

**RULES  
FOR THE CLASSIFICATION  
AND CONSTRUCTION  
OF SHIPS  
(2011)**



# INTERMARITIME CERTIFICATION SERVICES (*ICS Class*)

## Chapter 1 Classification

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### Section

- 1 General Provisions**
  - 2 Class of a Ship**
  - 3 Surveys and Inspections to Ships in Service**
  - 4 Additional Requirements for Special type of Ships other than Oil Tankers and Bulk Carriers**
  - 5 Technical Documentation of a Ship**
  - 6 Classification of Refrigerating Plants**
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1.2.2 The ICS Rules shall determine the requirements that are to be complied by the ship in order to grant them the *ICS Class*.

1.2.3 The present Chapter 1 applies to ships under construction and to ships in service.

### 1.3 Definitions and explanations

1.3.1 Definitions and explanations related to the general terminology are explained in the *General Regulations for the Supervision*.

1.3.2 In the present Chapter the following definitions has been adopted:

**Additional requirements:** Requirements not set forth in the ICS Rules which are imposed by *ICS Class* when carrying out classification.

**Rules:** The *Rules for the Classification and Construction of Ships*, which comprise the following Chapters:

## SECTION 1

### General Provisions

#### 1.1 General statements

1.1.1 *ICS Class* is an independent and non-commercial organization of technical experts.

1.1.2 *ICS Class* conducts its activities in an impartial and objective way in accordance with the ICS Rules and Regulations.

1.1.3 The interpretations of ICS Rules and Regulations are a right that concerns *ICS Class* only.

#### 1.2 Scope of application

1.2.1 Except where otherwise stated, the present Rules shall apply to the classification and technical supervision of ships having the following characteristics:

.1 Ships (except tugs) of 24m in length and above, regardless gross tonnage and total power of main engines.

.2 Tugs of 12m in length and above, irrespective of total power of their main engines.

.3 Those ships, which according to their technical complexity and at *ICS Class* consideration may be regarded as sea-going ships.

.1 Classification.

.2 Hull.

.3 Equipment, Arrangements and Outfit.

.4 Stability.

.5 Subdivision.

.6 Fire Protection.

.7 Machinery Installations.

.8 Pumping and Piping.

.9 Machinery.

.10 Boilers.

.11 Electrical Equipment.

.12 Refrigerating Plants.

.13 Materials.

.14 Welding.

.15 Automation.

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### 1.4 Reserve clause

1.4.1 No confirmation or certification about the compliance of technical processes or products with the ICS Rules edited by *ICS Class* may be emitted by other society without a prior written agreement ratified with other society.

1.4.2 On default of the pertaining *ICS Class* certificates, no criterion about the compliance of a process or product with the Rules may be emitted.

### 1.5 Protection rights

1.5.1 All rights are reserved to *ICS Class*. The Rules of *ICS Class* are to be applied without prejudice to any third parties protection rights.

### 1.6 Confidentiality

1.6.1 *ICS Class* will deal with as confidential any documents and information obtained as a result of a service request. Such documents and information could be supplied to third parties only with the prior written consent of the party entitled to authorize disclosure.

1.6.2 The condition stated in *rule 1.6.1* shall be maintained without prejudice to any obligation toward the Flag State Authorities.

### 1.7 Fees

1.7.1 For the classification services, *ICS Class* will perceive fees according to its tariffs, even in case the class is not granted. In addition thereto, *ICS Class* will charge any extra expenses incurred in connection with the rendered services (e.g.: travel, transportation, hotel accommodation and other expenses and, where applicable, any added value or turnover tax).

### 1.8 Payment of invoices

1.8.1 Fees for any classification services rendered by *ICS Class* are due to payment at the receipt of invoice. On default, *ICS Class* is entitled, without prejudice to any other claims (for example: legal expenses and other refunds), to add interests up to the usual banking rate, to withhold Certificates and other documents and to suspend or withdraw the class.

1.8.2 Any rights of lien or retention in favor of the client, statutory or otherwise, are hereby excluded. Likewise excluded are any rights of set off with client's counterclaims, unless such counterclaims are undisputed or finally adjudicated upon by the courts.

### 1.9 Liability

1.9.1 *ICS Class* will take due regard towards the selection of its surveyors and other personnel, whose services are requested when performing its obligations.

1.9.2 Class & Statutory conditions and warranties as are imposed on *ICS Class* regarding the proper performance of its obligations are confined, unless they relate to specifically warranted qualities, to the client's right to demand that defects be put in order, all further rights being hereby excluded. In the event that all attempts to amend the defects fail, the client shall have the right to demand a reduction in the remuneration or to cancel the contract.

1.9.3 Damage claims, whether by breach of duty in connection with contract negotiation or breach of contract or tortuous act, are not to be attributed to *ICS Class*, its representatives, employees or authorized agents. This does not apply to simple negligence.

1.9.4 Damage claims are also to be excluded with respect to patent negligence of *ICS Class*, its employees and agents, unless any authorized representative or chief executive acts with a gross negligence.

1.9.5 Any liability for subsequent damages is hereby excluded.

1.9.6 Any personal liability on the part of *ICS Class* representatives, employees or authorized agents is hereby excluded, unless those act deliberately or with gross negligence.

1.9.7 Whereas the legal or contract liability of *ICS Class* will be applicable according to the aforementioned rules, or in case any of those rules may be considered ineffective, an eventual compensation claim, regardless of title - except in case of specifically warranted - will be limited to an extent equal to the fees perceived for that particular service.

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1.9.8 All damage claims, except those based on non-performance or tortuous acts – regardless of their legal origin – will prescribe six (6) months after those services were rendered by *ICS Class*.

### 1.10 Jurisdiction

1.10.1 The place for any dispute about *ICS Class* services is subject to the exclusive jurisdiction of the Panama courts and will be governed by the Panama law.

1.10.2 The place of jurisdiction is the Republic of Panama.

1.10.2 Governing laws are those of the Republic of Panama.

### 1.11 Severability clause

1.11.1 In the event of one or more or any part of the present *General provisions* become ineffective, this will not affect the remaining conditions.

2.1.5 Withdrawal of the class to a ship means that the conditions no longer permit the maintenance of the class, that the immediate elimination of that condition is not achievable or that they need a long classing process. The class shall be considered withdrawn in the cases specified in the *General Regulations for the Supervision, regulations 1.4.4, 1.4.5 and 1.4.6*.

2.1.6 Suspension of the class means that temporarily have appeared conditions that no longer permit the maintenance of the class, but these conditions may be eliminated in a short period and they do not require a long and complex classing process.

2.1.7 Class may be suspended in the cases specified in the *General Regulations for the Supervision, regs 1.4.4, 1.4.5 and 1.4.6* and, additionally:

.1 As a result of damage to hull, equipment, arrangements or outfit subject to supervision under the Rules.

.2 If the Owner fails to comply with the payments convened with *ICS Class* for its services to a ship or group of ships.

.3 After changes that imply a new issue of documents that certify the compliance with the Rules (change of Owner, or the ship's flag, change of port of registry, call sign, etc.).

.4 In case of written application from the Owner.

2.1.8 Excluding the causes specified in the *General Regulations for the Supervision, reg.1.4*, the validity of class may be renewed upon the basis of positive results of the relevant surveys and when the causes of its loss have been eliminated. In the case when causes determining the suspension of the class are not eliminated in a **3 month** period, class may be suspended.

### 2.2 Class notation of a ship

#### 2.2.1 Marks in the class notation of a ship built under *ICS Class* supervision

2.2.1.1 The marks in the class notation of a ship whose hull and arrangements were built under *ICS Class* supervision shall consist of the symbol ☆ after the letter **H** or **M** as follows:

**H**☆ : For Hull Class Certificate  
**M**☆ : For Machinery Class Certificate, for self-propelled ships.

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## SECTION 2

### Class of a Ship

#### 2.1 General requirements

2.1.1 *ICS Class* may assign a class to a ship that has been under survey during construction, as well as assign or renew a class to a ship in service.

2.1.2 Assignment or renewal of class, or the re-classification of a ship means that she complies fully or to an acceptable degree with the relevant Rules of *ICS Class*.

2.1.3 When a class is assigned or renewed, the ship will be granted the *Certificates of Class: Hull and Machinery* (for self-propelled ships) with the corresponding class notation, and will be entered in *ICS Class Register Book*. In the case of non-propelled vessels (floating docks and cranes) to which the aforesaid may be applied, *ICS Class* will give consideration to each particular case.

2.1.4 The ship's class shall be assigned or renewed for a **5 year period** during the special survey.

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### 2.2.2 Marks in the class notation of a ship not built under supervision by ICS Class

2.2.2.1 If the ship as a whole, her hull or machinery installations have been built according to the Rules and under supervision by a Classification Society recognized by *ICS Class*, and afterwards classed with *ICS Class*, the marks in the class notation shall consist of the letters **H** and **M** as follows:

- H** : For Hull Class Certificate
- M** : For Machinery Class Certificate, for self-propelled ships.

2.2.2.2 If the ship as a whole, her hull or machinery installations were built without supervision by a recognized Classification Society, the marks in the class notation shall consist of letters **H** and **M** in brackets, as follows:

- [**H**] : For Hull Class Certificate.
- [**M**] : For Machinery Class Certificate, for self-propelled ships

### 2.2.3 Ice strengthening marks

2.2.3.1 For ships having ice strengthening according to the ICS Rules, an ice strengthening mark shall be included in the *Hull Class Certificate*, consisting in one of the following characters: **RHI**, **RH**, **H1**, **H2**, **H3** or **H4**.  
The scope of requirements for the appropriate ice categories shall be determined by the conditions specified in *table 2.2.3.1*.

2.2.3.2 The selection of the ice category is determined by the Owner in conformity with the service conditions of the ship.

### 2.2.4 Subdivision marks

2.2.4.1 If the ship was built in accordance with the requirements of *Ch 5*, to the class notation in the

*Hull Class Certificate*, is to be added a subdivision mark<sup>[1]</sup>, <sup>[2]</sup> or<sup>[3]</sup>, where the figure indicates the number of flooded compartments with which the ship remains in satisfactory stability and floating conditions.

Marks <sup>[2]</sup> and <sup>[3]</sup> indicate the number of adjacent compartments.

### 2.2.5 Marks for restricted areas of navigation

2.2.5.1 If the ship is intended for a restricted area of navigation and its construction, stability and equipment correspond to the requirements of the ICS Rules for a specified area, then to the class notation is added one of the following marks: **I**, **II** or **III**.

- .1 **I**: Comprises high-sea navigation up to 200 miles from a shelter place, and a distance of not more than 400 miles between 2 shelter places.
- .2 **II**: Comprises high-sea navigation up to 50 miles from a shelter place and a distance of not more than 100 miles between 2 shelter places.
- .3 **III**: Comprises coastal navigation up to 25 miles from a shelter place and a distance of not more than 50 miles between 2 shelter places.
- .4 If the ship is intended for navigation only within the boundaries of ports and harbors, after the mark **III** it will be added the expression **Harbor Service**.

2.2.5.2 Restrictions in the navigation area and navigation conditions will be determined by *ICS Class* in accordance with the ICS Rules and other relevant documents and will be specified in the corresponding Certificates and Reports.

2.2.5.3 Ships not having restrictions in navigation area shall not have a distinguishing mark in their class notation

**Table 2.2.3.1 Ice categories**

Category	Independent navigation	Navigation astern an icebreaker
RHI	In summer or autumn: in all the oceans	The strengthened category selection for the navigation in ice will be made by the ship owner, depending on the conditions of the service which the ship will be dedicated.
RH	In summer and autumn: in the arctic seas in light ice conditions and all year round in the non arctic seas freezing seas.	
H1	In summer in the Arctic in broken ice and all year round in the non arctic freezing seas in light ice conditions.	
H2	In the non arctic seas, broken ice in small size.	
H3	In the non arctic seas, broken ice in small size	
H4	Sporadic in small scarce broken ice in non-artic seas	

### 2.2.6 Automation marks

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- 2.2.6.1 If the automation equipment and systems comply with the requirements of *Ch 15*, to the class notation in the *Machinery Class Certificate* is added one of the marks stated in *rules 2.2.6.2 or 2.2.6.3*.
- 2.2.6.2 (A 1): For ships with gross tonnage 500 and upwards, except passenger ships, equipped with automated machinery installations enabling them to operate with unattended machinery spaces and main control station.
- 2.2.6.3 (A 2): For the following ships:
- Ships with gross tonnage 500 and upwards with unattended machinery space but with attended main control station.
  - Ships with a gross tonnage 50 to 500 with power of main engines 1500 kW or less, with unattended machinery spaces.
- 2.2.7 Additional characteristic *ICS Class* and conventional notation of the ship's purpose**
- 2.2.7.1 If the ship was built for a specific purpose or has construction details or any other distinctive characteristic *ICS Class*, the following is to be added to her class notation:
- Dry cargo ships  
*Container carrier*: A vessel designed for the carriage of cargo in containers and that has fixed rails to guarantee a secure stowage of cargo in holds.  
*Fitted for the carriage of containers*: A ship that carries containers occasionally or as a part of her cargo and has the suitable equipment for that purpose.  
*Bulk/ore carrier*: A vessel specially designed for the carriage of bulk cargo or minerals and that has the appropriate reinforcements, in compliance with the requirements of the Rules.
  - Tankers: Vessels built or adapted for the carriage of liquid cargoes that comply with the relevant requirements of the Rules of *ICS Class*. It shall be specially indicated their suitability for the carriage of certain dangerous goods or the flash point of the carried products, e. g.:  
*Chemical tanker- Type I*  
*Oil tanker (>60°C)*
  - Passenger ship*: A vessel that complies with the construction requirements of the Rules and the safety requirements of Conventions in force
- (especially SOLAS) for the transport and accommodation of passengers.
- .4 Vehicle carriers  
*Ro/Ro ship*: A vessel equipped with ramps and occasionally with ports in the hull for vehicle movement, and adequately reinforced in accordance with the requirements of the Rules.  
*Ferry*: A vessel equipped for the carriage of vehicles (as well as passengers) in a traffic line.
- .5 Special vessels: Ships or vessels with special construction, configuration or equipment due to the purpose they are intended for. Special notations are to be used, such as the following:  
*Tug*  
*Icebreaker*  
*Suction dredger*  
*Pilot vessel*  
*Research vessel*  
*Seamen training*  
*Factory vessel*  
*Rescue vessel*  
*Floating crane*
- .6 Floating docks: In this case the additional notation to the class shall be:  
*Floating dock* (indicating the docking capacity in tons).
- .7 High speed craft: The following special notations are to be included:  
*HSC-A*: For high-speed craft that carry no more than 450 passengers and that, when engaged in voyages with full load at the service speed, are never more than four hours from a shelter place. These craft correspond to Category A as defined in the High Speed Craft Code.  
*HSC-B*: For high speed craft carrying more than 450 passengers and that, when engaged in voyages with full load at the service speed, are never at more than four hours from a shelter place. These craft correspond to Category B as defined in the High Speed Craft Code.  
*HSC-Cargo (A)*: For cargo high speed craft not having the class notation HSC-Cargo (B).  
*HSC-Cargo (B)*: For cargo high speed craft with a gross tonnage 500 and upwards that, during voyages with full cargo and at service speed are never at more than eight hours from a shelter place. These craft correspond to definition

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“Cargo Craft” as stated in the High Speed Craft Code.

2.2.7.2 In the *Hull Class Certificate*, in addition to the aforementioned notations, will be included relevant information about the hull type or shape, the service mode to which the ship has been designed and built. A list of such vessel type notations follows:

- .1 *VCA*: It will be assigned to hovercrafts.
- .2 *Catamaran*: It will be assigned to vessels with twin hulls, joined by a deck-type structure.
- .3 *Hydrofoil*: It will be assigned to vessels that sail in a non displacement mode, supported by hydrodynamic forces created by submerged foils united to the hull by a rigid structure.
- .4 *ES*. It will be assigned to surface effect craft.

### 2.2.8 In-water survey mark

2.2.8.1 If a ship complies with requirements of *rule 3.5.3* the mark **ISA** is to be added to the *Hull Class Certificate*, meaning an in-water survey with satisfactory results has been carried out during the validity of the said Certificate.

### 2.3 Alteration of class notation

2.3.1 *ICS Class* may delete or alter any mark in the class notation of a ship in case of any alteration of, or non compliance with the requirements determining such a mark to be included in the class notation.

## 3.1 General

3.1.1 In order to maintain the class of the ship, periodical surveys are to be carried out, and, when necessary, eventual inspections to the hull, machinery (including electrical equipment), refrigerating plant and other items, as stated further.

3.1.2 *ICS Class* reserves the right to enhance the scope of the surveys indicated in *Subs 3.3* when deemed necessary for concrete reasons, on the basis of service experiences. In the same manner, the close-up surveys of some items could be omitted if an external inspection and a performance test demonstrate their good technical condition.

3.1.3 The surveys required to maintain the class, in some special cases such as repairs or modifications of some items subject to classification, are to be agreed with *ICS Class* local Offices in due time, to guarantee that the eventual measures could be assessed on time and the required works properly overseen.

3.1.4 *ICS Class* will report to the Shipowner or to the Operator the state of the class and the Statutory Certificates, indicating the last and due inspections. However, even in case such information does not reach the Owner or Operator, the latter is to submit the ship to survey in accordance with the present Rules.

3.1.5 The *Final Reports* on surveys, prepared by the Surveyors to *ICS Class*, will be assessed by the Head Office and, in case no objections are made, results will be kept in the Ship’s file.

3.1.6 The signature of a Surveyor to *ICS Class* on a Certificate or any other document means only the certification of what he has seen and tested during the survey or inspection.

## 3.2 Class surveys and inspections

3.2.1 In order to grant the class to a ship that is submitted for the first time to *ICS Class*, an **initial survey** is to be carried out, in an extent to

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## SECTION 3

### Surveys and Inspections to Ships in Service

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- be determined by *ICS Class* in each particular case, taken into account the requirements of *Subs 3.10*.
- 3.2.2 Every ship that has been assigned a class by *ICS Class* is to be subject to the following periodical surveys:
- .1 Annual survey.
  - .2 Intermediate survey.
  - .3 Special survey.
  - .4 Ship's bottom survey (DD/IWS).
  - .5 Propeller shaft survey.
  - .6 Boiler survey.
- 3.2.3 The aforementioned surveys are to be carried out simultaneously with the necessary surveys and inspections due to the requirements of International Conventions and National laws derived from them.
- 3.2.4 Annual, intermediate and special surveys shall be considered complete if the pertaining inspections to the ship's bottom, screw shaft, propellers, stern tube and boilers have been carried out (see *Subs 3.5, 3.6 and 3.7*).
- 3.2.5 Annual surveys shall have the purpose of confirming that the ship complies, to the appropriate extent, with the requirements that are necessary to maintain the class, and also to check the individual performance of machinery, systems and arrangements to which the requirements of the Rules apply.
- 3.2.6 Annual surveys shall be carried out during a period between three months before and three months after the anniversary date of the granting or renewal of the class.
- 3.2.7 Intermediate surveys are to be carried out in lieu of the second or third annual survey.
- 3.2.8 Special surveys shall have the purpose of ascertaining whether the ship's technical condition complies with the Rules and the additional requirements, and are to be carried out according to the following conditions:
- .1 They shall be performed at time intervals of not more than five years from the date of class granting or renewal, except in cases when *rules 3.2.9.1, 3.2.9.4, 3.2.9.5 and 3.2.9.6* apply.
  - .2 They may be commenced during the fourth annual survey and be carried out gradually until completion in due date. Whenever possible, as a part of the preparation to that survey, it is recommended that thickness measurements be started beginning from the fourth annual survey.
  - .3 Renewal surveys beginning before the fourth annual survey cannot be extended for a period over 12 months.
- 3.2.9 Notwithstanding the requirements of *3.2.8.1*, when establishing the expiry dates of the Certificate of Class, the following is to be kept:
- .1 When the special survey takes place within three months prior to the expiry date of the Certificate Class, the new Certificate shall be in force from the date of completion of the special survey for a period that shall not exceed **five years** from the expiry date of the existing Certificate.
  - .2 When the special survey takes place after the expiry date of the existing Certificate, the new Certificate shall be in force since the date of completion of the special survey for a period that shall not exceed **five years** from the expiry date of the existing Certificate.
  - .3 When the special survey takes place more than 3 months prior to the expiry date of the existing Certificate, the new Certificate shall be in force from the date of completion of the special survey for a period that shall not exceed **five years** from the date of completion of the said survey.
  - .4 If, in the expiry date of the Certificate of Class the ship is not in a port where she can undergo the special survey, *ICS Class* may extend the validity of the Certificate, provided the Administration grants such an extension for the Statutory Certificates, with the purpose that the ship proceeds to a port where she could be surveyed. Such extension may not exceed three months, and the ship to which it is granted shall not be allowed to leave the port of survey without a new Certificate. On completion of the special survey, the new Certificate shall be in force for a period not exceeding **five years**, beginning from the expiry date of the existing Certificate before the extension was granted.
  - .5 Class Certificate granted to a ship engaged on short international voyages or having a restricted area of navigation, if not extended in accordance



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- with the previous statements of this rule, may be extended by *ICS Class*, provided the Administration grants such an extension for the Statutory Certificates for a period of grace **not above one month** from the expiry date of the Certificate. On completion of the special survey, the new Certificate shall be valid for a period not exceeding **five years** from the expiry date of the existing Certificate.
- .6 Under special circumstances, set out by the Administration for Statutory Certificates, regardless of the requirements of *paragraphs 3.2.9.2, 3.2.9.4 and 3.2.9.5* it will not be necessary for the validity of the new Class Certificate to begin at the expiry date of the previous Certificate. Under such circumstance the new Certificate will be in force for a period not exceeding five years from the date of completion of the special survey.
- 3.2.10 When provisions of *para. 3.2.8.3* is apply and such survey is completed within a three month period prior to the expiry date of the existing Certificate, the new Certificate shall be valid from the date of completion of the survey for a period that shall not exceed **five years** from that date.
- 3.2.11 Upon Owner's request, *ICS Class* may establish continuous survey for hull, machinery installations and refrigerating plants in accordance with *Subs 3.12*.
- 3.2.12 Surveys to the ship's bottom are to be carried out with the purpose of confirming that this part of the ship maintains a satisfactory condition for the service the ship is intended. Surveys are to be carried out in accordance with the following:
- .1 They shall be carried out annually to passenger ships, icebreakers and ships sailing independently in Arctic zones, except when *3.2.9.4 and 3.2.9.5* apply.
- .2 Ships not included in *para. 3.2.12.1* shall be submitted to not less than two surveys in a 5 years term, except when provisions of *3.2.9.4 and 3.2.9.5* apply. In such a case, the five years term could be extended. However, the interval between any two of those surveys shall not exceed **36 months**.
- .3 For passenger ships not engaged on international voyages (except hydrofoils) *ICS Class* may allow - after consideration - a larger term than that stated in *3.1.12.1*.
- .4 Ships having class restrictions relating to the underwater shell plating, shafting, propellers or steering gear are to be submitted to bottom surveys annually.
- .5 The intervals between 2 bottom surveys of non-propelled ships, on agreement with *ICS Class*, could be extended from those mentioned in *para 3.2.12.2*
- 3.2.13 Screw shaft, propellers and stern tube periodical surveys are described under *Subs 3.6*.
- 3.2.14 Boiler periodical surveys are described under *Subs 3.7*.
- 3.2.15 The intervals between external inspections, measurements or tests of the machinery, systems or equipment elements could be reduced when deemed convenient or necessary, due to their technical condition or specific navigation conditions. When the cause of reduction is eradicated, the new expiry dates shall coincide with the expiry date of the full term periodical survey.
- 3.2.16 For every oil tanker and bulk carrier the Owner, in agreement with *ICS Class*, shall make a survey schedule for class renewal. The said schedule is to be composed before the renewal surveys and shall take into account the following:
- .1 The installation of access means to structural elements, considering the provisions for enhanced surveys, thickness measurements and tank pressure tests.
- .2 The thickness measurement schedule to be taken into account when preparing the vessel for the survey.
- 3.2.17.1 As regards *rule 3.2.16*, the Owner shall keep onboard the ship, during all her service life, the following documents, that are to be shown to the Surveyor to *ICS Class* whenever he requests them:
- .1 A record of enhanced survey reports including a log of all the structural inspections, a condition assessment and thickness

