p>(A) Complete transverse web frame ring including adjacent structural members.</p> <p>(B) Deck transverse including adjacent deck structural members.</p> <p>(C) Transverse bulkhead complete – including girder system and adjacent structural members</p> <p>(D) Transverse bulkhead lower part – including girder system and adjacent structural members</p> <p>(E) Deck and bottom transverse including adjacent structural members.</p> <p>(F) Additional complete transverse web frame ring.</p>			
<p><i>Note :</i> The 30% is to be rounded up to the next whole integer.</p>			

Table 3.16 Minimum requirements for close-up survey at hull class renewal surveys of double hull oil tankers

Class renewal survey No.1 Age ≤ 5	Class renewal survey No.2 5 < Age ≤ 10	Class renewal survey No.3 10 < Age ≤ 15	Class renewal survey No.4 and subsequent 15 < Age
One web frame (1), in a ballast tank (see note 1).	All web frames (1), in a ballast tank, (see note 1). The knuckle area and the upper part (5 metres approximately) of one web frame in each remaining ballast tank (6).	All web frames (1), in all ballast tanks.	As for class renewal survey for age from 10 to 15 years. Additional transverse areas as deemed necessary by TL.
One deck transverse in a cargo oil tank (2).	One deck transverse in two cargo oil tanks (2).	All web frames (7), including deck transverse and cross ties, if fitted, in a cargo oil tank. One web frame (7), including deck transverse and cross ties, if fitted, in each remaining cargo oil tank.	
One transverse bulkhead (4), in a ballast tank (see note 1)	One transverse bulkhead (4), in each ballast tank (see note 1)	All transverse bulkheads, in all cargo oil (3) and ballast (4) tanks.	
One transverse bulkhead (5), in a cargo oil centre tank.	One transverse bulkhead (5), in two cargo oil centre tanks.		
One transverse bulkhead (5), in a cargo oil wing tank (see note 2).	One transverse bulkhead (5), in a cargo oil wing tank (see note 2).		
<p>(1), (2), (3), (4), (5), (6) and (7) are areas to be subjected to close-up surveys and thickness measurements.</p> <p>(1) Web frame in a ballast tank means vertical web in side tank, hopper web in hopper tank, floor in double bottom tank and deck transverse in double deck tank (where fitted), including adjacent structural members. In fore and aft peak tanks web frame means a complete transverse web frame ring including adjacent structural members.</p> <p>(2) Deck transverse, including adjacent deck structural members (or external structure on deck in way of the tank, where applicable)</p> <p>(3) Transverse bulkhead complete in cargo tanks, including girder system, adjacent structural members (such as longitudinal bulkheads) and internal structure of lower and upper stools, where fitted.</p> <p>(4) Transverse bulkhead complete in ballast tanks, including girder system and adjacent structural members, such as longitudinal bulkheads, girders in double bottom tanks, inner bottom plating, hopper side, connecting brackets.</p> <p>(5) Transverse bulkhead lower part in cargo tank, including girder system, adjacent structural members (such as longitudinal bulkheads) and internal structure of lower stool, where fitted.</p> <p>(6) The knuckle area and the upper part (5 metres approximately), including adjacent structural members. Knuckle area is the area of the web frame around the connections of the slope hopper plating to the inner hull bulkhead and the inner bottom plating, up to 2 metres from the corners both on the bulkhead and the double bottom.</p> <p>(7) Web frame in a cargo oil tank means deck transverse, longitudinal bulkhead vertical girder and cross ties, where fitted, including adjacent structural members.</p> <p>Note:</p> <p>1. Ballast tank: means double bottom tank plus double side tank plus double deck tank, as applicable, even if these tanks are separate.</p> <p>2. Where no centre cargo tanks are fitted (as in case of centre longitudinal bulkhead), transverse bulkheads in wing tanks are to be surveyed.</p>			

Table 3.17 Minimum requirements for the thickness measurements at hull class renewal surveys of oil tankers, ore/oil ships, and etc.

Class renewal survey No.1 Age ≤ 5	Class renewal survey No.2 5 < Age ≤ 10	Class renewal survey No.3 10 < Age ≤ 15	Class renewal survey No.4 and subsequent 15 < Age
Suspect areas.	Suspect areas.	Suspect areas.	Suspect areas.
One section of deck plating for the full beam of the ship within the cargo area (in way of a ballast tank, if any, or a cargo tank used primarily for water ballast)	Within the cargo area: - Each deck plate - One transverse section	Within the cargo area: - Each deck plate - Two transverse sections (1) - All wind and water strakes.	Within the cargo area: - Each deck plate - Three transverse sections (1) - Each bottom plate.
	Selected wind and water strakes outside the cargo area.	Selected wind and water strakes outside the cargo area.	All wind and water strakes, full length.
Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.15.	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.15.	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.15.	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.15.
(1) At least one section is to include a ballast tank within 0.5 amidships.			

Table 3.18 Minimum requirements for the thickness measurements at hull class renewal surveys of double hull oil tankers

Class renewal survey No.1 Age ≤ 5	Class renewal survey No.2 5 < Age ≤ 10	Class renewal survey No.3 10 < Age ≤ 15	Class renewal survey No.4 and subsequent 15 < Age
Suspect areas.	Suspect areas.	Suspect areas.	Suspect areas.
One section of deck plating for the full beam of the ship within the cargo area	Within the cargo area: - Each deck plate - One transverse section	Within the cargo area: - Each deck plate - Two transverse sections (1) - All wind and water strakes.	Within the cargo area: - Each deck plate - Three transverse sections (1) - Each bottom plate.
	Selected wind and water strakes outside the cargo area.	Selected wind and water strakes outside the cargo area.	All wind and water strakes, full length.
Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.16.	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.16.	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.16.	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.16.
(1) At least one section is to include a ballast tank within 0.5 amidships.			

**Table 3.19 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of oil tankers, ore/oil ships, and etc.within the cargo length area**

**Sheet 1
BOTTOM STRUCTURE**

Structural member	Extent of measurement	Pattern of measurements
Bottom plating	Minimum of three bays across tank, including aft bay Measurements around and under all suction bell mouths.	Five point pattern for each panel between longitudinals and webs.
Bottom longitudinals	Minimum of three longitudinals in each bay where bottom plating measured.	Three measurements in line across the flange and three measurements on vertically web.
Bottom girders and brackets	At fore and aft transverse bulkhead, bracket toes and in centre of tanks.	Vertical line of single measurements on web plating with one measurement between each panel stiffener, or a minimum of three measurements. Two measurements across face plate. Five point pattern on girder/bhd. brackets.
Bottom transverse webs	Three webs in the bays where bottom plating measured, with measurements at both ends and middle.	Five point pattern over 2 m ² area. Single measurements on face flat.
Panel stiffening	Where provided	Single measurements

**Table 3.19 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of oil tankers, ore/oil ships, and etc.within the cargo length area**

**Sheet 2
DECK STRUCTURE**

Structural member	Extent of measurement	Pattern of measurements
Deck plating	Two bands across tank	Minimum of three measurements per plate per band
Deck longitudinals	Minimum of three longitudinals in each of two bays	Three measurements in line vertically on webs and two measurements on flange (if fitted)
Deck girders and brackets	At fore and aft transverse bulkhead, bracket toes and in centre of tanks.	Vertical line of single measurements on web plating with one measurement between each panel stiffener, or a minimum of three measurements. Two measurements across face flat. Five point pattern on girder/bhd. brackets.
Deck transverse web	Minimum of two webs with measurements at middle and both ends of span.	Five point pattern over 2 m ² area. Single measurements on face flat.
Panel stiffening	Where provided	Single measurements

Table 3.19 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of oil tankers, ore/oil ships, and etc.within the cargo length area
Sheet 3

SIDE SHELL AND LONGITUDINAL BULKHEADS

Structural member	Extent of measurement	Pattern of measurements
Deckhead and bottom strakes, and strakes in way of stringer platforms	Plating between each pair of longitudinals in a minimum of three bays	Single measurements
All other strakes	Plating between every 3 rd pair of longitudinals in same three bays	Single measurements
Longitudinals - deckhead and bottom strakes	Each longitudinal in same three bays	Three measurements across web and 1 measurement on flange
Longitudinals - all others	Every third longitudinal in same three bays	Three measurements across web and 1 measurement on flange
Longitudinals - bracket	Minimum of three at top, middle and bottom of tank in same three bays	Five point pattern over area of bracket
Web frames and cross ties	Three webs with minimum of three locations on each web, including in way of cross tie connections	Five point pattern over about 2 m ² area, plus single measurements on web frame and cross tie face flats.

Table 3.19 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of oil tankers, ore/oil ships, and etc.within the cargo length area

Sheet 4

TRANSVERSE BULKHEADS AND SWASH BULKHEADS

Structural member	Extent of measurement	Pattern of measurements
Deckhead and bottom strakes, and strakes in way of stringer platforms	Plating between pair of stiffeners at three locations- approx. ¼, ½ and ¾ width of tank	Five point pattern between stiffeners over 1 m length
All other strakes	Plating between pair of stiffeners at middle location	Single measurements
Strakes in corrugated bulkheads	Plating for each change of scantling at centre of panel and at flange or fabricated connection	Five point pattern over about 1 m ² of plating
Stiffeners	Minimum of three typical stiffeners	For web, five point pattern over span between bracket connections (Two measurements across web at each bracket connection, and one at centre of span). For flange, single measurements at bracket toe and at centre of span
Brackets	Minimum of three at top, middle and bottom of tank	Five point pattern over areas of bracket
Deep webs and girders	Measurements at toe of bracket and at centre of span	For web, five point pattern over abt. 1 m ² . Three measurements across face flat.
Stringer platforms	All stringers with measurements at both ends and middle	Five point pattern over 1 m ² of area plus single measurements near bracket toes and on face flats

**Table 3.20 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of double hull oil tankers within the cargo length area**

Sheet 1

BOTTOM, INNER BOTTOM AND HOPPER STRUCTURE

Structural member	Extent of measurement	Pattern of measurements
Bottom, inner bottom and hopper structure plating	Minimum of three bays across double bottom tank, including aft bay Measurements around and under all suction bell mouths.	Five point pattern for each panel between longitudinals and floors.
Bottom, inner bottom and hopper structure longitudinals	Minimum of three longitudinals in each bay where bottom plating measured.	Three measurements in line across the flange and three measurements on vertical web.
Bottom girders, including the watertight ones	At fore and aft watertight floors and in centre of tanks.	Vertical line of single measurements on girder plating with one measurement between each panel stiffener, or a minimum of three measurements.
Bottom floors, including the watertight ones	Three floors in the bays where bottom plating measured, with measurements at both ends and middle.	Five point pattern over 2 m ² area.
Hopper structure web frame ring	Three floors in bays where bottom plating measured	Five point pattern over 1 m ² of plating. Single measurements on flange.
Hopper structure transverse watertight bulkhead or swash bulkhead	- lower 1/3 of bulkhead	Five point pattern over 1 m ² of plating.
	- upper 2/3 of bulkhead	Five point pattern over 2 m ² of plating.
	- stiffeners (minimum of three)	For web, five point pattern over span (two measurements across web at each end and one at centre of span). For flange, single measurements at each end and centre of span.
Panel stiffening	Where applicable	Single measurements

**Table 3.20 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of double hull oil tankers within the cargo length area**

Sheet 2

DECK STRUCTURE

Structural member	Extent of measurement	Pattern of measurements
Deck plating	Two transverse bands across tank	Minimum of three measurements per plate per band
Deck longitudinals	Every third longitudinal in each of two bands with a minimum of one longitudinal	Three measurements in line vertically on webs and two measurements on flange (if fitted)
Deck girders and brackets (usually in cargo tanks only)	At fore and aft transverse bulkhead, bracket toes and in centre of tanks.	Vertical line of single measurements on web plating with one measurement between each panel stiffener, or a minimum of three measurements. Two measurements across flange. Five point pattern on girder/bhd. brackets.
Deck transverse webs	Minimum of two webs with measurements at middle and both ends of span.	Five point pattern over 1 m ² area. Single measurements on flange.
Vertical web and transverse bulkhead in wing ballast tank (two metres from deck)	Minimum of two webs, and both transverse bulkheads	Five point pattern over 1 m ² area.
Panel stiffening	Where applicable.	Single measurements

**Table 3.20 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of double hull oil tankers within the cargo length area**

Sheet 3

STRUCTURE IN WING BALLAST TANKS

Structural member	Extent of measurement	Pattern of measurements
Side shell and longitudinal bulkhead plating: - Upper strake and strakes in way horizontal girders - All other strakes	- Plating between each pair of longitudinals in a minimum of three bays (along the tank). - Plating between every third pair of longitudinals in same three bays.	- Single measurements - Single measurements
Side shell and longitudinal bulkhead longitudinals on: - Upper strake and strakes in way horizontal girders - All other strakes	- Each longitudinal in same three bays - Every third longitudinal in same three bays	- Three measurements across web and one measurements on flange - Three measurements across web and one measurements on flange
Longitudinals - brackets	Minimum of three at top, middle and bottom of tank in same three bays.	Five point pattern over area of bracket.
Vertical web and transverse bulkhead (excluding deckhead area) - Strakes in way horizontal girders - Other strakes	- Minimum of two webs and both transverse bulkheads - Minimum of two webs and both transverse bulkheads	- Five point pattern over approx. 2 m ² area. - Two measurements between each pair of vertical stiffeners
Horizontal girders	Plating on each girder in a minimum of three bays	Two measurements between each pair of longitudinal girder stiffeners
Panel stiffening	Where applicable.	Single measurements

**Table 3.20 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of double hull oil tankers within the cargo length area**

**Sheet 4
LONGITUDINAL BULKHEADS IN CARGO TANKS**

Structural member	Extent of measurement	Pattern of measurements
Deckhead and bottom strakes, and strakes in way of the horizontal stringers of transverse bulkheads	Plating between each pair of longitudinals in a minimum of three bays	Single measurements
All other strakes	Plating between every third pair of longitudinals in same three bays	Single measurements
Longitudinals on deckhead and bottom strakes	Each longitudinal in the same three bays	Three measurements across web and one measurement on flange
All other longitudinals	Every third longitudinal in same three bays	Three measurements across web and one measurement on flange
Longitudinals - brackets	Minimum of three at top, middle and bottom of tank in same three bays	Five point pattern over area of bracket
Web frames and cross ties	Three webs with minimum of three locations on each web, including in way of cross tie connections	Five point pattern over abt. 2 m ² area of webs plus single measurements on flanges of web frame and cross tie.
Lower end brackets (opposite side of web frame)	Minimum of three brackets	Five point pattern over abt. 2 m ² area of brackets plus single measurements on bracket flanges

**Table 3.20 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of double hull oil tankers within the cargo length area**

Sheet 5

TRANSVERSE WATERTIGHT AND SWASH BULKHEADS IN CARGO TANKS

Structural member	Extent of measurement	Pattern of measurements
Upper and lower stool, where fitted	<ul style="list-style-type: none"> - Transverse band within 25 mm of welded connection to inner bottom/deck plating - Transverse band within 25 mm of welded connection to shelf plate 	Five point pattern between stiffeners over 1 m length
Deckhead and bottom strakes, and strakes in way of horizontal stringers	Plating between pair of stiffeners at three locations: approx. 1/4, 1/2 and 3/4 width of tank	Five point pattern between stiffeners over 1 m length
All other strakes	Plating between pair of stiffeners at middle location	Single measurements
Strakes in corrugated bulkheads	Plating of each change of scantling at centre of panel and at flange of fabricated connection	Five point pattern over abt. 1 m ² of plating
Stiffeners	Minimum of three typical stiffeners	For web, five point pattern over span between bracket connections (two measurements across web at each bracket connection and one at centre of span). For flange, single measurements at each bracket toe and at centre of span
Brackets	Minimum of three at top, middle and bottom of tank	Five point pattern over area of bracket
Horizontal stringers	All stringers with measurements at both ends and middle	Five point pattern over 1 m ² of area plus single measurements near bracket toes and on flanges

Table 3.21 Minimum requirements to tank testing at class renewal survey of oil and chemical tankers

Class renewal survey No. 1 Age ≤ 5	Class renewal survey No. 2 and subsequent Age > 5
All ballast tank boundaries	All ballast tank boundaries
Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, pump rooms or cofferdams	All cargo tank bulkheads

2.6.2.5 Extent of overall and close-up survey

- An overall survey of all tanks and spaces is to be carried out at each class renewal survey.
- The minimum requirements for close-up surveys at class renewal survey are given in Table 3.22. The survey of stainless steel tanks may be carried out as an overall survey supplemented by close-up survey as deemed necessary by the surveyor.
- The surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and also in the following cases:
 - In particular, tanks having structural arrangements or details which have suffered defects in similar tanks or on similar ships according to available information.

In tanks which have structures approved with reduced scantlings due to an approved corrosion control system.

- For areas in tanks where hard protective coating are found to be in a good condition, the extent of close-up surveys according to Table 3.22 may be specially considered.

2.6.2.6 Extent of thickness measurement

- The minimum requirements for thickness measurements at class renewal survey are given in Table 3.23. Thickness measurement of stainless steel hull structure and piping may be waived, except for clad steel plating.
- Provisions for extended measurements for areas with substantial corrosion are given in Table 3.24 and as may be additionally specified in the survey programme. These extended thickness measurements are to be carried out before the

survey is credited as completed. Suspect areas identified at previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys are to have thickness measurements taken.

- The surveyor may further extend the thickness measurements as deemed necessary.
- For areas in tanks where hard protective coating are found to be in a good condition, the extent of thickness measurements according to Table 3.23 may be specially considered.
- Transverse sections are to be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements.
- In cases where two or three sections are to be measured, at least one is to include a ballast tank within 0.5L amidships.

2.6.2.7 Extent of tank testing

2.6.2.7.1 The minimum requirements for ballast tank testing at class renewal survey are given in 2.6.1.8.3 and Table 3.21. The minimum requirements for cargo tank testing at class renewal survey are given in 2.6.1.8.4 and Table 3.21. Cargo tank testing carried out by the vessel's crew under the direction of the Master may be accepted by the surveyor provided the following conditions are complied with:

- tank testing procedure specifying fill heights, tanks being filled and bulkheads being tested, has been submitted by the owner and reviewed by **TL** prior to the testing being carried out;
- there is no record of leakage, distortion or substantial corrosion that would affect the structural integrity of the tank;
- the tank testing has been satisfactorily carried out within class renewal survey window not more

than 3 months prior to the date of the survey on which the overall or close up survey is completed;

- the satisfactory results of the testing is recorded in the vessel's logbook;
- the internal and external condition of the tanks and associated structure are found satisfactory by the surveyor at the time of the overall and close up survey.

2.6.2.7.2 The surveyor may extend the tank testing as deemed necessary.

2.6.2.7.3 Boundaries of ballast tanks are to be tested with a head of liquid to the top of air pipes.

2.6.2.7.4 Boundaries of cargo tanks are to be tested to the highest point that liquid will rise under service conditions.

2.6.2.7.5 The testing of double bottom tanks and other spaces not designed for the carriage of liquid may be omitted, provided a satisfactory internal examination together with an examination of the tank top is carried out

2.6.2.8 Chemical tankers over 10 years of age

Selected steel cargo pipes outside cargo tanks and ballast pipes passing through cargo tanks are to be:

- Thickness measured at random or selected pipe lengths to be opened for internal inspection,
- Pressure tested to the maximum working pressure.

Special attention is to be given to cargo/slop discharge piping through ballast tanks and void spaces.

2.7 Liquefied gas tankers -additional requirements-

2.7.1 General

In addition to requirements listed in B.3.7 and C.4.3 the following additions are to be applied.

Ballast tanks, including double bottom tanks, pump rooms, compress rooms, pipe tunnels, cofferdams and void spaces bounding cargo tanks, decks and outer hull are to be examined, and this examination is to be supplemented by thickness measurements to ensure that structural integrity remains effective. The aim of the examination is to discover substantial corrosion, significant deformation, fractures, damages or other structural deterioration that may be present.

All piping systems within the above spaces, except those covered by 3.3 (see also UR Z 16), are to be examined and operationally tested to working pressure to attending surveyor's satisfaction to ensure that tightness and condition remain satisfactory.

2.7.2 Cargo containment survey

2.7.2.1 All cargo tanks are to be examined internally.

2.7.2.2 Special attention is to be given to the cargo tank and insulation in way of chocks, supports and keys. Removal of insulation may be required in order to verify the condition of the tank or the insulation itself if found necessary by the Surveyor.

Where the arrangement is such that the insulation cannot be examined, the surrounding structures of wing tanks, double bottom tanks and cofferdams are to be examined for cold spots when the cargo tanks are in the cold condition unless voyage records together with the instrumentation give sufficient evidence of the integrity of the insulation system.

2.7.2.3 Non-destructive testing:

Table 3.22 Minimum requirements for close-up survey at hull class renewal surveys of chemical tankers

Sheet 1

Class renewal survey No.1 Age < 5	Class renewal survey No.2 5 < Age < 10	Class renewal survey No.3 10 < Age < 15	Class renewal survey No.4 and subsequent Age > 15
<p>(A) One web frame ring in a ballast wing tank,</p> <p>(B) One deck transverse in a cargo oil tank.</p> <p>(D) One transverse bulkhead lower part in a ballast tank</p> <p>(D) One transverse bulkhead lower part in a cargo oil wing tank.</p> <p>(D) One transverse bulkhead lower part in a cargo centre tank. (see note 2)</p>	<p>(A) All web frame rings in a ballast wing tank, or double bottom ballast tank (see note 1)</p> <p>(B) One deck transverse in each remaining ballast tank or on deck</p> <p>(B) One deck transverse in a cargo wing tank.</p> <p>(B) One deck transverse in a cargo centre tanks or on deck</p> <p>(C) Both transverse bulkheads in a ballast wing tank</p> <p>(D) One transverse bulkhead lower part in each remaining ballast tank</p> <p>(D) One transverse bulkhead lower part in two cargo centre tanks (see note 2)</p> <p>(D) One transverse bulkhead lower part in a cargo wing tank</p>	<p>(A) All web frame rings in all ballast tanks</p> <p>(A) All web frame rings in a cargo wing tank.</p> <p>(A) One web frame ring in each remaining cargo tank</p> <p>(C) All transverse bulkheads in all cargo tanks.</p> <p>(C) All transverse bulkheads in all ballast tanks</p>	<p>As class renewal survey No. 3.</p> <p>Additional transverses areas as deemed necessary</p>
<p>A-D: are areas to be subjected to close-up surveys and thickness measurements</p> <p>(A) Complete transverse web frame ring including adjacent structural members.</p> <p>(B) Deck transverse including adjacent deck structural members.</p> <p>(C) (Transverse bulkhead complete - including girder system and adjacent structural members.</p> <p>(D) Transverse bulkhead lower part - including girder system and adjacent structural members.</p> <p>Note:</p> <p>1. Ballast double hull tank: means double bottom tank plus double side tank plus double deck tank, as applicable, even if these tanks are separate.</p> <p>2. Where no centre cargo tanks are fitted (as in case of centre longitudinal bulkhead), transverse bulkheads in wing tanks are to be surveyed.</p>			

Table 3.22 Minimum requirements for close-up survey at hull class renewal surveys of chemical tankers

Sheet 2

Class renewal survey No.1 Age < 5	Class renewal survey No.2 5 < Age < 10	Class renewal survey No.3 10 < Age < 15	Class renewal survey No.4 and subsequent Age > 15
(1) One web frame ring in a ballast double hull tank (see note 1) tank	(1) All web frame rings in a ballast wing tank or ballast double hull tank (see note 1)	(1) All web frame rings in all ballast tanks	As class renewal survey No. 3.
(2) One deck transverse in a cargo tank or on deck	(6) The knuckle area and the upper part (3 metres approx) of one web frame in each remaining ballast tank	(7) All web frame rings in a cargo wing tank.	Additional transverses areas as deemed necessary
(4) One transverse bulkhead in a ballast tank (see note 1)		(7) One web frame ring in each remaining cargo tank	
(5) One transverse bulkhead in a cargo wing tank	(2) One deck transverse in two cargo tanks	(3) All transverse bulkheads in all cargo tanks	
(5) One transverse bulkhead in a cargo centre tank (see note 2)	(4) One transverse bulkhead in a each ballast tank (see note 1)	(4) All transverse bulkheads in all ballast tanks	
	(5) One transverse bulkhead in two cargo centre tanks (see note 2)		
	(5) One transverse bulkhead in a cargo win tank		
<p>(1), (2), (3), (4), (5), (6) and (7) are areas to be subjected to close-up surveys and thickness measurements.</p> <p>(1) Web frame in a ballast tank means vertical web in side tank, hopper web in hopper tank, floor in double bottom tank and deck transverse in double deck tank (where fitted), including adjacent structural members. In fore and aft peak tanks web frame means a complete transverse web frame ring including adjacent structural members.</p> <p>(2) Deck transverse, including adjacent deck structural members (or external structure on deck in way of the tank, where applicable).</p> <p>(3) Transverse bulkhead complete in cargo tanks, including girder system, adjacent structural members (such as longitudinal bulkheads) and internal structure of lower and upper stools, where fitted.</p> <p>(4) Transverse bulkhead complete in ballast tanks, including girder system and adjacent structural members, such as longitudinal bulkheads, girders in double bottom tanks, inner bottom plating, hopper side, connecting brackets.</p> <p>(5) Transverse bulkhead lower part in cargo tank, including girder system, adjacent structural members (such as longitudinal bulkheads) and internal structure of lower stool, where fitted.</p> <p>(6) The knuckle area and the upper part (3 metres approximately), including adjacent structural members. Knuckle area is the area of the web frame around the connections of the slope hopper plating to the inner hull bulkhead and the inner bottom plating, up to 2 metres from the corners both on the bulkhead and the double bottom.</p> <p>(7) Web frame in a cargo tank means deck transverse, longitudinal bulkhead vertical girder and cross ties, where fitted, including adjacent structural members.</p> <p>Note:</p> <p>1. Ballast double hull tank: means double bottom tank plus double side tank plus double deck tank, as applicable, even if these tanks are separate.</p> <p>2. Where no centre cargo tanks are fitted (as in the case of centre longitudinal bulkhead), transverse bulkheads in wing tanks are to be surveyed.</p>			

Table 3.23 Minimum requirements for the thickness measurements at hull class renewal surveys of chemical tankers

Class renewal survey No.1 Age ≤ 5	Class renewal survey No.2 5 < Age ≤ 10	Class renewal survey No.3 10 < Age ≤ 15	Class renewal survey No.4 and subsequent 15 < Age
Suspect areas.	Suspect areas.	Suspect areas.	Suspect areas.
One section of deck plating for the full beam of the ship within the cargo area (in way of a ballast tank, if any, or a cargo tank used primarily for water ballast)	Within the cargo area: - Each deck plate - One transverse section	Within the cargo area: - Each deck plate - Two transverse sections (1) - All wind and water strakes.	Within the cargo area: - Each deck plate - Three transverse sections (1) - Each bottom plate.
	Selected wind and water strakes outside the cargo area.	Selected wind and water strakes outside the cargo area.	All wind and water strakes, full length.
Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.22, Sheet 1 or Sheet 2, as applicable.	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.22, Sheet 1 or Sheet 2, as applicable.	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.22, Sheet 1 or Sheet 2, as applicable.	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.22, Sheet 1 or Sheet 2, as applicable.
(1) At least one section is to include a ballast tank within 0.5 L amidships.			

**Table 3.24 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of chemical tankers within the cargo length area**

Sheet 1

BOTTOM, INNER BOTTOM AND HOPPER STRUCTURE

Structural member	Extent of measurement	Pattern of measurements
Bottom, inner bottom and hopper structure plating	Minimum of three bays across tank, including aft bay Measurements around and under all suction bell mouths.	Five point pattern for each panel between longitudinals and floors.
Bottom, inner bottom and hopper structure longitudinals	Minimum of three longitudinals in each bay where bottom plating measured.	Three measurements in line across the flange and three measurements on vertical web.
Bottom girders, including the watertight ones	At fore and aft watertight floors and in centre of tanks.	Vertical line of single measurements on girder plating with one measurement between each panel stiffener, or a minimum of three measurements. Two measurements across face flat where fitted.
Bottom floors, including the watertight ones	Three floors in the bays where bottom plating measured, with measurements at both ends and middle.	Five point pattern over 2 m ² area.
Hopper structure web frame ring	Three floors in bays where bottom plating measured	Five point pattern over 1 m ² of plating. Single measurements on flange.
Hopper structure transverse watertight bulkhead or swash bulkhead	- lower 1/3 of bulkhead	Five point pattern over 1 m ² of plating.
	- upper 2/3 of bulkhead	Five point pattern over 2 m ² of plating.
	- stiffeners (minimum of three)	For web, five point pattern over span (two measurements across web at each end and one at centre of span). For flange, single measurements at each end and centre of span.
Panel stiffening	Where applicable	Single measurements

**Table 3.24 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of chemical tankers within the cargo length area**

Sheet 2

DECK STRUCTURE

Structural member	Extent of measurement	Pattern of measurements
Deck plating	Two transverse bands across tank	Minimum of three measurements per plate per band
Deck longitudinals	Every third longitudinal in each of two bands with a minimum of one longitudinal	Three measurements in line vertically on webs and two measurements on flange (if fitted)
Deck girders and brackets	At fore and aft transverse bulkhead, bracket toes and in centre of tanks.	Vertical line of single measurements on web plating with one measurement between each panel stiffener, or a minimum of three measurements. Two measurements across flange. Five point pattern on girder/bhd. brackets.
Deck transverse webs	Minimum of two webs with measurements at middle and both ends of span.	Five point pattern over 1 m ² area. Single measurements on flange.
Vertical web and transverse bulkhead in wing ballast tank for double hull design (two metres from deck)	Minimum of two webs, and both transverse bulkheads	Five point pattern over 1 m ² area.
Panel stiffening	Where applicable.	Single measurements

**Table 3.24 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of chemical tankers within the cargo length area**

Sheet 3

SIDE SHELL AND LONGITUDINAL BULKHEADS

Structural member	Extent of measurement	Pattern of measurements
Side shell and longitudinal bulkhead plating: - Deckhead and bottom strakes, and strakes in way horizontal girders - All other strakes	- Plating between each pair of longitudinals in a minimum of three bays (along the tank). - Plating between every third pair of longitudinals in same three bays.	Single measurements
Side shell and longitudinal bulkhead longitudinals on: - Deckhead and bottom strakes - All other strakes	- Each longitudinal in same three bays - Every third longitudinal in same three bays	Three measurements across web and one measurements on flange
Longitudinals - brackets	Minimum of three at top, middle and bottom of tank in same three bays.	Five point pattern over area of bracket.
Vertical web and transverse bulkheads of double side tanks (excluding deck area) - Strakes in way horizontal girders - Other strakes	- Minimum of two webs and both transverse bulkheads - Minimum of two webs and both transverse bulkheads	- Five point pattern over approx. 2 m ² area. - Two measurements between each pair of vertical stiffeners
Web frames and cross ties for other tanks than double side tanks	Three webs with minimum of three locations on each web, including in way of cross tie connections and lower end brackets	Five point pattern over approx. 2 m ² areas of webs, plus single measurements on flanges of web frame and cross tie.
Horizontal girders	Plating on each girder in a minimum of three bays	Two measurements between each pair of longitudinal girder stiffeners
Panel stiffening	Where applicable.	Single measurements

**Table 3.24 Requirements for extent of thickness measurement at those areas of substantial corrosion
Class renewal survey of chemical tankers within the cargo length area**

Sheet 4

TRANSVERSE WATERTIGHT AND SWASH BULKHEADS

Structural member	Extent of measurement	Pattern of measurements
Upper and lower stool, where fitted	<ul style="list-style-type: none"> - Transverse band within 25 mm. of welded connection to inner bottom/deck plating - Transverse band within 25 mm. of welded connection to shelf plate 	Five point pattern between stiffeners over 1 m. length
Deckhead and bottom strakes, and strakes in way of horizontal stringers	Plating between pair of stiffeners at three locations: approx. ¼, ½ and ¾ width of tank	Five point pattern between stiffeners over 1 m. length
All other strakes	Plating between pair of stiffeners at middle location	Single measurements
Strakes in corrugated bulkheads	Plating of each change of scantling at centre of panel and at flange of fabricated connection	Five point pattern over abt. 1 m ² of plating
Stiffeners	Minimum of three typical stiffeners	<p>For web, five point pattern over span between bracket connections (two measurements across web at each bracket connection and one at centre of span).</p> <p>For flange, single measurements at each bracket toe and at centre of span</p>
Brackets	Minimum of three at top, middle and bottom of tank	Five point pattern over area of bracket
Horizontal stringers	All stringers with measurements at both ends and middle	Five point pattern over 1 m ² of area plus single measurements near bracket toes and on flanges
Deep webs and girders	Measurements at toe of bracket and at centre of span	For web, five point pattern over abt. 1 m ² . Three measurements across face flat.

2.7.2.3.1 Non-destructive testing is to supplement cargo tank inspection with special attention to be given to the integrity of the main structural members, tank shell and highly stressed parts, including welded connections as deemed necessary by the surveyor. However, for type C tanks, this does not mean that non-destructive testing can be dispensed with totally. The following items are, inter alia, considered as highly stressed parts:

- Cargo tanks supports and anti-rolling/anti-pitching devices,
- Web frames or stiffening rings,
- Swash bulkhead boundaries,
- Dome and stump connections to tank shell,
- Foundations for pumps, towers, ladders, etc.,
- Pipe connections.

2.7.2.3.2 For independent tanks type B, the extent of non-destructive testing shall be as given in a programme specially prepared for the cargo tank design.

2.7.2.4 The tightness of all cargo tanks is to be verified by an appropriate procedure. Provided that the effectiveness of the ship's gas detection equipment has been confirmed, it will be acceptable to utilize this equipment for the tightness test of independent tanks below deck.

2.7.2.5 Where findings of 2.7.2.1 to 2.7.2.4 or an examination of the voyage records raises doubts as to the structural integrity of a cargo tank, a hydraulic or hydro-pneumatic test is to be carried out. For integral tanks and for independent tanks type A and B, the test pressure is to be in accordance with Chapter 10 - Liquefied Gas Tankers, 4.10.6 or 4.10.10 as appropriate. For independent tanks type C, the test pressure is not to be less than 1.25 times the MARVS (Maximum allowable relief valve setting).