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- measurements as required by IMO *Resolution A.774 (18)*, as amended.
- .2 Additional documents such as the following:
- Structural plans of holds and ballast tanks.
  - Repairs record.
  - Loading and ballast operations record.
  - Survey reports concerning general structural wear and tear, leaks in bulwarks and pipelines, condition of shell plating and rust protection system, if provided.
  - Any other information deemed useful to determine the critical structure zones.
  - The survey schedule provided for in 3.2.16.
- 3.2.18 The report on condition assessment stated in *para 3.2.17.1* shall be translated into English, in case the language in which it is written is not English.
- 3.2.19 In order to carry out the inspections under safe conditions and in a practical form, the Owner shall provide the necessary means, among which are the following:
- .1 Closed spaces and tanks are to be ventilated and degassed.
- .2 Tanks and spaces adequately clean and free from water, rust, oil residues, etc.
- .3 Enough illumination to permit the detection of significant corrosions, deformation, fractures, damages or any other forms of structural damage.
- .4 Provision of safe access means such as scaffolds, provisional or permanent walkways, lifts and mobile platforms, etc.
- 3.2.20 Oil tankers built after **July 1, 1983** are to be fitted with access means to structural parts in an extent which corresponds with the minimum requirements of inspections, thickness measurements of the structural parts and the sealing tests.
- 3.3 Scope of periodical surveys**
- 3.3.1 Annual survey**
- 3.3.1.1 Annual survey of hull and its equipment shall include:
- .1 External inspections to an extent which enables to ascertain the technical conditions of the following:
- Above water plating.
  - Upper deck plating.
  - Guardrails and bulwarks.
  - Freeing ports.
  - Superstructures and deckhouses.
  - Portable and mechanically driven hatch covers.
  - Companion hatch coamings and ventilator coamings.
  - Hatch covers closings in weather decks.
  - Outlets from ventilator ducts, sounding pipes and other ducts.
  - Tow hook with fixing arrangement and accessories (for tugboats).
  - Intakes and outlets of ventilation ducts in superstructure and deckhouse bulkheads.
  - Closings of manholes and other openings to weather decks.
  - Outer doors, gangways, side scuttles and skylights.
- .2 Operation test of:
- Freeing ports, side ports and stern ramps.
  - Doors in bulkheads.
  - Steering gear.
  - Anchor arrangement (testing of windlasses may be carried out in port).
  - Mooring arrangement,
- 3.3.1.2 Additional requirements for Double Hull Oil Tankers:
- .1 Examination of cargo tanks openings including gaskets, covers, coamings and flame screens.
- .2 Examination of cargo tank pressure/vacuum valves and flame screens.
- .3 Examination of flame screens on vents to all bunker and oily slop tanks

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- .4 Examination of cargo, crude oil washing, bunker and vent piping systems, including vent masts and headers.
- .5 Examination of all bulkheads for signs of oil leakage or fractures and, in particular, the sealing arrangements of all penetrations of bulkheads.
- .6 Examination of the condition of all piping systems and pipe tunnels.
- .7 Double hull oil tankers exceeding 15 years of age: All ballast tanks adjacent to (i.e. with a common plane boundary) a cargo or fuel tank with any means of heating should be examined internally. When considered necessary by the surveyor, thickness measurement should be carried out and if the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements should be increased in accordance with tables 3.3.3-10 to 3.3.3-14.
- Note: On double hull oil tankers of 15 or less years of age, examination of ballast tanks should be carried out when required as a consequence of the results of the special survey and intermediate survey. When extensive corrosion is found, thickness measurements should be carried out. Where substantial corrosion is found, the extent of thickness measurements should be increased in accordance with table 3.3.3-10 to 3.3.3-14
- 3.3.1.3 Additional requirements for bulk carriers:
- .1 Single skin Bulk Carriers of 10 to 15 years of age.**
- .1.1 An overall survey of all cargo holds.
- .1.2 A close-up survey to the forward cargo hold of at least 25% of frames (lower end attachments and shell plating). When this 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 extend of all remaining cargo holds. Thickness measurement is to be carried out at the surveyor's consideration. In case a significant corrosion is observed, the thickness measurement is to be carried out in accordance with tables 3.3.3-1 to 3.3.3-5.
- .1.3 Examination of all piping and penetrations in cargo holds, including overboard piping.
- .2 Single skin Bulk Carriers over 15 years of age.**
- .2.1 Overall survey of all cargo holds.
- .2.2 A close-up survey of the forward cargo hold and one other selected cargo hold.
- .2.3 Examination of all piping and penetrations in cargo holds, including overboard piping.
- .3 Single Skin Bulk carriers of 150 m in length and upwards, carrying solid bulk cargoes having a density of 1780 Kg/m<sup>3</sup> and above, constructed before 1 July 1999 with an insufficient number of transverse watertight bulkheads to enable them to withstand flooding of the foremost cargo hold.**
- .3.1 For single skin Bulk Carriers of 5 to 15 years of age:**
- .1 An overall survey of the foremost cargo hold, including close-up survey minimum 25% of frames (shell frames including their upper and lower and attachments, adjacent shell plating, and transverse bulkheads) and suspect areas identified at previous surveys.
- .2 Where considered necessary a close-up survey of all the shell frames and adjacent shell plating of the foremost cargo hall.
- .3.2 For single skin Bulk Carriers exceeding 15 years of age:**
- .1 An overall survey of the foremost cargo hold, including close-up survey of all shell frames including their upper and lower end attachments, adjacent planting and transverse bulkheads and suspect areas identified at previous surveys.
- .3.3 Thickness measurement to be carried out to an extent sufficient to determine both general and local corrosion levels at areas subject to close-up survey, minimum at suspect areas identified at previous surveys. Where substantial corrosion found, the extent of thickness measurements should be increased in accordance with the requirements of Tables 3.3.3-1 to 3.3.3-5

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### **.4 Double Skin Bulk Carriers of 10 to 15 years of age.**

.4.1 Overall survey of two selected cargo holds. Thickness measurements are to be carried out at the surveyor's consideration. In case of sufficient corrosion is observed, the thickness measurement is to be carried out in accordance with table 3.3.3-6 to 3.3.3-9.

.4.2 Examination of all piping and penetrations in cargo holds, including overboard piping.

### **.5 Double Skin Bulk carrier over 15 years of age.**

.5.1 Overall survey of all cargo holds. Thickness measurement is to be carried out of the surveyor's consideration. In case of sufficient corrosion is observed, the thickness measurement is to be carried out in accordance with table 3.3.3-6 to 3.3.3-9.

.5.2 Examination of all piping and penetrations in cargo holds, including overboard piping.

### **.6 All Bulk Carriers**

.6.1 Examination and test, at random of the water ingress detection systems on cargo holds, ballast tanks forward the collision bulkhead and dry or void spaces as well of their alarms.

.6.2 Examination and 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 as well as their controls.

.6.3 Examination of ballast tanks when required as a consequence of the results of the special survey and the intermediate survey. Thickness measurement is to be carried out of the surveyor's consideration. In case of sufficient corrosion is observed, the thickness measurement is to be carried out in accordance with table 3.3.3-6 to 3.3.3-9. Suspected areas indentified are previous surveys are to be examined. Areas of substantial corrosion identified at previous surveys to be thickness measured.

### **3.3.2 Intermediate survey**

3.3.2.1 Intermediate survey of the hull and its equipment shall include the items listed under the annual survey and, additionally:

.1 Examination of cargo holds (as deemed necessary by the Surveyor), inner bottom, bulkheads, plating, decks, tweendecks, pipelines and cable ducts passing through holds, openings and accesses in watertight bulkheads, for all ships **over 10 years of age**.

.2 Examination of machinery spaces and funnels and their closing arrangements.

.3 Examination of fastening arrangements of bottom and side valves.

.4 Inspection of ballast tanks for ships **between 5 and 10 years** built:

Tanks that is peculiar to the ship's type, as indicated by the Surveyor. If no hull damage is observed, the inspection may include only a revision of the protective coating, provided it is in a good condition.

When serious breakdown of the protective coating, rust or any other damage is observed in ballast tanks, or in case no protective coating was applied to the tanks when the ship was built, the inspection is to be extended to other tanks of the same type.

When breakdown of the protective coating has been observed and no repair has been made or in case no coating was applied when the ship was built, *ICS Class* may require annual inspections of the tanks and thickness measurements of their members.

.5 Inspection of ballast tanks for ships **over 10 years** built:

- All ballast tanks.

- If no damage of members was observed during the inspection, it may be limited to an examination of the protective coating.

If breakdown of the protective coating is observed and no repair has been made or when no coating was applied when the ship was built, *ICS Class* may require annual inspections of tanks and thickness measurements of their members in order to confirm the class.

### **3.3.2.2 Additional requirements for Double Hull Oil Tankers:**

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- .1 For weather decks, an examination as far as applicable of cargo, crude oil washing, bunker, ballast, steam and vent piping systems as well as vent masts and headers. If upon examination there is any doubt as to the condition of the piping, the piping may be required to be pressure tested, thickness measured or both.
- .2 Oil tankers of 5 to 10 years of age**
- .2.1 The requirements of 3.3.2.2.1 apply
- .2.2 For tanks used for salt-water ballast, an overall survey of representative tanks selected by the surveyor should be carried out. If the overall survey of salt-water ballast tanks reveals no visible structural defects, the examination may be limited to verification that the protective coatings remain efficient.
- .3 Oil tankers of 10 to 15 years of age**
- .3.1 The requirements of 3.3.2.2.2 apply
- .3.2 An overall survey of at least two representative cargo tanks should be carried out.
- .3.3 For ballast tanks, where fitted, an overall survey of all such tanks should be carried out. If such survey reveals no visible structural defects, the survey may be limited to verification that the protective coatings remain efficient.
- .3.4 Extent of close-up survey  
Ballast tanks: to the same extent as previous special survey;  
  
Cargo tanks: the extent of survey should be based on the record of the previous special survey and repair history of the tanks, and be applied to two cargo tanks after the second special survey.
- .3.5 Extent of thickness measurements  
The minimum requirements for thickness measurements at the intermediate survey are areas found to be suspect areas at the previous special survey. Where substantial corrosion is found, the extent of the thickness measurements should be increased in accordance with tables 3.3.3-10 to 3.3.3-14.
- .4 Oil tankers exceeding 15 years of age**  
The requirements of the intermediate survey should be to the same extent as the previous
- Special survey. However, pressure testing of cargo and ballast tanks is not required unless deemed necessary by the attending surveyor.
- 3.3.2.3 Additional requirements for Bulk Carriers:**
- .1 Single Skin Bulk Carriers 5 to 10 years of age**
- .1.1 Overall survey of representative ballast tanks including fore and aft peak tanks, when considered necessary by the surveyor, or where extensive corrosion exist, thickness measurements are to be carried out. Suspected areas identified at previous surveys are to be overall and close-up surveyed.
- .1.2 Overall survey of all cargo holds, including close-up survey of at least 25% of frames in the forward cargo hold and one other selected cargo hold, including shell frames, their upper and lower attachments, adjacent shell plating and transverse bulkheads as well as areas found suspect at previous survey. Where considered necessary by the surveyors 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 all remaining cargo holds.
- .1.3 Thickness measurements at areas subject to close-up survey to an extent sufficient to determine general and local corrosion levels, minimum at areas found to be suspect areas and areas of substantial corrosion identified at previous surveys. Where substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with table 3.3.3-1 to 3.3.3-5.
- .2 Single Skin Bulk Carriers of 10 to 15 years of age.**
- The requirements of the Intermediate Survey are to be to the same extend to the previous Special Survey. However, internal examination of fuel tanks and pressure testing of all tanks are not required unless deemed necessary.
- .3 Single Skin Bulk Carriers over 15 years of age**

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The requirements of the Intermediate Survey are to be to the same extend to the previous Special Survey. However, internal examination of fuel tanks and pressure testing of all tanks are not required unless deemed necessary.

### **.4 Double Skin Bulk Carrier of 5 to 10 years age**

.4.1 Overall survey of representative ballast tanks including fore and aft peak tanks, when considered necessary by the surveyor, or where extensive corrosion exist, thickness measurements are to be carried out. Suspected areas indentifies at previous surveyor are to be overall and close-up surveyed.

.4.2 Overall survey of all cargo holds extended to include a close-up survey of selected areas of structure when considered necessary.

.4.3 Thickness measurements at areas subject to close-up survey to an extent sufficient to determine general and local corrosion levels, minimum at areas found to be suspect areas and areas of substantial corrosion identified at previous surveys. Where substantial corrosion is found, the extent of thickness measurements is to be increased in accordance with table 3.3.3-6 to 3.3.3-9.

### **.5 Double Skin Bulk Carriers 10 to 15 years of age.**

The requirements of the Intermediate Survey are to be to the same extend to the previous Special Survey. However, internal examination of fuel tanks and pressure testing of all tanks are not required unless deemed necessary.

### **.7 Double Skin Bulk Carriers over 15 years of age.**

The requirements of the Intermediate Survey are to be to the same extend to the previous Special survey. However, internal examination of fuel tanks and pressure testing of all tanks are not required unless deemed necessary.

3.3.3.1 The first special survey of the hull and its equipment shall have the extent of an annual survey and, additionally:

- .1 Survey of the ship's bottom in a Dry Dock.
- .2 Survey of every cargo hold, inner bottom, plating, bulkheads, decks, tween decks, pipelines and cable ducts passing through holds, openings in watertight bulkheads.
- .3 Examination of tanks:  
Forepeaks, after peaks, chain lockers.  
Ballast tanks.  
When serious breakdown of the protective coating is observed in ballast tanks, or in case no coating was applied to the tanks when the ship was built, the ship is to submit the said tanks to internal inspection during annual surveys in order to maintain the class.  
One fuel tank and one double bottom fresh water tank, when required by the Surveyor.
- .4 Survey of drain wells in cargo holds, machinery space and cofferdams.
- .5 Survey of seating of main and auxiliary engines and boilers.
- .6 Survey of tweendeck hatch covers.
- .7 Inspection of masts, their rigging and gear.
- .8 Inspection of anchors, chains, devices for releasing the chain cable and stoppers.
- .9 Inspection of bits, mooring and towing ropes.
- .10 Functional tests of steering gear, windlass, towing and mooring gear. In case the aforesaid equipment is found to be malfunctioning, *ICS Class* may request it to be submitted for a detailed revision, including total or partial overhaul.
- .11 Revision of the proper operation and watertightness of hatch and manhole covers on weather decks, external doors, gangways, scuttles and skylights. Checking of the inventory and external inspection of emergency outfit.
- .12 The extent of thickness measurement is to include the examination of the critical area, at the Surveyor's discretion.

### **3.3.3 First special survey (Ship's age: up to 5 years)**

### **3.3.3.2 Additional requirements for Double Hull Oil Tankers**

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- .1 Minimum extent of overall and close-up surveys. An overall survey of all empty tanks and spaces in pump and machinery rooms. A close-up survey of:
- One web frame, in a ballast tank.
  - One deck transverse in a cargo oil tank.
  - One transverse bulkhead in a ballast tank
  - One transverse bulkhead in a cargo oil centre tank.
  - One transverse bulkhead in a cargo oil wing tank.
- .2 The extent of thickness measurement is to include:
- Suspect areas.
  - One section of deck plating for the full beam of the ship within the cargo area.
  - Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to **UR Z104, Table I**.
- .3 In areas where substantial corrosion is observed, the extent of thickness measurement is to be in accordance with *tables 3.3.3-10 to 3.3.3-14*
- .4 The extent of Tank testing as following:
- All ballast tank boundaries.
  - Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, pump rooms or cofferdams.
- 3.3.3.3 Additional requirements for Bulk Carriers**
- .1 Single Skin Bulk Carriers**
- .1.1 The extend of Close-up survey is to include:
- 25% of shell frames in the forward cargo hold at representative positions.
  - Selected frames in remaining cargo hold.
  - One transverse web with associated plating and longitudinal in two representative water ballast tanks of each type (i.e. topside, or hopper side tank).
  - Two selected cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted.
- All cargo hold hatch covers and coamings (plating and stiffeners).
- .1.2 The extent of thickness measurements is to include suspect areas, at the Surveyor's discretion. In areas where substantial corrosion is observed, the extent of thickness measurements is to be in accordance with *tables 3.3.3-1 to 3.3.3-6*
- .1.3 All piping systems within al 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 operationally tested.
- .2 Double Skin Bulk Carriers.**
- .2.1 The extent of close-up survey excluding ore carriers is to include:
- One transverse web with associated plating and longitudinal 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).
  - Two selected cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted.
  - All cargo hold hatch covers and coamings (platings and stiffeners)
- .2.2 The extent of close-up survey of ore carriers is to include:
- One web frame ring complete including adjacent structural members in a ballast wing tank.
  - One transverse bulkhead lower part-including girder system and adjacent structural members – in a ballast tank.
  - Two selected cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted.
  - All cargo hold hatch covers and coamings (plating and stiffeners).
- .2.3 The extent of thickness measurements is to include suspect areas at the surveyor's discretion. In areas where substantial corrosion is observed, the extent of thickness

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measurements is to be in accordance with tables 3.3.3-6 to 3.3.3-9.

.2.4 All piping systems within 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 operationally tested.

### 3.3.4 Second special survey (Ship's age: 5–10 years)

3.3.4.1 The second special survey of the hull and its equipment shall include the first special survey and, additionally:

- .1 Measurement of anchor chain links.
- .2 Sealing tests of tanks, their sounding and vent pipes:
  - Forepeak and after peak.
  - Ballast tanks.
  - Fuel tanks, as required by the surveyor(s).
  - Structural sewage and waste tanks.
  - Sealing test of tanks may be allowed only after their internal inspection.
  - Sealing tests of the fuel tanks using fuel may be allowed.
- .3 The extent of thickness measurement is to include the examination of suspect areas at the Surveyor's discretion.

### 3.3.4.2 Additional requirements for Double Hull Oil Tankers.

- .1 The extent of close-up surveys is to include:
  - All web frames, in a ballast tank. The knuckle area and the upper part (5 meters approximately) of one web frame in each remaining ballast tank.
  - One deck transverse, in two cargo oil tanks.
  - One transverse bulkhead, in each ballast tank.
  - One transverse bulk head, in two cargo oil centre tanks.
  - One transverse bulkhead, in a cargo oil wing tank.

.2 The extent of thickness measurement is to include suspect areas within the cargo area:

- Each deck plate
- One transverse section
- Selected wind and water strakes outside the cargo area.
- Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey.

.3 The extent of Tank testing as following:

- All ballast tank boundaries.
- All cargo tank bulkheads.

### 3.3.4.3 Additional requirements for Bulk Carriers:

#### .1 Single Skin Bulk Carriers

.1.1 The extent of close-up survey is to include:

- 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.
- One transverse web with associated plating and longitudinal in each water ballast tank.
- Forward and aft transverse bulkhead in one ballast tank, including stiffening system.
- All cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted.
- All cargo holds hatch covers and coamings (plating and stiffeners).
- All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches.

.1.2 The extent of thickness measurement is to include:



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- Within the cargo length: Two transverse sections of deck plating outside line of cargo hatch openings
  - Wind and water strakes in way of the two transverse sections considered above.
  - Selected wind and water strakes outside the cargo length area.
  - Measurements for general assessment and recording of corrosion pattern of those structural members subject to close-up survey according to **UR Z10.2, Table I**.
  - Additional measurements with respect of side shell frames and brackets of cargo holds of bulk carriers (including ORE carriers) contracted for construction before 01 July 1998.
- adjacent structural members – in a ballast wing tank.
  - One transverse bulkhead lower part - including girder system and adjacent structural members – in each remaining ballast tank.
  - One transverse bulkhead in each cargo hold, including internal structure of upper and lower stools, where fitted.
  - All cargo hold hatch covers and coamings (plating and stiffeners)
  - All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches.
- .2.3 The extent of thickness measurements is to include:

### .2 Double Skin Bulk carriers

.2.1 The extent of close-up survey excluding ORE carriers is to include:

- One transverse web with associated plating and longitudinal as applicable in each water ballast tank.
- Forward and aft transverse bulkheads including stiffening system in a transverse section including topside, hopper side and double side ballast tanks.
- 25% of ordinary transverse web frames in the foremost double side tanks.
- One transverse bulkhead in each cargo hold, including internal structure of upper and lower stools, where fitted.
- All cargo holds hatch covers and coamings (plating and stiffeners).
- All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches.

.2.2 The extent of close-up survey of ORE carriers is to include:

- All web frame rings complete including adjacent structural members in a ballast wing tank.
- One deck transverse including adjacent deck structural members in each remaining ballast tank.
- Forward and aft transverse bulkheads complete – including girder system and

.2.3 The extent of thickness measurements is to include:

- Suspected areas.
- Within the cargo length: Two transverse sections of deck plating outside line of cargo hatch openings.
- Wind and water strakes in way of the two transverse sections considered above.
- Selected wind and water strakes outside the cargo length area.
- Measurements for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to **UR Z10.5, Table I/Sheet I**.

.2.4 All piping systems within 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 operationally tested.

### 3.3.5 Third special survey (Ship's age: 10–15 years)

3.3.5.1 The third special survey of the hull and its equipment shall include the second special survey, and, additionally:

- .1 Inspections of tanks:
- Fuel tanks, double bottom and otherwise.
  - Fresh water tanks.
  - Structural sewage and waste tanks.

- .2 Sealing test of tanks:
- Fuel tanks, double bottom and otherwise.

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- Fresh water tanks.

.3 The extent of thickness measurement is to include:

- Suspect areas, at the Surveyor's discretion.
- Two transverse sections of deck plating outside the line of cargo hatch openings, within 0,5 L amidships.
- Selected cargo hold hatch openings and coamings (plates and stiffeners).
- Selected areas of deck plating within the line of cargo hatch openings.
- Wind and water strakes within 0,5L amidships.
- Side shell plating in one ballast tank and cargo hold.

### 3.3.5.2 Additional requirements for Double Hull Oil Tankers

.1 The minimum extent of close-up survey is to include:

- All web frames, in all ballast tanks.
- All web frames, including deck transverse and cross ties, if fitted, in a cargo oil tank.
- One web frame, including deck transverse and cross ties, if fitted, in each remaining cargo oil tank.
- All transverse bulkheads, in all cargo oil and ballast tanks.

2. The extent of thickness measurement is to include:

Suspect areas within the cargo area:

- Each deck plate
- Two transverse sections
- All wind and water strakes
- Selected wind and water strakes outside the cargo area.
- Measurements for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to **UR Z10.4, Table I.**

.2 The extent for Tank testing as following:

- All ballast tank boundaries.

- All cargo tank bulkheads.

### 3.3.5.3 Additional requirements for Bulk Carriers:

#### .1 Single Skin Bulk carriers

.1.1 The extent of close-up survey is to include:

- 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.
- All transverse webs with associated plating and longitudinal in each water ballast tank.
- All transverse bulkheads in ballast tanks, including stiffening system.

.1.2 The extent of thickness measurements is to include suspect areas within the cargo length:

- Each deck plate outside line of cargo hatch openings.
  - Two transverse sections, one in the amidship area, outside line of cargo hatch openings.
  - All wind and water strakes.
  - Selected wind and water strakes outside the cargo length area.
  - Measurements for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to **UR Z10.2, Table I.**
  - Additionally measurements to the vertically corrugated transverse watertight bulkhead between cargo hold No. 1 and No. 2. On bulk carriers of 150 m in length and over built before 01 July 1999 carrying solid bulk cargoes having a density of 1780 Kg/m<sup>3</sup> and above
  - Additional measurements with respect of side shell frames and brackets of cargo holds of bulk carriers (including ORE carriers) contracted for construction before 01 July 1998.
- .1.3 All piping systems within all cargo holds, ballast tanks, including double bottom tanks, pipe tunnels, cofferdams and void spaces bounding

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cargo holds, decks and outer hull are to be examined and operationally tested.

### **.2 Double Skin Bulk carriers**

.2.1 The extent of close-up survey, excluding ORE carriers, is to include:

- All transverse webs with associated plating and longitudinal as applicable in each water ballast tank.
- All transverse bulkheads including stiffening system in each water ballast tank.
- 25% of ordinary transverse web frames in all double side tanks.
- All cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted.
- All cargo hold hatch covers and coamings (platings and stiffeners).
- All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches.

.2.2 The extent of close-up survey of ORE carriers is to include:

- All web frame rings complete including adjacent structural members in each ballast tank.
- All transverse bulkheads complete – including girder system and adjacent structural members – in each ballast tank.
- One web frame ring complete including adjacent structural members in each wing void space.
- Additional web frame rings in void spaces as deemed necessary by the Classification Society.
- All cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted.
- All cargo hold hatch covers and coamings (plating and stiffeners)
- All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches

.2.3 The extent of thickness measurements is to include:

- Suspect areas
- Within the cargo length:  
Each deck plate outside line of cargo hatch openings.  
Two transverse sections, one in the amidship area, outside line of cargo hatch openings.  
All wind and water strakes.
- Selected wind and water strakes outside the cargo length area.
- Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to **UR Z10.5, Table I/ Sheet 2.**

.2.4 All piping systems within 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 operationally tested.

### **3.3.6 Fourth and subsequent special surveys (Ship's age: 15 years and over)**

**3.3.6.1** The fourth special survey of the ship and its equipment shall have the same extent as the third special survey and, additionally:

.1 Close-up surveys of:  
All shell frames, including their upper and lower end attachments, adjacent shell plating and transverse bulkheads in all cargo holds.

.2 The extent of thickness measurements is to include:  
Suspect areas, at the Surveyor's discretion.  
All deck plating outside the line of hatch openings, within 0,5L amidships.  
Two transverse sections including deck and side shell plating outside the line of cargo hatch openings.  
All cargo hold hatch covers and coamings (plating and stiffeners).  
All wind and water strakes within 0,5L amidships.  
Selected side shell plating in one ballast tank or cargo hold.

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### 3.3.6.2 Additional requirements for Double Hull Oil Tankers:

- .1 Minimum extent of close-up surveys:
- As for Special Survey for age from 10 to 15 years.
  - Additional transverse areas as deemed necessary by the Society.
- .2 The extent of thickness measurement is to include suspect areas within the cargo area:
- Each deck plate.
  - Three transverse sections
  - Each bottom plate
  - 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 **UR Z10.4, Table I**.
  - In areas where substantial corrosion is observed, the extent of thickness measurement is to be in accordance with *tables 3.3.3-6 to 3.3.3-10*.
- .3 The extent for Tank testing as following:
- All ballast tank boundaries.
  - All cargo tank bulkheads.

- The extent of thickness measurements is to include suspect areas within the cargo length
- Each deck plate outside line of cargo hatch openings.
- Three transverse sections, one in the amidship area, outside line of cargo hatch openings.
- Each bottom plate
- All wind and water strakes, full length.
- Measurements, for general assessment and recording corrosion pattern, of those structural members subject to close-up survey according to **UR Z10.2, Table I**.
- Additional measurements with respect of side shell frames and brackets of cargo holds of bulk carriers (including ORE carriers) contracted for construction before 01 July 1998.
- Additionally measurements to the vertically corrugated transverse watertight bulkhead between cargos hold No. 1 and No. 2. On bulk carriers of 150 m in length and over built before 01 July 1999 carrying solid bulk cargoes having a density of 1780 Kg/m<sup>3</sup> and above

- .1.2 All piping systems within 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 operationally tested.

### 3.3.6.3 Additional requirements for Bulk Carriers

- .1 **Single Skin Bulk Carrier**
- .1.1 The extent of close-up survey is to include:
- All shell frames in all cargo holds including upper and lower end attachments and adjacent shell plating
  - All transverse bulkheads in ballast tanks, including stiffening system.
  - All cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted.
  - All cargo hold hatch covers and coamings (plating and stiffeners)
  - All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches.

### .2 **Double Skin Bulk Carrier**

- .2.1 The extent of close-up survey, excluding ORE carriers, is to include:
- All transverse webs with associated plating and longitudinal as applicable in each water ballast tank
  - All transverse bulkheads including stiffening system in each water ballast tank.
  - All ordinary transverse web frames in all double side tanks.
  - All cargo hold transverse bulkheads including internal structure of upper and lower stools, where fitted.
  - All cargo hold hatch covers and coamings (platings and stiffeners)

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- All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches.
- .2.2 The extent of close-up survey of ORE carriers is to include:
  - All transverse webs with associated plating and longitudinal as applicable in each water ballast tank.
  - All transverse bulkheads including stiffening system in each water ballast tank
  - All ordinary transverse frames in all double-side tanks.
  - All cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted.
  - All cargo hold hatch covers and coamings (plating and stiffeners)
  - All deck plating and under deck structure inside line of hatch openings between all cargos holds hatches.
- .2.3 The extent of thickness measurements is to include:

Suspect areas within the cargo length:

  - Each deck plate outside line of cargo hatch openings.
  - Three transverse sections, one in the amidship area, outside line of cargo hatch openings.
  - Each bottom plate.
  - 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 **UR Z10.5, Table I/ Sheet 2.**
- .2.4 All piping systems within 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 operationally tested.
- 3.6.4 Close-up surveys of transverse bulkheads are to be carried out at four levels:
  - .1 Immediately above the inner bottom and immediately above the line of gussets (if fitted) and shedder plates, for ships without lower stool.
  - .2 Immediately above and below the lower stool shelf plate (for ships fitted with lower stools) and immediately above the line of the shedder plates.
  - .3 At about mid-height of the bulkhead.
  - .4 Immediately below the upper deck plating and immediately adjacent to the upper wing tank, and immediately below the upper stool shelf plate (for ships fitted with upper stools) or immediately below the topside tank.

### 3.3.7 Thickness measurements

3.3.7.1 The surveyor(s) may require thickness measurements in any part of the ship's structure where wastage signs are evident or where wastage is normally found.

3.3.7.2 Thickness measurements are to be taken in not less than three locations, as shown in *fig 3.3.7.2* in forward and aft areas of all plates, except where the Rules state otherwise.

Where the plates cross the ballast/cargo tanks boundaries, separate measurements are to be taken for the area of plating in way of each type of tank. In all cases, reported measurements are to represent the average of multiple measurements taken on each plate or stiffener. These measurements show the average thickness of plates subject to wastage by uniform corrosion. Measurements indicating local corrosion are to be excluded from the average. For this purpose, average of the remaining measurements is to be taken and, if the measurements which correspond to local corrosion differ in more than 1,5 mm from that average, they are to be discarded.

3.3.7.3 Where measured plates are renewed, the thicknesses of adjacent plates in the same strake are to be reported.

3.3.7.4 Thickness measurements are normally to be taken by means of ultrasonic test equipment (or with an equivalent degree of accuracy for the tested materials) by a company qualified as Grade A or Grade B, according to *ICS Class*

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Procedure for Approval of Companies and Personnel that carry out thickness measurements in ships.

3.3.7.5 The degree of supervision or check testing by *ICS Class* of the thickness measurements carried out by a company is dependent upon the grade on the *Certificate of Approval* extended by *ICS Class*.

3.3.7.6 The work of companies having Grade A approval is subject to check testing by *ICS Class*.

3.3.7.7 Thickness measurements by companies having Grade B approval are to be carried out with the attendance of the Surveyor.

3.3.7.8 Thickness measurements may be carried out at the fourth annual survey, on Owner's request.

3.3.7.9 *ICS Class* may extend the scope of the thickness measurements if deemed necessary.

3.3.7.10 The approved company carrying out the thickness measurements is to prepare a final report.

3.3.7.11 The thickness measurement report is to be verified by the attending surveyor (s).

**Table 3.3.3-1 Requirements for extent of thickness measurement at those areas of substantial corrosion Special Survey Single Hull of Bulk Carriers within cargo area Refer to UR Z10.2 - Hull Surveys of Bulk Carriers (Table VIII, Sheet 1)**

Shell structures		
Structural member	Extent of measurement	Pattern of measurement
.1 Bottom and side shell plating	a) Suspect plates, plus 4 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 and side longitudinals	Minimum of 3 longitudinals in suspect areas.	3 measurements in line across web 3 measurements on flange

**Table 3.3.3-2 Requirements for extent of thickness measurement at those areas of substantial corrosion Special Survey of Single Hull Bulk Carriers within cargo area. Refer to UR Z10.2 - Hull Surveys of Bulk Carriers (Table VIII, 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 pattern between stiffeners over 1 m length. b) 5 point pattern between stiffeners over 1 m 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 <sup>2</sup> of plating. b) 5 point pattern over 1 m <sup>2</sup> of plating.

**Table 3.3.3-3 Requirements for extent of thickness measurement at those areas of substantial corrosion Special Survey of Single Hull Bulk Carriers within cargo area. Refer to UR Z10.2-Hull Surveys of Bulk Carriers (Table VIII, Sheet 3)**

Deck structure including cross strips, main cargo hatchways, hatch covers, coamings and topside tanks

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Structural member	Extent of measurement	Pattern of measurement
.1 Cross deck strip plating	Suspect cross deck strip plating	5 point pattern between under deck stiffeners over 1 m length
.2 Underdeck Stiffeners	a) Transverse members b) Longitudinal member	a) 5 point pattern at each end and mid-span b) 5 point pattern in both web and flange
.3 Hatch Covers	a) Side and end skirts, each 3 locations b) 3 longitudinal bands outboard strakes (2), and centerline strake (1)	a) 5 point pattern at each location a) 5 point pattern at each band
.4 Hatch Coamings	Each side and end of coamings, one band lower 1/3, one upper band 2/3 of coamings	5 point measurement each band i.e end of side coaming
.5 Topside Water Ballast Tanks	a) Watertight transverse bulkheads .1 Lower 1/3 of bulkhead .2 Upper 2/3 of bulkhead .3 Stiffeners  b) 2 representative swash transverse bulkheads .1 Lower 1/3 of bulkhead .2 Upper 2/3 of bulkhead .3 Stiffeners  c) 3 representative bays of slope plating .1 Lower 1/3 of tank .2 Upper 2/3 of tank  d) Longitudinals, suspect and adjacent	.1 5 point pattern over 1 m <sup>2</sup> of plating .2 5 point pattern over 1 m <sup>2</sup> of plating .3 5 point pattern over 1 m of length  .1 5 point pattern over 1m <sup>2</sup> of plating .2 5 point pattern over 1m <sup>2</sup> of plating .3 5 point pattern over 1 m length  .1 5 point pattern over 1m <sup>2</sup> of plating .2 5 point pattern over 1m <sup>2</sup> of plating  d) 5 points pattern both web and flange over 1 m length.
.6 Main Deck Plating	Suspect plates and adjacent (4)	5 points pattern over 1m <sup>2</sup> of plating
.7 Main Deck Longitudinal	Minimum of 3 longitudinals where plating measured	5 points pattern on both web and flange over 1 metre length
.8 Web frames/Transverse	Suspect plates	5 point pattern over 1m <sup>2</sup>

**Table 3.3.3-4 Requirements for extent of thickness measurement at those areas of substantial corrosion Special Survey of Single Hull Bulk Carriers within cargo area. Refer to UR Z10.2-Hull Surveys of Bulk Carriers (Table VIII, Sheet 4)**

Double bottom and hopper structure		
Structural member	Extent of measurement	Pattern of measurement
.1 Inner/Double bottom plating	Suspect plates plus all adjacent plates	5 point pattern for each panel between longitudinals over 1m length
.2 Inner/Double bottom longitudinal	3 longitudinals where plates measured	+3 points in line across web and 3 measurements on flange
.3 Longitudinal girders or transverse floors	Suspect plates	5 point pattern over approximately 1 m <sup>2</sup> of plating
.4 Watertight bulkheads (Watertight floors)	a) Lower 1/3 of tank a) Upper 2/3 of tank	a) 5 point pattern over 1m <sup>2</sup> of plating b) 5 point pattern alternate plates over 1m <sup>2</sup> of plating
.5 Web frames	Suspect plate	5 point pattern over 1m <sup>2</sup> of plating
.6 Bottom/side shell longitudinal	Minimum of 3 longitudinals in way of suspect areas	3 measurements in line across web 3 measurements on flange

**Table 3.3.3-5 Requirements for extent of thickness measurement at those areas of substantial corrosion. Special Survey of Single Hull Bulk Carriers within cargo area. Refer to UR Z10.2-Hull Surveys of Bulk Carriers (Table VIII, Sheet 5)**

<b>Cargo holds</b>
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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 points pattern of both web and flange b) 5 point pattern within 25 mm of welded attachment to both shell and lower slope plate

**Table 3.3.3-6 Requirements for extent of thickness measurements at those areas of substantial corrosion of Double Hull Bulk Carriers within the cargo length area. Refer to UR Z10.5 – Hull Survey of Double Skin Bulk Carriers (Table III, Sheet 1)**

Bottom, inner bottom and hopper structure		
Structural member	Extent of measurement	Pattern of measurement
Bottom, inner bottom and hopper structure plating	Minimum of three bays across double bottom tank, including aft bay Measurements around and under all suction bell mouths	Five-point pattern for each panel between longitudinals and floors
Bottom, inner bottom and hopper structure longitudinals	Minimum of three longitudinals in each bay where bottom plating measured	Three measurements in line across 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 two square metre area
Hopper structure web frame ring	Three floors in bays where bottom plating measured	Five-point pattern over one square metre of plating Single measurements on flange
Hopper structure transverse watertight bulkhead or swash bulkhead	- lower 1/3 of bulkhead	- five-point pattern over one square metre of plating
	- upper 2/3 of bulkhead	- five-point pattern over two square metre 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

**3.3.3-7 Requirements for extent of thickness measurements at those areas of substantial corrosion of Double Hull Bulk Carriers within the cargo length area. Refer to UR Z10.5 – Hull Surveys of Double Skin Bulk Carriers (Table III, Sheet 2)**

**Deck structure including cross strips, main cargo hatchways, hatch covers, coamings and topside tanks**



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Structural member	Extent of measurement	Pattern of measurement
Cross Deck Strip plating	Suspect Cross Deck Strip plating	Five-point pattern between underdeck stiffeners over 1 metre length
Underdeck Stiffeners	Transverse members Longitudinal member	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, 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 sq. metre of plating Five-point pattern over 1 sq. metre of plating Five-point pattern over 1 metre length
Topside Ballast Tanks	b) two representative swash transverse bulkheads: - Lower 1/3 of bulkhead - Upper 2/3 of bulkhead - Stiffeners	Five-point pattern over 1 sq. metre of plating Five-point pattern over 1 sq. metre of plating Five-point pattern over 1 metre length
Topside Ballast Tanks	c) three representative bays of slope plating - Lower 1/3 of tank  - Upper 2/3 of tank	Five-point pattern over 1 sq. metre of plating  Five-point pattern over 1 sq. metre of plating
Topside Ballast Tanks	d) Longitudinals, suspect and adjacent	Five-point pattern on both web and flange over 1 metre length
Main Deck Plating	Suspect plates and adjacent (4)	Five-point pattern over 1 sq. metre of plating
Main Deck Longitudinals	Suspect Plates	Five-point pattern on both web and flange over 1 metre length
Web Frames/Transverses	Suspect Plates	Five-point pattern over 1 sq. metre

**3.3.3-8 Requirements for extent of thickness measurements at those areas of substantial corrosion of Double Hull Bulk Carriers within the cargo length area. Refer to UR Z10.5 Hull Surveys of Double Skin Bulk Carriers (Table III, 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 measurement

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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 1 measurement on flange - Three measurements across web and 1 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. two square metre area - Two measurements between each pair of vertical stiffeners
Horizontal girders	Plating on each girder in a minimum of three bays	Two measurements between each pair of longitudinal girder stiffeners
Panel stiffening	Where applicable	Single measurements

**3.3.3-9 Requirements for extent of thickness measurements at those areas of substantial corrosion of double hull bulk carriers within the cargo length area. Refer to UR Z10.5 Hull Surveys of Double Skin Bulk Carriers (Table III, Sheet 4)**

<b>Transverse bulkheads in cargo holds</b>		
<b>Structural member</b>	<b>Extent of measurement</b>	<b>Pattern of measurement</b>
Lower stool, where fitted	- Transverse band within 25mm of welded connection to inner bottom - Transverse bands within 25mm of welded connection to shelf plate	- Five-point pattern between stiffeners over one metre length - Five-point pattern between stiffeners over one metre length
Transverse bulkheads	- Transverse band at approximately mid height - Transverse band at part of bulkhead adjacent to upper deck or below upper stool shelf plate (for those ships fitted with upper stools)	- Five-point pattern over one square metre of plating - Five-point pattern over one square metre of plating

**Table 3.3.3-10 Requirements for extent of Thickness Measurements at those areas of substantial corrosion - Special Survey of Double Hull Oil Tankers within the Cargo Area Length. Refer to UR Z10.4 - Hull Surveys of Double Hull Oil Tankers (Table IV, Sheet 1)**

<b>Bottom, inner bottom and hopper structure</b>		
<b>Structural member</b>	<b>Extent of measurement</b>	<b>Pattern of measurement</b>

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Bottom, inner bottom and hopper structure plating	Minimum of three bays across double bottom tank, including aft bay Measurements around and under all suction bell mouths	5-point pattern for each panel between longitudinals and floors
Bottom, inner bottom and hopper structure longitudinals	Minimum of three longitudinals in each bay where bottom plating measured	Three measurements in line across 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	5-point pattern over two square metre area
Hopper structure web frame ring	Three floors in bays where bottom plating measured	5-point pattern over one square metre of plating. Single measurements on flange
Hopper structure transverse watertight bulkhead or swash bulkhead	- lower 1/3 of bulkhead	- 5-point pattern over one square metre of plating
	- upper 2/3 of bulkhead	- 5-point pattern over two square metre of plating
	- stiffeners (minimum of three)	- For web, 5-point pattern over span (two measurements across web at each end and one at centre of span). For flange, single measurements at each end and centre of span
Panel stiffening	Where applicable	Single measurements

**Table 3.3.3-11 Requirements for extent of Thickness Measurements at those areas of substantial corrosion - Special Survey of Double Hull Oil Tankers within the Cargo Area Length. . Refer to UR Z10.4 - Hull Surveys of Double Hull Oil Tankers (Table IV, Sheet 2)**

<b>Deck structure</b>		
<b>Structural member</b>	<b>Extent of measurement</b>	<b>Pattern of measurement</b>
Deck plating	Two transverse bands across tank	Minimum of three measurements per plate per band
Deck longitudinals	Every third longitudinal in each of two bands with a minimum of one longitudinal	Three measurements in line vertically on webs and two measurements on flange (if fitted)
Deck girders and brackets (usually in cargo tanks only)	At fore and aft transverse bulkhead, bracket toes and in centre of tanks	Vertical line of single measurements on web plating with one measurement between each panel stiffener, or a minimum of three measurements. Two measurements across flange. 5-point pattern on girder/bulkhead brackets
Deck transverse webs	Minimum of two webs, with measurements at both ends and middle of span	5-point pattern over one square metre area. Single measurements on flange
Vertical web and transverse bulkhead in wing ballast tank (two metres from deck)	Minimum of two webs, and both transverse bulkheads	5-point pattern over one square metre area
Panel stiffening	Where applicable	Single measurements

**Table 3.3.3-12 Requirements for extent of Thickness Measurements at those areas of substantial corrosion - Special Survey of Double Hull Oil Tankers within the Cargo Area Length. Refer to UR Z10.4 - Hull Surveys of Double Hull Oil Tankers (Table IV, Sheet 3)**

<b>Structure in wing ballast tanks</b>		
<b>Structural member</b>	<b>Extent of measurement</b>	<b>Pattern of measurement</b>

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Side shell and longitudinal bulkhead plating: -Upper strake and strakes in way of 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 measurement  -Single measurement
Side shell and longitudinal bulkhead longitudinals on: -Upper strake  -All other strakes	-Each longitudinal in same three bays  -Every third longitudinal in same three bays	-3 measurements across web and 1 measurement on flange -3 measurements across web and 1 measurement on flange
Longitudinals - brackets	Minimum of three at top, middle and bottom of tank in same three bays	5-point pattern over area of bracket
Vertical web and transverse bulkheads (excluding deckhead area): -Strakes in way of horizontal girders  -Other strakes	-Minimum of two webs and both transverse bulkheads -Minimum of two webs and both transverse bulkheads	-5-point pattern over approx. two square metre area -Two measurements between each pair of vertical stiffeners
Horizontal girders	Plating on each girder in a minimum of three bays	Two measurements between each pair of longitudinal girder stiffeners
Panel stiffening	Where applicable	Single measurements

**Table 3.3.3-13 Requirements for extent of Thickness Measurements at those areas of substantial corrosion - Special Survey of Double Hull Oil Tankers within the Cargo Area Length. Refer to UR Z10.4 - Hull Surveys of Double Hull Oil Tankers (Table IV, Sheet 4)**

<b>Longitudinal bulkheads in cargo tanks</b>		
Structural Member	Extent of Measurement	Pattern of Measurement
Deckhead and bottom strakes, and strakes in way of the horizontal stringers of transverse bulkheads	Plating between each pair of longitudinals in a minimum of three bays	Single measurement
All other strakes	Plating between every third pair of longitudinals in same three bays	Single measurement
Longitudinals on deckhead and bottom strakes	Each longitudinal in same three bays	Three measurements across web and one measurement on flange
All other longitudinals	Every third longitudinal in same three bays	Three measurements across web and one measurement on flange
Longitudinals - brackets	Minimum of three at top, middle and bottom of tank in same three bays	5-point pattern over area of bracket
Web frames and cross ties	Three webs with minimum of three locations on each web, including in way of cross tie connections	5-point pattern over approximately two square metre area of webs, plus single measurements on flanges of web frame and cross ties
Lower end brackets (opposite side of web frame)	Minimum of three brackets	5-point pattern over approximately two square metre area of brackets, plus single measurements on bracket flanges

**Table 3.3.3-14 Requirements for extent of Thickness Measurements at those areas of substantial corrosion - Special Survey of Double Hull Oil Tankers within the Cargo Area Length. Refer to UR Z10.4 - Hull Survey of Double Hull Oil Tankers (Table IV, Sheet 5)**

<b>Transverse watertight and swash bulkheads in cargo tanks</b>		
Structural member	Extent of measurement	Pattern of measurement

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Upper and lower stool, where fitted	-Transverse band within 25mm of welded connection to inner bottom/deck plating -Transverse band within 25mm of welded connection to shelf plate	5-point pattern between stiffeners over one metre length
Deckhead and bottom strakes, and strakes in way of horizontal stringers	Plating between pair of stiffeners at three locations: approximately 1/4, 1/2 and 3/4 width of tank	5-point pattern between stiffeners over one metre length
All other strakes	Plating between pair of stiffeners at middle location	Single measurement
Strakes in corrugated bulkheads	Plating of each change of scantling at centre of panel and at flange of fabricated connection	5-point pattern over about one square metre of plating
Stiffeners	Minimum of three typical stiffeners	For web, 5-point pattern over span between bracket connections (two measurements across web at each bracket connection and one at centre of span). For flange, single measurements at each bracket toe and at centre of span
Brackets	Minimum of three at top, middle and bottom of tank	5-point pattern over area of bracket
Horizontal stringers	All stringers with measurements at both ends and middle	5-point pattern over one square metre area, plus single measurements near bracket toes and on flanges

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<b>3.4 Scope of periodical surveys to machinery installations</b> Periodical surveys to machinery installations shall include equipment and machinery of the engine room, systems and piping, the fire protection systems and equipment, electrical equipment and control and monitoring systems.	.8	Functional tests of remote closing devices for fuel and lubricating oil tank valves.
<b>3.4.1 Annual surveys</b>	.9	Tests of steam boiler (external inspection), feeder, and mud extraction systems, regulation systems, protection and signaling devices, triggering of safety valves.
3.4.1.1 Annual survey shall include:	.10	Tests of the change of position of controllable pitch propellers.
.1 For ships with oil engines: Functional tests of the main engine's protections. Functional tests of remote controls of starting and maneuvering devices of the main engine. Measurements of the bending of the main engine crankshaft	.11	Fire protection: <ul style="list-style-type: none"><li>- Revision and functional tests of fixed water system, water spraying system, sprinkler system, water screen system, drenching system, foam, carbon dioxide, inert gas and dry powder systems.</li><li>- Revision of validity of hydraulic tests of carbon dioxide and inert gas balloons. Unless otherwise required by the flag State, hydraulic tests are to be carried out <b>every 10 years</b> for 10% or more of the balloons.</li><li>- Revision of the level of the extinguishing mean in the balloons. Allowable level shall be 90% for carbon dioxide and 95% for inert gas balloons.</li><li>- Revision of the validity of lab tests of the foam generating mean; it shall be tested <b>twice every 5 years</b>.</li><li>- Revision of the quality of extinguishing powder.</li><li>- Blowing tests of the carbon dioxide, inert gas and powder ducts.</li><li>- Internal revision of dry powder vessels, after each powder change.</li><li>- Hydraulic test of collectors and pipelines of the carbon dioxide system, up to the distribution valves: <b>every 10 years</b>.</li><li>- Hydraulic test of the carbon dioxide distribution pipelines, from the distribution valves to the protected spaces that serve for taking air samples: <b>every 10 years</b>.</li></ul>
.2 For turbine driven ships: <ul style="list-style-type: none"><li>- Tests of maneuvering valves, maneuvering devices, steering engines and speed regulator (it may be tested by simulation).</li><li>- Functional tests of the axial gauge in the turbine's thrust bearings.</li><li>- Functional tests of the temperature indicator of the thrust bearings</li></ul>		
.3 For electric propulsion ships: inspection and testing of main generators, exciters, electric propulsion motors and electromagnetic clutches, switchboards, control and monitoring desks and panels.		
.4 Functional test of prime movers' protection devices.		
.5 Functional test of self driven pumps.		
.6 Testing of the bilge system, including emergency bilge system of the engine room, and the high water level signaling (if fitted).		
.7 Testing of the compressed air system: functional test of compressors, external inspection of air vessels, functional tests of safety valves of compressors and compressed air vessels.		