2.7.2.6 At every other class renewal survey (i.e., 2nd, 4th, 6th, etc.), all independent cargo tanks type C are to be either:

2.7.2.6.1 Hydraulically or hydro-pneumatically tested to 1.25 times MARVS, followed by non-destructive testing in accordance with 2.7.2.3.1, or

2.7.2.6.2 Subjected to a thorough, planned non-destructive testing. This testing is to be carried out in accordance with a programme specially prepared for the tank design. If a special programme does not exist, the following applies:

- Cargo tank supports and anti-rolling/anti-pitching devices,
- Stiffening rings,
- Y-connections between tank shell and a longitudinal bulkhead of bilobe tanks,
- Swash bulkhead boundaries,
- Dome and sump connections to the tank shell,
- Foundations for pumps, towers, ladders etc.,
- Pipe connections.

At least 10% of the length of the welded connections in each of the above mentioned areas is to be tested. This testing is to be carried out internally and externally as applicable.

Insulation is to be removed as necessary for the required non-destructive testing.

2.7.2.7 As far as practicable all hold spaces and hull insulation (if provided), secondary barriers and tank supporting structures are to be visually examined. The secondary barrier of all tanks is to be checked for their effectiveness by means of a pressure/vacuum test, a visual examination or another acceptable method.

2.7.2.8 For membrane and semi-membrane tanks systems, inspection and testing are to be carried out in accordance with programmes specially prepared in accordance with an approved method for the actual tank system.

For membrane containment systems a tightness test of the primary and secondary barrier shall be carried out in accordance with the system designers' procedures and acceptance criteria as approved by the TL. Low differential pressure tests may be used for monitoring the cargo containment system performance, but are not considered an acceptable test for the tightness of the secondary barrier.

For membrane containment systems with glued secondary barriers if the designer's threshold values are exceeded, an investigation is to be carried out and additional testing such as thermographic or acoustic emissions testing should be carried out.

2.7.3 Dry dock survey

A survey in dry dock is to be a part of the class renewal survey. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo tanks and ballast tanks are to be carried out in accordance with the applicable requirements for class renewal surveys, if not already performed.

Note:

Lower portions of the ballast tanks are considered to be the parts below light ballast water line.

2.7.4 Examination of tank protection

2.7.4.1 Where provided, the condition of the corrosion prevention system of ballast tanks is to be examined. For tanks used for water ballast, excluding double bottom tanks, where a hard protective coating is found in poor condition and it is not renewed, where soft or semi-hard coating has been applied, or where a hard protective coating was not applied from time of construction, the tanks in question are to be examined at annual intervals. Thickness measurements are to be carried out as deemed necessary by the surveyor.

When such breakdown of hard protective coating is found in water ballast double bottom tanks and it is not renewed, where a soft or semi-hard coating has been applied, or where a hard protective coating was not applied from the time of construction, the tanks in question may be examined at annual intervals. When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurements are to be carried out.

2.7.4.2 Where the hard protective coating in ballast tanks is found to be in a good condition, the extent of close-up surveys and thickness measurements may be specially considered.

2.7.5 Extent of overall and close-up survey

- An overall survey of all tanks and spaces, excluding fuel oil, lub oil and fresh water tanks, is to be carried out at each class renewal survey.
- The minimum requirements for close-up surveys at class renewal survey are given in Table 3.25.
- The surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and where tanks have structural arrangements or details which have suffered defects in similar spaces or on similar ships according to available information.
- For areas in tanks where hard protective coatings are found to be a good condition, the extent of close-up surveys according to Table 3.25 may be specially considered.

2.7.6 Extent of thickness measurement

- The minimum requirements for thickness measurements at class renewal survey are given in Table 3.26.
- The surveyor may extend the thickness measurements as deemed necessary. When thickness measurements indicate substantial corrosion, the extent of thickness measurements

is to be increased to determine the extent of areas of substantial corrosion. Table 3.1 may be used as guidance for these additional thickness measurements.

- For areas in tanks where hard protective coatings are found to be in a good condition, the extent of thickness measurement according to Table 3.26 may be specially considered.
- Transverse sections are to be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements

2.7.7 Extent of tank testing

- All boundaries of water ballast tanks and deep tanks used for water ballast within the cargo area are to be pressure tested. For fuel oil tanks, the representative tanks are to be pressure tested.
- The surveyor may extend the tank testing as deemed necessary.
- Tank testing of fuel oil tanks is to be carried out with a head of liquid to the highest point that liquid will rise under service conditions. Tank testing of fuel oil tanks may be specially considered based on a satisfactory external examination of the tank boundaries, and a confirmation from the master stating that the pressure testing has been carried out according to the requirements with satisfactory results.

2.8 Survey Requirements for Shell and Inner Doors of Ro-Ro Ships

2.8.1 The Class Renewal Survey is to include, in addition to the requirements of the Annual Survey as required in B 3.8, examination, tests and checks of sufficient extent to verify that the bow, inner, side shell and stern doors, are in satisfactory condition and considered able to remain in compliance with applicable requirements, subject to proper maintenance and operation in accordance with the Operation and Maintenance Manual or manufacturer's recommendations and the periodical surveys being

carried out at the due dates for the five year period until the next Class Renewal Survey .

2.8.2 The examinations of the doors are to be supplemented by thickness measurements and testing to verify compliance with applicable requirements so that the structural and weathertight integrity remain effective. The aim of the examination is to identify corrosion, significant deformation, fractures, damages or other structural deterioration, that may be present.

2.8.3 The bow, inner, side shell and stern doors are to be surveyed as follows:

2.8.3.1 A survey of the items listed in 3.8.4, including close-up survey of securing, supporting and locking devices, together with welding, is to be carried out, for details refer to IACS UR Z 24.

2.8.3.2 Non-destructive testing and thickness measurements are to be carried out on securing, supporting and locking devices, including welding, to the extent considered necessary by the surveyor. Whenever a crack is found, an examination with NDT is to be carried out in the surrounding area and for similar items as considered necessary by the surveyor.

2.8.3.3 The maximum thickness diminution of hinging arms, securing, supporting and locking devices is to be treated according to the normal procedure of **TL** for primary structures, but is not to be more than 15% of the as-built thickness or the maximum corrosion allowance of **TL**, whichever is less. Certain designs may be subject to **TL**'s special consideration.

2.8.3.4 Checking the effectiveness of sealing arrangements by hose testing or equivalent is to be carried out.

2.8.3.5 Clearances of hinges, bearings and thrust bearings are to be taken. Unless otherwise specified in the OMM or by manufacturer's recommendation, the measurement of clearances on Ro-Ro cargo ships may be limited to representative bearings where dismantling is needed in order to measure the clearances. If dismantling is carried out, a visual examination of hinge pins and bearings together with NDT of the hinge pin is to be carried out.

Table 3.25 The minimum requirements for close-up survey at hull class renewal surveys of liquefied gas tankers

Class renewal survey No. 1 Age ≤ 5	Class renewal survey No. 2 5 < Age ≤ 10	Class renewal survey No. 3 and subsequent Age > 10
<p>One web frame in a representative ballast tank of the topside, hopper side and double hull side type (1)</p> <p>One transverse bulkhead in a ballast tank (3)</p>	<p>All web frames in a ballast tank, which is to be a double hull side tank or a topside tank. If such tanks are not fitted, another ballast tank is to be selected (1).</p> <p>One web frame in each remaining ballast tank (1).</p> <p>One transverse bulkhead in each ballast tank (2).</p>	<p>All web frames in all ballast tanks (1).</p> <p>All transverse bulkheads in all ballast tanks (2).</p>
<p>(1) Complete transverse web frame including adjacent structural members.</p> <p>(2) Transverse bulkhead complete, including girder system and adjacent members, and adjacent longitudinal bulkhead structure.</p> <p>(3) Transverse bulkhead lower part including girder system and adjacent structural members.</p> <p><i>Note:</i></p> <p>1. Ballast tanks include topside, double hull side, double bottom, hopper side, or any combined arrangement of the aforementioned, and peak tanks where fitted.</p> <p>2. For areas in tanks where coatings are found to be in good condition, the extent of close-up surveys may be specially considered by TL.</p> <p>3. For ships having independent tanks of type C, with a midship section similar to that of a general cargo ship, the extent of close-up surveys may be specially considered by TL.</p> <p>4. The surveyor may extend the close-up surveys as deemed necessary, taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and also in the following cases:</p> <ul style="list-style-type: none"> - in particular, in tanks having structural arrangements or details which have suffered defects in similar tanks, or on similar ships according to available information. - in tanks having structures approved with reduced scantlings. 		

Table 3.26 Minimum requirements for the thickness measurements at hull class renewal surveys of liquefied gas tankers

Class renewal survey No.1 Age ≤ 5	Class renewal survey No.2 5 < Age ≤ 10	Class renewal survey No.3 10 < Age ≤ 15	Class renewal survey No.4 and subsequent 15 < Age
One section of deck plating for the full beam of the ship within 0.5 L amidships in way of a ballast tank, if any.	Within the cargo area: - Each deck plate - One transverse section within 0.5 L amidships in way of a ballast tank, if any	Within the cargo area: - Each deck plate - Two transverse sections (1) - All wind and water strakes.	Within the cargo area: - Each deck plate - Three transverse sections (1) - Each bottom plate. - Duct keel plating and internals
	Selected wind and water strakes outside the cargo area.	Selected wind and water strakes outside the cargo area.	All wind and water strakes, full length.
Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.25.	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.25.	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.25.	Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to Table 3.25.
Suspect areas.	Suspect areas.	Suspect areas.	Suspect areas.
<p>(1) At least one section is to include a ballast tank within 0.5L amidships, if any.</p> <p>Note:</p> <p>1. For ships having independent tanks of type C, with a midship section similar to that of a general cargo ship, the extent of thickness measurements may be increased to include the tank top plating at the discretion of the surveyor.</p> <p>2. For areas in spaces where coatings are found to be in good condition, the extent of thickness measurements may be specially considered by TL.</p> <p>3. The surveyor may extend the thickness measurements as deemed necessary. Where substantial corrosion is found, the extent of thickness measurements is to be increased to the satisfaction of the surveyor.</p>			

2.8.3.6 The non-return valves of the drainage system are to be dismantled and examined.

- Injection system, attached pumps and compressors, supercharges, suction and exhaust lines, charge air coolers, filters, starting, reversing and manoeuvring equipment.

3. Machinery and Systems

3.1 General (all ships)

3.1.1 The survey is to cover the following items:

- The propulsion system is to be inspected for the proper functioning of the following:
 - Intermediate shafts and bearings, including thrust bearings,
 - Gearings,
 - Mechanical and flexible couplings,
 - Turning gear.

Furthermore the propulsion system is to be tested for proper functioning of the following:

- Alarm and safety system,
- Manual and remote control of the machinery,
- Transfer to stand-by manual control in the engine room in case of power supply failure to the remote control system.

- Components of main propulsion engines listed below are to be inspected and where deemed necessary by the surveyor checked in dismantled 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,

- As part of the Class Renewal Survey of Machinery, a dock trial is to be carried out to attending Surveyors' satisfaction to confirm satisfactory operation of main and auxiliary machinery. If significant repairs are carried out to main or auxiliary machinery or steering gear, consideration should be given to a sea trial to attending Surveyors' satisfaction.

- The vibration behaviour of the main propulsion turbines is to be proved, possibly by regular checks during operation. Depending on the results obtained and as required by the surveyor, the turbine casing will have to be opened.

- The safety equipment of the turbines is to be tested.

- For all essential auxiliary engines, the survey scope is identical to that applying to main propulsion engines. A reduction in the scope of survey may be agreed upon examination of the maintenance protocol.

- The following machinery components are to be inspected and tested in the dismantled condition, where deemed necessary by the surveyor:

- All pumps of the essential systems;
- Air compressors, including safety equipment;
- Separators, filters and valves;
- Coolers, preheaters;
- Main and auxiliary steering gear;
- Anchor and other windlasses, including their drives;

- Pippings, pipe connections, compensators and hoses;
 - Tank level indicators;
 - Installations preventing the ingress of water into open spaces
 - Fresh water distillation plant
 - Oil purifiers
 - Additional systems and components, where deemed necessary by the surveyor.
- The electrical equipment, including the generators, the motors of the essential auxiliary machinery, the switch gear, including its protective and interlocking device, cable network is to be examined externally. The insulation resistance is to be measured (see, IACS Rec. 57).
- Electrical installations, including machinery and equipment, located in spaces in which there is a risk of inflammable gas or steam air mixture accumulating, are to be checked as to the explosion protection provided (see, IACS Rec. 35).
- 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 interlocking devices. The electric cables and their connections are to be inspected. The insulation resistance of all electric machinery and equipment is to be tested.
- Proof is to be furnished to the surveyor of the entire fire extinguishing equipment being ready for operation.

Emergency exits/escapes are to be inspected.

For CO₂ cylinders, see I.3.

On the occasion of every class renewal survey all CO₂ hose assemblies are to be subjected to a visual check.

All CO₂ hose assemblies made of synthetic rubber are to be replaced by type approved CO₂ hose assemblies not later than 10 years from the date of manufacture.

- The survey for control and monitoring system of main and auxiliary machinery is to include verification of correct functioning of the alarm system, safety system, and automatic control loops.

Ships equipped for periodically unattended machinery space and machinery centralised operated are to comply with the above requirements.

- Where pipes lead through tanks, they are to be examined and, if required by the surveyor, subjected to hydraulic tests. Depending on the results obtained, thickness measurements are to be carried out.
- Upon completion of class renewal surveys, the surveyor must be satisfied that the entire machinery installation, including the electrical machinery and equipment is operable without any restriction. In case of doubt, this may have to be proved by trials and operational tests.
- In ships assigned DK class notation, dynamic positioning systems including electrical control systems are to be subjected to operational tests.
- In ships with class notations FF1, FF2 or FF3, the fire fighting equipment are to be inspected and tested.
- In ships having class notation DG, the equipment for the carriage of dangerous goods (e.g. special fire fighting, alarm, ventilation and explosion protection equipment) is to be surveyed.
- For ships with inert gas plant (including ships with class notation INERT), the scrubber, deck water seal and non-return valves are to be opened up for examination.

Pressure testing may be required if deemed necessary by the surveyor.

- In ships with FC (fuel cell) class notation, the survey is to include the following:
 - Examination of gastight bulkheads,
 - Testing of FC fuel tanks high level alarms
 - Examination and testing of FC fuel tanks safety relief valves, tank room or secondary barrier space p/v valves and relief hatches, as relevant, FC fuel handling machinery, portable gas detectors and oxygen analyser.
- For ships with gas turbine installations the survey is to include verification of records and major overhaul reports on board.
- For single hold cargo ships complying with the requirements of SOLAS II-1/23-3 and II-1/25 and for bulk carriers complying with the requirements of SOLAS XII/12 and XII/13, an examination and test of the water ingress detection system and of their alarms is to be carried out.

3.2 Oil and chemical tankers -additional requirements-

3.2.1 Heating coils, tank cleaning apparatus and other equipment in cargo tanks, cofferdams and pipe tunnels within the cargo area are to be examined. Heating coils are normally to be subjected to pressure test. Attachments of sacrificial anodes in tanks are to be examined.

3.2.2 For chemical tankers the survey is to include the following:

- Examination of systems for cargo heating and cooling.
- Testing of the instrumentation of the cargo plant
- Examination and testing of valves for drop lines, gas return lines and automatic shut-down of loading, drip trays and spray shields, emergency discharge pumps.

- Verification of the arrangement for discharge of contaminated water.

- Stripping tests of two cargo tanks.

3.3 Liquefied gas tankers -additional requirements-

In addition to requirements listed in B.3.7 and C.4.3, the following additions are to be applied.

3.3.1 Pressure and Vacuum Relief Valves

The pressure/vacuum relief valves, rupture disc and other pressure relief devices for interbarrier spaces and hold spaces are to be opened, examined, tested and readjusted as necessary, depending on their design.

The pressure relief valves for the cargo tanks are to be opened for examination, adjusted, function tested, and sealed. If the cargo tanks are equipped with relief valves with non-metallic membranes in the main or pilot valves, such non-metallic membranes are to be replaced. Where a proper record of continuous overhaul and retesting of individually identifiable relief valves is maintained, consideration will be given to acceptance on the basis of opening, internal examination, and testing of a representative sampling of valves, including each size and type of liquefied gas or vapor relief valve in use, provided there is logbook evidence that the remaining valves have been overhauled and tested since crediting of the previous class renewal survey.

3.3.2 Piping Systems

The cargo, liquid nitrogen and process piping systems, including valves, actuators, compensators, etc. are to be opened for examination as deemed necessary.

Insulation is to be removed as deemed necessary to ascertain the condition of the pipes. If the visual examination raises doubt as to the integrity of the pipelines, a pressure test at 1.25 times the MARVS for the pipeline is to be carried out. After re-assembly the complete piping systems are to be tested for leaks.

The pressure relief valves are to be function-tested. A random selection of valves is to be opened for examination and adjusted.