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- Revision and blowing tests of the water screen and drenching systems' ducts: **every 5 years.**
  - Revision and functional test of doors and securing of openings in fireproof and fire-retarding structures.
  - Revision and test of the fire alarm system.
  - Revision of machinery space and its equipment for the detection of spills of volatile substances that may pose a fire threat.
- .12 Revision and test of electric sources (main and emergency) without functional tests of overload protections.
- .13 Revision and test of electric converters that feed essential consumers.
- .14 Revision and test of distribution gear.  
Main and emergency switchboards.  
Intermediate and terminal switchboards.  
Control and monitoring desks.  
External source switchboard.
- .15 Revision and test of electric drives:  
Pumps, compressors, anchor and maneuvering windlasses, towing winches, steering gear.
- .16 Test of the lighting of compartments and spaces that are essential for the ship's safety; test of emergency lighting.
- .17 Test of the navigation lights switchboard and failure alarms (if fitted), test of navigation lights.
- .18 Revision and test of electric systems and devices in dangerous compartments and in spaces with electrical installation for over 1000 V.
- .19 Test of main electric signal panels in machinery spaces and of communications bridge-engine room–steering engine compartment.
- .20 Power ventilation:
  - Inspection and test of ventilation in engine room, battery room, cargo holds and accommodation.
- .21 Inspection and test of emergency stop of ventilation in engine room, cargo holds and accommodation from all the required locations.
  - Verification of remote stop of fans.
- .22 Revision of sensors of the protection system of the main engine and the machinery space equipment.
- .23 Test of the engine room's automation systems.
- .24 Insulation resistance measurement of electric networks, electric devices and appliances, essential for the ship's safety.
- .25 Revision of electric lighting and power circuits in general, in inner spaces, weather decks, storerooms, etc., to evaluate the short circuit and explosion risk, the fastening of cables in their ducts and the sealing of cable runs through decks and bulkheads.
- .26 General examination of engine and boiler rooms, giving special attention to the existence of fire or explosion hazard, as well as to the escape ways being free from obstructions and duly illuminated.
- .27 General examination of non-integral tanks within engine and boiler rooms.
- Additional requirements for oil tankers:**
- Revision of cargo pump.
  - Testing of the cargo system's remote control (valves, pumps, indicators).
  - Revision of the technical condition of pressure indicators and cargo level indicators in the cargo system.
  - Ventilation tests with an inspection of trunks, covers, etc.
  - Inspection and test of the inert gas system.
  - Revision of electrical equipment and cable runs in dangerous zones of weather decks and pump room, including insulation resistance measurement.
  - General examination of pump room, giving special attention to the existence of fire

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hazard and the escape ways being free from obstructions and duly illuminated.

- General examination of non-integral tanks in pump room.
- Inspection and test of power ventilation of pump room and interlocking with the lighting.
- Inspection and test of emergency stop of power ventilation of pump room (if fitted).

### 3.4.2 Intermediate survey

3.4.2.1 The intermediate survey shall include:

- .1 The intermediate survey of machinery installations to the extent of an annual survey.
- .2 Insulation resistance measurement of the cable network feeding lighting and power switchboards, branch switchboards, main switchboard, emergency switchboard, connection between main and emergency switchboards, main and emergency generators and motors.

3.4.2.2 Additional requirements for **oil tankers**:

- .1 Revision of liquid cargo system at the pump room.
- .2 Revision of pipelines on weather deck; cargo, steam, gas exhaust and other pipelines, if fitted.
- .3 If doubts concerning the technical condition of pipelines arise, the Surveyor may require thickness measurements of pipes and hydraulic tests.

### 3.4.3 Special survey

3.4.3.1 The inspections, measurements and tests of the installations are to be established as to ascertain properly their technical condition. Equipment and systems subject to special survey are to be submitted to survey opened and overhauled.

3.4.3.2 Special surveys of machinery installations shall include intermediate surveys and, additionally:

.1 Main oil engine:

- Inspection of main components that ensure the proper functioning of the engine.
- Mechanisms and devices coupled to the engine, as well as auxiliary devices.
- Revision of explosion-safe devices, tests of safety valves.
- Close-up survey, to the Surveyor's satisfaction, of every part of blowers: rotor, flexible couplings and casing
- Revision of tensional vibration dampers, checking the compliance with the Maker's service conditions.
- Revision of fastening, in accordance with the Maker's instructions.
- Revision of the engine's fixing to its seating.
- Start and reversal tests of the engine.

.2 Main and auxiliary steam turbines:

- Revision of the turbine's parts.  
If the turbine has had a faultless functioning and is fitted with a type-approved rotor position indicator, with a vibration indicator, and measuring instruments along the steam lines, *ICS Class* may limit the extent of the first renewal survey to a revision of the rotor bearings, the thrust bearings and elastic couplings, provided the Surveyor has admitted the turbine's functioning to be satisfactory on the basis of the engine log book and trials after inspection.

For the class renewal the following is to be inspected:

- Fixing of the turbine to its seating.
- Test of the maneuvering devices-reversing valves, speed governor, test of reversing valves: **every 8 years**.

.3 Reductors: internal inspection in an extent necessary to ascertain the technical condition of gear wheels, shafts, thrust bearings and couplings.



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- .4 Couplings:  
**Sliding couplings:** Revision and trials.  
**Spring couplings:** Revision and overhaul of the cover to ascertain the technical condition of the elastic parts of the coupling.  
**Elastic couplings:** Five years after installation or following the replacement of the rubber pin: revision. At subsequent renewal surveys: revision and overhaul.  
Intermediate shafts with their bearings and fixing of bearings to their seating.
- .5 Thrust shaft and its bearings.
- .6 Inspection of parts of controllable pitch propeller (see *Subs 3.6*).
- .7 Inspection of the generators' prime movers.
- .8 Inspection of air compressors.
- .9 Air vessels:  
Internal inspection of air vessels: **every 5 years**.  
If the technical condition of the air vessels cannot be determined from the internal inspection, *ICS Class* may require thickness measurements and hydraulic tests.  
Air vessels are to be submitted to a hydraulic test after repairs.
- .10 Inspection of self - driven pumps.
- .11 Performance test of the bow thruster
- .12 Piping:  
- Revision of overflow, air and sounding pipes.  
- Revision and trial of the ballast system, water cooling system, steam, fuel, lubricating, hydraulic systems. When steam temperature at the overheater outlet does not exceed 450°C both the saturated steam and overheated steam pipelines are to be surveyed ten years after date of built (or completion) and subsequently at 5-year intervals; when temperature of steam at the overheater outlet exceeds 450°C, the overheated steam pipelines are to be surveyed five years after date of built (or completion) and subsequently at 5-year intervals.
- If doubts concerning the technical condition of pipelines arise, *ICS Class* may require hydraulic tests or thickness measurements.
- All copper or copper alloy pipelines with external diameter over 76 mm that feed steam for essential services are to be submitted to hydraulic test 10 years after date of built (or completion) and subsequently at 5-year intervals.
- Hydraulic tests of pipelines passing through fuel tanks, cargo tanks and holds shall be carried out **every 5 years**.
- .14 Inspection of ventilation ducts passing through watertight and fireproof bulkheads.
- .15 Inspection of non-integral tanks
- .16 Heat exchangers:  
- Internal inspection.  
- Hydraulic tests are to be carried out depending on the results of the inspection and after repairs.
- .17 Inspection and tests of fire protection closures.
- .18 Testing of generators' protections (overload, short circuit, reverse power or current, as applicable).
- .19 Tests of heaters and heating appliances related to the machinery installation.
- .20 Inspection of cables' sheathing and covers, and cable ducts passing through watertight and fireproof bulkheads.
- .21 Measurement of insulation resistance of every electric circuit, as well as equipment and machinery.
- .22 Revision of lightning rod and earthing.
- .23 Control and measuring instruments:  
- Technical condition of the device, by the examination and checking of the pertaining stamps.  
- Verifying whether it gives a correct indication (in boilers and pressure vessels:

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using a pressure gauge; in other cases comparing lectures from 2 simultaneously working devices).

- .24 Revision of the sensors of the engine room's automation systems.
- .25 Additional requirements for oil tankers:  
Inspection of cargo pumps, as deemed necessary by *ICS Class*.  
Hydraulic tests and thickness measurements of inert gas pipelines: **every 5 years**.

### 3.5 Bottom survey

3.5.1 The ship's bottom survey shall include:

- .1 The bottom and side plating up to the deepest waterline, keel, stem, stern frame, shaft brackets, rudder hole, bow thruster tunnel, bilge keels, protective coating means.
- .2 Plugs of drain pipes of ballast tanks, fresh water tanks, fuel tanks and lubricating oil tanks, as well as cofferdams: **every 5 years**.
- .3 Sea chests and side valves.
- .4 Accessories of bottom and side pipings.
- .5 Rudder blade.
- .6 Clearance measurements in trunk and pintle bearings, with an inspection of steering gear **every 5 years**.
- .7 Bow thruster.
- .8 Propellers: for controllable pitch propellers a test of the propeller seating and tests of pitch variation.
- .9 Measurement of deflection/clearance in the tailshaft bearing.
- .10 Checking of the tailshaft sealing from the propeller's side.

3.5.2 Measurements

- 3.5.2.1 When a bottom survey for the renewal of class is carried out, thickness measurements of the hull plating are to be carried out to an extent in accordance with the ship's age and type.

### 3.5.3 In-water survey (IWS)

3.5.3.1 For cargo ships less than 15 years built that comply with the requirements of *rules 3.5.1.1 to 3.5.1.7*, every other underwater survey may be carried out by certified divers while the ship is afloat. The method used to examine the ship's bottom shall ensure an amount of information similar to that of a docking survey (see *3.5.1*, where applicable).

3.5.4 Conditions to obtain the in-water survey mark (ISA) in the class notation are the following:

- .1 The underwater part of hull is to be protected against corrosion, and places where such protection is fitted shall be properly marked to allow the divers to locate possible defects. The position of transverse bulkheads shall be clearly marked on the bottom and the sides, below the lowest waterline.
- .2 It shall be possible to open and clean the sea chests with the ship afloat.
- .3 It shall be possible to close the valves' intakes and outlets, in order to allow their cleansing and removal.
- .4 It shall be possible to measure the clearances in the rudder bearings and tailshaft bearings.
- .5 The rudder stock bush and heel pintle bush are to be properly marked to spot any displacement.
- .6 Requirements relating to additional equipment such as bow propellers, bilge keels, etc shall be separately established in each case.
- .7 Aboard the ship there shall be a set of plans or color photographs showing the arrangement of hull members, details of rudder clearance measurements, the sealing of openings, etc. All that information is to be checked with *ICS Class*.  
The survey of different bottom parts and the pertinent operations are to be carried out by divers if the said operations cannot be performed from above water due to the ship's heel or trim. The divers operations shall be under the Surveyor's guidance by means of an underwater camera with oral communication and a recording device.

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- .8 In-water survey is to be carried out in clear still water.
- .9 Underwater pictures shall have the necessary resolution to allow the Surveyor to evaluate the surveyed devices.
- .10 In-water surveys in accordance with the Rules shall be accepted only if carried out by other recognized class society.
- .11 Validity of recognition shall depend on the keeping of qualification that permits to carry out the surveys and operations at the required technical level.
- .12 The surveyor(s) may require additional inspections of inner parts of the hull, if there are evidences of the ship having grounded.
- .13 If any damages are observed at the in-water survey that can be assessed only at a docking survey, or that require immediate repairs, the surveyor(s) may demand that the ship be dry-docked.
- 3.6 Screw shaft, propeller and stern tube survey**
- 3.6.1 Intervals between surveys**
- 3.6.1.1 To be submitted to Complete Survey once every 5 years are screwshafts with keyed propeller attachments and meeting one or more of the following characteristic *ICS Class*:
- .1 Having oil-lubricated bearings and a stern tube oil gland that has been approved by *ICS Class*.
- .2 Having continuous liners or an approved corrosion-resistant coating or, alternately, a combination of non-continuous liner and approved coating.
- .3 Shafts made of corrosion-resistant materials.
- 3.6.1.2 To be submitted to Complete Survey once every 5 years: are screwshafts fitted with keyless propeller attachments and meeting one or more of the following characteristic *ICS Class*:
- .1 Having oil-lubricated bearings and a stern tube oil gland that has been approved by *ICS Class*.
- .2 Shafts made of corrosion-resistant material.
- 3.6.1.3 Screwshafts not covered by 3.6.1.1 or 3.6.1.2 are to be submitted to Complete Survey not less than twice in 5 years, considering that the interval between 2 Complete Surveys shall not exceed 3 years.  
Screwshafts covered by 3.6.1.1 and 3.6.1.2 are to be submitted to survey at a bottom survey in the 5-year interval.
- 3.6.1.4 Screwshafts covered by 3.6.1.1.1 and 3.6.1.2.1 might be subject to Modified Survey in alternate 5-year periods in lieu of a Complete Survey.  
In order to proceed to a **Modified Survey** in lieu of a Complete Survey the following is to be complied with:
- .1 From the date of completion of the Complete Survey and at intervals not exceeding 6 months the stern tube lubricating oil be analyzed to determine the minimum content of water, chlorides, bearing material or metal particles, as well as to assess the oil aging.  
The oil sample is to be taken under service conditions of the propulsion system, as close as possible to its nominal parameters, sailing in non-restricted waters.  
The oil certificate is to include, besides the results of the test, the confirmation of the oil's fitness.
- .2 A record be kept on board of all the analysis carried out in compliance with 3.6.4.1.
- .3 A record be kept on board of the stern tube bearings' temperature and the stern tube lubricating oil consumption.
- .4 The propeller oil glands are to be capable of being replaced without withdrawal of the screw shaft.
- 3.6.1.5 Screw shafts covered by 3.6.1.1.1 and 3.6.1.2.1 might be subject to **Screw shaft Condition Monitoring** provided the following is complied with:
- .1 Lubricating oil analysis to be carried out at intervals not exceeding six months. The lubricating oil analysis documentation is to be available on board. Each analysis is to include the following minimum parameters:
- Water content.
  - Chloride content.
  - Bearing material and metal particles content.
  - Oil aging (resistance to oxidation).

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- .2 Oil consumption is to be recorded.
- .3 Bearing temperatures are to be recorded (two temperature sensors or other approved arrangements are to be installed).
- .4 Facilities are to be provided for the measurement of bearing wear down
- .5 Oil glands are to be capable of being replaced without withdrawal of the screw shaft.
- 3.6.1.6 At the monitored survey the screw shaft need not be withdrawn or overhauled at surveys.
- 3.6.1.7 When the Surveyor considers that the data presented are not satisfactory, the shaft will be required to be withdrawn.
- 3.6.1.8 The scope of the monitored survey is to include the modified survey (see 3.6.2.2.2).
- 3.6.1.9 Screwshafts where modified survey is applicable may be submitted, upon Owner's application, to a **partial survey** in order to extend the validity of a complete or modified survey. The extension of the validity between two subsequent surveys is not to exceed one half of the specified cycle. After a partial survey, the screw shaft is to be submitted to a modified or complete survey.
- 3.6.1.10 Directional propellers for main propulsion purposes are to be surveyed at intervals not exceeding those for the screwshafts.
- 3.6.1.11 Controllable pitch propellers for main propulsion purposes are to be surveyed at the same intervals as the screw shaft. The control gear is to be surveyed with the propeller opened up and dismantled, as necessary, **every 5 years**.
- 3.6.1.12 Water jet propellers intended for main propulsion purposes, provided their impeller shafts are made of approved corrosion resistant material or have approved equivalent arrangements, are to be surveyed dismantled at intervals **not exceeding 5 years**.
- 3.6.1.13 Water jet propellers not covered by the former rule are to be surveyed in dismantled condition **twice in a 5-year cycle**, and the interval between surveys is not to exceed **3 years**.
- 3.6.1.14 Bow thrusters and their impellers are to be surveyed in dismantled condition as necessary, at intervals not exceeding **5 years**.
- 3.6.1.15 All screwshafts covered by 3.6.1.1 and 3.6.1.2 and all the propellers intended for main propulsion purposes are to be surveyed at every docking survey subsequent to complete or modified survey.
- 3.6.1.16 Intervals between complete or modified surveys to screwshafts, stern tubes and propellers may have a  $\pm 6$  month difference whenever *ICS Class* deems necessary, in order to make them coincide with the intermediate docking surveys.
- ### 3.6.2 Scope of surveys
- #### 3.6.2.1 Complete survey
- 3.6.2.1.1 At the complete survey both the propeller and the screw shaft are to be withdrawn.
- 3.6.2.1.2 The scope of the complete survey is to include, as necessary, the complete examination of the screw shaft, i. e., of all its parts, in particular its cone, keyway, screws, journal bearings and coupling flanges. It will include also an examination, by a magnetic particle crack detection method, of:
- The after end of the cylindrical part of the shaft (the after end of the liner) and approximately 1/3 of the shaft cone from its greater diameter, including the keyway in the case of keyed propeller attachments.
  - The screw shaft area around the cone's greater diameter (after end of the liner) or the area of the shaft with transition flange diameter, for shafts with keyless propeller attachments.
  - Examination of screw shaft bearings (stern tube bearings).
  - Examination of stern tube oil glands sealing.
  - Examination of lubricating and sea water cooling systems, checking the certificates of lubricating oil test.
  - Measurement of the bearings' clearances.

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- Examination of the propeller and its fastening to the shaft.
- Checking the setting and working condition of the screw shaft lubricating oil temperature monitoring system.

3.6.2.1.3 At the complete survey controllable pitch propellers and their control gear are to be surveyed in dismantled condition.

3.6.2.1.4 At the complete survey directional propellers are to be surveyed in dismantled condition.

### 3.6.2.2 Modified survey

3.6.2.2.1 At the modified survey, screw shaft is to be partially withdrawn and the propeller dismantled, at the Surveyor's discretion.

3.6.2.2.2 The scope of the modified survey is to include, as applicable:

- Revision of the screw shaft lubricating oil analysis certificates and general examination of the lubricating system.
- Revision of the screw shaft bearings' temperature records and of the lubricating oil consumption.
- General examination of the accessible part of the screw shaft and of the fore and aft bearings.
- Examination, by an approved magnetic particle crack detection method, of the after end of the cylindrical part of the shaft and approximately 1/3 of the shaft cone from its greater diameter, including the keyway, for shafts with keyed propeller attachments; for shafts with keyless propeller attachments or solid coupling flanges this examination will not be required.
- Measurement of wear down of screw shaft bearings (stern tube bearings).
- General examination of the oil gland and checking of its sealing. In case no oil leakage is observed, the gland may not be dismantled for survey.

- General examination of the propeller and its fastening.

3.6.2.2.3 At the modified survey of controllable pitch propellers at least one of the blades is to be dismantled for the examination of its working parts and the control gear. Attention is to be paid to the tightness of the fastening of the blades to the boss and to the certificates of the lubricating oil analysis.

3.6.2.2.4 At the modified survey of directional propellers their seals, gear and couplings are to be checked, as well as the lubricating oil analysis certificates.

### 3.6.2.3 Monitored survey

3.6.2.3.1 At the monitored survey, partial withdrawal or dismantling of the screw shaft may not be required.

3.6.2.3.2 The scope of the monitored survey is to include the modified survey (see 3.6.2.2.2) and the complete survey (see 3.6.2.1.2) as applicable.

### 3.6.2.4 Partial survey

3.6.2.4.1 The scope of the partial survey is to include, as applicable:

- Examination, by an approved magnetic particle crack detection method, of approximately 1/3 of the shaft cone from its greater diameter, including the keyway, and the after end of the cylindrical part of the shaft for shafts with keyed propeller attachments.
- Measurement of wear down/clearance of the screw shaft bearings.
- General examination of the oil gland and checking of its sealing.
- General examination of the propeller and its attachment

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### 3.6.2.5 *In situ* survey

3.6.2.5.1 The scope of the in situ survey is to include, as applicable:

- Revision of the screw shaft lubricating oil analysis certificates and general examination of the lubricating system.
- Revision of the screw shaft bearings' temperature records and lubricating oil consumption.
- Checking the stern tube sea water cooling/blowing system.
- General examination of the oil gland and checking of its sealing.
- Measurement of the wear down/clearance of the screw shaft bearings.
- General examination of the propeller and its fastening.

3.6.2.5.2 At the in situ survey of a controllable pitch propeller a general examination of the propeller is to be carried out, as well as a test of the local and remote pitch control gears.

3.6.2.5.3 At the in situ survey of directional propellers a general examination of the propellers is to be carried out, as well as a sealing and working test of the operating and control gear.

### 3.7 Boiler surveys

3.7.1 Main water tube boilers (intended for propulsion) are to be examined internally, preferably at the intermediate or renewal survey during **the first 8 years** from the date of build. After that period the internal examination is to be carried out annually. For ships having one main boiler, the internal examination is to be carried out **annually** (regardless of the boiler's age).

3.7.2.1 Any other boiler with working pressure over 0,35 MPa and heating surface exceeding 4,5 m<sup>2</sup>, as well as steam receivers of exhaust gas boilers, are to be examined internally every 2,5 years, preferably at the intermediate or renewal survey.

3.7.3 For the internal examination of water and steam spaces, they are to be cleaned in such a way that enables a correct technical assessment of the examined elements. If, as a result of the examination, arise any doubts about the boiler's technical condition, the Surveyor may require, additionally, thickness measurements of the boiler's parts, a partial or complete removal of isolation and hydraulic tests.

3.7.4 The tests of boilers (external examinations) are to be carried out annually at the machinery periodical surveys. For exhaust gas boilers steam tests are not required, only an external examination is to be carried out.

3.7.5 After major repairs of main parts hydraulic tests are to be carried out, with a test pressure **1,5 times** the working pressure, but not greater than the pressure to which the boiler was operated since built.

### 3.8 **Unscheduled surveys**

3.8.1 **Unscheduled surveys** to the ship, her machinery, appliances, arrangements, equipment or outfit are to be carried out whenever the ship is submitted for surveys other than initial or periodical. The scope of the survey and its conditions are to be determined by *ICS Class* depending upon the kind of survey, the ship's age and technical condition.

3.8.2 The ship is to be submitted to **unscheduled survey** whenever any damage occurs to her hull, machinery, appliances, arrangements or outfit covered by the Rules and under *ICS Class* technical supervision, provided the aforementioned damage cannot be fully repaired with the ship's means. The same is applicable after grounding, when such damage is expected.

3.8.3 The **unscheduled survey** is to be carried out at the port of call or at the next port of call after damage or grounding. This survey shall have the purpose of determining the extent of the damage, establishing the scope of repair works and the conditions of class.

3.8.4 *ICS Class* is to be informed of every casualty of a synthetic fiber vessel involving damage to the hull.

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- 3.8.5 On special circumstances, unscheduled surveys may be carried out upon Owner's or Insurer's request, to the extent necessary to fulfill the application.
- 3.9 Laid-up ships**
- 3.9.1 Upon Owner's application, a laid-up ship can maintain her class on the conditions set up by *ICS Class*. It shall be necessary to carry out the following surveys:
- .1 Lay - up survey.
- .2 Surveys during lay-up period, at intervals corresponding to periodical surveys.
- .3 Recommission survey.
- 3.9.2 To a laid - up ship, the following surveys may be postponed:
- .1 Class renewal survey.
- .2 Docking survey.
- .3 Propeller shaft survey.
- .4 Boiler survey.
- .5 Surveys arising from the continuous functioning of equipment not to be used during lay - up time.
- 3.9.3 The scope of the surveys set out in 3.9.1, shall be established by *ICS Class* for each case, following the Owner's application.
- 3.10 Classification of ships classed with another class society and ships without a class**
- 3.10.1 *ICS Class* may assign a class to a ship not previously classed or whose class has been withdrawn, on condition that she be submitted to the initial survey.
- 3.10.2 A ship having a class from other classification society may be assigned a class by *ICS Class*, on condition that she be submitted to an initial survey in an extent similar to that of an annual survey. If the survey gives positive results, *ICS Class* may assign the ship a class for the period stated in her previous *Class Certificate*.
- 3.10.3 In the cases covered by 3.10.2 the survey and inspection cycles set out by the previous Society are to be maintained.
- 3.10.4 In order to class a ship, having a class from another Classification Society or whose class,
- assigned by another Classification Society, has lost validity, it shall be necessary to submit the following documents:
- .1 The last *Class Certificate*.
- .2 All the existing class survey reports related to surveys carried out since the last renewal survey.
- .3 Anchor and chain certificates.
- .4 Ship's specifications.
- .5 General arrangement plan.
- .6 Main frame and characteristic transverse sections drawings.
- .7 Longitudinal section
- .8 Watertight decks and bulkheads.
- .9 Stem, sternframe, rudder, rudder stock.
- .10 Approved *Information on Stability*.
- .11 Approved Information on Damage Stability
- .12 General arrangement of engine and boiler rooms, as well as emergency generators' room
- .13 Shafts and stern tube plans.
- .14 Piping plans, as well as arrangement of air and sounding pipes and closures.
- .15 Boilers and pressure vessels plans.
- .16 Main electrical scheme.
- .17 Electrical schemes of main and emergency switchboards.
- 3.10.5 If the Owner is unable to submit all the documents stated in 3.10.4 or can submit them partially, must ensure that *ICS Class* be provided all the necessary information during the initial survey.
- 3.10.6 To obtain the class for a ship not previously classed or whose class is unknown, the Owner is to submit technical documentation to an extent agreed with *ICS Class* and including, as a minimum, the documents stated in 3.10.4.
- 3.11 Reclassification**
- 3.11.1 Any ship whose *Class Certificates* have expired may be surveyed for reclassification upon Owner's application.

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3.11.2 The scope of the survey shall be determined by *ICS Class* in each case (case-by-cases basis).

### 3.12 Continuous survey for class renewal

3.12.1 Continuous survey shall consist in the distribution of the special survey's items for separate surveys that are to be carried out regularly at 5 years intervals.

3.12.2 A ship under continuous survey shall receive the applicable forms and computer lists.

3.12.3 The continuous survey may include the hull and machinery, as well as to other special equipment.

3.12.4 Ships shall be placed under continuous surveys following a written application by the Owner.

3.12.5 The schedule for the continuous survey is to be set under the following conditions:

.1 Schedule of the various surveys is to be agreed between the Owner and *ICS Class* in such a manner that approximately 20% of all the items under survey be submitted to survey each year.

.2 Intervals between surveys to various item groups are not to exceed the set period.

.3 Intervals between class renewal surveys are not to exceed 5 years.

### 3.12.6 Surveys not carried out by *ICS Class*

3.12.6.1 Upon previous request by the Owner, *ICS Class* may accept that certain groups of items of the ship's machinery installation, surveyed under the continuous survey program be surveyed by the ship's Chief Engineer in such ports where *ICS Class* is not represented or, if practicable, with the ship under way, provided in the next port of call where *ICS Class* is represented the said groups of items be submitted to a confirmation survey by the Society. It is mandatory that next survey of the said groups of items be carried out by *ICS Class*.

3.12.6.2 For the purpose of the confirmation survey, the Chief Engineer is to submit a detailed

report of the accomplished surveys and works, with the measurement records and the results of the pertinent checks and tests.

### 3.12.7 Acknowledgement of unscheduled surveys as continuous surveys

3.12.7.1 Whenever the scope of an unscheduled survey due to damage or other causes, corresponds to that of the continuous survey, the former may be acknowledged as continuous.

3.12.7.2 The interval of survey for the items or parts submitted to the unscheduled survey shall be from the date of that unscheduled survey. In this case the interval set for next survey is to be considered from the date of the unscheduled survey.

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## SECTION 4

### Additional Requirements for Special types of Ships other than Oil Tankers and Bulk Carriers

#### 4.1 General provisions

4.1.1 The present Section is applicable to ships and vessels with distinctive characteristic *ICS Class* in their design, construction or service and that as a whole have not been dealt with in *Section 3*.

4.1.2 Unless otherwise specified, requirements of *Sec 3* are to be applicable.

4.1.3 Surveys and inspection are to include all the arrangements and outfit for the specific purpose of each ship type, and are to include also the surveys and inspections required by the relevant IMO Conventions and Codes.

4.1.4 Hull surveys provided for in the following rules are described in their minimum extent; nevertheless, they may be extended, in the cases when corrosion or major structural defects are observed, to include additional close-up surveys (visual examinations) of the areas at hand, when the Surveyor deems necessary.



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### 4.2 Chemical tankers

#### 4.2.1 Annual surveys

4.2.1.1 Additionally to requirements of *Sec 3*, structural members, arrangements and outfit covered by *4.2.1.3 – 4.2.1.8* are to be surveyed as regards their technical condition.

4.2.1.2 Annual survey shall confirm that the equipment of the cargo handling system and its safety arrangements are maintained in good working condition.

Surveys are to be performed preferably during the cargo handling operations. During surveys it will not be necessary, as a rule, to have access to tanks or any other compartments of the cargo area that imply a degasification, except for the cases when verification of the equipment's performance is otherwise impossible.

4.2.1.3 Equipment of the cargo handling system on weather deck and not covered by *Sec 3* are to be surveyed, including cargo hoses and their attachments, spray shields and dip trays, etc.

4.2.1.4 Regardless of the provisions of *4.2.1.3*, for this type of ship the same requirements as for oil tankers are to be applied.

4.2.1.5 If deemed necessary, as a result of previous intermediate or renewal surveys, ballast tanks are to be surveyed.

When corrosion is observed during the said surveys, thickness measurements are to be carried out to the extent required by the degree of corrosion.

4.2.1.6 The following elements are to be surveyed, when fitted:

- .1 Special safety equipment for flooding cases, such as closing arrangements of watertight doors, according to approved damage control plans.
- .2 Cargo sample stowage spaces.
- .3 Gas detection devices.
- .4 Cargo handbook, safety instructions.

4.2.1.7 In supply ships fitted for the carriage of dangerous or corrosive substances all the

equipment used for cargo handling and monitoring (pipelines, pumps, valves, safety equipment, etc.) is to be surveyed.

4.2.1.8 In ships engaged on the carriage of corrosive waste chemicals, in addition to the aforementioned surveys, all the cargo tanks and pipelines are to be carefully examined from the point of view of corrosion and damage to coating.

#### 4.2.2 Intermediate surveys

4.2.2.1 In addition to surveys and tests required by *Sec 3* and *4.2.1* the elements, arrangements and equipment covered by *rules 4.2.2.3 – 4.2.2.7* are to be surveyed.

4.2.2.2 Regardless of the provisions of *4.2.2.1* for this type of ships, the additional requirements for tankers set out in *Subs 3.3* and *3.4* are to be applied.

4.2.2.3 Among the main cargo piping systems the following items are to be surveyed:

- .1 Drainage of tank venting pipes.
- .2 Functioning of high velocity vent and pressure/vacuum valves and, if deemed necessary by the Surveyor, their opening and adjustment.
- .3 Cargo hoses.
- .4 Cargo cooling plants.
- .5 Tank heating systems.
- .6 Spare parts for ventilation systems.

4.2.2.4 For ships more than 10 years of age close-up surveys are to be carried out in accordance with following requirements:

- .1 Ballast tanks are to be surveyed in the same manner as for previous special survey.
- .2 At least two combined cargo/ballast tanks are to be surveyed, the extent of the survey based on the record of the previous special survey and the repair history.
- .3 Additionally, one combined cargo/ballast tank, after the 3<sup>rd</sup> special survey, to an extent as indicated in *4.2.2.4.2*.

4.2.2.5 In areas found to be suspect at the previous class renewal survey, thickness measurements are to be carried out to an extent in accordance with the degree of corrosion.

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- 4.2.2.6 For supply vessels fitted for the carriage of dangerous or corrosive substances, all the tanks used for those substances are to be subjected to close-up surveys as regards corrosion and protective coating damage.
- 4.2.2.7 Chemical incinerator ships, in addition to aforementioned surveys, are to be subjected to the following checks:
- .1 All cargo tanks and pipelines are to be surveyed for corrosion.
  - .2 The steel structure of incinerator, its insulation and brick lining are to be surveyed.
  - .3 An overall survey is to be carried out to burners, their auxiliaries and instruments, electrical installation, ventilation fans and ducts, to determine their condition.
- 4.2.3 Special surveys**
- 4.2.3.1 In addition to the requirements of *Sec 3* concerning renewal surveys, and to provisions of *4.2.2* for intermediate surveys, the cargo handling equipment and its associated safety systems are to be subjected to functional tests and thorough examinations, at the Surveyor's discretion.
- 4.2.3.2 It is to be ensured that the relevant instructions and necessary documents related to cargo handling, such as plans, loading limit information, etc., are kept on board.
- 4.2.3.3 Examinations and tests of cargo handling equipment and its safety systems covered by *4.2.3.1* are to be carried out when the ship's spaces are freed from gases.
- 4.2.3.4 Regardless of provisions of *4.2.3.1* this type of ships is subjected to additional requirements for oil tankers concerning overall surveys, as provided for in *Subs 3.3* and *3.4*.
- 4.2.3.5 For class renewal, the Owner is to prepare a survey program considering requirements of *3.2.16*, *3.2.17* and *3.2.18*.
- 4.2.3.6 When carrying our surveys and examination of piping systems covered by *3.3.2.2*, *3.4.3.2.13* and *3.4.3.2.25* particular attention is to be paid to pipelines in ballast tanks and void spaces.
- 4.2.3.7 Stainless steel tanks are to be subjected to overall surveys that may be completed with close-up surveys if deemed necessary by the surveyor.
- 4.2.3.8 Depending on the ship's age, close-up surveys are to be carried out, at least, as required by *4.2.3.9 – 4.2.3.11*. Nevertheless, the Surveyor may modify this scope taking in consideration the tanks' maintenance, the condition of the corrosion protection system and in the following cases:
- .1 Tanks with structural systems or arrangements where defects have been observed in other ships of the same type.
  - .2 Tanks having structures with reduced scantlings, due to an approved corrosion protection coating.
  - .3 Stainless steel tanks.
- 4.2.3.9 Ships less than 5 years of age are to be subjected to close-up surveys having the following scope:
- .1 Structural members of one transverse section or one web frame with all the adjacent structural members, if any, in one wing or ballast double hull tank (side and bottom tanks, even though these tanks are separate).
  - .2 One deck transverse in one cargo tank or on deck, including the latter's shell.
  - .3 Lower part of a transverse bulkhead, including adjacent structural members in one ballast tank, one ballast wing tank and a center cargo tank.
- 4.2.3.10 Ships with age from 5 to 10 years (Special Survey N°2) are to be subjected to close-up surveys with the following scope:
- .1 All the shell plating and all the internal structure of one ballast wing tank or one ballast double hull tank (wing and bottom tank). Deck structure is to be included, if applicable.
  - .2 One deck transverse (web) in one cargo tank or on deck, including deck shell plating and adjacent structural members.

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- .3 One transverse (or, if fitted, one deck transverse) in one cargo wing tank and two cargo center tanks.
  - .4 Both transverse bulkheads (complete) including structural members in one cargo wing tank and one double hull tank (wing and hull tank).
  - .5 Lower part of a transverse bulkhead, including adjacent structural members, in each of the remaining ballast tanks in one cargo wing tank and in two cargo center tanks.
- 4.2.3.11 Ships over 10 years of age are to be subjected to close-up surveys with the following scope:
- .1 All plating and all the internal structure in all ballast tanks (including deck structure, if any).
  - .2 All plating and all the internal structure in one cargo wing tank.
  - .3 Structural members of one transverse section (a complete transverse web, if fitted, including adjacent structural members) in each remaining cargo tank.
  - .4 All transverse bulkheads (complete) including adjacent structural members, in all cargo tanks.
- 4.2.3.12 Minimum requirements for thickness measurements at renewal surveys are indicated in 4.2.3.17 – 4.2.3.20 in accordance to the ship's age. In areas where substantial corrosion is observed, the extent of thickness measurements is to include the items in tables 3.3.3-6, 3.3.3-8 and 3.3.3-9.
- 4.2.3.13 The Surveyor may modify the extent of measurements required by rules 4.2.3.17 – 4.2.3.20 for areas where anti-corrosion coating is found to be in good condition and for stainless steel tanks.
- 4.2.3.14 The selected transverse sections are to include all the continuous longitudinal elements. Sections are to be chosen in areas where major corrosion is expected or where such a necessity is revealed by deck plating measurements.
- 4.2.3.15 In cases where three sections are measured, at least one should be in way of a ballast tank within 0,5L amidships.
- 4.2.3.16 For ships **greater than 10 years of age**, selected cargo pipes outside cargo tanks and sections of ballast pipes passing through the said tanks are to be subjected to random thickness measurements and, if deemed necessary, some of them may be opened.
- 4.2.3.17 For ships **5 years of age or less**, the minimum requirements for thickness measurements are the following:
- .1 One transverse section of deck plating for the full breadth of the ship within the cargo tanks length, preferably in way of a ballast tank, if any, or of a cargo tank primarily used as a ballast tank.
  - .2 Measurements in structural members subjected to close-up surveys in accordance with 4.2.3.9, for assessment of general corrosion pattern.
  - .3 Suspect areas, at the Surveyor's discretion.
- 4.2.3.18 For ships of age **greater than 5 years but not exceeding 10 years**, the minimum requirements for thickness measurements are the following:
- .1 Measurement, within the cargo tanks length, of all deck plates and two transverse sections.
  - .2 Measurements in structural members subjected to close-up surveys in accordance with 4.2.3.10 for assessment of general corrosion pattern.
  - .3 Suspect areas, at the Surveyor's discretion.
  - .4 Selected wind and water strakes outside the cargo tank area.
- 4.2.3.19 For ships with age **greater than 10 years but not exceeding 15 years**, the minimum requirements for thickness measurements are the following:
- .1 Measurements, within the cargo tank area, of all deck plates and two transverse sections.
  - .2 Measurements in structural members subjected to close-up surveys in accordance with 4.2.3.11, for assessment of general corrosion pattern.
  - .3 Suspect areas, at the Surveyor's discretion.
  - .4 Selected wind and water strakes, outside the cargo tank area.

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- 4.2.3.20 For ships **over 15 years of age**, the minimum requirements for thickness measurements are the following:
- .1 Measurements, within the cargo tank area, of all deck plates, three transverse sections and all the bottom plates.
  - .2 Measurements in structural members subjected to close-up surveys in accordance with 4.2.3.11, for assessment of general corrosion pattern.
  - .3 Suspect areas, at the Surveyor's discretion.
  - .4 Selected wind and water strakes, outside the cargo tank area.
  - 5 Selected wind and water strakes, within the cargo tank area.
- 4.2.3.21 In general, pressure tests are to be carried out in accordance with the requirements of 4.2.3.22 – 4.2.3.24. However, depending on the use or design of tanks, the Surveyor may accept deviations as properly documented recent pressure tests performed by the crew or require additional tests.
- 4.2.3.22 For ships **5 years of age or less**, the minimum requirements for tank testing are to include the following:
- .1 Void spaces, shaft tunnels, representative fuel tanks, pump rooms and cofferdams.
  - .2 All the bulkheads and decks which form boundaries of ballast tanks.
- 4.2.3.23 For ships of age **greater than 5 years but not exceeding 10 years**, the minimum requirements for tank testing are to include the following:
- .1 Void spaces, pipe tunnels, representative fuel tanks, pump rooms and cofferdams.
  - .2 All cargo tank bulkheads which form the boundaries of segregated cargoes.
  - .3 All ballast tank boundaries.
- 4.2.3.24 For ships **over 10 years of age** the minimum requirements for tank testing are to include the following:
- .1 Void spaces, pipe tunnels, representative fuel tanks, pump rooms and cofferdams.
  - .2 All cargo tank bulkheads.
  - .3 All ballast tank boundaries.
- 4.2.3.25 In ships over 10 years of age, selected cargo pipes outside the cargo tanks and ballast pipes passing through cargo tanks are to be tested with the minimum service pressure.
- ### 4.3 Gas carriers
- #### 4.3.1 Annual surveys
- 4.3.1.1 Additionally to requirements of *Sec 3*, structural members, arrangements and equipment covered by *rules 4.3.1.3 – 4.3.1.13* are to be surveyed as regards their technical condition.
- 4.3.1.2 Annual survey shall confirm that the cargo handling systems and their corresponding safety devices are maintained in good working condition. The technical condition and certification (if applicable) of the crew protection means covered by Chapters XIV and XVII of the Gas Carrier Code is to be checked. Surveys are preferably to be carried out during a loading or discharging operation. At these surveys, access to cargo tanks or inerted cargo holds that require gas freeing / ventilation operations will normally not be required; however, when circumstances advise to do so and the Surveyor deems necessary, such action may be required and carried out.
- 4.3.1.3 Spaces and areas related to cargo handling process (e.g.: cargo control room, compressor room, etc.) are to be surveyed for their general condition and maintenance. In the same manner all the accessible gastight spaces where existence of gas leakage is likely to occur are to be visually examined.
- 4.3.1.4 With regard to the cargo system the following is to be carried out:
- .1 All cargo and process pipes, expansion joints, cargo hoses and machinery such as heat exchangers, vaporizers, pumps and compressors are to be visually examined.
  - .2 The log books are to be examined as regards the correct functioning of the cargo containment and cargo handling systems, checking the running hours per day of the

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- reliquefaction plant or the boil-off rate, as well as the inert gas consumption.
- .3 Checking of the existence on board of the relevant instructions and other documents, necessary for the cargo handling process, cargo tank loading limits information, relating to refrigeration process etc.
- 4.3.1.5 With regard to the venting systems of the cargo spaces the following is to be carried out:
- .1 Visual examination of the venting systems of the cargo and inter-barrier spaces.
- .2 Checking that the cargo tank relief valves are sealed and that the certificate with details of the closing/opening pressures is kept on board.
- .3 Examination of the flame screens and flame arresters as regards corrosion and cleanliness.
- 4.3.1.6 Control and monitoring devices for pressure, temperature and liquid levels are to be checked for their good working condition by one of the following procedures:
- .1 Visual external examination.
- .2 Comparison of read-outs of different indicators.
- .3 Comparison of read-outs with the data of the cargo actually handled.
- .4 Examination of repair and maintenance records of the liquefied gas plant.
- 4.3.1.7 Emergency shutdown valves of shore connections and tanks are to be tested without flow in the pipelines. Such a test is to verify that the emergency shutdown system is capable of stopping the cargo pumps and compressors.
- 4.3.1.8 Fixed and portable gas detection equipment, including indicators and alarms, is to be tested for proper functioning.
- 4.3.1.9 In gas dangerous spaces the electrical equipment, including cables and their supports, are to be visually examine, particularly regarding explosion protection.
- 4.3.1.10 Ventilation systems in all compartments in cargo area, including cargo pump rooms, cargo compressor rooms, electric motors rooms, cargo control room and other spaces used for cargo handling operations, are to be verified for their correct functioning.
- 4.3.1.11 Inert gas and dry air systems, including devices for the prevention of back flow of cargo vapors to gas proof spaces are to be checked for their satisfactory operating condition.
- 4.3.1.12 Regardless of the provisions of *rule 3.4.1.1, paragraph .11*, all the fire-fighting systems in cargo tanks area, including the compressor room, are to be visually examine.
- 4.3.1.13 The following items and equipment are to be checked for their condition and correct functioning:
- .1 Means for gas-tightness of wheelhouse windows and doors, windows in end bulkheads of superstructures and deckhouses facing the cargo area or the stern cargo handling equipment, and closing devices of all air intakes and openings into accommodation; service and control stations.
- .2 Drip trays or other fittings for the protection of decks against cargo leakage.
- .3 Electrical bonding of cargo piping systems.
- .4 Equipment for the use of boil-off gas as fuel, including alarm and safety systems.
- 4.3.2 Intermediate surveys**
- 4.3.2.1 In addition to the requirements of *Sec 3 and 4.3.1*, at the second or third annual survey the examinations and checks required by *4.3.2.2 – 4.3.2.8* are to be carried out.
- 4.3.2.2 For some of the examinations and checks that are to be carried out at the intermediate survey, the Surveyor may require the ship, at his discretion, to be in gas-free condition.
- 4.3.2.3 With regard to the cargo system the following is to be carried out:
- .1 Bonding of tanks and pipes is to be checked.
- .2 It is to be checked that cargo hoses are of an approved type and in a satisfactory

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- condition. Hoses are to be subjected to pressure and sealing tests at intervals not exceeding 2,5 years.
- .3 Main pipelines essential for the ship's service is to be examined when they are located on weather deck, e.g.: cargo transfer, bunker and ballast pipelines, etc.
- .4 In ships over 10 years of age carrying products other than those specified in the *IMO Certificate of Fitness*, not less than two selected structural cargo tanks and selected double bottom spaces or ballast spaces, if any are to be subjected to external examination Pipelines in cargo tanks are to be examined. The electrical bonding of tanks to the hull is to be examined.
- 4.3.2.4 With regard to the ventilation system of cargo tanks the following is to be carried out:
- .1 Examination of draining means of vent piping system.
- .2 If the cargo tanks are equipped with non-metallic membrane relief valves (main or pilot valves) such membranes are to be replaced by new ones and adjusted, function-tested and sealed. If non-metallic membranes are replaced regularly at intervals not exceeding 3 years, aforementioned measures need not be taken at intermediate surveys. In this case the replacement dates are to be checked in existing logs.
- 4.3.2.5 Alarm, control and safety devices of the cargo system are to be visually examined and tested by variable pressure, temperature and liquid level so far as practicable, checking the results with test instruments. The test simulation may be accepted for sensors not accessible or located within inerted tanks or spaces. This test is to include checking the functioning of the alarm and safety systems. In this case the date of replacement is to be checked in existing logs.
- 4.3.2.6 The gas detection equipment, including indicators and alarms, is to be tested for correct functioning. The piping of the gas detection equipment is to be visually examined also, for corrosion and damage. The tightness and integrity of the suction lines between suction points and the analyzers are to be tested, so far as practicable.
- 4.3.2.7 On ships equipped for the use of boil-off gases as fuel, the safety, control, alarm and shutdown systems are to be tested. The extent of such tests is to be determined in each particular case.
- 4.3.2.8 The inert gas plant is to be tested in accordance with an approved program.
- 4.3.2.9 With regard to the electrical equipment located in gas-dangerous spaces or zones the following is to be verified:
- .1 Protective earthing (random checks).
- .2 Integrity of explosion-safe equipment.
- .3 Damages in cable sheathing.
- .4 Functioning of pressurized equipment and the associated alarms.
- .5 The shutdown devices for non-safe electrical equipment located in spaces protected by air locks, e.g.: electric motor rooms, cargo control room, etc.
- .6 The insulation resistance of circuits. This may be performed only when the ship is gas-free or inerted. In cases when proper records of tests made by the crew are kept on board, the Surveyor may to his discretion accept these readings.
- .7 When the ship is in gas-free condition, it is to be checked that the cargo tanks are electrically bonded to the hull.
- 4.3.3 Special survey**
- 4.3.3.1 In addition to requirements of *Sec 3* and *4.3.2*, the examinations and tests required by *4.3.3.2 – 4.3.3.24* are to be carried out.
- 4.3.3.2 With regard to cargo tanks examinations the following is to be carried out:
- .1 All the cargo tanks are to be internally examined. However, when applicable, the result of a close-up survey performed between two renewal surveys may be accepted.

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- .2 So far as practicable, the outer surface of non-insulated cargo tanks or the outer surface of cargo tanks insulation (if any) is to be examined. In the same manner, tank support keys and anti-flotation chocks are to be examined.  
Depending on the results of the examination, the Surveyor may require a partial removal of the insulation in order to verify the condition of the tank or the insulation itself.
- .3 If the arrangement of the insulation is such that it cannot be examined, as in the case of membrane tanks, then the surrounding structural members of wing tanks, double bottom tanks and cofferdams are to be examined for cold spots when the cargo tanks are in cold condition.
- .4 When sufficient evidence is found of the integrity of insulation, on the basis of the log book and the readings of the monitoring instruments, the said examination may be dispensed with.
- .5 Thickness measurements in cargo tanks are to be carried out at the Surveyor's discretion.
- 4.3.3.3 Whenever deemed necessary by the Surveyor, examinations to cargo tanks are to be supplemented with non-destructive tests of main structural members, tank shell plating and highly stressed parts, including welded connections. The following are to be considered highly stressed parts:
- .1 Transverse and longitudinal tank supports.
  - .2 Y-type connections between the tank shell and the longitudinal bulkhead.
  - .3 Web frames or stiffener rings.
  - .4 Swash bulkheads and their fixations.
  - .5 Pipe connections.
- 4.3.3.4 For independent type B tanks the extent of non-destructive tests will depend on a program specially designed for the particular ship type.
- 4.3.3.5 The tightness of all cargo tanks is to be verified by an appropriate method. Provided that the effectiveness of ship's gas detection system has been confirmed, the said equipment may be used for the tightness tests of independent tanks below deck during the first process of filling the cargo tanks subsequent to the class renewal survey.  
Whenever applicable, examinations carried out between class renewals may be accepted.
- 4.3.3.6 In cases when the finding of checks stated in 4.3.3.2 – 4.3.3.5 or the examination of the log book raise doubts concerning structural integrity of cargo tanks, these are to be subjected to hydrostatic or hydropneumatic tests.  
For integral tanks and independent type A or B tanks the test pressure at the top tank is to correspond to MARVS (maximum allowable relief valve setting). In cases if independent type C tanks the test pressure is not to be lesser than  $1,25 \times \text{MARVS}$  at the upper edge of the tank.
- 4.3.3.7 At class renewals II, IV, VI etc., the following requirements for independent tanks type C are to be complied with:
- .1 They are to be subjected to hydrostatic and hydropneumatic tests to a pressure of  $1,25 \text{ MARVS}$  at the upper edge of the tank and, thereafter, to a non-destructive test in accordance with 4.3.3.3 and 4.3.3.4 or, alternatively, to a thorough, systematically planned non-destructive test which is to be carried out in accordance with a program specifically designed for the particular tank type.
  - .2 In cases when the aforementioned program does not exist, the welded connections in highly stressed areas covered by 4.3.3.3 are to be subjected to a crack detection test; not less than 10% of the longitude is to be tested in the welded connections of the said areas internally and externally, so far as practicable. If necessary, the insulation is to be removed for the non-destructive test.
- 4.3.3.8 So far as practicable, all hold spaces, tank supporting structures and secondary barriers are to be subjected to a visual examination. The secondary barriers are to be checked for their effectiveness by a pressure/vacuum test, an examination or other approved procedure.
- 4.3.3.9 For membrane and semi-membrane tanks, the examinations and tests are to be performed in accordance with 4.3.3.8 by a procedure

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- 4.3.3.10 specially designed for this tank type and duly approved.
- 4.3.3.10 Cargo tanks relief valves are to be opened up, adjusted, subjected to a functional test and sealed. Requirements of 4.3.2.4.2 regarding the replacement of non-metallic membranes are to be taken into consideration.
- During the aforementioned test it is to be verified that each valve opens at the set pressure with a tolerance that is not to exceed  $\pm 10\%$  for pressures from 0 to 1,5 bar;  $6\%$  for pressures from 1,5 to 3,0 bar and  $\pm 3\%$  for 3,0 bar and upwards.
- 4.3.3.11 Pressure/vacuum valves, rupture discs and other pressure relief devices for inter-barrier and hold spaces are to be examined and, if deemed necessary, to be tested, depending on their construction type.
- 4.3.3.12 The electrical bonding of the cargo tanks to the hull is to be checked.
- 4.3.3.13 If deemed necessary by the Surveyor, the cargo, liquid nitrogen and process pipelines are to be opened up for examination, including accessories and actuators, compensators, etc. In the same manner, when deemed necessary, the insulation of the said pipelines is to be removed to examine the pipelines' external condition. Welded seams of branches and bends are to be subjected to non-destructive crack detection tests at random, to the Surveyor's discretion.
- 4.3.3.14 If, as a result of the examination required by 4.3.3.13, arise doubts regarding the condition of pipelines, a pressure test at 1,25 MARVS is to be carried out. After reassembly the complete piping system is to be tested for leakage.
- 4.3.3.15 Pressure relief valves of the pipelines are to be subjected to a functioning test; some of the valves are to be opened out at random, checked and adjusted.
- 4.3.3.16 Cargo pumps, booster pumps and compressors are to be examined and tested.
- 4.3.3.16.1 With regard to the reliquefaction plant the following is to be carried out:
- .1 The parts of the compressors that might be subject to wear, such as cylinders, pistons, connecting rods, bearings, etc., are to be examined. In the same manner, the auxiliary machinery components such as shafts, rotors and diffusers of centrifugal pumps, are to be examined.
- .2 Compressor drives, including the equipment necessary for their functioning, are to be examined.
- .3 All covers of the heat exchangers are to be removed for examination of the plates and pipes. In case of pipes renewal, pressure and sealing tests are to be carried out. When only a few pipes have been renewed, a sealing test may be considered sufficient, at the Surveyor's discretion.
- .4 The safety equipment (pressure relief valves, rupture discs, etc.) is to be tested.
- 4.3.3.17 At class renewals all the process pressure vessels are to be tested pneumatically at a pressure equal to 1,1 times the service pressure, unless the results of the examination indicate the need for a hydrostatic test at 1,5 times the service pressure.
- 4.3.3.18 When the ship is equipped with a system for the use as fuel of gases evaporated from the cargo, the following is to be performed:
- .1 The gas conditioning plant is to be subjected to an external examination.
- .2 The pipe or duct enclosing the gas pipeline is to be checked for leakage.
- .3 The ventilation system of the above mentioned pipe or duct, as well as the inerting equipment of a double wall gas piping, including its alarm devices, are to be examined.
- .4 The main valve for the gas fuel is to be checked.
- .5 The heat exchangers are to be internally examined.
- .6 Closing valves of installations are to be subjected to functional tests at random.
- .7 The rest of the safety, control, alarm and shutdown systems are to be checked, at the Surveyor's discretion in each particular case.