3.3.3 Components

Cargo pumps, compressors, process pressure vessels, liquid nitrogen tanks, heat exchangers and other components, including prime movers, used in connection with cargo handling and methane boil-off burning are to be examined as required in periodical survey of machinery.

3.3.4 Miscellaneous

Systems for removal of water or cargo from interbarrier spaces and holds are to be examined and tested as deemed necessary.

All gas-tight bulkheads are to be inspected. The effectiveness of gas-tight shaft sealing is to be verified.

The following equipment is to be examined: hoses and spool pieces used for segregation of piping systems for cargo, inert gas and bilging.

It is to be verified that all cargo piping systems are electrically bonded to the hull.

3.4 Periodic Survey of Fuel Installations on Ships other than Liquefied Gas Carriers utilizing gas or other low flash point fuels

3.4.1 Application

These requirements apply to ships, other than those covered by the 3.3, which utilize gas or other low flash point fuels as a fuel for propulsion prime mover/auxiliary power generation arrangements and associated systems. These requirements are in addition to the requirements of 3.1.

These survey requirements do not cover fire protection, fire-fighting installation, and personnel protection equipment.

3.4.2 Schedule

3.4.2.1 Class Renewal Surveys are to be carried out at 5 years intervals to renew the Classification Certificate.

3.4.2.2 The first Class Renewal Survey is to be completed within 5 years from the date of the initial classification survey and thereafter within 5 years from the credited date of the previous Class Renewal Survey. However, an extension of class of 3 months maximum beyond the 5th year can be granted in exceptional circumstances. In this case, the next period of class will start from the expiry date of the Class Renewal Survey before the extension was granted.

3.4.2.3 For surveys completed within 3 months before the expiry date of the Class Renewal Survey, the next period of class will start from the expiry date of the Class Renewal Survey. For surveys completed more than 3 months before the expiry date of the Class Renewal Survey, the period of class will start from the survey completion date. In cases where the vessel has been laid up or has been out of service for a considerable period because of a major repair or modification and the owner elects to only carry out the overdue surveys, the next period of class will start from the expiry date of the Class Renewal Survey. If the owner elects to carry out the next due Class Renewal Survey, the period of class will start from the survey completion date.

3.4.2.4 The Class Renewal Survey may be commenced at the 4th Annual Survey and be progressed with a view to completion by the 5th anniversary date. When the Class Renewal 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 Class Renewal Survey.

3.4.2.5 Class Renewal Surveys may be carried out on a continuous survey basis. In this case, the interval between consecutive examinations of each item is not to exceed five (5) years.

3.4.3 Scope

3.4.3.1 General

The Class Renewal Survey is to include, in addition to the requirements of the Annual Survey, examination, tests and checks of sufficient extent to ensure that the fuel installations are in a satisfactory condition and is fit

for its intended purpose for the new period of class of 5 years to be assigned, subject to proper maintenance and operation and to periodical surveys being carried out at the due dates.

3.4.3.2 Fuel Handling and Piping

All piping for fuel storage, fuel bunkering, and fuel supply such as venting, compressing, refrigerating, liquefying, heating storing, burning or otherwise handling the fuel and liquid nitrogen installations are to be examined. Removal of insulation from the piping and opening for examination may be required. Where deemed suspect, a hydrostatic test to 1.25 times the Maximum Allowable Relief Valve Setting (MARVS) for the pipeline is to be carried out. After reassembly, the complete piping is to be tested for leaks. Where water cannot be tolerated and the piping cannot be dried prior to putting the system into service, the Surveyor may accept alternative testing fluids or alternative means of testing.

3.4.3.3 Fuel Valves

All emergency shut-down valves, check valves, block and bleed valves, master gas valves, remote operating valves, isolating valves for pressure relief valves in the fuel storage, fuel bunkering, and fuel supply piping systems are to be examined and proven operable. A random selection of valves is to be opened for examination.

3.4.3.4 Pressure Relief Valves

- i) Fuel Storage Tank Pressure Relief Valves. The pressure relief valves for the fuel storage tanks are to be opened for examination, adjusted, and function tested. If the tanks are equipped with relief valves with non-metallic membranes in the main or pilot valves, such non-metallic membranes are to be replaced.
- ii) Fuel Supply and Bunkering Piping Pressure Relief Valves. A random selection of pressure relief valves for the fuel supply and bunkering piping are to be opened for

examination, adjusted, and function tested. Where a proper record of continuous overhaul and retesting of individually identifiable relief valves is maintained, consideration will be given to acceptance on the basis of opening, internal examination, and testing of a representative sampling of valves, including each size and type of liquefied gas or vapor relief valve in use, provided there is logbook evidence that the remaining valves have been overhauled and tested since crediting of the previous Class Renewal Survey.

- iii) Pressure/Vacuum Relief Valves. The pressure/vacuum relief valves, rupture disc and other pressure relief devices for interbarrier spaces and hold spaces are to be opened, examined, tested and readjusted as necessary, depending on their design.

3.4.3.5 Fuel Handling Equipment

Fuel pumps, compressors, process pressure vessels, inert gas generators, heat exchangers and other components used in connection with fuel handling are to be examined as required in TL Rules for periodical survey of machinery.

3.4.3.6 Electrical Equipment

- i) Examination of electrical equipment to include the physical condition of electrical cables and supports, intrinsically safe, explosion proof, or increased safety features of electrical equipment.
- ii) Functional testing of pressurized equipment and associated alarms.
- iii) Testing of systems for de-energizing electrical equipment which is not certified for use in hazardous areas.
- iv) An electrical insulation resistance test of the circuits terminating in, or passing through, the hazardous zones and spaces is to be carried out.

3.4.3.7 Safety Systems

Gas detectors, temperature sensors, pressure sensors, level indicators, and other equipment providing input to the fuel safety system are to be tested to confirm satisfactory operating condition.

- i) Proper response of the fuel safety system upon fault conditions is to be verified.
- ii) Pressure, temperature and level indicating equipment are to be calibrated in accordance with the manufacturer's requirements.

3.4.3.8 Fuel Storage Tanks

Fuel storage tanks are to be examined in accordance with an approved survey plan. Liquefied gas fuel storage tanks are to be examined based upon IACS Recommendation No. 148.

E. Bottom Survey

1. Scope of the Survey

1.1 When a ship is in drydock 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.

1.2 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 the connection between the bilge strakes and the bilge keels. Important plate unfairness or other deterioration which do not necessitate immediate repairs are to be recorded.

1.3 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 class renewal survey period unless considered necessary by the Surveyor.

1.4 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. Where applicable, pressure test of the rudder may be required as deemed necessary by the surveyor.

1.5 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.

1.6 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 arrangement of propeller blades, propeller shaft and steering column shall be verified.

Note:

For the survey of propeller shafts, refer to A.4.9.

1.7 Special consideration may be given in application of relevant sections to commercial vessels owned or chartered by Governments, which are utilized in support of military operations or service.

2. General

2.1 Bottom surveys are surveys of the outside of the ship's hull below the load water line and related items.

2.2 The survey is to include the following examinations:

- Bottom and side plates of the shell plating,

- Rudder with attachments and bearings.

Visible parts of the following items are to be examined:

- Rudder,
- Rudder horn,
- Sole piece,
- Rudder stock with couplings,
- Rudder pintles and gudgeons.

For oil lubricated rudder bearings, the sealing arrangement is to be examined for tightness and the bearings are to be checked for wear as far as practicable.

For water lubricated rudder bearings the bearing clearances are to be measured.

For cone couplings, nuts are to be examined for verifying that all parts are intact and secure.

For flange couplings, bolts and nuts are to be examined for verifying that all parts are intact and secure.

- All sea valves, including scuppers and sanitary discharges are to be fully or partly opened and examined at alternate bottom survey.
- Steering fins, shaft brackets and other appendages are to be examined.
- Propellers with attachments and bearings.

The propeller blades, propeller boss and shaft external part is to be examined.

The propeller shaft external sealing arrangement and the propeller blade sealing arrangement are to be examined for tightness.

For water lubricated bearing, the propeller shaft bearing clearances are to be measured.

The following items are to be examined for tightness:

- Propeller nut

- Propeller hub coupling bolt and nuts, if bottom survey afloat, only the securing of the protective arrangement is to be examined.

- Propeller blade bolts:

- Stabilizer fins.
- All thrusters are to be examined externally. This examination covers survey of gear housing, propeller blades, bolt locking and other fastenings.

3. In Water Surveys

3.1 General

Every alternate bottom survey may in general be permitted while the ship is afloat for ships having class notation IWS.

3.2 Approvals

3.2.1 The diving firm assisting in in-water surveys must be approved by **TL** for this purpose.

3.2.2 Validity of an approval granted will depend on the continued qualification of satisfactorily carrying out the work required. The approval will have to be renewed after a period not exceeding 5 years.

3.3 Performance of survey

3.3.1 Unless accessible from outside with the aid of the vessel's trim and/or heel, underwater parts are to be surveyed and/or relevant maintenance work is to be carried out with assistance by a qualified diver under surveillance of a Surveyor. The diver is to be employed by a firm approved as a service supplier according to UR Z17. The Surveyor is to be satisfied with the method of pictorial representation (i.e. an underwater camera with monitor with recording systems), and a good two-way communication between the Surveyor and divers is to be provided.

3.3.2 The In-water Survey is to be carried out with the ship in sheltered water and preferably with weak tidal streams and currents. The in-water visibility and

the cleanliness of the hull below the waterline is to be clear enough to permit a meaningful examination which allows the surveyor and diver to determine the condition of the plating, appendages and the welding. The TL is to be satisfied with the methods of orientation of the divers on the plating, which should make use where necessary of permanent markings on the plating at selected points.

3.3.3 The underwater pictures on the surface monitor screen must offer reliable technical information such as to enable the Surveyor to judge the parts and/or areas surveyed.

3.3.4 Documentation suited for reproduction (video tape with sound) is to be made available to TL.

3.4 Additional examinations

3.4.1 Where, for instance, grounding is assumed to have taken place, the Surveyor may demand individual parts of the underwater body to be additionally inspected from inside.

3.4.2 If during the in-water survey damages are found which can be assessed reliably only in dry-dock or require immediate repair, the vessel is to be dry-docked. If the coating of the underwater body is in a condition which may cause corrosion damages affecting vessel's class to occur before the next dry-docking the vessel is to be dry-docked.

F. Propeller Shaft Survey

1. Propeller Shafts and Tube Shafts

1.1 General

1.1.1 Application

1.1.1.1 Unless alternative means are provided to assure the condition of the propeller shaft assembly,

these requirements apply to all vessels with conventional shafting fitted with a propeller as follows:

- from 1 January 2016 for ships delivered on or after 1 January 2016,
- after the first shaft survey scheduled on or after 1 January 2016, for ships delivered before 1 January 2016

Note: Upon the completion of the first shaft survey scheduled on or after 1 January 2016, the designation of dates for the next shaft survey is to be made based upon Rev. 3 of IACS UR Z21 Rev. 3.

1.1.2 Definitions

See also Figure 3.1.

1.1.2.1 Shaft

For the purpose of requirements of item 1. shaft is a general definition that includes:

- propeller shaft
- tube shaft

The definition does not include the intermediate shaft (s) which is (are) considered part of the propulsion shafting inside the vessel.

1.1.2.2 Propeller Shaft

Propeller shaft is the part of the propulsion shaft to which the propeller is fitted. It may also be called screwshaft or tailshaft.

1.1.2.3 Tube Shaft

Tube shaft is a shaft placed between the intermediate shaft and propeller shaft, normally arranged within a stern tube or running in open water.

It may also be called Stern Tube Shaft.

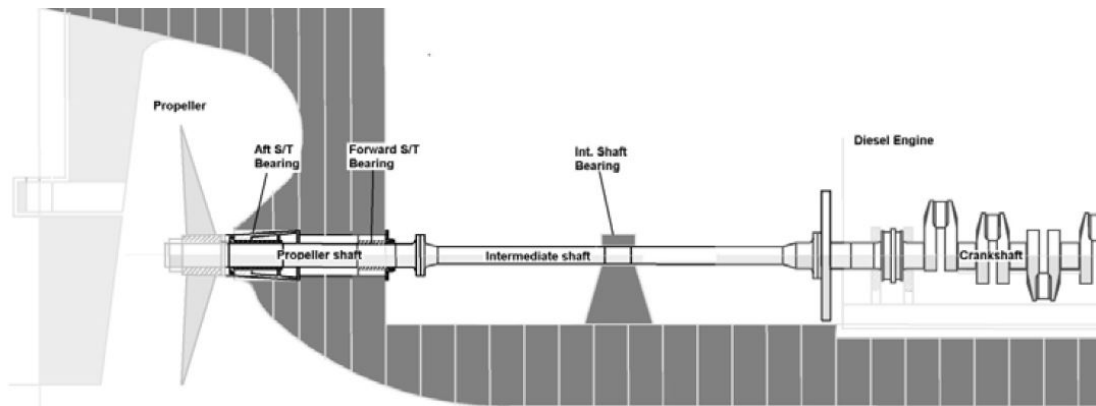


Diagram 3.1 Typical Shafting Arrangement

1.1.2.4 Sterntube

Tube or pipe fitted in the shell of a ship at the stern (or rear part of the ship), below the waterline, through which passes the tube shaft or aftermost section of the propeller shaft.

Sterntube is the housing of the shaft bearings, generally two (one aft and one fore), that sustain the shaft and allows its rotation with less frictional resistance. The stern tube also accommodates the shaft sealing arrangement.

1.1.2.5 Close Loop (system) Oil Lubricated Bearing

Closed Loop oil lubricating systems use oil to lubricate the bearings and are sealed against the environment (seawater) by adequate sealing / gland devices.

1.1.2.6 Water Lubricated Bearing

Water lubricated bearings are bearings cooled / lubricated by water (fresh or salt).

1.1.2.7 Closed Loop System Fresh Water Lubricated Bearing

Closed loop water lubricating systems use fresh water

to lubricate the bearings and are sealed against the environment (such as seawater) by adequate sealing / gland devices.

1.1.2.8 Open Systems (water)

Open water lubricating systems use water to lubricate the bearings and are exposed to the environment.

1.1.2.9 Adequate Means for Protection Against Corrosion

An adequate means for protection against corrosion is an approved means for full protection of the core shaft against seawater intrusion and subsequent corrosion attack. Such means are used for the protection of common steel material against corrosion particularly in combination with water lubricated bearings.

Typical means are for example:

- Continuous metallic, corrosion resistant liners,
- Continuous cladding,
- Multiple layer synthetic coating,
- Multiple layer of fibreglass,

- Combination of above mentioned,
- Rubber/elastomer covering coating.

The means for protection against corrosion are installed / applied according to class approved procedures.

1.1.2.10 Corrosion Resistant Shaft

Corrosion resistant shaft is made in approved corrosion resistant steel as core material for the shaft.

1.1.2.11 Sterntube Sealing System

Serntube sealing system is the equipment installed on the inboard extremity and, for closed systems, at outboard extremity of the sterntube.

Inboard seal is the device fitted on the fore part of the sterntube that achieve the sealing against the possible leakage of the lubricant media into the ship internal.

Outboard seal is the device fitted on the aft part of the sterntube that achieve the sealing against the possible sea water ingress and the leakage of the lubricant media.

1.1.2.12 Service Records

Service records are regularly recorded data showing in-service conditions of the shaft (s) and may include, as applicable: lubricating oil temperature, bearing temperature and oil consumption records (for oil lubricated bearings) or water flow, water temperature, salinity, pH, make-up water and water pressure (for closed loop fresh water lubricated bearings depending on the design).

1.1.2.13 Oil Sample Examination

An oil sample examination is a visual examination of the stern tube lubricating oil taken in presence of the surveyor with a focus on water contamination.

1.1.2.14 Lubricating Oil Analysis

Lubricating oil analysis is to be carried out at regular intervals not exceeding six months taking into account IACS Rec. 36.

The documentation on lubricating oil analysis is to be available on board. Oil samples, to be submitted for the analysis, should be taken under service conditions.

1.1.2.15 Fresh Water Sample Test

Fresh water sample test should be carried out at regular intervals not exceeding six months.

Samples are to be taken under service conditions and are to be representative of the water circulating within the sterntube.

Analysis results are to be retained on board and made available to the surveyor.

At time of survey the sample for the test has to be taken at the presence of the surveyor.

Fresh water sample test shall include the following parameters:

-
- Chlorides content
- pH value

Presence of bearing particles or other particles (only for laboratory analysis, not required for tests carried out in presence of the surveyor).

Note: Refer to IACS Rec No.143 for Recommended procedure for the determination of contents of metals and other contaminants in a closed fresh water system lubricated stern tube.

1.1.2.16 Keyless Connection

Keyless connection is the forced coupling methodology between the shaft and the propeller without a key achieved through the interference fit of the propeller boss on the shaft tapered end.

1.1.2.17 Keyed Connection

Keyed connection is the forced coupling methodology between the shaft and the propeller with a key and

keyway achieved through the interference fit of the propeller boss on the shaft tapered end.

1.1.2.18 Flanged Connection

Flanged connection is the coupling methodology between the shaft and the propeller, achieved by a flange, built in at the shaft aft end, bolted to propeller boss.

1.1.2.19 Alternative Means

Shafting arrangements such as, but not limited to, an approved Condition Monitoring Scheme and/ or other reliable approved means for assessing and monitoring the condition of the tail shaft, bearings, sealing devices and the stern tube lubricant system capable to assure the condition of the propeller shaft assembly with an equivalent level of safety as obtained by survey methods as applicable in Section 3, F.

1.2 Oil Lubricated Shafts or Closed Loop System Fresh Water Lubricated Shafts (closed system)

1.2.1 Shaft Survey Methods

1.2.1.1 Method 1

The survey is to consist of :

- Drawing the shaft and examining the entire shaft, seals system and bearings
- For keyed and keyless connections:
- Removing the propeller to expose the forward end of the taper,
- Performing a non-destructive examination (NDE) by an approved surface crack-detection method all around the shaft in way of the forward portion of the taper section, including the keyway (if fitted). For shaft provided with liners the NDE shall extended to the after edge of the liner.
- For flanged connection:

- Whenever the coupling bolts of any type of flange-connected shaft are removed or the flange radius is made accessible in connection with overhaul, repairs or when deemed necessary by the surveyor, the coupling bolts and flange radius are to be examined by means of an approved surface crack detection method.
- Checking and recording the bearing clearances.
- Verification that the propeller is free of damages which may cause the propeller to be out of balance.
- Verification of the satisfactory conditions of inboard and outboard seals during the re-installation of the shaft and the propeller.
- Recording the bearing wear down measurements (after re-installation).

1.2.1.2 Method 2

The survey is to consist of :

- For keyed and keyless connections:
- Removing the propeller to expose the forward end of the taper,
- Performing a non-destructive examination (NDE) by an approved surface crack-detection method all around the shaft in way of the forward portion of the taper section, including the keyway (if fitted).
- For flanged connection:
- Whenever the coupling bolts of any type of flange-connected shaft are removed or the flange radius is made accessible in connection with overhaul, repairs or when deemed necessary by the surveyor, the coupling bolts and flange radius are to be examined by means of an approved surface crack detection method.

- Checking and recording the bearing wear down measurements.
- Visual inspection of all accessible parts of the shafting system.
- Verification that the propeller is free of damages which may cause the propeller to be out of balance.
- Seal liner found to be or placed in a satisfactory condition.
- Verification of the satisfactory re-installation of the propeller including verification of satisfactory conditions of inboard and outboard seals.

Pre-requisites to satisfactorily verify in order to apply Method 2 :

- Review of service records.
- Review of test records of:
 - Lubricating oil analysis (for oil lubricated shafts), or
 - Fresh water sample test (for closed system fresh water lubricated shafts).
 - Oil sample examination (for oil lubricated shafts), or fresh water sample test (for closed system fresh water lubricated).
- Verification of no reported repairs by grinding or welding of shaft and/or propeller.

1.2.1.3 Method 3

The survey is to consist of :

- Checking and recording the bearing wear down measurements.

- Visual inspection of all accessible parts of the shafting system.
- Verification that the propeller is free of damages which may cause the propeller to be out of balance.
- Seal liner found to be or placed in a satisfactory condition.
- Verification of the satisfactory conditions of inboard and outboard seals.

Pre-requisites to satisfactorily verify in order to apply Method 3 :

- Review of service records.
- Review of test records of:
 - Lubricating oil analysis (for oil lubricated shafts), or
 - Fresh water sample test (for closed system fresh water lubricated shafts).
 - Oil sample examination (for oil lubricated shafts), or fresh water sample test (for closed system fresh water lubricated).
- Verification of no reported repairs by grinding or welding of shaft and/or propeller.

1.2.2 Shaft Extension Surveys - Extension Types

1.2.2.1 Extension up to 2,5 Years

The survey is to consist of :

- Checking and recording the bearing wear down measurements, as far as practicable.
- Visual inspection of all accessible parts of the shafting system.

- Verification that the propeller is free of damages which may cause the propeller to be out of balance.
- Verification of the effectiveness of the inboard and outboard seals.

Pre-requisites to satisfactorily verify in order to apply Extension up to 2,5 Years :

- Review of service records.
- Review of test records of:
- Lubricating oil analysis (for oil lubricated shafts), or
- Fresh water sample test (for closed system fresh water lubricated shafts).
- Oil sample examination (for oil lubricated shafts), or fresh water sample test (for closed system fresh water lubricated).
- Verification of no reported repairs by grinding or welding of shaft and/or propeller.
- Confirmation from the Chief Engineer that the shafting arrangement is in good working condition.

1.2.2.2 Extension up to 1 Year

The survey is to consist of :

-
- Visual inspection of all accessible parts of the shafting system.
- Verification that the propeller is free of damages which may cause the propeller to be out of balance.
- Verification of the effectiveness of the inboard and outboard seals.

Pre-requisites to satisfactorily verify in order to apply Extension up to 1 Year :

- Review of the previous wear-down and/or clearance recordings.
- Review of service records.
- Review of test records of:
- Lubricating oil analysis (for oil lubricated shafts), or
- Fresh water sample test (for closed system fresh water lubricated shafts).
- Oil sample examination (for oil lubricated shafts), or fresh water sample test (for closed system fresh water lubricated).
- Verification of no reported repairs by grinding or welding of shaft and/or propeller.
- Confirmation from the Chief Engineer that the shafting arrangement is in good working condition.

1.2.2.3 Extension up to 3 Months

The survey is to consist of :

- Visual inspection of all accessible parts of the shafting system.
- Verification of the effectiveness of the inboard and outboard seals.

Pre-requisites to satisfactorily verify in order to apply Extension up to 3 Months :

- Review of the previous wear-down and/or clearance recordings.
- Review of service records.
- Review of test records of:
- Lubricating oil analysis (for oil lubricated shafts), or

- Fresh water sample test (for closed system fresh water lubricated shafts).
- Oil sample examination (for oil lubricated shafts), or fresh water sample test (for closed system fresh water lubricated).
- Verification of no reported repairs by grinding or welding of shaft and/or propeller.
- Confirmation from the Chief Engineer that the shafting arrangement is in good working condition.

not exceed 15 years, except in the case when one extension for no more than three months is granted.

1.2.3.1.3 Keyed Propeller Connection

The following methods are applicable :

- Method 1 every 5 years, or
- Method 2 every 5 years (pre-requisite have to be fulfilled).

1.2.3.2 Survey Extension

For all types of propeller connections, the interval between two consecutive surveys may be extended after the execution of extension surveys as follows :

- **Extension up to a maximum of 2,5 years** : no more than one extension can be granted. No further extension, of other type, can be granted.
- **Extension up to a maximum of 1 year** : no more than two consecutive “one year extension” can be granted. In the event an additional extension is requested the requirements of the “2.5 year extension” are to be carried out and the shaft survey due date, prior to the previous extension(s), is extended for a maximum of 2.5 years.
- **Extension up to a maximum of 3 months** : no more than one “three months extension” can be granted. In the event an additional extension is requested the requirements of the “one year extension” or “2.5 years extension” are to be carried out and the shaft survey due date, prior to the previous extension, is extended for a maximum of one year or 2.5 years.

1.2.3 Oil Lubricated Shafts

1.2.3.1 Survey Intervals

For surveys completed within 3 months before the shaft survey due date, the next period will start from the shaft survey due date.

1.2.3.1.1 Flanged Propeller Connection

The following methods are applicable :

- Method 1 every 5 years, or
- Method 2 every 5 years (pre-requisites have to be fulfilled),or
- Method 3 every 5 years (pre-requisites have to be fulfilled).

1.2.3.1.2 Keyless Propeller Connection

The following methods are applicable :

- Method 1 every 5 years, or
- Method 2 every 5 years (pre-requisites have to be fulfilled),or
- Method 3 every 5 years (pre-requisites have to be fulfilled). The maximum interval between two surveys carried out according to Method 1 or Method 2 shall

The extension survey should normally be carried out within 1 month of the shaft survey due date and the extension counts from the shaft survey due date.

If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of extension counts from the date of the extension survey was completed.

1.2.4 Closed Loop System Fresh Water Lubricated Shafts

The maximum interval between two surveys carried out according to Method 1 shall not exceed 15 years. An extension for no more than three months can be granted.

1.2.4.1 Survey Intervals

For surveys completed within 3 months before the shaft survey due date, the next period will start from the shaft survey due date.

1.2.4.1.1 Flanged Propeller Connection

The following methods are applicable :

- Method 1 every 5 years, or
- Method 2 every 5 years (pre-requisites have to be fulfilled),or
- Method 3 every 5 years (pre-requisites have to be fulfilled).

1.2.4.1.2 Keyless Propeller Connection

The following methods are applicable :

- Method 1 every 5 years, or
- Method 2 every 5 years (pre-requisites have to be fulfilled),or
- Method 3 every 5 years (pre-requisites have to be fulfilled).

1.2.4.1.3 Keyed Propeller Connection

The following methods are applicable :

- Method 1 every 5 years, or

- Method 2 every 5 years (pre-requisite have to be fulfilled).

1.2.4.2 Survey Extensions

For all types of propeller connections, the interval between two consecutive surveys may be extended after the execution of extension surveys as follows :

- **Extension up to a maximum of 2,5 years:** no more than one extension can be granted. No further extension, of other type, can be granted.
- **Extension up to a maximum of 1 year :** no more than two consecutive extensions can be granted. In the event an additional extension is requested the requirements of the “2.5 year extension” are to be carried out and the shaft survey due date, prior to the previous extension(s), is extended for a maximum of 2.5 years.
- **Extension up to a maximum of 3 months:** no more than one “three months extension” can be granted. In the event an additional extension is requested the requirements of the “one year extension” or “2.5 years extension” are to be carried out and the shaft survey due date, prior to the previous extension, is extended for a maximum of one year or 2,5 years.

The extension survey should normally be carried out within 1 month of the shaft survey due date and the extension counts from the shaft survey due date.

If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of extension counts from the date of the extension survey was completed.

The maximum interval between two surveys carried out according to Method 1 shall not exceed 15 years, except in the case when one extension for no more than three months is granted.

1.3 Water Lubricated Shafts (open systems)

1.3.1 Shaft Survey Methods

1.3.1.1 Method 4

The survey is to consist of :

- Drawing the shaft and examining the entire shaft (including liners, corrosion protection system and stress reducing features, where provided), inboard seal system and bearings.
- For keyed and keyless connections:
 - removing the propeller to expose the forward end of the taper,
 - performing a non-destructive examination (NDE) by an approved surface crack detection method all around the shaft in way of the forward portion of the taper section, including the keyway (if fitted). For shaft provided with liners the NDE shall be extended to the after edge of the liner.
- For flanged connection:
 - whenever the coupling bolts of any type of flange-connected shaft are removed or the flange radius is made accessible in connection with overhaul, repairs or when deemed necessary by the surveyor, the coupling bolts and flange radius are to be examined by means of an approved surface crack detection method.
- Checking and recording the bearing clearances,
- Verification that the propeller is free from damages which may cause the propeller to be out of balance.
- Verification of the satisfactory conditions of inboard seal during re-installation of the shaft and propeller.

1.3.2 Shaft Extension Surveys - extension types

1.3.2.1 Extension up to 1 Year

The survey is to consist of :

- Visual inspection of all accessible parts of the shafting system.
 - Verification that the propeller is free from damages which may cause the propeller to be out of balance.
 - Checking and recording the bearing clearances,
 - Verification of the effectiveness of the inboard seal.
- Pre-requisites to satisfactorily verify in order to apply extension up to 1 year:
- Review of the previous clearance recordings.
 - Service records.
 - Verification of no reported repairs by grinding or welding of shaft and/or propeller.
 - Confirmation from the Chief Engineer that the shafting arrangement is in good working condition.

1.3.2.2 Extension up to 3 Months

The survey is to consist of :

- Visual inspection of all accessible parts of the shafting system.
- Verification that the propeller is free from damages which may cause the propeller to be out of balance.
- Verification of the effectiveness of the inboard seal.

1.2.5 Table of Survey Intervals (Closed Systems)

SURVEY INTERVALS (Closed Systems)			
Oil Lubricated			
	Flanged propeller coupling	Keyless propeller coupling	Keyed propeller coupling ^b
Every five years ^a	Method 1 or Method 2 or Method 3	Method 1 or Method 2 or Method 3 ^c	Method 1 or Method 2
Extension 2,5 Years	Yes ^d	Yes ^d	Yes ^d
Extension 1 Year	Yes ^e	Yes ^e	Yes ^e
Extension 3 Months	Yes ^f	Yes ^f	Yes ^f
Closed Loop System Fresh Water Lubricated			
	Flanged propeller coupling	Keyless propeller coupling	Keyed propeller coupling ^b
Every five years ^a	Method 1 ^g or Method 2 or Method 3	Method 1 ^g or Method 2 or Method 3	Method 1 ^g or Method 2
Extension 2,5 Years	Yes ^d	Yes ^d	Yes ^d
Extension 1 Year	Yes ^e	Yes ^e	Yes ^e
Extension 3 Months	Yes ^f	Yes ^f	Yes ^f
<p>General notes:</p> <p>For surveys (Method 1 or Method 2 or Method 3) completed within 3 months before the shaft survey due date, the next period will start from the shaft survey due date.</p> <p>The extension survey should normally be carried out within 1 month of the shaft survey due date and the extension counts from the shaft survey due date. If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of extension counts from the date of the extension survey was completed.</p> <p>Notes :</p> <p>a : unless an extension type (extension 2,5 years, extension 1 year, extension 3 months) is applied in between.</p> <p>b : Method 3 not allowed.</p> <p>c : The maximum interval between two surveys carried out according to Method 1 or Method 2 shall not exceed 15 years, except in the case when one extension for no more than three months is granted.</p> <p>d : no more than one extension can be granted. No further extension of other type can be granted.</p> <p>e : no more than two consecutive extensions can be granted. In the event an additional extension is requested, the requirements of the one year or “2.5 years extension” extension are to be carried out and the shaft survey due date prior to the previous extension is extended for a maximum of one year or 2.5 years.</p> <p>f : no more than one three months extension can be granted. In the event an additional extension is requested, the requirements of the “one year extension” or “2.5 years extension” are to be carried out and the shaft survey due date, prior to the previous extension, is extended for a maximum of one year or 2.5 years.</p> <p>g : the maximum interval between two surveys carried out according to Method 1 shall not be more than 15 years.</p>			

Pre-requisites to satisfactorily verify in order to apply extension up to 3 months:

- Review of the previous clearance recordings.
- Service records.
- Verification of no reported repairs by grinding or welding of shaft and/or propeller.
- Confirmation from the Chief Engineer that the shafting arrangement is in good working condition.

1.3.3 Shaft Survey Intervals

1.3.3.1 Survey Intervals

The following survey intervals between surveys according to Method 4 are applicable to all types of propeller connections.

- For keyless propeller connections the maximum interval between two consecutive dismantling and verifications of the shaft cone by means of non-destructive examination (NDE) shall not exceed 15 years.
- For surveys completed within 3 months before the shaft survey due date, the next period will start from the shaft survey due date.

1.3.3.1.1 Configurations Allowing 5 Year Intervals

- Single shaft operating exclusively in fresh water.
- Single shaft provided with adequate means of corrosion protection, single corrosion resistance shaft.
- All kinds of multiple shafts arrangements.

1.3.3.1.2 Other Systems

Shaft not belonging in one of the configurations listed in 1.3.3.1.1 has to be surveyed according to Method 4 every 3 years.

1.3.3.2 Survey Extensions

For all types of propeller connections, the interval between two consecutive surveys may be extended after the execution of extension survey as follows:

- **Extension up to a maximum of 1 year:** no more than one extension can be granted. No further extension, of other type, can be granted.
- **Extension up to a maximum of 3 months:** no more than one “three months extension” can be granted. In the event an additional extension is requested, the requirements of the “one year extension” are to be carried out and the shaft survey due date prior to the previous extension is extended for a maximum of one year.

The extension survey should normally be carried out within 1 month of the shaft survey due date and the extension counts from the shaft survey due date.

If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of extension counts from the date of the extension survey was completed.

2. Propellers

Propellers are to be examined visually on the occasion of each propeller shaft or tube shaft survey.

Damages, such as cracks, deformation, cavitation effects, etc. are to be reported and repaired at the Surveyor's discretion.

Controllable pitch propellers are to be checked for oil leakages. The function of the controllable pitch propellers has to be tested. The maintenance according to manufacturer's instructions has to be checked.

3. Other Systems

As far as practicable, the gearing and control elements of rudder and steering propellers are to be examined through inspection openings. For other systems such as pod propulsion systems, pump jet units, etc. the scope

of survey is to be agreed with TL Head Office. The maintenance according to manufacturer's instructions is to be checked. A function test is to be carried out.

G. Boiler Survey

1. External Inspection

External survey of boilers including test of safety and protective devices and test of safety valve using its relieving gear is to be carried out annually.

The operability and general condition of the entire boiler, including its valves and fittings, pumps, pipings insulations, foundation, control and regulation systems, and its protective and safety equipment, are to be examined. Also, the boiler records, operational documentation and qualification of the boiler operator are to be checked.

For exhaust gas heated boilers, the safety valves are to be tested by the Chief Engineer at sea within the boiler external survey window, see A.4.10.2. This test is to be recorded in the log book for review by the attending Surveyor prior to crediting the Annual Survey of Machinery.