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- 4.3.3.19 In addition to examinations and tests required by 4.3.3.19, the electric motor safety devices are to be tested.
- 4.3.3.20 Drainage systems for the removal of water or cargo from inter-barrier or hold spaces are to be examined. These systems are to be checked if necessary.
- 4.3.3.21 All the gastight bulkheads are to be examined.
- 4.3.3.22 The effectiveness of gastight shaft seals passing through gastight bulkheads is to be checked.
- 4.3.3.23 The existence on board of all the regulated spare parts is to be checked.
- 4.4 Oil recovery vessels**
- 4.4.1 Annual surveys**
- 4.4.1.1 In addition to requirements of *Sec 3*, the structural members, arrangements and equipment covered by rules 4.4.1.4 – 4.4.1.7 are to be examined as regards their technical condition.
- 4.4.1.2 The annual survey shall confirm that the equipment for oil recovery and cargo handling are kept in a satisfactory technical condition.
- 4.4.1.3 At the annual survey, the access to tanks or other spaces not related to the oil recovery and handling system that requires gas freeing will not normally be required, except for cases when checking the functioning of equipment is otherwise impossible.
- 4.4.1.4 The installations in pump room and other enclosed spaces used during oil recovery and cargo handling are to be checked, particularly as regards leakage and potential hazard sources (explosion protection) e.g.:
- .1 Bulkhead and deck penetrations
- .2 All the piping systems.
- .3 Cargo, stripping, bilge and ballast pumps.
- .4 Electrical and mechanical remote control and emergency stopping equipment.
- .5 Ventilation systems.
- .6 Equipment for oil recovery and handling (separation plants, etc.).
- 4.4.1.5 In addition to requirements of 4.4.1.4, special equipment and drives that are used for the oil and solid wastes recovery and handling operations are to be examined and tested, e. g.:
- .1 Air locks and associated driving arrangements.
- .2 Initial recovery arrangements.
- .3 Pipelines and ducts.
- 4.4.1.6 When deemed necessary by the Surveyor, in areas that might be exposed to gas vapors, the examination of electrical installations, including cables and their supports may be required, particularly as regards the explosion protection.
- 4.4.1.7 If deemed necessary, as a result of previous intermediate or renewal surveys, ballast tanks are to be surveyed as needed. When unusual corrosion is observed at these surveys, the pertinent thickness measurements are to be performed, according to the extent of corrosion.
- 4.4.2 Intermediate surveys**
- 4.4.2.1 In addition to requirements of *Sec 3* and 4.4.1, at the second or third annual survey the examinations and checks required by rules 4.4.2.2 – 4.4.2.4 are to be carried out.
- 4.4.2.2 Irrespective of the ship's age, the condition of oil recovery, cargo handling, ballast and tank venting systems are to be carefully examined. In case of doubt, pressure tests and thickness measurements may be required.
- 4.4.2.3 For ballast tank examinations see 3.3.2.
- 4.4.2.4 In areas considered suspect at the previous renewal survey thickness measurements are to be carried out and may be extended in accordance with the corrosion pattern.
- 4.4.3 Special survey**
- 4.4.3.1 In addition to the requirements of *Sec 3* for each of the special surveys, and of 4.4.2 for the intermediate surveys, the oil recovery and cargo handling equipment and the pertinent special devices are to be subjected to

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- thorough examinations and functional tests at the Surveyor's discretion.
- 4.4.3.2 Examinations and tests stated in 4.4.3.1 are to be performed only with the ship in gas-free condition.
- 4.4.3.3 Spaces and areas used in connection with oil recovery and handling (e. g.: pump room, separation tanks) are to be examined as regards their maintenance condition and possible hazard sources. All accessible gastight bulkhead penetrations, including shaft seals, are to be examined.
- 4.4.3.4 With regard to the ship's hull the following is to be dealt with:
- .1 All tanks connected with the recovery and handling process, ballast tanks including double bottom tanks, pipeline tunnels, cofferdams and void spaces bounding cargo handling tanks, decks and outer shell plating are to be examined.
- .2 Examinations are to be sufficiently detailed as to reveal any major corrosion or deformation, cracks and other structural damages.
- .3 Aforementioned examinations are to be supplemented by thickness measurements and tanks testing whenever deemed necessary, in order to ascertain that the structural integrity remains undamaged.
- .4 Irrespective of ship's age, the condition of the ballast tank protective coating, if fitted, is to be examined.
- .5 When the Surveyor deems necessary, close-up surveys may be required, taking into consideration the maintenance condition of the examined tanks and the condition of the protective coating, if any.
- .6 Regarding thickness measurements the requirements of 3.3.3.1.11 are to be considered and, additionally, the requirements of 3.3.3.2.2 and 3.3.3.2.3, as applicable.
- 4.4.3.5 Piping systems for cargo recovery and handling, including valves and accessories are to be internally examined whenever the Surveyor deems necessary in order to verify the existence of corrosion; subsequently, they are to be pressure tested.
- 4.4.3.6 Cargo, bilge and ballast pumps are to be examined and tested.
- 4.4.3.7 The cargo tanks venting and airing systems are to be examined by opening and closing flame screens and arresters when deemed necessary
- 4.4.3.8 The following equipment, if fitted, is to undergo a functional test:
- .1 Tank level indicators and alarms.
- .2 Overflow control systems.
- .3 Temperature and pressure alarms.
- .4 Remote control systems for cargo pumps.
- 4.5 Floating docks**
- 4.5.1 For floating docks subject to classification, class renewal surveys at 5-year intervals are to be carried out, unless other term is considered necessary.
- 4.5.2 Non-classed floating docks may be subjected to a survey to assess their technical condition prior to sale, refitting or conversion.
- 4.5.3 When classing floating docks not built under *ICS Class* supervision, the procedure concerning documents that are to be submitted and the scope of surveys as stated in *Subs 3.10*.
- 4.5.4 When restoring class to floating docks previously classed with *ICS Class*, procedure shall be as stated in *Subs 3.11*. For this purpose the Head Office shall establish the scope of the survey to be carried out by the Surveyor depending on the dock's age and the particulars of each case.
- 4.5.5 All the repairs to hull and machinery of floating docks required for the maintenance of class are to be carried out to the satisfaction of a Surveyor to *ICS Class*.
- 4.5.6 When the extent of damage or average or any other reason determines that a classed floating dock be towed off the port where it usually renders service, the Owner is to inform *ICS Class* prior to the beginning of the tow.

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### 4.5.7 Requirements for special surveys

4.5.7.1 For the renewal surveys, the dock's immersion is to be as least as possible.

4.5.7.2 Spaces between safety and work decks are to be free from obstacles and clean as necessary for the survey; in the same manner enclosures of pipelines, when fitted, are to be removed.

4.5.7.3 With regard to the dock's hull the following is to be dealt with:

.1 Watertight pontoons are to be internally examined and the extent of examination is to the Surveyor's discretion.

.2 Inner exposed bulkheads of towers and outer shell plating above waterline are to be examined in both sides, to the extent determined by the Surveyor in each case, considering the results of previous surveys, evident damage or casualties, etc.

.3 Work and safety decks are to be visually examined.

.4 Tightness of bulkheads bounding watertight compartments is to be checked and the bulkheads pneumatically tested (max. 0,2 kgf/cm<sup>2</sup>). Compartments to be tested should be selected, depending on the dock's age and general condition; however, at least every second compartment is to be tested. When only every second compartment is tested, the tightness of the safety deck is to be tested also by a trial immersion.

.5 The maintenance condition of all passageways and companionways is to be checked, particularly of those directly exposed to seawater during the immersion/emersion process.

.6 All manholes, hatches, skylights and portholes, including their closing and securing arrangements, should be examined.

.7 The maintenance condition of air pipes, side scuppers and outlets to the sea is to be checked.

.8 The maintenance condition of guardrails, stanchions and similar protection means is to be checked.

.9 Particular attention is to be paid to pipelines arranged in compartments and their valves, which are to be checked for tightness and operability, as are the sea inlet and outlet valves.

4.5.7.4 At every second class renewal thickness measurements to selected structural parts are to be carried out. Parts are to be selected by the Surveyor depending on the dock's age and general condition and the results of previous surveys; however, in case of notorious suspect of substantial corrosion or wear, the Surveyor may require the performance of such measurements at any renewal survey.

4.5.7.5 Surveys to the submerged part of the hull may be carried out at dry-docking, with the dock floating in an inclined position or by an in-water survey and are to be limited to special cases such as averages, leakages, etc., according to the results of examinations to the interior of watertight compartments or by evidence of substantial corrosion or damage to the shell plating.

4.5.7.6 Machinery equipment for the dock operation, including electrical equipment, is to be surveyed and tested as required by *Subs 3.4* so far as practicable. Particular attention is to be paid to the functional tests of ballast, drainage, airing and measuring systems.

4.5.7.7 In addition to requirements of 4.5.7.6, the following equipment for dock operation is to be subjected to an overall survey:

.1 Bilge and keel blocks, including their drives.

.2 Warping capstans.

.3 Cranes.

.4 Bridge connections.

.5 Shore connections.

.6 Dock mooring equipment

.7 Special equipment, e. g.: navigation equipment, equipment and systems for docking operations control, systems for improving work conditions on board.

4.5.8 Irrespective of requirements of 4.5.7, with regard to the floating dock fire protection and firefighting outfit, the requirements of 3.4.1 and 3.4.3 are to be applied so far as practicable.

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#### 4.6.1 Annual surveys

4.6.1.1 In addition to requirements of *Sec 3*, structural members, arrangements and equipment covered by *4.6.1.3 – 4.6.1.10* are to be surveyed for their technical condition and are to be tested when applicable.

4.6.1.2 Annual survey is to include a survey to hull and machinery so far as necessary and practicable, to confirm that their general condition is satisfactory.

4.6.1.3 An examination to sanitary outlets and their valves and to side scuppers is to be carried out so far as practicable.

4.6.1.4 All mechanically driven hatch covers or cargo ports are to be subjected to a tightness test for the condition of the closing and sealing arrangements, the drainage ducts, driving devices, rails and wheels.

4.6.1.5 A general examination of the machinery spaces is to be carried out, paying particular attention to propulsion system, auxiliary machinery and to the fire or explosion hazard. When applicable, emergency escape ways are to be examined to ensure that are free from obstructions.

4.6.1.6 Communication means between bridge and machinery spaces are to be tested, as are communication means between bridge and servomotor, if applicable.

4.6.1.7 Bilge system, including hand pumps, if any, is to be examined so far as practicable.

4.6.1.8 Every pressure vessel is to be subjected to an overall survey that is to include safety, control and relief devices, as well as associated piping systems, insulation and measuring instruments.

4.6.1.9 Electrical equipment and cabling that form the main and emergency electrical installations are to be generally examined under operating conditions so far as practicable. The satisfactory operation of the main and emergency sources of power and the electrical services essential for safety in emergency conditions is to be tested.

When the sources of power are automatically controlled they are to be tested in the automatic

mode. Bonding straps for static electricity and earthing arrangements are to be examined when applicable

4.6.1.10 For steel vessels, the requirements of *4.6.2.2* regarding survey of ballast spaces, integral sanitary tanks and bilges are also to be complied with.

#### 4.6.2 Intermediate surveys

4.6.2.1 In addition to surveys and tests required by *Sec 3* and *4.6.1*, the items, arrangements and equipment covered by *4.6.2.2 – 4.6.2.5* is to be examined and tested for their technical condition.

4.6.2.2 For steel craft a general examination of ballast tanks, sanitary tanks and bilges is to be carried out as required below. If such examinations reveal no visible structural defects, then they may be limited to a verification that the protective coating remains in good condition; however, when deemed necessary, the Surveyor may require thickness measurements of structure to be carried out. In cases when the protective coating is found to be in any other condition and repairs have not been made, maintenance of class will be subject to the said spaces being internally examined and gauged at annual surveys if necessary.

With regard to the aforesaid the following is to be dealt with:

.1 For all craft over 5 years of age and up to 10 years, representative ballast tanks, structural sanitary tanks and bilges are to be generally examined. When defects are found in the protective coating or other defects are found, the examination is to be extended to other spaces of the same type.

.2 For all craft over 10 years of age all ballast tanks, structural sanitary tanks and bilges are to be generally examined.

4.6.2.3 For all craft **over 10 years** of age the anchors are to be partially lowered and raised using the windlass.

4.6.2.4 Electric generating sets are to be examined under working conditions.

4.6.2.5 Representative internal spaces, including fore and aft peaks, machinery spaces, etc., are to be

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generally examined. These spaces shall include suspect areas.

### 4.6.3 Special surveys

4.6.3.1 In addition to requirements of *Sec 3* as regards each special survey, and of 4.5.2 for intermediate surveys, the requirements of 4.6.3.2 – 4.6.3.13 should be met.

The craft is to be prepared for survey in accordance with the requirements that follow. The preparation should be sufficient to facility

4.6.3.2 With regard to the requirements of 4.6.3.2 for ships **over 5 years of age and up to 10 years**, the following to be dealt with:

.1 The craft interior is to be opened up by removal of linings, ceilings, cabin soles, non-integral tanks, ballast or other members to an extent determined by the Surveyor. A record is to be made of those areas where the lining, ceiling, sole or other elements are removed and where any equipment has been removed during survey. The record is to be kept on board as a reference for subsequent surveys.

.2 Machinery spaces, fore and aft peaks and other spaces are to be cleared and cleaned to the Surveyor's satisfaction. Removable platform plates in engine rooms are to be lifted, as are pipelines necessary to guarantee access to structures selected for survey. Where necessary, the removal of pipe work may be required for the examination of structure.

.3 In accommodation areas located above double bottom tanks or any other tanks, lining or sole is to be removed to the extent necessary to examine the tanks' top below.

.4 All integral tanks subjected to survey are to be cleaned to the Surveyor's satisfaction.

4.6.3.3 In addition to requirements of 4.6.3.3, for ships **over 10 years of age and up to 15 years**, the following requirements are to be met:

.1 The chain locker is to be cleared and cleaned internally for the examination of its structure and of the chain securing arrangement. Anchor cables or chains are to be ranged for examination. Anchors are to be cleaned and secured in an accessible position for examination.

.2 The rudder is to be unshipped for the examination of its parts to the Surveyor's satisfaction.

4.6.3.4 In addition to requirements of 4.6.3.4, for ships **over 15 years of age**, the following is to be dealt with:

.1 The linings, ceilings, soles of cabins and other spaces are to be removed to the Surveyor's satisfaction in such a manner that he had access for the examination of structure below them.

.2 For steel craft the wood deck sheathing is to be partially removed to the extent necessary to determine the condition of plates; in the same manner, in insulated spaces, insulation is to be removed in each of them to enable the Surveyor to verify the condition of structure. The side shell plating is also to be removed immediately above tank top connections to the side shell, in way of galleys and washrooms, and below scuttles and windows.

4.6.3.5 The detection of excessive corrosion, significant deformation, fractures and other structural damages in places where, according to 4.6.3.3 – 4.6.3.5, defects or other damages are observed, the complete removal may be required in order to allow the Surveyor to determine the real extent of defects or damages.

4.6.3.6 For examinations and tests the following general requirements are to be met:

.1 All spaces within the hull and superstructure, including integral tanks are to be examined. Particular attention is to be paid to suspect areas.

.2 Double bottom spaces, peak tanks and other integral tanks are to be tested by a head sufficient to give the maximum pressure at the vent pipe upper opening. Tanks may be tested afloat, provided that their internal examination is also carried out afloat.

.3 Where repairs are made to the hull shell or bulkheads, any tanks in way are to be tested to the Surveyor's satisfaction.

.4 All decks and superstructures are to be examined.

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- .5 Particular attention is to be paid to examination of corners of openings and other discontinuities in the hull structure.
- .6 Anchors are to be examined and, in cases where, in accordance with 4.6.3.4.1, the anchor chain is ranged, it is to be examined together with the chain locker. If any length of the anchor chain is found to be reduced in mean diameter more than 12%, it is to be renewed. The windlass is to be generally examined.
- .7 The Surveyor is to be satisfied that there are suitable towlines and mooring lines when they are required by the Rules.
- .8 The Surveyor may require at his discretion tests of representative structural fastenings, e. g.: bolts in way of resiliently mounted deckhouses, to ascertain their soundness and may require them, when deemed necessary, to be drawn as far as practicable.
- .9 In general, the surveys of machinery installations, of the underwater part of the hull, the screw shaft and stern tube, as well as of steam boilers, are to meet the requirements of Subs 3.4 – 3.7.
- 4.6.3.7 Regardless of requirements of 4.6.3.7, the additional requirements of 4.6.3.9 – 4.6.3.12 are to be complied with.
- 4.6.3.8 For the survey of steel craft the following additional requirements are to be taken into account:
- .1 Under certain circumstances, at the Surveyor's discretion, the internal examination of lubricating oil, fresh water and fuel oil tanks may be omitted.
- .2 In areas where the inner surface of the bottom plating is covered with cement, asphalt or other similar compound, the removal of this covering may be omitted, provided its condition is good and adhering satisfactorily to the steel.
- .3 In decks having wood sheathing, its caulking is to be examined if applicable, and renewed as necessary. If decay or rot is found or the wood is worn in excess, it has to be renewed. Particular attention is to be given to plates under wood sheathing or other deck covering; if it is found that such coverings are broken or are not adhering closely to the plates, sections are to be removed as necessary to ascertain the real condition of plating.
- .4 The structure is to be examined in way of bimetallic connections, e. g.: steel-aluminum.
- .5 The Surveyor may require thickness measurements in any parts of the structure where signs of wastage are evident.
- 4.6.3.9 In addition to requirements of 4.6.3.9.5, thickness measurement is to be carried out taking into consideration the age of vessel and complying with the following minimum requirements:
- .1 For craft **up to 15 years of age** the suspect areas are to be measured, at the Surveyor's discretion and may be included areas where protective coating is observed to be other than in good condition. Suspect areas are those within the hull structure vulnerable to increased likelihood of structural deterioration as may be areas of substantial corrosion, breaking, cracking or other defect due to
- .2 For craft **over 15 years of age**, in addition to requirements of *para .1*, all exposed plates throughout the main deck are to be measured and shell plating in way of waterline throughout the length of the craft.
- .3 For craft **20 years of age and over** the following measurements are to be carried out: material fatigue.
- All main deck plating outside superstructures and deckhouses, including all deck plating under wood planking or sheathing.  
All plating below waterline.  
Two transverse sections of deck and shell plating within 0,5 L amidships.  
Suspect areas at the Surveyor's discretion that are to include, as applicable, areas where the protective coating is found to be in other than good condition; shell plates beneath windows and scuttles; upper decks; tank top plating immediately below ceiling or cabin soles; shell and deck plating in way of galleys, washrooms, and refrigerated store spaces and structure in way of integral sanitary tanks

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**Table 4.6.3.11 Tank internal examination requirements for steel craft**

Tank	Renewal I (5 years)	Renewal II (10 years)	Renewal III (15 years)	Renewal IV (20 years)	Subsequent renewals
Peaks	All tanks	All tanks	All tanks	All tanks	All tanks
Salt water ballast	All tanks	All tanks	All tanks	All tanks	All tanks
Lubricating oil	-	-	See note 2	See note 3	All tanks
Fresh water	-	See note 1	See note 2	See note 3	All tanks
Fuel	-	See note 1	See note 2	See note 3	All tanks
Sanitary	All tanks	All tanks	All tanks	All tanks	All tanks

**NOTES:**

1. Tanks (excluding peak tanks) used exclusively for oil fuel or fresh water need not all be examined internally, provided that the Surveyor is satisfied with the condition, after both external examination and testing and from an internal examination of the aft end of one forward double bottom tank and of one selected deep tank.
2. Tanks (excluding peak tanks) used exclusively for oil fuel, oil fuel or fresh water ballast or lubricating, oil need not all be examined internally, provided that the Surveyor is satisfied with the condition, after both external examination and testing and from an internal examination of one forward double bottom tank and one aft and one selected deep tank.
3. Tanks (excluding peak tanks) used exclusively for oil fuel, oil fuel and fresh water ballast or lubricating oil, need not all be examined internally, provided that the Surveyor is satisfied with the condition, after both external examination and testing and from an internal examination of at least one double bottom tank amidships, one forward and one aft and one deep tank.
4. When examining tanks internally, the Surveyor is to verify the condition of striking plates fitted beneath sounding pipes, as applicable.
5. In the case of tanks fitted with remote gauging facilities, the satisfactory operation of the gauges is to be confirmed.