1.3.4 Table of Survey Intervals (open systems)

SURVEY INTERVALS (Open Systems)			
<ul style="list-style-type: none"> - Single shaft operating exclusively in fresh water - Single shaft provided with adequate means of corrosion protection, single corrosion resistant shaft, - All kinds of multiple shafts arrangements. 		Other shaft configuration.	
All kinds of propeller coupling ^d		All kinds of propeller coupling ^d	
Every five years ^a	Method 4	Every three years ^a	Method 4
Extension 1 year	Yes ^b	Extension 1 year	Yes ^b
Extension 3 months	Yes ^c	Extension 3 months	Yes ^c
<p>General notes:</p> <p><i>For surveys (Method 4) completed within 3 months before the shaft survey due date, the next period will start from the shaft survey due date.</i></p> <p><i>The extension survey should normally be carried out within 1 month of the shaft survey due date and the extension counts from the shaft survey due date. If the extension survey is carried out more than 1 month prior to the shaft survey due date, then the period of extension counts from the date of the extension survey was completed.</i></p> <p>Notes :</p> <p><i>a : unless an extension type (extension 1 year, extension 3 months) is applied in between.</i></p> <p><i>b : no more than one extension can be granted. No further extension of other type can be granted.</i></p> <p><i>c : no more than one extension can be granted. In the event an additional extension is requested, the requirements of the one year extension are to be carried out and the shaft survey due date prior to the previous extension is extended for a maximum of one year.</i></p> <p><i>d : for keyless propeller connections the maximum interval between two consecutive dismantling and verifications of the shaft cone by means of non-destructive examination (NDE) shall not exceed 15 years.</i></p>			

2. Internal Inspection

Water tube boilers used for main propulsion, including reheat boilers, all other boilers of essential service, and boilers of non-essential service having working pressure exceeding 0.35 N/mm^2 (3.5 bar) and a heating surface exceeding 4.5 m^2 , are to be surveyed internally.

Where deemed necessary by the Surveyor, the boiler is to be cleaned on the water, flue gas and exhaust gas sides, and, if required, its outside surfaces are to be exposed as well, so that all walls subject to pressure may be examined.

At each survey the boilers, super heaters and economizers are to be examined internally on water-steam side and fire sides. Boiler mountings and safety valves are to be examined at each survey and opened out as considered necessary by **TL**.

When direct visual internal inspection is not feasible due to the limited size of the internal spaces, such as for small boilers and/or narrow internal spaces, this may be replaced by a hydrostatic pressure test or by alternative verifications as determined by **TL**.

The adjustment of the safety valves is to be verified during each boiler internal survey. For exhaust gas boilers, if steam cannot be raised at port, the safety valves are to be adjusted at the test bench. The correct set pressure is to be verified by the Chief Engineer at sea and the results recorded in the log book for review by **TL**.

Review of the following records since the last boiler survey is to be carried out as part of the survey:

- Operation,
- Maintenance,
- Repair history,
- Feed water chemistry.

Where the design of the boiler does not permit of 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.

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.

The hydraulic pressure test is to be carried out to a test pressure of 1.5 times the maximum allowable working pressure.

If this is less than 2 bars, then the test pressure should be at least 1 bar more than the maximum allowable working pressure. In no case the test pressure may exceed the test pressure applied during the constructional check and hydrostatic pressure test of the boiler after completion.

In addition to above requirements, in exhaust gas heated economizers of the shell type, all accessible welded joints are to be subjected to a visual examination for cracking. It is left to the discretion of the Surveyor if non-destructive testing is required for this purpose additionally.

3. Extraordinary Inspection

Beyond the above mentioned periodical inspections extraordinary inspections including non-destructive tests and hydraulic pressure tests may be required at the Surveyor's discretion, e.g. in case of damages, repairs and maintenance work.

4. Steam Pipes

4.1 Steam pipes with steam temperatures of up to 350°C and with outside diameters of more than DN 75, are to be examined at random. 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.

4.2 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 an outside diameter exceeding DN 32. 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.

4.3 Steam pipes designed to resist steam temperatures exceeding 500°C and welded piping systems are to be examined as follows:

Flanged pipes in accordance with 4.2; however, the inspection for cracks has to cover at least 20% of the weld seams.

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.

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

The same applies to heating coils in cargo tanks.

H. Thermal Oil Heater Survey

1. External Inspection

Thermal oil plants are to be subjected to a functional test, while in operation. In detail, the following items are to be examined:

- The entire thermal oil plant for leakages,
- The condition of the insulation,
- The functioning of the indication, control and safety equipment,

- The remote controls for the shut-off and discharge valves,
- The leakage monitors for the heaters,
- The emergency switch-off devices (oil firing, pumps),
- The safety switch-off devices for the oil burner
- Lighting, emergency lighting and labelling.

Reference is to be made to the test reports on the annual checks to be performed by an appropriate testing institution for continued used of the thermal oil. This is to be confirmed in the report.

2. Internal Inspection

During the internal inspection the heating surfaces and, where appropriate, the combustion chamber, are to be examined for contamination, corrosion, deformations and leakages.

As a rule, tightness tests are to be carried out to the admissible working pressure. Following repairs and renewals of plant components exposed to pressure, a pressure test is to be carried out to 1.5 times the admissible working pressure.

I. Survey and Testing of Pressurized Systems

1. General

Subject to A.4.12, pressure vessels are to be inspected internally and externally.

2. Supplementary Testings

Where pressure vessels cannot satisfactorily be 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 PB. If the maximum allowable working pressure is less than 2 bars, then the test pressure should be at least 1 bar more than the maximum allowable working pressure. Pressure vessels manufactured in accordance with DIN 4810 are, subject to that standard, to be tested to 1.3 times the admissible working pressure. The test pressure must in no case exceed the initial test pressure.

3. CO₂ Low-Pressure Fire-Extinguishing Systems

The surfaces are to be checked for corrosion at the Surveyor's discretion.

Insulated vessels are to be exposed at some selected points, such as to offer a general impression of the vessel's external condition.

Following a hydraulic pressure test, the vessels and/or bottles are to be carefully dried.

J. Thickness Measurements and Corrosion Tolerances

1. General

1.1 The thicknesses of structural elements are checked by measurements, in order to assess whether or not the values stipulated in the Construction Rules are observed, taking into account the admissible tolerances. Unless severe corrosion has occurred owing to particular service conditions, thickness measurements will not be required until Class Renewal II.

1.2 Thickness measurements are to be carried out in accordance with recognized methods, by authorized personnel or companies. Rust and contamination are to be removed from the components to be examined. The Surveyor is entitled to require check measurements or more detailed measurements to be performed in his presence. The thickness measurements are to be witnessed by the surveyor on board to the extent necessary to control the process.

The scope of thickness measurement as well as the reporting shall be fixed in a survey planning meeting between the surveyor(s), representatives of the owner and the approved thickness measurement operator/firm well in advance of measurements and prior to commencing the survey.

Thickness measurements of structures in areas where close-up surveys are required shall be carried out simultaneously with the close-up surveys.

2. Authorization

2.1 The personnel or the company entrusted with thickness measurements must be approved by TL for this purpose.

2.2 Validity of an approval granted will depend on the continued qualification. The approval will have to be renewed after period not exceeding 3 years.

3. Scope of Measurements

3.1 **Main hull structural elements:** In Class Renewal II and all subsequent ones the plate thicknesses of the main hull (essential longitudinal and transverse) structural elements are to be checked by measurements. The number of measurements depends on the vessel's maintenance condition and is left to the Surveyor's discretion.

The minimum requirements for thickness measurements on the occasion of class renewal surveys are stated in Table 3.3, depending on the ship's age. Respective thickness measurements to determine the general level of corrosion are to be carried out.

3.2 The extent of thickness measurements may be reduced, in comparison with those stated in Table 3.2, provided during the close-up examination the Surveyor satisfies himself that there is no structural diminution, and the protective coating, where applied, continues to be effective.

The Surveyor may extend the thickness measurement as deemed necessary. This applies especially to areas with substantial corrosion.

Transverse sections should be chosen where largest corrosion rates are suspected to occur or are revealed by deck plating measurements.

3.3 Seawater ballast tanks: In the case of major corrosion damages, the structural elements of seawater ballast tanks are to be checked by thickness measurements.

3.4 Where special reasons exist, the Surveyor may demand thickness measurements to be carried out already on the occasion of Class Renewal I, also outside the area of 0,5L amidships. The same applies in the case of conversion or repair of a ship.

3.5 In order to be used as a basis for class renewal, thickness measurements should, as far as practicable, be carried out already on the occasion of the fourth annual survey.

3.6 Equipment: In Class Renewal II and all subsequent Class Renewals the cross sectional areas of the anchor chain cables are to be determined. The mean diameters of the anchor chain cables are to be determined by representative measuring approx. 3 links per length (27,5 m.), made at the ends of the links in way of the maximum wear.

4. Corrosion and Wear Tolerances

4.1 Where thickness measurements according to 3. result in corrosion and wear values exceeding those stated in the following, the respective hull structural elements will have to be renewed.

TL reserves the right where applicable to modify the indicated values according to 4.3 and 4.5.3 referring to the maximum permissible large surface corrosion allowances.

Where reduced material thicknesses were admitted for the newbuilding (effective system of corrosion protection), the permissible corrosion allowances are to be based on the unreduced rule thicknesses.

4.2 Longitudinal strength

Maximum permissible reduction of midship section modulus: 10%.

4.3 Local strength

Maximum permissible large-surface reduction of plate thickness and web thickness of profiles: t_K

for $t \leq 11.5$ mm.: $t_K = 1.5$ mm.

for $t > 11.5$ mm.: $t_K = 0.09 t + 0.45$ mm.,

max. 3.0 mm.

t = Plate and/or web thickness in [mm], as stipulated in the Construction Rules.

Maximum permissible locally limited reduction of thickness is 0.2 t . However, in some cases, further reductions may be allowed according to "Permissible Reduction of Thickness".

In ballast tanks in way of 1.5 m. below the weather deck, if the weather deck is the tank deck: $t_K = 2.5$ mm.

In cargo oil tanks in way of 1.5 m. below the weather deck, if the weather deck is the tank deck, and for horizontal structural elements in cargo oil and fuel tanks: $t_K = 2.0$ mm.

In dry cells, such as fore-to-aft passageways of container ships and comparable spaces:

for $t \leq 11.5$ mm.: $t_K = 1.0$ mm.

for $t > 11.5$ mm.: $t_K = 0.09 t$,
max. 2.5 mm.

For hatch covers of dry cargo holds, $t_K = 1.0$ mm.

Max. permissible surface reduction of the side shell in way of the ice belt: 2.0 mm.

Steel renewal is required where the gauged thickness is less than $t_{net} + 0,5$ mm for

- Single skin hatch covers,
- The plating of double skin hatch covers and,
- Coaming structures the corrosion additions t_K of which are provided in Chapter 1 Hull Section 15 Table 15.1.

Where the gauged thickness is within the range $t_{net} + 0.5$ mm and $t_{net} + 1.0$ mm, coating (applied in accordance with the coating manufacturer's requirements) or annual gauging may be adopted as an alternative to steel renewal. Coating is to be maintained in GOOD condition.

For the internal structure of double skin hatch covers, thickness gauging is required when hatch cover top or bottom plating renewal is to be carried out or when this is deemed necessary, at the discretion of the surveyor, on the basis of the plating corrosion or deformation condition. In these cases, steel renewal for the internal structures is required where the gauged thickness is less than t_{net} .

For corrosion addition $t_K = 1.0$ mm the thickness for steel renewal is t_{net} and the thickness for coating or annual gauging is when gauged thickness is between t_{net} and $t_{net} + 0.5$ mm.

For coaming structures, the corrosion additions t_K of which are not provided in Chapter 1 Hull Section 15 Table 15.1, steel renewal and coating or annual gauging are to be at discretion of TL.

4.4 Anchor equipment

Maximum permissible reduction of diameter of chain links 12%.

Maximum permissible reduction in weight of anchors: 10%.

4.5 High speed craft

4.5.1 For high-speed (seagoing) craft as defined in the TL Pt. C-Ch.7-High Speed Crafts, the following corrosion and wear tolerances apply for steel and/ or aluminium hull.

4.5.2 Longitudinal strength

Maximum permissible reduction of midship section modules: 10%

4.5.3 Local strength

Where applicable, maximum permissible large surface reduction of plate thickness of profiles: t_K

for $t \leq 10.5$ mm.: $t_K = 0.5$ mm.

for $t > 10.5$ mm.: $t_K = 0.03 t + 0.2$ mm.,

max. 1.0 mm.

Tank bottoms: 1.0 mm.

Maximum permissible locally limited reduction of thickness: 0.1 t.

If the measures for corrosion protection described in the Rules for high speed craft, Chapter 7 - High Speed Craft, Section 3, K.3.1.5 are fully applied, the corrosion reduction t_K can be assumed as 0.0 mm. for steel and the aluminium alloys described in K.3.2.3.

4.5.4 For anchor chain cables the maximum permissible reduction of the mean diameter of chain links is 10%.

K. Surveys for Special Ship Types

1. Inland Vessels

1.1 General requirements

1.1.1 The following rules relate to inland vessels.

1.1.2 Unless otherwise stated in the following, the rules in subsections A apply, as far as of relevance for inland vessels.

1.1.3 In case of inland vessels annual surveys are required for steam boilers only.

1.1.4 As a matter of principle, the class period for hull and machinery is identical. However, surveys and inspections performed in accordance with items 1.3 and 1.4 respectively may be recognized for the class

renewal, even if conducted more than 15 months before the date of expiry of the class.

1.1.5 Records on the periodical inspections of steam boilers, thermal oil heaters, pressure vessels and piping systems are entered into special inspection certificates to be kept on board.

1.2 Intermediate surveys

1.2.1 General

Intermediate surveys will be carried out about 2.5 years, but not later than 3 years, after commissioning and each class renewal. The survey may be affected with the ship afloat and will in general cover an external check of the main hull elements and of all components which are of significance for the vessel's safety such as the steering gear, the machinery, including the electrical installation, and pressure vessels with their safety devices.

1.2.2 Machinery installations, general

1.2.2.1 The following items are to be checked:

- Electrical machinery and pertinent switch gear, including cables.

Main and auxiliary machinery, with accessories,

1.2.2.2 The automation equipment is to be checked in accordance with TL Survey programme.

1.2.2.3 For internal surveys of steam boilers, see 1.3.4.7.

1.2.2.4 Steering gear

The steering gear is to be function-tested.

1.2.3 Machinery installations, safety systems (tankers)

On tankers the following installations and equipment are to be checked:

- Electrical equipment, in particular electrical

installations in areas of explosion hazard, in which ignitable gas mixtures or water vapours may accumulate,

- Level/overflow alarms,
- Level indicators,
- Tank venting systems,
- Flame arresters,
- Pippings, valves and fittings, pumps,
- Pump room equipment, including ventilation system,
- Fire-extinguishing equipment.

1.2.4 Dry docking

Intermediate surveys have to be carried out in dry-dock;

- If the vessel's shell is riveted,
- If the vessel's age exceeds 20 years and if required by the Surveyor.

1.3 Class Renewal Surveys

1.3.1 Hull, general

1.3.1.1 The class renewal survey will be held while the ship is in dry-dock or on the slipway. The ship has to be placed on blocks of sufficient height so as to allow the keel, bottom plating, rudder, propeller and propeller shaft to be inspected.

1.3.1.2 The survey will cover all structural elements of the ship and all component parts essential for her operation and safety, such as steering gear, watertight doors, hatchways, capstans and windlasses, anchors, cables and hawsers, as well as fire protection installations.

1.3.1.3 In order to render possible inspection of all inner structural elements, such as frames, floor plates,

stringers, shell plating, decks, deck beams, bulkheads, ceiling, inner bottom, the cargo holds and all cargo tanks are to be emptied and cleaned and -where necessary- freed of gas. Service tanks (fuel, lubricating-oil and fresh-water tanks) need not be emptied if their tightness, while completely filled, is proved by means of an external inspection.

1.3.1.4 If deemed necessary, the Surveyor may require the rust to be removed from selected areas of the ship's structure and have the thickness of the shell plating, of the built-in tanks, the walls of which do not form part of the shell plating, of the decks and bulkheads measured by recognized test methods (e.g. ultrasonic measurements). Defective coverings (e.g. cement and asphalt) must be removed in accordance with the Surveyor's instructions. Prior to renewing paintwork or coverings, the ship's steelwork concerned is to be inspected.

1.3.1.5 On the occasion of each survey, at least one bottom ceiling strake on either side and near of the centre keelson and one strake each of the bottom and bilge ceiling at the ship's sides will have to be removed in each compartment over their entire length in order to allow the inner surface of the bottom plates to be inspected. At every third survey, at least one third of the ceiling will have to be removed at the Surveyor's discretion.

1.3.2 Hull, tankers

1.3.2.1 On tankers which -as can be proved- have exclusively carried cargo not causing corrosion, the cargo tanks shall be inspected at every other class renewal only, provided that it may be assumed on the basis of random checks that the component parts are still in satisfactory condition, and provided that no objections will result from the pressure tests as per 1.3.2.2.

1.3.2.2 During each class renewal, the cofferdams of tankers are to be hydrostatically tested to the test pressure as defined in the Construction Rules for Inland Steel Ships. At every other class renewal, in tankers, the cargo tanks are to be tested by water and/or air pressure, to the test pressure stated in the Rules.

Where substances are carried which cause corrosion in connection with water, the kind of testing is to be specified.

1.3.2.3 At every class renewal, tanks of tankers carrying acids and lyes will be subjected to an internal examination and, at every other class renewal, to a hydrostatic pressure test. The test pressure to be fixed in accordance with the Construction Rules depends on the density of the cargo.

1.3.2.4 Tanks for the carriage of pressurized liquefied gases are to be tested like pressure vessels. Deviating there from, cargo tanks need to be subjected to an internal inspection on the occasion of every other class renewal only, if in these tanks only gases or gas mixtures have been carried, which have no corrosive effect upon their walls, and if random checks suggest that the tanks are in satisfactory condition.

1.3.3 Tankers, piping systems

Cargo pipings, including valves and fittings, pumps as well as gas-freeing and safety equipment are to be surveyed.

At each class renewal, the loading and discharge pipes of tankers are to be tested to 1.2 times the allowable working pressure.

1.3.4 Machinery

1.3.4.1 The class renewal survey includes the surveys and checks mentioned in 1.2.

1.3.4.2 The main and auxiliary machinery, including the electric generators, may also be inspected on the occasion of overhaul work of the machinery plant. The survey dates will be fixed by **TL**, taking into account the intervals between repairs as recommended by the engine manufacturers.

Where, owing to service periods, intervals between repairs of main propulsion engines exceed a period of class, an inspection is to be provided for, permitting the condition of engine components subject to wear to be assessed. The inspection will also cover the couplings, gears and adjacent shafts and bearings.

1.3.4.3 Electrical installations

1.3.4.3.1 The electrical installation in the engine room, in the compartments and on deck will be checked, including cables, wires, distributors, etc. The windings of the electric generators and motors for essential auxiliary machinery will be checked for their condition, as will be parts subject to wear, such as collectors, slip rings and carbon brushes.

1.3.4.3.2 On tankers, the electrical installations and equipment are to be checked for compliance with the relevant explosion protection requirements.

1.3.4.4 The automation equipment is to be checked in accordance with **TL** survey programme.

1.3.4.5 All pressure vessels will be surveyed internally and externally during each class renewal.

For pressure vessels, which cannot be properly inspected internally or the condition of which cannot be ascertained during the internal inspection, either a non-destructive testing method is to be applied or, additionally, a hydrostatic test is to be performed.

The hydrostatic test will be conducted to 1.5 times the maximum allowable working pressure. Pressure tanks according to DIN 4810 are to be tested to a test pressure of 5.2 and 7.8 bar respectively, depending on their pressure stage, i.e. 4 or 6 bars. In no case must the test pressure exceed the initial test pressure.

1.3.4.6 Supply steam pipings and cargo heating equipment, such as steam heating coils in oil bunkers/vessels and cargo tanks will be surveyed and subjected to a hydrostatic test to 1.5 times the maximum allowable working pressure. Random checks of the inner condition of the pipings, in particular of the pipe bends, may likewise be demanded, or additional examinations may be required.

1.3.4.7 Boiler installations

For inspections of steam boilers, see A.4.10 and G.

External inspections are to be carried out annually and internal inspections on the occasion of each intermediate survey and class renewal.

1.3.4.8 Thermal oil plants

Thermal oil plants are to be subjected to periodical surveys.

External inspections are to be performed on the occasion of each intermediate and class renewal survey. Proof of continued usability of the thermal oil shall be furnished annually by a competent testing institution.

Internal inspections, including a tightness test of the whole plant, are to be performed at intervals of 5 years, counting from commencement of initial operation and possibly in connection with a class renewal survey.

1.4 Periodical Surveys of Propeller and Stern Tube Shafts**1.4.1 Survey intervals**

1.4.1.1 For Survey intervals and Survey methods, the requirements provided in Section 3, F are to be applied.

1.4.2 Survey methods

1.4.2.1 Survey methods are as described in F.

1.5 Class extension surveys

1.5.1 Class extension surveys are as described in F.

1.6 Damage and Repair Surveys

Every damage affecting the safety of the ship or her machinery or endangering her cargo must be reported to **TL** and be inspected by a Surveyor prior to commencement of repair work.

1.7 Conversion and modification surveys

All conversions and modifications of component parts covered by the Construction Rules must be carried out under Surveyor supervision.

Conversion drawings will have to be submitted to the **TL** and approved prior to commencement of work.

Hull and machinery components and parts of the equipment may have to be replaced if, subject to the Construction Rules, they are inadequate in dimensions and size for the converted or modified ship. TL may, however, grant exemptions.

2. Floating Docks

2.1 General

2.1.1 For floating docks subject to classification by TL, unless otherwise agreed, class renewal surveys are to be conducted at intervals of 5 years.

2.1.2 Floating docks which are not classified may on application be subjected to a condition survey, e.g. prior to sale or conversion.

2.1.3 If classification is intended, the procedure to be followed regarding documents to be submitted and the scope of surveys for classification is analogous to that outlined in Section 2, B.3. Structural plans of the essential structural elements of the dock structure and particulars on their machinery and equipment are to be submitted for approval.

2.2 Class Renewal Surveys

2.2.1 Dock structure

2.2.1.1 For class renewal, the dock structure should be immersed as little as possible; the structural elements above the waterline will be inspected both, internally and externally, and the watertight compartments internally only, at the Surveyor's discretion. Particular attention is to be paid to the pipings arranged inside the compartments, including their valves; these, as well as the inlet and outlet valves, are to be checked for tightness and operability.

2.2.1.2 The partition bulkheads of the watertight compartments are to be checked for tightness and tested by compressed air (max. 0.2 bar). The compartments to be tested will be selected by the Surveyor, depending on the age and general condition of the dock; however, at least every other compartment is to be tested.

2.2.1.3 If only every other compartment is pressure-tested, on the occasion of a trial docking also the tightness of the safety deck is to be tested.

2.2.1.4 Thickness measurements as parts of the dock structure are to be carried out on the occasion of every other class renewal, and/or the Surveyor may require them to be carried out, if he suspects an inadmissible degree of corrosion.

2.2.1.5 Dry dockings or bottom surveys with the dock in inclined position will be confined to particular cases (averages, leakages, etc.) upon agreement between owners/operators and TL.

2.2.2 Machinery equipment

The machinery equipment for operation of the dock, including the electrical equipment, is to be surveyed and checked analogously to the procedure outlined in D.3, as far as applicable.

2.2.3 Equipment

The equipment required for operation of the dock, e.g. bilge and keel blocks and -if fitted- their drives, warping capstans, cranes, bridge connections, shore connections and the dock mooring equipment are to be covered by the condition survey.

Changes introduced since the last class renewal are to be documented.

3. Oil Recovery Vessels

3.1 General requirements

3.1.1 Application

3.1.1.1 The following instructions refer to oil recovery vessels as defined by the TL Construction Rules.

3.1.1.2 Unless otherwise stated in the following, the rules as per A, B.3.6, B.4.5, C.3.5, C.4.2, D.2.6 and D.3.2 apply.

3.1.2 Extent of surveys

3.1.2.1 The surveys are to cover installations, outfit and equipment for:

- Operation in oil covered waters,
- Recovering oil floating on the water,
- The carriage and handling of oil cargo.

They also cover the surveys required by the SOLAS regulations for oil tankers.

The protective equipment and the safety equipment required by the SOLAS regulations for protection of the personnel as well as other equipment and outfit, which are no class requirement items, are not covered by the present Rules for Classification and Surveys. These items will, however, be included in the surveys, if compliance with the requirements of an flag state has to be certified.

3.1.2.2 Hull: The following requirements under 3.2. to 3.4. define the minimum extent of examinations. The surveys shall be extended where substantial corrosion and/or structural defects are found, and will include an additional close-up survey where deemed necessary by the Surveyor.

3.1.3 Documents to be carried on board

The following information is to be readily available for the Surveyor's use in connection with the survey:

- Operations and equipment manual
- Maintenance records for the gas detection and alarm system

and any information that will help to identify suspect areas requiring inspection.

3.1.4 Access to structures

3.1.4.1 Regarding accessibility to spaces, absence of gases, removal of residual cargo and rust, and in respect of lighting, the ship is to be prepared such as to enable it to be duly examined without any risk.

3.1.4.2 For close-up surveys in cargo and salt water ballast tanks, one or more of the following means for access, acceptable to the Surveyor, is to be provided:

- Permanent or temporary staging,
- Passages through structures,
- Lifts and moveable platforms,
- Hydraulic arm vehicles (cherry pickers),
- Boats or rafts,
- Other equivalent means.

3.1.5 Survey at sea

Upon prior agreement with the owner, TL may carry out surveys at sea or at anchorage, provided the

Surveyor is given the necessary assistance, including safety equipment, by the personnel on board.

3.2. Annual Surveys

3.2.1 General

3.2.1.1 In addition to the surveys as stipulated in B, the following installations, structural elements, items of equipment and outfit, including facilities for handling and carriage of the oil cargo, are to be surveyed in order to ensure that they are maintained in satisfactory condition.

Prior to inspection, the Surveyor shall examine the documentation required to be kept on board for this type of vessel, as a basis for the survey.

3.2.1.2 The annual survey is to ensure that the equipment for operation in oil-covered waters and for oil recovery as well as the cargo handling installations and pertinent safety equipment are in good working order.

For the aforementioned surveys normally access to cargo holds or other spaces within the cargo area necessitating gas-freeing is not required, unless checking of the equipment for correct functioning is not possible otherwise.

3.2.2 Installations on the weather deck

On the weather deck the oil recovery equipment will have to be surveyed and/or checked.

3.2.3 Pump rooms

Equipment in pump rooms and other enclosed spaces used during oil recovery and cargo handling operations is to be checked, in particular as to leakages and potential sources of danger.

3.2.4 Equipment for operation in oil-covered waters

The following equipment for operation in oil-covered waters is to be visually examined and to be checked:

- Air locks,
- Arrangements for affecting the closures necessary for explosion protection,
- Ventilation system for pressurizing accommodation and machinery spaces,
- Vapour detection and alarm systems and portable gas detection equipment.

3.2.5 Electrical installations

In gas-dangerous spaces and zones the electrical equipment, including cables and their supports is to be visually examined, particularly regarding explosion protection.

3.2.6 Fire-extinguishing systems

The scope of survey of the fire-extinguishing systems is as specified in B 4.1.

3.3 Intermediate surveys

3.3.1 General

In addition to the surveys and checks listed in item 3.2 above, on the occasion of the second or the third annual survey the checks mentioned below will be carried out.

If deemed necessary by the Surveyor, apart from the survey a functional test will be performed.

3.3.2 Installations in the cargo area

3.3.2.1 Irrespective of the vessel's age the condition of the cargo, oil recovery, tank cleaning, bunkering, ballast, steam and venting systems, as well as of the ventilation and ventilator heads are to be checked. In cases of doubt pressure tests and/or wall thickness measurements may be demanded.

Cargo tank high velocity vent and pressure/vacuum valves are to be function tested, and if deemed necessary by the Surveyor, to be opened up and re-adjusted.

3.3.2.2 In the case of oil recovery vessels beyond this, the following are to be checked:

- Drainage of cargo tank vent lines,
- Bonding devices of all piping systems and independent cargo tanks,
- Cargo hoses (repeat test, if needed),
- Sea inlet discharge valves,

3.3.3 Ballast and cargo tanks

For the scope of the surveys refer to C.3.1.

3.3.4 Thickness measurements

Thickness measurements have to be carried out in sections found to be suspect on occasion of the previous class renewal survey.

In case of substantial corrosion the extent of the thickness measurements is to be increased.

3.3.5 Electrical installations

For the scope of the surveys refer to C.4.1.

3.4 Class Renewal Surveys

3.4.1 General requirements

3.4.1.1 In addition to the class renewal surveys of the ship's hull, the machinery plant and electrical installation, the cargo system, the oil recovery system and pertinent safety devices listed in 3.3.2 for intermediate survey are to be subjected to thorough examination and testing for proper functioning at the surveyor's discretion.

It is to be verified that the relevant instructions, documentation and information material, such as cargo handling plans, cargo tank loading limit information, etc. are kept on board.

3.4.1.2 The class renewal survey of cargo handling installations and related control, alarms and safety devices cannot normally be carried out during loading or discharging operations and is preferably to be carried out with the ship in gas-free condition.

3.4.1.3 Spaces and areas used in connection with cargo handling (e.g. cargo control rooms and pump rooms), are to be examined with respect to their general condition and possible sources of danger. All accessible gas-tight bulkhead penetrations including gastight shaft sealings are to be visually examined.

3.4.1.4 The equipment for operation of the vessel in oil-covered waters has to be subjected to thorough surveys and operational tests.

3.4.2 Hull

3.4.2.1 General requirements

3.4.2.1.1 All cargo tanks, sea water ballast tanks including double bottom tanks, pipe tunnels, cofferdams and void spaces bounding cargo holds, decks and outer hull are to be examined. This examination is to be supplemented by thickness measurements and tank testing as deemed necessary to ensure that the structural integrity continues to be given.

The examination is to be sufficiently thorough for

revealing substantial corrosion, significant deformations, fractures, damages or other structural deteriorations.

3.4.2.1.2 All piping systems within the above spaces are to be examined and tested under working conditions to ensure their continued satisfactory condition.

Special attention is to be given to ballast piping in cargo tanks and cargo piping in ballast tanks and void spaces.

3.4.2.1.3 The survey extent of combined ballast / cargo holds is to be determined based on the records of ballast history.

3.4.2.2 Surveys

3.4.2.2.1 An overall survey of all tanks and spaces is to be carried out.

3.4.2.2.2 The scope of Close-up surveys shall be established based on the requirements shown in Table 3.15, or for double hull vessels, Table 3.16, depending on following items:

- Age of the vessel,
- Operation profile of the vessel during the last period of class.

The surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of the tanks under survey and the condition of the corrosion protection system, and also in the following cases;

- In particular, tanks having structural arrangements or details which have suffered defects in similar tanks or on similar ships according to available information,
- Tanks which have structures approved with reduced scantlings due to an approved corrosion control system.

3.4.2.2.3 Corrosion protection: Where provided, the condition and/or function of coating or corrosion protection of ballast tanks are to be examined.

3.4.2.3 Thickness measurements

3.4.2.3.1 The scope of thickness measurements shall be established based on the requirements shown in Table 3.18, depending on following items.

- Age of the vessel,
- Operation of the vessel during the last period of class,
- Results of the close-up surveys according to 3.4.2.2.2.

3.4.2.3.2 Transverse sections should be chosen where largest corrosion rates suspected to occur or are revealed by deck plating measurements.

In cases where three sections are to be measured, at least one should include a ballast tank within 0.5 L amidship.

3.4.2.4 Tank testing

3.4.2.4.1 The scope of tank testing shall be established based on the requirements shown in Table 3.21, depending on following items:

- Age of the vessel,
- Operation of the vessel during the last period of class,
- Results of the close-up surveys according to 3.4.2.2.2,
- Results of the thickness measurements according to 3.4.2.3.

3.4.3 Cargo area equipment

3.4.3.1 Cargo, oil recovery and ballast piping systems, including valves and fittings, are to be internally inspected for corrosion as deemed necessary by the Surveyor. Subsequently, a pressure test is to be carried out.

3.4.3.2 Cargo, stripping, oil recovery, and ballast pumps are to be examined and checked. Pressure relief valves of pumps are to be function tested.

3.4.3.3 Cargo tank high velocity vent and pressure/vacuum valves are to be overhauled, adjusted by makers/recognized firm and tested under supervision of a Surveyor.

3.4.3.4 Tank venting systems are to be examined; flame arresters are to be opened as far as necessary, and cleaned.

3.4.3.5 Cargo tank heating systems are to be examined and pressure-tested to 1.5 times the operating pressure.

3.4.3.6 The bilge systems of pump rooms are to be inspected and tested.

3.4.3.7 All ventilation systems in the cargo area, including portable fans are to be examined and function-tested.

3.4.3.8 The following equipment is to be function-tested:

- Level indicators of cargo tanks,
- Liquid level alarms,
- Overflow controls,
- Pressure and temperature alarms,
- Remote-control systems of cargo pumps,
- Sampling arrangements of cargo tanks, if fitted.

3.4.4 Equipment for operation in oil-covered waters

The equipment for operation in oil-covered waters and the pertinent safety equipment has to be subject to through surveys and operational tests.

3.4.5 Electrical installations

In addition to the inspection and testing as per 3.3.5 the protection devices of electric motors are to be tested.

4. Barges and Pontoons

4.1 General

4.1.1 Scope

Survey requirements specified in this item are to apply to steel barges and pontoons notwithstanding the requirements specified in other items of this section.

4.1.2 General requirements

4.1.2.1 The general requirements on periodical surveys are to follow the requirements specified in Section 2 and 3.

4.1.2.2 Notwithstanding the requirement in 4.1.2.1, periodical surveys for barges and pontoons not engaged in international voyages or those less than 24 m. in length are to comply with the following:

4.1.2.2.1 Annual surveys specified A.4.1 are not required to be carried out.

4.1.2.2.2 Intermediate surveys specified in A.4.2 are to be carried out within 3 months (before or after) of the second or third anniversary date.