- 4.6.3.10 Internal examination of tanks in steel craft shall have a minimum extent in accordance with *table 4.6.3.11*. .1 For longitudinal resistance, section modulus amidships is not to exceed 10%.
- 4.6.3.11 At hull surveys in aluminum alloy craft the following requirements are to be met: .2 For local resistance, the maximum admissible reduction of thickness for large area plates and the thickness of S-profile webs will be:
- .1 The structure in way of any bimetallic connections e. g.: aluminum- steel, is to be examined, and the efficiency of insulation arrangements is to be verified. For  $S \leq 10,5$  mm:  $S_r = 0,5$  mm  
For  $S > 10,5$  mm:  $S_r = 0,035 \pm 0,2$  mm but not greater than 1,0 mm.  
For tank bottoms  $S_r = 1,0$  mm
- .2 The Surveyor may require thickness measurements in portions of structure where signs of deterioration are evident or are normally found. Those parts of the structure found defective or with excessively reduced scantlings are to be renewed by materials of the required quality and scantlings. Regardless of the above, at the Surveyor's discretion, in local limited areas a maximum thickness reduction of 0,1S may be admitted.
- 4.7 Air cushion vehicles**
- 4.7.1 Annual surveys**
- 4.7.1.1 In general, the requirements of *Sec 3* are to be complied with; however, structural members are to be surveyed always, and arrangements and equipment covered by *4.7.1.4 – 4.7.1.5* are to be examined and tested to the Surveyor's satisfaction in order to ascertain their good technical condition.
- 4.6.3.12 Considering requirements of *4.6.3.10* and *4.6.3.12* as well as provisions of *3.3.7*, the admissible values of thickness reduction by wear or corrosion will be the following:

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- 4.7.1.2 The craft is to be subjected to survey in accordance with requirements of *rules 4.7.2.2 to 4.7.2.4, 4.7.3.2 and 4.7.3.3.*
- 4.7.1.3 As regards requirements of *4.7.1.2*, the following is to be dealt with:
- .1 The craft is to be slung or jacked up in such a way as to permit a thorough examination of all the submerged parts, fitting and attachments.
  - .2 Panels, floor coverings, etc., need not be removed at these surveys, unless they are of portable type or the Surveyor has reason to suspect that they may conceal significant damage.
- 4.7.1.4 Considering the requirements of *4.7.1.1* with regard to the craft's hull, the Surveyor is to be satisfied as to the condition of the following items, arrangements and equipment:
- .1 Bottom and side plating, any external stiffener, side walls or skirts, including flexible keels.
  - .2 Weather doors, ventilators, windows and other emergency hatches.
  - .3 Weather decks, deckhouses and superstructures.
  - .4 Machinery casings and seats.
  - .5 Anchoring and mooring equipment when required by the Rules.
  - .6 Fire equipment, including fire detection, alarms and means of escape, where the survey of such items is not covered by Statutory certificates.
  - .7 Passenger seat foundations and cargo tie down points, as applicable in each case.
  - .8 Skirt attachment and operating mechanisms.
  - .9 Air propeller shroud structures.
  - .10 Side body attachments and supports.
  - .11 Operation of ramps and their closing and locking arrangements.
  - .12 Structural attachment and retention arrangements for external fuel tanks (when applicable).
- 4.7.1.5 With regard to machinery, the Surveyor is to verify the condition of the following items, systems, arrangements and equipment:
- .1 Fuel tanks and associated fuel systems, including pumps, filters, etc.
  - .2 Lubricating oil tanks and associated lubricating systems, including coolers, pumps, filters, etc.
  - .3 Bilge pumping systems.
  - .4 Machinery alarm devices.
  - .5 Electrical machinery, switchgear and other electrical equipment are to be generally examined under operating conditions as far as practicable. The satisfactory operation of emergency sources, including the automatic controls, if fitted, is to be verified.
  - .6 Hydraulic, electrical and pneumatic control systems, including steering, are to be examined under operating conditions.
  - .7 Engine starting arrangements.
  - .8 All drive belts, associated running surfaces, the existence and condition of protectors.
  - .9 Air propellers, including (when fitted) hub assemblies, servomotors and equipment for the control of propellers' pitch.
  - .10 All the operations of the machinery, including propulsion and lift machinery.
- 4.7.2 Intermediate surveys**
- 4.7.2.1 In addition to requirements of *4.7.1*, the requirements of *4.7.2.2 – 4.7.2.4* are to be complied with.
- 4.7.2.2 A sufficient amount of paneling, floor covering, insulation, paint, etc. is to be removed to enable the Surveyor to verify to his satisfaction that all major structural items are in a satisfactory condition.
- 4.7.2.3 Representative integral tanks and buoyancy spaces are to be examined, at the Surveyor's discretion.



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- 4.7.2.4 Tanks and buoyancy spaces are to be tested, at the Surveyor's discretion. arrangements and outfit that identify it as a vessel.
- 4.7.3 Special surveys**
- 4.7.3.1 Requirements set out in 4.7.1 and 4.7.2 are to be supplemented by requirements of 4.7.3.2 – 4.7.3.3.
- 4.7.3.2 With regard to the hull the following is to be dealt with:
- .1 All tanks and buoyancy spaces are to be examined and tested to ensure that they continue to be tight and in a satisfactory condition.
- .2 All other inner hull compartments not covered by *paragraph .1* are to be examined.
- .3 The anchoring and mooring equipment (when required by the Rules) is to be examined to ensure its efficiency, accessibility and readiness for use. Anchor cables or chains are to be ranged for examination.
- 4.7.3.3 With regard to the machinery the following is to be dealt with:
- .1 Main and essential auxiliary machinery is to be generally examined, giving particular attention to safety devices, fastening arrangements and resilient mountings. A limited opening of such items is to be undertaken in order that the Surveyor can confirm their satisfactory condition.
- .2 Where not carried out as a regular monitoring, the condition of lubricating oil, its analysis may be required.
- .3 The Surveyor may require the opening for examination of those items not overhauled as part of a maintenance scheme since their installation or the previous renewal survey.
- .4 The insulation resistance of electrical equipment and connections is to be tested.
- 4.8 Floating cranes**
- 4.8.1 Annual surveys**
- 4.8.1.1 All the upper structure of the crane is to be subjected to annual survey, as are all the items, 4.8.1.2 With regard to the requirements of 4.8.1.1, in general, requirements of 3.3.1 and 3.4.1 are to be complied with as applicable; however the requirements of 4.8.1.3 – 4.8.1.4 are to be taken into consideration.
- 4.8.1.3 If as a result of previous intermediate or renewal surveys it is considered necessary to examine ballast tanks, this examination is to be carried out to an extent determined by the Surveyor depending on the age of the craft and the results of previous surveys. When at those surveys substantial corrosion is observed, the pertinent thickness measurements are to be carried out, that may be extended as necessary due to the corrosion pattern.
- 4.8.1.4 With regard to the upper structure (lifting appliances, metallic structure, jib, etc.) the following requirements are to be complied with:
- .1 A thorough examination of cables is to be carried out, in order to determine:
- The existence of cracks; no more than 5% of which may be admitted for a length 10 times the cable diameter.
  - The trend to separation of wires within strands, or strands within ropes.
  - The existence of broken strands or excessive wear on the surface of wires.
  - The existence of substantial corrosion, mainly in the interior.
  - The formation of kinks.
  - The absence of lubrication.
- .2 A thorough examination of accessories (chains, eye plates, eyebolts, shackles) in order to verify their condition. Wears not exceeding 10% of the original diameter or gauge may be admitted.
- .3 When applicable, a thorough examination of single- and multiple sheave blocks is to be carried out in order to verify that:
- The sheaves do not have cracks in their lids.

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- The sheaves rotate swiftly around their axis without axial or longitudinal displacements.
  - Claws and boxes are without wear.
- .4 A thorough examination of rope drums is to be carried out in order to determine:
- The existence of cracks in the surface, side discs and pipelines.
- .5 Hooks are to be examined for:
- The existence of corrosion or any mechanical wears. In such cases a reduction in transverse section not exceeding 5% at any place may be admitted.
  - The existence of deformations or difficulty in the hook rotation. In such a case the hook is to be renewed.
  - The possibility of an increase of the hook's opening, which is not to exceed 10%.
  - A possible wear of the hook's neck, which is not to be above 10% of its original section.
- .6 The brakes are to be subjected to a thorough examination, giving particular attention to:
- The coating of foundations. In this case wear is not to exceed 50% of the Maker's recommendation.
  - Leakages in electro-hydraulic pushers.
  - The existence of irregular wear in the brake disc.
- .7 The crane winches are to be subjected to a thorough examination, giving particular attention to:
- The control levers, checking that they operate normally in all their working positions.
  - The correct operation of the emergency stop.
  - The technical condition of the electrical installation (including motors) and the results of the insulation resistance measurements.
  - The reduction gear, checking that the gearing is without wear and that the oil is in a good technical condition.
- The reduction gear covers, checking their sealing.
  - The technical condition of the attachment arrangement of the engaging-disengaging levers (if fitted).
- .8 The crane cabin is to be generally examined.
- .9 The jib, mast or derrick (as applicable) is to be visually examined for:
- Deformations, whose maximum flexion is not to exceed the ratio 1/1500 to their length.
  - Cracks or fissures.
  - Substantial corrosion
- .10 The metallic structure in general (including foundation and its attachment to deck) is to be visually examined for:
- Cracks or fissures.
  - Deformations or breaks in ladder guardrails and steps.
- .11 Safety arrangements are to be thoroughly examined.
- .12 The condition and functioning of the internal lighting of cabin and machinery room, as well as external lighting.
- .13 The expiry date of the Certificate of the measuring devices for mechanical and electrical parameters is to be checked.

### 4.8.2 Intermediate surveys

- 4.8.2.1 Intermediate surveys are to be carried out in accordance with the requirements of 3.3.2 and 3.4.2 as far as applicable.

### 4.8.3 Special surveys

- 4.8.3.1 In addition to requirements of *Sec 3* regarding each of the special surveys, as far as applicable, and to requirements of 4.8.1 for annual surveys, the requirements of 4.8.3.2 and 4.8.3.3 are to be complied with.

- 4.8.3.2 At each special survey thickness measurements to the upper structure are to be carried out, to an

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extent determined by the Surveyor on the basis of the crane's age and the results of previous surveys. Wears exceeding 20% will not be admitted.

- 4.8.3.3 At each special survey, a static and a dynamic tests are to be performed to the crane, in order to supplement the requirements of *rule 4.8.1.4*.

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## SECTION 5

### Technical Documents of a Ship

#### 5.1 Technical project of a ship under construction

##### 5.1.1 General provisions

- 5.1.2.1 Prior to the beginning of a new construction, the technical project documents are to be submitted for the approval of *ICS Class* to an extent that enables to ascertain that the relevant requirements of the Rules have been met. The technical documents to be submitted to *ICS Class* for approval are listed in *rules 5.1.2 to 5.1.11*.

##### 5.1.2 General documents

The following general documents are to be submitted to *ICS Class* for approval:

- .1 **Ship's specification.**
- .2 **General arrangement plan**, showing escapes routes.
- .3 **List of elements, materials and equipment**, indicating their main characteristic *ICS Class*, maker and whether approved or not by *ICS Class* or another recognized Society.
- .4 **Plan of dangerous zones and areas.**
- .5 **Measures** to be taken by the Owner to recover an oil spill, in the case of an oil recovery ship.

##### 5.1.3 Documents of the hull

- 5.1.3.1 The following documents are to be submitted (with a subsequent approval of working plans):

- .1 Calculations of scantlings of the main hull members.

- .2 Main frame and characteristic transverse sections, showing spacing between main transverses and longitudinal, ship's main particulars and ratios, as well as the intended class notation.
- .3 Longitudinal section showing clearances, limits of the ship's length sections (see *Ch 2, Subsection 1.3*), the position of watertight bulkheads, pillars, superstructures and deckhouses.
- .4 Construction plans of decks and platforms indicating the design loads (including hoist and containers), position and dimensions of openings and their strengthening; construction particulars of longitudinal coamings.
- .5 Construction plans of the inner bottom or bottom, showing the sea chest section and indicating pressure in the clearing systems. For ships intended for the carriage of bulk cargo and ore the maximum allowable load in the double bottom is to be indicated.
- .6 Shell plating expansion plans, showing sections referred to in *4.1.3.1.3*; position and dimensions of openings in the shell plating and, for ships with ice strengthening, upper and lower limits of the ice belt, as well as corresponding drafts fore and aft (considering trim), the arrangement of intermediate frames. For GRP vessels the shell plating expansion plan shall be submitted when the shell has different thicknesses.
- .7 Plans showing longitudinal and transverse bulkheads, including tank wash bulkheads (the height of air and overflow pipes of tanks is to be indicated).
- .8 Framing members of the aft end and sternframe.
- .9 Framing members of the fore end and stem.
- .10 Plans of the propeller brackets and bossing of screw shafts and fixed nozzles.
- .11 Plans of the seating of main engines and boilers, showing the bottom's construction below them, their type and power, and indicating whether the seating meet the conditions specified by the Maker of the main engines or boilers or fail to meet some of the Maker for the seating.
- .12 Structures and deckhouses expansion plans.
- .13 Main particulars of the hull protection devices (for ships expected to be moored at sea to other ships).
- .14 Welding charts.

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- 5.1.3.2 Without the subsequent approval of working plans, the documents listed under 5.1.3.1 are to be submitted, indicating in the double bottom plan (see 5.1.3.1.5) the pressure chart for the sealing test, the dimensions and position of manholes and other openings, and also the hydrostatic load chart. Additionally, the following documents are to be submitted:
- .1 Welding chart with a control scheme of the welded connections and the following:
    - Name and thickness of the structural members to be welded together.
    - Type and symbol of edge preparation.
    - Make and grade of the base metal.
    - Make and grade of the welding consumables.
    - Welding process and position of connection in space. If the information above is already shown on hull design plans, it may be omitted.
  - .2 A scheme of the hull's sections, with a brief description of their assembly and welding technology.
  - .3 A description of the main technological process for the connection of the hull sections with the ship afloat, using methods recognized by *ICS Class* for this purpose.
  - .4 A detailed description of the hull construction process, including information on materials, methods of forming the hull items, necessary conditions to form the hull items, necessary conditions to build the hull and an analysis of general and local strength (for GRP vessels only).
  - .5 A scheme of watertightness tests of the ship's compartments.
  - .6 Plans of pipelines, ventilation ducts, etc, through bulkheads, decks, double bottom, watertight floors, and web members.
  - .7 A program of mooring and sea trials.
  - .8 Ship's loading information.
- 5.1.4 Documents on arrangements, equipment and outfit**
- 5.1.4.1 Subject to the subsequent appraisal of working plans, the following is to be submitted:
    - .1 A diagram showing the arrangement of hull openings, superstructures and deckhouses, indicating the height of coamings and type of closing arrangements.
    - .2 Strength calculation of the closing arrangements.
    - .3 General arrangement of steering system, bow propeller, anchoring, mooring and towing systems.
    - .4 Calculations of steering gear, bow propeller, anchoring, mooring and towing systems and, for tugs, a diagram of towing stress.
    - .5 Plans of signal masts and rigging.
    - .6 Calculations of signal masts and rigging.
    - .7 General arrangement of guide members for containers in holds.
    - .8 Calculations of guide members for containers in holds.
  - 5.1.4.2 Working plans are to be submitted (not subject to subsequent approval) as well as documents listed under 4.1.4.1 and, additionally:
    - .1 List of emergency outfit and its location.
    - .2 Mooring and sea trials program.
    - .3 Documents required by *Ch 3 rule 1.3.4*.
- 5.1.5 Documents on stability**
- 5.1.5.1 The following documents are to be submitted:
    - .1 Hull form plan.
    - .2 Hydrostatic curves.
    - .3 Curves of the areas and static moments of the frames.
    - .4 Calculations and curves of the form stability arms, showing the considered hull volumes.
    - .5 Tables of displacements, positions of the center of gravity, trim and initial stability for the different loading conditions.
    - .6 Calculations, necessary to confirm the ship's compliance with the Rules as regards stability: - Weight tables for the different loading

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conditions, indicating the distribution of cargoes, fuel, fresh water and water ballast in tanks; calculation of the amplitude of roll and weather criterion; a scheme of windage area and a calculation of hull due to passengers' crowding and due to turning; calculation of the effects of icing; calculation of the flooding angles; corrections for the influence of liquid cargoes and spares; arrangement schemes of hull openings, superstructures and deckhouses, etc.

- .7 Information table with the results of stability calculations according to the Rules, and curves of static or dynamic stability.
- .8 Documents on roll damping ballast tanks and their free surfaces, including the following:
- Construction plans of tanks.
  - Characteristic diagrams of tanks and tanks-ship link, stating the variation of equalizing moment due to the wave frequency, ship's roll and liquid in tanks, equalizing effects in different wave frequencies, etc.
  - Data for the synchronism of the liquid's oscillations in the tanks with the ship's roll.
  - Indications for a more effective use of the damper system.

### 5.1.6 Documents on subdivision

5.1.6.1 The following documents are to be submitted:

- .1 Probability estimation of subdivision (if required), curves of floodable lengths of compartments.
- .2 Calculation of trim and damage stability, including stability curves.
- .3 Plan of compartments, showing all watertight structures and openings with an indication of the types of closing arrangements, as well as arrangements used to equalize heel and trim of the damaged ship.
- .4 Cross curves (for the damaged ship) if necessary for the adopted method of damage stability calculation.
- .5 Calculation of the section areas of cross flooding pipelines and of the ship's up righting time.

### 5.1.7 Documents on fire protection

5.1.7.1 Subject to the subsequent approval of working plans, the following documents are to be submitted:

- .1 Arrangement plan of fireproof structures (including doors), indicating their tolerance or data concerning statutory tests (Certificates of approval).
- .2 Elementary diagrams of fire fighting systems, arrangement of fire stations and control stations of the ship's fire extinguishing systems.
- .3 Diagrams of fire alarms.
- .4 Calculations of fire fighting systems: pumps, water system, froth system, etc.
- .5 Diagram and detailed description of insulation, lining, finishing and deck covering, indicating the degree of combustibility of used materials, as well as a calculation of the amount of combustible materials per square meter of floor area of the standard compartments.
- .6 Full information about the degree of combustibility and fire hazard of newly used materials.
- .7 Diagram of bunkering, storage and distribution system for fuel oil with flash point below 43°C, for helicopters.
- .8 List of fire fighting outfit.
- .9 Environment control diagram (for oil recovery ships).

5.1.7.2 Without the subsequent approval of working plans, the documents stated in 5.1.7.1 are to be submitted, and additionally:

- .1 Plans of assemblies and parts of fireproof divisions, classes A and B.
- .2 Plans of the compartments' insulation and lining, and deck coverings.
- .3 Arrangement plan of the fire fighting outfit.
- .4 List of spare parts and tools.

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### 5.1.8 Documents on machinery and boiler installations

5.1.8.1 Subject to the subsequent approval of working plans, the following is to be submitted:

.1 General arrangement plan of machinery, boilers and equipment in engine room and emergency generator room, showing the escape routes.

.2 Diagram and description of the remote control of main engine, including information about equipment in the remote control stations, indicator and signaling devices, means of communication and other arrangements.

.3 Documents on shafting:

- General arrangement of shafting.
- Plans of the stern tube and its parts.
- Plans of shafts (screw shaft, intermediate and thrust shafts).
- Drawings of the shaft connections and coupling.
- Drawings of the main and thrust bearings and their fastening to seating.
- Strength calculations of shafts and their fastening parts.
- Load calculation of propeller's fitting and shaft couplings.
- Calculations of torsional vibrations of the system "Main engine-Propeller" with oil engines over 75kW; generator sets and auxiliary engines with oil engines over 110 kW. For turbine-or electric-driven machinery the submission of torsional vibration calculations is subject to a special consideration by *ICS Class*.

.4 Documents on propellers:

- General view of propellers.
- Drawings of blade, boss and attachments (for detachable blade propellers and controllable pitch propellers [**CPP**]).
- Plans of the actuating mechanism of CPP and its description.
- Drawings of the shaft connections and coupling.
- Drawings of the main parts of the pitch control gear of CPP, including hydrocylinders, push-pull rods, pistons, slides, lubricating oil Strength calculations of

propeller blades and, for detachable blade propellers and CPP, also calculation of the fastening of blades to the boss.

- Calculations of mutual strength between propeller and screw shaft in case of blade breakdown due to collision.

.5 Documents on Voith-Schneider propellers:

- General arrangement plan of propeller with necessary sections and sealing details.
- Plans of shaft, gearings, rotors, blades and blade turning devices.
- Strength calculations of the driving shaft, rotor shaft, blade, gearing.
- Main hydraulic diagram and its description.
- Propeller control diagram and its description.
- Lubrication and cooling systems diagrams of the propeller.

.6 Documents concerning steerable propellers and thrusters:

- General arrangement plan with necessary sections and sealing details.
- Drawings and calculations of propeller, shaft and gear wheels.
- Diagram of control and lubricating systems.

.7 Documents on refrigerating plants (see *Subs. 5.4*).

5.1.8.2 Without a subsequent approval of working plans, documents required by 5.1.8.1 are to be submitted, including information on treatment and geometry of working surfaces, heat treatment, tolerances of mating parts, hydraulic tests, as well as nondestructive tests and, additionally:

.1 Calculation of parameters of shafting alignment.

.2 Plans of installation on seating and drawings of main machinery, boilers, heat exchangers and pressure vessels.

.3 List of spare parts.

.4 Program of mooring and sea trials.

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### 5.1.9 Documents on automation equipment

5.1.9.1 Subject to the subsequent appraisal of working plans, the following is to be submitted:

- .1 List of systems, devices and elements used in automation systems, and also information concerning their intended use, reliability and *ICS Class* approval.
- .2 Elementary and functional (block) diagrams of automated emergency signaling systems, including feeding diagrams.
- .3 List of controlled parameters, indicating type of devices, makers, reliability data and Register's approval of instruments.
- .4 Technical documents on automation devices for main machinery and CPP, circuit and block diagrams; front panels of the automation desk showing all devices; feeder circuits of the automation equipment; protection circuits, alarms and monitoring of parameters of main machinery and CPP.
- .5 Functional (block) and circuit diagrams of automation systems for the main engines (cooling, lubricating and fuel preparation systems).
- .6 Technical documents on automation of the auxiliary engines and electric generator sets: functional and circuit diagrams; front panels of the automation desks for the electric power plants showing all the devices; feeder circuits, protection, alarm signaling and monitoring circuits for all the parameters of auxiliary engines and electric generators.
- .7 Technical documents on automation of boiler installation: functional and circuit diagrams; front panels of the automation desk showing all the devices, feeder, protection, signaling and monitoring circuits.
- .8 Functional and circuit diagrams of automation of starting air compressors, including protection, signaling and monitoring circuits.
- .9 Functional and circuit diagrams of remote level sounding systems for tanks.
- .10 Functional and circuit diagrams of remote level sounding systems for tanks.

.11 Front panel drawing of the control and signaling desks at the main control station and the bridge, showing all the devices.

.12 General arrangement plans of the automation equipment at the main control station in the engine room and the bridge.

.13 List of spare parts for the automation systems.

### 5.1.10 Documents on pumping and piping

5.1.10.1 *ICS Class* subject to the subsequent approval of working plans, the following is to be submitted:

.1 Documents on the ship's general systems:

- Bilge system diagram
- Ballast system diagram
- Up righting system diagram
- Diagrams of the sounding vent and overflow pipes.
- Diagrams of ventilation and air conditioning systems in accommodation, service, cargo, machinery and working spaces, indicating watertight and fireproof bulkheads, arrangement of fire dampers and closures of ventilation ducts and openings.
- Diagrams of sewage and other waste water systems, as well as scuppers, indicating the watertight bulkheads, location of freeboard deck and distance from the waterline or the freeboard deck to the opening stated in Ch 8 rules 1.5.2.6 and 1.5.2.7.
- Diagrams of the clearing and heating systems of the sea chests, heating systems of the side scuppers, of the liquid in tanks and the steam systems for the tanks.
- Diagrams of the compressed air system for the horn and the sea chests' clearing.
- Diagrams of the hydraulic systems for the machinery and equipment.

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- Diagrams of the compressed air system for the horn and the sea chests' clearing.
  - Diagrams of the hydraulic systems for the machinery and equipment.
  - Diagrams of the cargo, stripping and gas vent systems (for oil tankers and combination carriers).
  - Calculations of systems: bilge, ballast, ventilation of battery rooms, cargo pump rooms, enclosed spaces and compartments intended for the carriage of motor vehicles.
- .3 Documents on the machinery systems:
- Diagrams of the live and exhaust steam systems.
  - Diagrams of blowing-off systems for boilers, machinery and steam pipes.
  - Diagrams of the feed water and condensate system.
  - Diagrams of the fuel system.
  - Diagrams of the fresh and sea water cooling systems.
  - Diagrams of starting air system.
  - Diagrams of exhaust gas pipes and funnels.
  - Plan of sea chests and ice chests equipment.
  - Calculation of starting air system.
- 5.1.10.2 Without a subsequent approval of working plans, the documents listed under 5.1.10.1 are to be submitted, including information on insulation materials, manufacture, assembly, arrangement, hydraulic tests and, additionally:
- .1 Plans of the silencers and spark arresters of exhaust gas pipes and funnels.  
Program of mooring and sea trials.
- 5.1.11 Documents on electrical equipment**
- 5.1.11.1 Subject to the subsequent approval of working plans, the following is to be submitted:
- .1 Circuit diagrams of power generation and distribution from the main and emergency sources: mains circuits, lighting (up to final circuits of lighting switchboards) and navigation lights.
  - .2 Circuit diagrams and general view plan of the main and emergency switchboards, control panels and other non-standard switchboards.
  - .3 Calculation of the necessary output of the ship's electric power plant for the operating conditions specified in *Ch 11, rule 3.1.4*, explaining the choice of the generators (quantity and power output) and a calculation of the emergency electric source.
  - .4 Results of the calculation of cross - sections of cables, indicating their type, current and protection.
  - .5 Principle or detailed diagrams of main circuits, excitation, command, control, signaling, protection and interlocking circuits of the electric propulsion plant.
  - .6 Calculation of the output of the propulsion generators, needed to ensure a normal operation of the ship under all operating conditions.
  - .7 Calculation of short circuit currents and analysis of selective properties of protection devices (when rated generator current or the sum of rated currents of generators intended for parallel service exceeds 1000 A).
  - .8 Calculation of the illumination intensity of compartments and spaces.
  - .9 Diagrams of the external connections of ship's control apparatus, telephone communication, general alarm and fire alarm systems.
  - .10 Circuit diagrams of essential electric drives, in accordance with *Ch 11, rule 1.3.2.1.5*.