4.1.2.2.3 Surveys other than annual and intermediate surveys are to be carried out in accordance with the requirements in A.4.3, A.4.7, A.4.10 and A.4.13.

4.2 Annual survey

4.2.1 General

4.2.1.1 For survey items deemed necessary by the surveyor, surveys equivalent to class renewal surveys may be carried out.

4.2.1.2 Annual surveys for machinery are not carried out.

4.2.2 Annual survey for hull and equipment

At annual surveys for hull and equipment, surveys applicable to the barge's and pontoon's construction and equipment are to be performed according to the requirements specified in B.

4.3 Intermediate survey

4.3.1 General

For survey items deemed necessary by the surveyor, surveys equivalent to class renewal surveys may be carried out.

4.3.2 Intermediate survey for hull and equipment

At intermediate surveys for hull and equipment, surveys applicable to the barge's and pontoon's construction and equipment are to be performed according to the requirements specified in C.

4.3.3 Intermediate survey for machinery

In the intermediate survey for machinery, open-up inspection of auxiliary generator engines, auxiliary machinery, heat exchangers and air tanks that are used as parts of important systems are to be performed. These open-up inspections may be dispensed with, however, where it is verified that this machinery is in satisfactory condition as a result of a general examination and investigation of the maintenance records by the surveyor.

4.4 Class renewal surveys

4.4.1 Class renewal survey for hull and equipment

Class renewal surveys for hull and equipment are to be in accordance with the relevant requirements specified in D.2 corresponding to the barge's and pontoon's structure and equipment.

4.4.2 Class renewal survey for machinery

At class renewal survey for machinery, open-up

inspection of auxiliary generator engines, auxiliary machinery, heat exchangers and air tanks that are used as parts of important systems are to be performed. These open-up inspections may be dispensed with, however, where it is verified that this machinery is in satisfactory condition as a result of a general examination and investigation of the maintenance records by the surveyor.

4.5 Bottom survey

4.5.1 For bottom surveys of the barge and pontoon, bottom survey items related to barges and pontoons in the requirements of E. are to be carried out.

4.6 Boiler survey

4.6.1 Boiler surveys are to be carried out in accordance with G.

5. Fishing Vessels

See special rules for Classification and Construction of Fishing Vessels.

6. Yachts

See special rules for Classification and Construction of Yachts.

7. High Speed Crafts

See special rules for Classification and Construction of High Speed Crafts.

8. Dynamic Positioning Systems

See special TL rules for Classification and Construction of Dynamic Positioning Systems.

9. Diving Systems

See special TL rules for Classification and Construction of Diving Systems.

10. Submersibles

See special TL rules for Classification and Construction of Submersibles

11. Underwater Equipment

See special TL rules for Classification and Construction of Underwater Equipment.

12. Offshore Installations

See special TL rules for Classification and Construction of Offshore Installations.

13. Multi-point Mooring Systems

See special TL rules for Classification and Construction of Multi-point Mooring Systems.

14. Wind Turbines

See special TL rules for Classification and Construction of Wind Turbines.

15. Special Crafts

For additional survey requirements see Preliminary Rules for Special Crafts, Section 2, B.

L. Additional Safety Measures for Bulk Carriers

1. Strength Evaluation of the Foremost Cargo Hold

The strength of the transverse watertight corrugated bulkhead between cargo holds No. 1 and 2 **(5)** and the allowable hold loading **(6)**, i.e. the strength of the internal structure of the double bottom in hold No. 1 have to be evaluated for flooded condition of the foremost cargo hold.

(5) For requirements see UR S 19 of IACS.

(6) For requirements see UR S 22 and S 23 of IACS.

This applies to existing bulk carriers of 150 m. in length and above, intended to carry solid bulk cargoes having a density of 1,78 t/m³, or above, with single deck, top-side tanks, hopper tanks and single side shell or double skin construction of less than 760 mm. breadth.

In connection with this strength calculation additional thickness measurements have to be taken of the aforementioned structures. Renewal and strengthening required are to be approved by **TL**. Thickness measurements and strength calculations are to be performed at all subsequent Intermediate Surveys (for ships over 10 years) and Class Renewal Surveys.

2. Damage Stability Requirements

Bulk carriers of 150 m. in length and above of single side skin construction have to comply with the damage stability requirements as specified in SOLAS Reg. XII/4.

For possible exemptions refer to SOLAS Reg. XII/9

3. Cargo Hold Hatch Cover Securing Arrangements

Bulk carriers which were not built in accordance with the particular requirements **(7)** for evaluation of the scantlings of hatch covers and hatch coaming of cargo holds have to comply with the additional requirements **(8)** for cargo hatch cover securing arrangements.

4. Side Shell Frames and Brackets

Single side bulk carriers which were not built in accordance with the particular requirements **(9)** for side structures, as well as Oil/Bulk/Ore (OBO) carriers, have to be assessed for compliance with the respective renewal criteria for side shell frames and brackets **(10)**.

In connection with this, additional thickness measurements and strength calculations have to be performed for the aforementioned structures. Renewal and strengthening required are to be approved by **TL**. Thickness measurements and strength calculations have to be performed at all subsequent intermediate and Class Renewal Surveys.

5. Strength and Securing of Small Hatches on Exposed Fore Deck

All bulk carriers have to comply with the requirements **(11)** concerning the strength and securing devices for small hatches fitted on the exposed fore deck.

Those hatches are designed for access to spaces below deck and are capable to be closed weather-tight or watertight, as applicable. Their opening is normally 2.5 square meters or less.

6. Strength of Fore Deck Fittings and Equipment

All bulk carriers have to comply with the requirements **(12)** concerning the strength of air pipes, ventilator pipes and their closing devices and windlasses.

7. Restriction from Sailing with any Hold Empty

Bulk carriers of 150 m. in length L and upwards of single-side skin construction carrying dry cargoes having a density of 1,780 kg/m³ and above, have to comply with the requirements **(13)** concerning the loading of cargo holds in full load condition (at least 90% of ship's deadweight). Requirements are applicable after the vessel reaches 10 years of age and only if the vessel meets not the requirements for withstanding flooding of any one cargo hold.

(7) For requirements see UR S 21 of IACS.

(8) For requirements see UR S 30 of IACS.

(9) For requirements see UR S 12 of IACS.

(10) For requirements see UR S 31 of IACS.

(11) For requirements see UR S 26 of IACS.

(12) For requirements see UR S 27 of IACS.

(13) For requirements see SOLAS XII/14.

M. Survey of Electrical Equipment Installed in Hazardous Areas on Tankers

1. Application

The requirement in this item apply for survey of electrical installation in hazardous areas on tankers, both for new construction and ships in service.

2. General Requirements

2.1 Marking

The equipment marking is to be in accordance with IEC 60079 or the relevant standards to which it is constructed. Normally, all Ex equipment is to be marked with protection type, test institute and certificate number, maker, type, gas group and temperature class (if applicable). In case, this information is not possible to read on the equipment it will normally be considered as not suitable for hazardous areas.

2.2 Certificates

2.2.1 All electrical equipment constructed for use in Zone 0 and Zone 1 are to have a certificate from a recognised accredited test laboratory.

The Ex- protection and IP degree are to be suitable for the hazardous zone and the location, and special conditions are to be complied with.

Note:

Simple apparatus (thermocouples, photocells, junction boxes, etc.), as defined in IEC 60079-11, in intrinsically safe or energy-limited circuits do not require any of the evidence given above.

2.2.2 Electrical equipment for use in Zone 2 is to comply with one of the following:

- Covered by an Ex certificate for Zone 2 (or 0 or 1), for acceptance criteria see 2.2.1 above, or
- Have a manufacturer's conformity declaration, stating that the equipment is suitable for installation in Zone 2, declaring conformity with specified standard/standards such as IEC 60079-15, or

- Be of a type designed to prevent spark and arcs and unacceptable surface temperatures (above the limits of the required temperature class) during its normal operation, or

- Having enclosure of at least IP55 and acceptable surface temperature (within the limits of the required temperature class).

Simple apparatus (thermocouples, photocells, junction boxes, strain gauges, switching devices, etc.), as defined in IEC 60079-11, in intrinsically safe or energy-limited circuits do not require any of the evidence given above.

Note: Information on the nameplate of equipment is to be consistent with information given in the manufacturer's conformity declaration or Ex certificate.

2.3 Modifications

Unauthorised modifications are not permitted. If equipment has been subjected to unauthorised modifications, it will be considered as not suitable for hazardous areas.

Note:

Some examples of unauthorised modifications are:

- *Additional holes drilled in an Ex-d enclosure.*
- *Gaskets fitted to enclosures not certified with it.*
- *Flame paths taped, painted or tighten by other means for preventing corrosion.*

Drawings (as mentioned in item 3.1) are to be submitted to **TL** for approval for new installations or conversion of electrical installations in hazardous areas, which may affect classification.

The modifications are to be carried out in accordance with IEC 60079.

2.4 Cable glands and plugs for Ex-d and Ex-e enclosures are marked and of same Ex type as the enclosure, unless certified for use of different type.

For Ex-d enclosures, the gas group is also stated on the gland. If this information is not readable on the equipment it will normally be considered as not suitable for hazardous areas. For Zone 1, glands with rubber

seal can only be used for enclosure with internal volume less than 2 litres and gas group IIA & IIB.

Note : Cable glands are marked individually (IEC 60079-0 Appendix A.4.1). However, individual marking of cable glands is not required when the cable glands form an integral and permanently fixed part of the enclosure having been certified as one single unit.

2.5 Flame paths on Ex-d enclosures can be protected by the following:

- Suitable non-hardening grease.
- Gaskets, if the equipment has been certified with gaskets.
- One layer of soft tape, but not for gas group IIC (and not on threads).
- Maker's recommendation.

Cable glands are to be also Ex-d.

2.6 If a gasket is damaged and needs replacement, it is of the same type as originally fitted or another acceptable type as stated in the certificate. Any change of gaskets is typically an item that is to be recorded in the maintenance record onboard and thereby easy to identify.

2.7 Repair of equipment

Minor maintenance by shipboard personnel such as changing gaskets, covers for light fittings, etc. is permitted, but is to be recorded.

Major repairs such as the change of motor bearings, etc. are to be done by qualified personnel, and recorded and marked with the symbol:

R

Note that the Flag state might have further requirements for repair of Ex equipment.

2.8 Maintenance procedures and records for all electrical equipment located in hazardous areas are documented and kept onboard.

The record includes the following as a minimum:

- Date of inspection
- Identification of any maintenance found necessary
- Details of maintenance and date when it was completed
- Name of companies and persons who carried out the inspection and maintenance

3. Surveys on New Construction

3.1 Documentation to be submitted:

3.1.1 The following plans and documents are to be submitted to **TL** for approval before the new construction survey:

- a) Area classification drawing of the ship showing gas-dangerous zones and spaces. Spaces requiring over-pressure/ under-pressure, ventilation openings, air-locks, etc. are to be indicated in the drawing or its attachments.
- b) Layout drawing of electrical equipment in hazardous areas.
- c) List of all electrical equipment in hazardous areas, including the following details:
 - Zone classification of location
 - Reference to equipment identification used on layout / area classification drawing
 - Type of equipment and manufacturer
 - Type of explosion protection
 - Apparatus group
 - Temperature class
 - Ingress Protection(IP) rating

- Test authority and Ex-certificate number
- Ambient temperature range for the equipment (*)

Note (*)

If ambient temperature is not stated it is to be understood as the temperature range as -20 deg to +40 deg, as per IEC 60079-14.

- d)** Verification of the compatibility between the barrier and the field component for Intrinsically Safe (IS) circuits.

3.1.2 The documentation as per 3.1.1 is to be available and approved. The actual installation is to be compared with relevant approved drawings. Manufacturer's declarations and certificates for certified Ex equipment are to be delivered with the vessel. All nameplates on equipment are to be consistent with the certificate or declaration.

3.2 Survey of Installation

The installation of electrical equipment in hazardous area is to be verified in accordance with approved drawings.

All equipment is subject to survey, including the checking of connections, conditions and functions and the opening of enclosures by appropriate tools. Proper electrical installation and compliance with possible special conditions from the Ex-certificate are to be verified.

It is to be verified that:

3.2.1 Cables are properly fixed and mechanically protected. The type of cable is appropriate for the hazardous area (screened or armoured) or has been installed in a pipe.

3.2.2 There is no obvious damage to cables. There are normally no cable joints in hazardous areas, but for repairs this may be acceptable provided the continuity of the cable is maintained. Except for intrinsically safe circuits, cable joints are not accepted in Zone 0.

3.2.3 There is no undue accumulation of dust and dirt.

3.2.4 Earth fault monitoring devices are in normal operation and no active alarm due to abnormal low level of insulation resistance or high level of leakage current.

3.2.5 Measurement of insulation resistance: All applicable electrical equipment are able to read minimum 1 MΩ. Confirm that earthing and bonding are made with proper resistance to earth.

Note: The measurement of insulation resistance for IS equipment is to be carried out only after isolating the circuitry, where otherwise damage to the equipment may result.

3.2.6 The hazardous area end of spare cables / cores are connected to earth or spare terminals suitable for the zone. Insulation by tape alone is not permitted on spare cable / cable pairs. Cables containing IS circuits are marked to identify them as being part of IS circuit.

3.2.7 Intrinsically safe cable and non-intrinsically safe cable are not laid in the same cable bunch or pipe unless provided with an earthed metal partition. Ex-ia circuits and Ex-ib circuits are not to be run in the same cable.

Terminals for intrinsically safe circuits and terminals for non-intrinsically safe circuits are separated by a physical distance of 50 mm or a separating panel. Terminals for intrinsically safe circuits are marked as such.

3.2.8 Sealing of gas tight cable penetrations separating hazardous and non-hazardous area are satisfactory.

3.2.9 Earthing of cable braiding or other metallic coverings. Power and lighting circuits are earthed in both ends. Single core cables above 20 A in one end only, preferable in hazardous area.

3.2.10 Drainage of cable pipes are arranged and located at the lowest part of the pipe.

3.2.11 There are no obstructions adjacent to flameproof flanged joints. Minimum clearance:

- 10 mm IIA
- 30 mm IIB
- 40 mm IIC

3.2.12 For spaces in which ventilation is required, e.g. cargo pump room, cargo compressor room, etc., the ventilation capacity on the fans nameplate is to be verified according to the approved ventilation capacity to ensure that a sufficient number of air changes are provided. Ventilation failure is to be alarmed.

Purging time of spaces protected by overpressure is to be determined or verified according to approved drawings.

3.2.13 For spaces protected by over-pressure, actions upon the loss of pressure are to be verified according to approved drawings. These may be automatic or manual disconnections depending on the type of Ex- protection used and audible and visual alarms. Alarms are to be given at a manned station.

Note: Loss of overpressure means less than 0.25 mbar in the protected area.

3.2.14 Setting of overload or thermal protection for Ex-e motor is in accordance with approved drawings.

3.2.15 The flame path protection of Ex-d equipment is to comply with 2.5. Corrosion or paint blocking the path is not accepted.

3.2.16 Condition of equipment is such that it allows safe operation.

Corrosion damages are not acceptable as these can cause Ex equipment to lose its protective function and its watertight integrity.

The protective gas pressure and flow for Ex-p equipment is according to design and flow is adequate.

The resin for Ex-m equipment in the enclosure is not damaged.

A suitable safety barrier/isolator is provided for Ex-ia/-ib equipment.

4. Surveys on Ships in Service

4.1 General

The maintenance record, as per 2.8, is to be reviewed for updates carried out the last 12 months. Repaired or replaced Ex equipment is to be surveyed by checking connections, conditions and function including opening enclosures by appropriate tools, including updated document (Refer IEC 60079-17).

4.1.1 Electrical equipment in gas-dangerous spaces and zones are to be examined with respect to:

- The enclosure is in satisfactory condition.
- No unauthorised modifications
- Bolts of the enclosure are tight and in satisfactory condition.
- There are no strains, poor insulation or loosen connection to the electrical equipment in the enclosure.
- Cable glands are tight and in good condition.
- Gasket is in good condition.
- Equipment marking in order
- Equipment earthing / bonding in order
- Cables in good condition

Specific for protection type:

- Ex-d: The flame path is in satisfactory condition.
- Ex-p: The protective gas pressure and flow are adequate.
- Ex-m: The resin in the enclosure is not damaged.

Areas protected by overpressure:

- Test audible and visual alarm in manned station upon loss of pressure.

- Check automatic or manual disconnection. Ref. 3.2.13

4.2 Annual Surveys

Visual inspection of installations and spot-checking of equipment is to be carried out. In case of any findings, the surveyor may extend the survey as deemed necessary, requiring the examination of covering connections, conditions and functions including opening enclosures by appropriate tools.

4.3 Special Surveys

The following items are to be checked for satisfactory condition during special surveys in addition to 4.2:

- Scope is as for Annual Survey. Surveyor may ask for function testing if defects are found or suspected.

- Insulation monitoring with alarm to be tested.
- Megger testing of power circuits.

Note that Megger testing in gas dangerous spaces may involve risk of explosion due to sparks.

- In spaces protected by overpressure: audible and visual alarm upon loss of pressure to be tested and automatic or manual disconnection of power supply to be checked.