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- .11 Diagrams of the lubricating systems of the electric machines and of the air cooling systems of the main electric machines.
- .12 Diagram of the earthing; plans and, if necessary, calculations of lightning conductors for oil tankers, gas carriers and non metallic ships.
- .13 Main diagram of cable runs, indicating the compartments through which they are installed, the distance between cable lines, zone division according to their protection and earthing, as well as steps taken to ensure electromagnetic compatibility.
- .14 Calculation of capacity of batteries for emergency lighting, navigation lights, fire detection means and fire smothering appliances.
- .15 Preliminary calculation results of non-linear distortion factors in different parts of the ship's mains, when static power converters are used.
- .16 Information about electrical equipment installed in dangerous zones, spaces and compartments, indicating the degree of protection for each compartment.
- .17 A description of the electric installation, including measures to guarantee the electromagnetic compatibility of essential consumers and data concerning the expected interference level.
- .18 Diagrams and plans of the disconnection and interlocking system for electrical equipment not to be used during oil recovery operations.
- .19 Instructions on the preparation and use of the electrical equipment for oil recovery operations, stating the procedure for compulsory disconnection and blocking of non-safe type equipment.
- 5.1.11.2 Without a subsequent approval of working plans, the documents stated in 5.1.11.1 are to be submitted and, additionally:
  - .1 Plans of cable runs passing through watertight bulkheads, decks and platforms, indicating the means to suppress radio interference.
  - .2 Diagrams of final lighting circuits.
  - .3 List of spare parts.
  - .4 Program of mooring and sea trials.
  - .5 Plans of the penetration of hull members through the shell plating, considering watertightness (only for glass reinforced plastic vessels).
  - .6 Arrangement plans of electrical equipment in all spaces and compartments.
- 5.1.11.3 Where refrigerating plant is to be classed, the documents stated in 5.1.11.1 and 5.1.11.2 shall include data concerning electrical equipment of the refrigerating plant.
- 5.2 Technical documents for a ship under conversion or reconstruction**
  - 5.2.1 Prior to the beginning of the ship's conversion or reconstruction, the technical documents related to the relevant parts of the hull, machinery or equipment shall be submitted to *ICS Class* appraisal.
  - 5.2.2 When in a ship in service new machinery or arrangements are fitted, which differ substantially from those previously fitted and that are to meet the Rules' requirements, additional technical documents of the new fittings shall be submitted to *ICS Class* approval, to an extent similar to that for a new building (see *Subs 4.1*).
- 5.3 Working plans of a new building**
  - 5.3.1 General documents:**
    - .1 List of emergency, fire fighting and other outfit, indicating its main technical characteristic *ICS Class* and its position in the ship; list of spare parts and special tools.
    - .2 Program of mooring and sea trials.
  - 5.3.2 Documents on hull:**
    - .1 Stem and sternframe plans.
    - .2 Plans of sections and main hull parts, including decks, transverse bulkheads, the position of manholes and openings, of integral tanks outside the double bottom, etc.

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- .3 Plans of sections and details of superstructures and decks.
  - .4 Plans of engine- and boiler room casings, coamings, sills and other guards of the openings in the ship's hull.
  - .5 Plan of the propeller shaft tunnel, recesses and emergency escape trunks.
  - .6 Drawings of the shaft brackets and stern tubes.
  - .7 Drawings of the main machinery seating of boilers and shafting bearings auxiliary machinery seating, equipment and arrangement included in the class inventory.
  - .8 Bulwark drawings.
  - .9 Plan of watertightness test of the hull.
- 5.3.3 Documents on arrangements, equipment and outfit:**
- .1 Overall view plans of assemblies and parts of closing appliances and openings in the hull superstructures and deckhouses.
  - .2 Overall view plans of assemblies and parts of the steering gear, steering nozzles, and mooring and towing arrangement, as well as masts, rigging and guardrails.
  - .3 Overall view plans of assemblies and parts of grain fittings.
- 5.3.4 Documents on fire protection:**
- .1 Plans of the assemblies and parts of A- and B-class fire protection structures, indicating whether fire tests have been satisfactory.
  - .2 Plans and calculations of separate typical assemblies and equipment of fire alarm, fire detection and fire fighting systems.
  - .3 Diagram of the fire fighting systems.
  - .4 Arrangement plan of the fire fighting outfit.
  - .5 Drawings of the insulation and lining.
- 5.3.5 Documents on pumping and piping:**
- .1 Diagrams of the ship's systems:
    - .1 Bilge system.
    - .2 Ballast system.
- .3 Up righting system, diagram and construction of arrangements (automatic and manual) used for equalizing the damaged ship by means of counter flooding.
  - .4 Air, overflow and sounding pipes, remote-sounding systems of fuel tanks.
  - .5 Ventilation of accommodation, service, cargo, machinery and working spaces, construction of dampers and closing arrangements of ventilation and other openings, necessary to ensure the ship's fire protection.
  - .6 Exhaust gas pipes, firelight structures and pressure valves.
  - .7 Sewage system and side scuppers.
  - .8 Cargo pumping system.
  - .9 Cargo heating system.
  - .10 Fuel oil loading and transfer system.
  - .11 Liquid cargo loading and transfer system in dry cargo ships.
- .2 Plans of the propulsion plant piping:**
- .1 Live and waste steam and blow off pipes.
  - .2 Feed water, condensate and evaporator.
  - .3 Fuel oil.
  - .4 Lubricating oil.
  - .5 Cooling.
  - .6 Exhaust gas and funnels.
  - .7 Compressed air.
  - .8 Heating systems for fuel, water and lubricating oil.
  - .9 Arrangement and attachment assemblies for bottom and side fittings.
- .3 Structural plans of pipelines passing through watertight bulkheads, decks and platforms.**

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### 5.3.6 Documents on machinery and boiler installations:

- .1 Installations and attachment plans of main machinery and steam boilers.
- .2 Drawings of the fuel and lubricating oil tanks' fittings.
- .3 Drawings of silencers and flame arresters in exhaust pipes and funnels.
- .4 Plans of shafting and stern tube.
  - .1 Thrust, intermediate and screw shafts.
  - .2 Main and thrust bearings and their attachments.
  - .3 Couplings.
  - .4 Steam tube and its arrangements (bushings, bearings and sealings).
- .5 Plans of the fixed pitch propeller (with details of blade fastenings, if a detachable blade propeller is fitted).
- .6 Plans of the controllable pitch propeller (CPP).
  - .1 Hub.
  - .2 Blades.
  - .3 Screw shaft and its attachment to the hub.
  - .4 Oil transfer block, assembled.
  - .5 Actuating mechanism, complete
  - .6 Rod of actuating mechanism.

**NOTE:** Where Voith-Schneider or other types of propellers, not provided for in the Rules, are fitted, the list of working plans is to be agreed with *ICS Class* in each case.

### 5.3.7 Documents on automation systems and devices:

- .1 Installation and mounting plans of the automation systems and equipment, sensors, alarm signaling devices and appliances, and also of control and monitoring switchboards and desks.

### 5.3.8 Documents on electrical equipment:

- .1 Final lighting circuits diagram.
- .2 Cabling diagrams, showing cable penetrations through watertight bulkheads, decks and platforms.
- .3 Construction drawings (only for non-standard equipment) of:
  - .1 Main switchboard.
  - .2 Electric propulsion switchboard.
  - .3 Emergency switchboard.
  - .4 Control stations and desks.
  - .5 Special switchboards.
  - .6 Power and lighting switchboards.
- .4 Installation diagrams and arrangement plans of equipment for the measuring of non - electric parameters (level, pressure, temperature and other indicators)
- .5 Diagrams and drawings showing radio interference suppressing devices.
- .6 Diagrams and drawings of electrical equipment's earthing and lightning protection.
- .7 Arrangement and installation drawings of electrical equipment in all the ship's compartments and spaces.
- .8 Corrected plans and diagrams specified in 4.1.11.1.

5.3.9 Documents on refrigerating plants are listed under 6.4.3.

### 5.4 Completion documents of a ship

- 5.4.1 After completion of construction and tests of a ship and her commissioning, the completion (commissioning) documents of the ship are to be submitted to *ICS Class* for acknowledgement.
- 5.4.2 The scope and submission sequence of aforesaid documents is to be agreed with *ICS Class* before the ship's completion.

## SECTION 6

### Classification of Refrigerating Plants

#### 6.1 General provisions

- 6.1.1 *ICS Class* may class, on special request:
- .1 Refrigerating plants intended for achieving and maintaining required temperatures in refrigerated cargo spaces of cargo vessels.
  - .2 Refrigerating plants intended for achieving and maintaining required temperatures in refrigerated cargo spaces for cold treatment of seafood (cooling and freezing) and for supplying
  - .3 the necessary cold for all production processes in factory ships.
- 6.1.2 Refrigerating plants of ships classed with *ICS Class* are under technical supervision to ensure the ship's safety in the following cases:
- .1 If the refrigerating plant works on Group II or Group III refrigerants (see *table 6.1.2.1*)
  - .2 If the refrigerating plant works on Group I refrigerants and is fitted with compressors, having a theoretical absorption capacity 100 m<sup>3</sup>/h and over; or if the refrigerating plant has 300 kg or more of the refrigerant. For installations fitted with many autonomous refrigerating machines, the amount of refrigerant shall be considered by its amount in one machine.

**Table 6.1.2.1 Groups of refrigerants**

Refrigerant group	Symbol	Formula	Design pressure <i>P</i> (MPa)
I	R 12 R 22 R 502 (R 22+R 115)	CF <sub>2</sub> Cl CHF <sub>2</sub> Cl CHF <sub>2</sub> Cl+C <sub>2</sub> F <sub>5</sub> Cl (Azeotropic mixture)	1,2 2,0 2,0
II	R 7 17	NH <sub>3</sub> (Ammonia)	2,0
III	R 290 R 1270	C <sub>3</sub> H <sub>8</sub> (Propane) C <sub>3</sub> H <sub>6</sub> (Propylene)	1,6 2,0

#### 6.2 Class of refrigerating plant

##### 6.2.1 General provisions

- 6.2.1.1 *ICS Class* may assign a class to a refrigerating plant built under its supervision as well as assign, renew or reinstate the class of the refrigerating plant of a ship in service.
- 6.2.1.2 Assignment, renewal or reinstatement of class means that the refrigerating plant complies fully or to an acceptable degree with the requirements of *ICS Class*, as set up in the relevant Rules.
- 6.2.1.3 Assignment or renewal of class to a refrigerating plant shall be confirmed by the issue of the **Refrigerating Plant Class Certificate** and the appropriate entry in *ICS Class Register Book*.
- 6.2.1.4 Renewal of class of a refrigerating plant shall be for a 5 years term.
- 6.2.1.5 The class of a refrigerating plant may be withdrawn or lose validity in the cases stated in 2.1.5 and 2.1.6.
- 6.2.1.6 The class of a refrigerating plant may be renewed upon application by the Shipowner, after completion of surveys. The extent of the survey is to be determined by *ICS Class* in each case.
- 6.2.1.7 The class of a refrigerating plant may be suspended upon application by the Shipowner, on the conditions that the surveys be continued during the lay-up time. The type and extent of survey is to be determined by *ICS Class* in each case.

##### 6.2.2 Class notation of a refrigerating plant

- 6.2.2.1 The class notation of a refrigerating plant is as follows:
- .1 The class notation of a refrigerating plant built according to the Rules and under *ICS Class* supervision shall consist of the distinctive mark ☆ preceded by the letter **F** ie: **F ☆**.

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.2 If the refrigerating plant was built under the Rules and the supervision of any Classification Society, recognized by *ICS Class*, the class notation shall consist solely of the letter **F**.

.3 If the refrigerating plant was not built under the supervision of a Classification Society, recognized by *ICS Class*, or without supervision by any Society at all, the class notation shall consist of the letter **F** between parentheses: (**F**).

6.2.2.2 If the refrigerating plant has a cooling capacity able to reduce the temperature of non-precooled cargoes during a time interval that prevents the spoiling of the cargo, then to the class notation shall be added the distinctive mark +. In this case, a note specifying the cooling conditions for this cargo shall be made in the *Certificate of Class Refrigerating Plant* and in *ICS Class Book*.

6.2.2.3 If the refrigerating plant is intended for cooling or freezing sea products, and meets the requirements of *Ch 12*, to the main class notation the letter **P** is to be added: **F + P**.

### 6.2.3 Additional notations

6.2.3.1 Additional notations may be included in the *Certificate of Class Refrigerating Plant* and *ICS Class Book* whenever *ICS Class* deems necessary to specify the purpose or design particulars of a refrigerating plant.

### 6.2.4 Alterations of class notation

6.2.4.1 *ICS Class* may delete or alter any mark in the class notation in case of any modification or non-compliance with the requirements which determined the insertion of the mark.

## 6.3 Class surveys to refrigerating plants

### 6.3.1 Initial survey

6.3.1.1 The scope of the initial survey enables to ascertain that a refrigerating plant submitted to *ICS Class* for the first time may be assigned a class.

6.3.1.2 The scope of the initial survey is determined by *ICS Class* in each case, according to 6.3.3, when any renewal survey becomes due and

depending on the age and technical condition of the plant, its machinery, systems and items (see also rule 6.3.5.2).

### 6.3.2 Periodical surveys

6.3.2.1 The renewal survey serves to ascertain that the condition of the refrigerating plant meets the provisions of the Rules and the additional requirements of *ICS Class*.

6.3.2.2 Following application by the Shipowner, *ICS Class* may establish continuous survey to a refrigerating plant. The continuous survey implies the distribution of the extent of the renewal survey into annual surveys or to be carried out at ports of call, so that the complete survey is fulfilled during the period of validity of class.

### 6.3.2.3 Annual survey

6.3.2.3.1 Annual surveys enable to ascertain whether the refrigerating plant meets the conditions to maintain the class to a sufficient degree, and also to check the operation of various machinery items and arrangements covered by the Rules.

6.3.2.3.2 The annual survey has to be carried out within 3 months of the anniversary date of class assignment or renewal.

### 6.3.2.4 Intermediate survey

6.3.2.4.1 The intermediate survey enables to ascertain that the refrigerating plant meets the conditions to maintain the class, and also to check the operation of machinery and devices covered by *ICS Class Rules*, to an extent exceeding that of an annual survey. This survey is to be carried out in lieu of the 2<sup>nd</sup> or 3<sup>rd</sup> annual survey.

## 6.3.3 Scope of periodical surveys to refrigerating plants

6.3.3.1 At the **annual survey** the following is to be carried out:

.1 Control of the *Refrigerating Plant Log Book* and functional test of the plant under working conditions.

.2 Examination and control tests of compressors, refrigerating pumps, pumps of liquid cooling

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- medium, cooling and defrosting water and hydraulic equipment of freezing spaces.
- .3 Examination of heat exchangers, liquid separators, fans, filters and pressure vessels. Selective inspection of covers of condensers and evaporators of ammonia systems.
- .4 Examination and tightness tests of pipings and accessories for refrigerant, liquid cooling medium, cooling water, defrosting system and hydraulic equipment of freezing spaces.
- .5 Functional tests of fans and air coolers of refrigerated cargo spaces and freezing spaces.
- .6 Functional test of cooling and freezing equipment of fishing vessels.
- .7 Functional test of the automatic control, regulation and protection systems of compressors pumps fans and cooling systems.
- .8 Examination of the safety devices of the cooling system and valves, as well as a functional test of the emergency discharge of refrigerant unto the sea.
- .9 Examination of plating, insulation, hatch covers doors, air valves, discharge ducts, drainage ducts and other items of refrigerated cargo spaces.
- .10 Examination of thermometers and temperature measuring systems in refrigerated cargo and equipment spaces.
- .11 Functional tests of the water curtain system and water irrigating system in the refrigerating machinery spaces and refrigerant storerooms in ammonia systems.
- .12 Functional test of the emergency ventilation of the refrigerating machinery spaces.
- .13 Functional test of the electric energy sources, their switchgear, control and operation desks and also control of the condition of electric motors.
- .14 Functional test of emergency lighting of the refrigerating machinery space.
- .15 Functional test of the emergency signaling system.
- .16 Insulation measurement of the electric networks and of the electric devices and appliances that ensure the safety of the cargo.
- 6.3.3.2 Within the **intermediate survey** activities listed under 6.3.3.1 for the annual survey are to be carried out and, additionally:
- .1 Capacity test of the refrigerating plant.
- .2 Insulation test of the refrigerated cargo spaces. Whenever the tests show a non-satisfactory technical condition of the plant or the insulation, *ICS Class* may proceed to a more detailed examination.
- 6.3.3.3 Within the **special survey** the activities listed under 6.3.3.1 and 6.3.3.2 are to be carried out and, additionally:
- .1 Checking and examination of all the piston compressors, refrigerant pumps, liquid cooling medium pumps, cooling water pumps, defrosting system and hydraulic equipment of freezing spaces.
- .2 Examination of electric sources, switchgear, cables, electric motors, control desks that ensure the functioning of the refrigerating plant.
- .3 Examination of all side covers, pipeline networks, condenser piping and evaporators.
- .4 Checking of the technical condition of the casing, assemblies and fittings of the heat exchangers; separators, dryers, filters and pressure vessels, especially below the insulation.
- .5 Checking the condition of fans and emergency ventilation ducts of the refrigerating machinery room.
- .6 Checking the condition of the protection devices: valves, plants and, upon request by *ICS Class*, drawing and functional test at a workshop.
- .7 Checking the condition of plating, insulation and lining of decks, bulkheads, seating, coamings and ducts in the refrigerated cargo spaces, with partial drawing upon request by *ICS Class*.

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.8 Checking the condition of control and measuring instruments for refrigerant, liquid cooling medium, cooling water and hydraulic equipment of the freezing compartments.

.9 Strength and tightness test, under pressure, of:

- Heat exchangers, pressure vessels, pipings, fittings of refrigerant system, after 10 years of service and every 5 years afterwards.
- Heat exchangers, pipings and fittings of liquid cooling medium system after 10 years of service and every 5 years afterwards.
- Heat exchangers, pipings and fittings of the cooling water systems after 10 years of service and every 5 years afterwards.

6.3.3.4 In particular cases *ICS Class* may grant exemptions as regards the overhaul of special devices for the survey, or may limit the survey whenever the functional test or partial overhaul show a satisfactory condition of a given device.

### 6.3.4 Unscheduled surveys

6.3.4.1 Unscheduled surveys are to be held when submitting the refrigerating plant to surveys other than initial or periodical. The scope and schedule of this survey is determined by *ICS Class* depending on the reason of survey, the age and technical condition of the refrigerating plant.

6.3.4.2 The refrigerating plant is to be submitted to survey whenever it sustains any damage as a whole, or when its machinery, devices or items covered by the Rules and under Register's supervision are damaged, provided the damage cannot be repaired using the ship's means.

The survey is to be held at the port where the ship is or at the first port of call after damage to the refrigerating plant has been sustained. The survey enables to ascertain the damage extent, the repair works and the possibility of maintaining the plant's class.

6.3.4.3 An unscheduled survey due to particular circumstances may be held upon Shipowner's or Underwriter's request, to the extent necessary to fulfill the application.

6.3.4.4 A preloading or unloading survey of the refrigerating plant may be carried out following a special application by the Shipowner.

### 6.3.5 Classing of refrigerating plants classed with other classification society or plants without a class

6.3.5.1 *ICS Class* may accept for classing a refrigerating plant not previously classed or whose class, granted by another Society, has lost validity, on the condition that the plant be submitted to an initial survey.

6.3.5.2 A refrigerating plant with a valid class by other Society may be accepted for classing after an initial survey to the extent of an annual survey. If the survey shows satisfactory results *ICS Class* may acknowledge the class for the term of the Certificate of Class in force.

6.3.5.3 When submitting to classing a refrigerating plant with a valid class by other Society, or whose class has lost validity, the following documents are to be submitted:

- .1 The last *Class Certificates*.
- .2 The survey reports from the previous Society of all the surveys held since the last renewal survey.
- .3 General arrangement plan of the refrigerating plant.
- .4 Diagrams of the refrigerating plant.  
If the Owner can not submit the above mentioned documents either wholly or partially, *ICS Class* shall be supplied with the necessary information during the initial survey.

6.3.5.4 When submitting to classing a refrigerating plant without a class, it is necessary to submit technical documents as required by *ICS Class*.

### 6.3.6 Determination of intervals between periodical surveys

6.3.6.1 The determination of intervals between periodical surveys to refrigerating plants built

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under *ICS Class* supervision shall be the date of issue of the *Class Certificate*.

6.3.6.2 The determination of intervals between periodical surveys to a refrigerating plant that holds a valid class from other Society and was accepted for classing with *ICS Class* on the basis of an annual survey shall be from the date of issue of the *Class Certificate* of the previous Society.

6.3.6.3 The determination of intervals between periodical surveys of refrigerating plants not previously classed shall be from the date of assignment of class.

6.3.6.4 The determination of intervals between periodical surveys of refrigerating plants in service shall be from the date of completion of the renewal survey.

### 6.4 Technical documents of a refrigerating plant

#### 6.4.1 Technical project of a classed refrigerating plant

6.4.1.1 Prior to the beginning of the ship's construction, technical documents of the refrigerating plant are to be submitted to *ICS Class*, with sufficient information to ascertain the compliance with the provision of the Rules. A list of technical documents to be submitted to *ICS Class* is given in 6.4.1.2 and 6.4.1.3.

6.4.1.2 With a subsequent approval of working plans, the following documents are to be submitted:

- .1 A technical description of the refrigerating plant.
- .2 Cooling capacity calculations, indicating the thermal load from each space.
- .3 General arrangement plan of the refrigerating plant.
- .4 Diagrams of main and emergency ventilation systems of refrigerating machinery rooms, showing watertight and fireproof bulkheads, and also the number of air changes per hour.
- .5 Diagrams of refrigerant, liquid cooling medium and cooling water systems, indicating the places

where measuring, control and automation devices are to be installed.

- .6 Air cooling diagram with indication of watertight and fireproof bulkheads.
  - .7 Equipment arrangement plans of refrigerating machinery spaces, showing escape routes.
  - .8 Equipment arrangement plans of refrigerated spaces, indicating the places where temperature control devices are to be installed.
  - .9 Construction plans of the insulation of refrigerated spaces, indicating the technical particulars of the insulating material.
  - .10 Diagram of the water screen system in refrigerating machinery spaces (for Group II or III refrigerants)
  - .11 General arrangement plans of cooling and freezing equipment, as well as any other refrigerating processing equipment
  - .12 Circuit diagrams of regulation, protection and signaling systems.
  - .13 List of machinery, vessels and appliances of the refrigerating plant, with indication of their technical particulars, type (trademark) maker and data on Register's type approval.
  - .14 List of control and measuring devices, indicating their technical particulars, types (trademarks), makers and data on Register's type approval.
  - .15 Tables showing surface areas of refrigerated cargo holds and tweendecks and the calculation of heat transfer factor for each surface.
- 6.4.1.3 Without the subsequent approval of working plans, documents listed under 6.4.1.2 are to be submitted and, additionally:
- .1 Drawings of the installation and fastening of machinery, vessels and appliances.
  - .2 Arrangement plans of refrigerant, liquid cooling medium and cooling water pipelines, showing details of their penetrations through bulkheads, decks and platforms.
  - .3 Arrangement plans of thermometer pipes in refrigerated spaces.



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| .4  | Arrangement plans of the emergency refrigerant discharge station.   | .8  | Instructions for maintenance and operation of the refrigerating plant  |
| .5  | Spare parts handbook.   | .9  | Spare parts list.  |
| .6  | Test program with description of methods for determining the refrigerating plant capacity, heat transfer factor and methods of generating the design heat load. | .10 | Test program   |
| .11 |   | .11 | For unclassified refrigerating plants the documents listed in <i>rule 6.4.3.1, paragraphs .1, .2, .6 and .7</i> are to be submitted. |
- 6.4.2 Technical design of an unclassified refrigerating plant**
- 6.4.2.1 Subject to a subsequent approval of working plans, the documents stated in *6.4.1.2.3* to *6.4.1.2.5* are to be submitted (for refrigerant only); in *6.4.1.2.7, 6.4.1.2.10, 6.4.1.2.11* (only for arrangements working under refrigerant only); in *6.4.1.2.12* (for protection and signaling systems only); in *6.4.1.2.13* and *6.4.1.2.14* (for signaling and protection devices only).
- 6.4.2.2 Without a subsequent approval of working plans the documents stated in *6.4.2.1, 6.4.1.3.1, 6.4.1.3.2* (for refrigerant only) and *6.4.1.3.4* are to be submitted.
- 6.4.3 Working plans of refrigerating plants**
- 6.4.3.1 The following documents are to be submitted:
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| .1 | Drawings of installation and fastening of machinery, vessels and appliances.          |
| .2 | Arrangement plan of refrigerant pipelines.  |
| .3 | Arrangement plan of liquid cooling medium and cooling water pipelines.                |
| .4 | Drawing of the cooling air system.  |
| .5 | Arrangement plan of thermometer pipes.  |
| .6 | Drawing of the water screen and water spray systems in refrigerating machinery rooms. |
| .7 | Arrangement plans of emergency refrigerant discharge stations.                        |