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CR Classification Society

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RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF STEEL SHIPS 2013

AMENDMENT No.1
June 2015

CR CLASSIFICATION SOCIETY

RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF STEEL SHIPS 2013

AMENDMENT No.1

The following Parts have been amended and the effective dates are:	
Parts	Effective date
I	June, 2015
II	June, 2015
IV	June, 2015
VI	June, 2015
IX	June, 2015
X	June, 2015
XI	June, 2015
XII	June, 2015
XIII	June, 2015
XIV	June, 2015

The Rules for the Construction and Classification of Steel Ships 2013 thereof is to be read in conjunction with this Amendment.

AMENDMENT TO THE RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF
STEEL SHIPS, 2013

PART I CLASSIFICATION AND SURVEY

List of major changes in Part I from 2013 edition

1.6.2(a)	Revised	Table I 2-3C	Revised
2.6.3(c)	Revised	Table I 2-17	Revised
2.6.4(b)	Revised	Table I 2-19	Revised
Table I 2-3B	Revised		

Rules for the construction and classification of steel ships, 2013 has been partly amended as follows:

Chapter 1 Classification of Steel Ship

Paragraph 1.6.2(a) has been amended as follows:

1.6.2 Classification initial survey during construction

(a) New ships are to be built in accordance with the Rules. The constructional plans and particulars of the hull, equipment and machinery, together with their drawing list, are to be submitted for approval of the Society before the work is commenced. In case these plans need to be modified or altered, a re-approval is indispensable.

Chapter 2 Survey Requirements of Steel Ship

Paragraph 2.6.3(c) has been amended as follows:

2.6.3 Additional ESP hull requirements for oil tankers including combination carriers

(c) Oil tankers of $10 < \text{age} \leq 15$

~~(i) An overall survey of at least two representative cargo tanks is to be carried out.~~

~~(ii) For tanks used for salt water ballast including combined cargo/ballast tanks, an overall survey of all such tanks is to be carried out. If such a survey reveals no visible structural defects, the survey may be limited to a verification that the protective coating remains effective.~~

~~(iii) Extent of close-up survey~~

~~(1) Ballast tanks: To the same extent as previous special survey.~~

~~(2) Cargo tanks: Two combined cargo/ballast tanks. The extent of survey is to be based on the record of the previous special survey, and repair history of the tanks.~~

~~(3) The extent of close-up surveys may be extended stated in 2.7.5 (c) (iii).~~

~~(4) For areas in tanks where coatings are found to be in Good condition, the extent of close-up surveys may be specially considered by the Surveyor.~~

~~(iv) 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 is to be increased in accordance with the requirements of Table I 2-4B.~~

(i) The requirements of the intermediate enhanced survey are to be to the same extent as the previous special survey required in 2.7.5 and 2.1.5(a). However, pressure testing of tanks and cargo holds used for ballast is not required unless deemed necessary by the attending Surveyor.

(ii) In application of 2.6.3(c)(i) above the intermediate enhanced survey may be commenced at the second annual survey and be progressed during the succeeding year with a view to completion at the third annual survey.

[PART I]

Paragraph 2.6.4(b) has been amended as follows:

2.6.4 Additional ESP hull requirements for bulk carriers

(b) For bulk carriers $10 < \text{age} \leq 15$

~~(i) Ballast tanks~~

~~(1) For bulk carriers:~~

~~All salt water ballast tanks are to be examined. If such inspections reveal no visible structural defects, the examination may be limited to a verification that the protective coating remains efficient.~~

~~(2) For ore carriers (close up survey):~~

~~— all web frame rings in one ballast wing tank;~~

~~— one deck transverse in each of the remaining ballast wing tanks;~~

~~— both transverse bulkheads in one ballast wing tank;~~

~~— one transverse bulkhead in each remaining ballast wing tank.~~

~~(3) In addition, the requirements described in 2.6.4(a)(i)(2) to 2.6.4(a)(i)(4) apply.~~

~~(ii) Cargo holds~~

~~(1) An overall survey of all cargo holds, including close up survey of sufficient extent, minimum 25% of frames, is to be carried out to establish the condition of:~~

~~— shell frames including their upper and lower and attachments, adjacent shell plating, and transverse bulkheads of all cargo holds; and~~

~~— areas found to be Suspect Areas at the previous special survey.~~

~~(2) Where considered necessary by the Surveyor as a result of the overall and close up survey, as described in 2.6.4(b)(ii)(1) above, the survey is to be extended to include a close up survey of all of the shell frames and adjacent plating of all cargo holds.~~

~~(iii) Extent of thickness measurement~~

~~(1) Thickness measurement is to be carried out to an extent sufficient to determine both general and local corrosion levels at areas subject to close up survey, as described in 2.6.4(b)(i) and 2.6.4(b)(ii). The minimum requirements for thickness measurements at the intermediate enhanced survey are areas found to be Suspect Areas at the previous special survey.~~

~~(2) In addition, the requirements described in 2.6.4(a)(i)(2) to 2.6.4(a)(i)(4) apply.~~

(i) The requirements of the intermediate enhanced survey are to be to the same extent as the previous special survey required in 2.7.5 and 2.1.5 (a). However, pressure testing of tanks and cargo holds used for ballast is not required unless deemed necessary by the attending Surveyor.

(ii) In application of 2.6.4(b)(i) above the intermediate enhanced survey may be commenced at the second annual survey and be progressed during the succeeding year with a view to completion at the third annual survey.

Table I 2-3B has been amended as follows:

Table I 2-3B Minimum Requirements for Thickness Measurements at Hull Special Survey of Oil Tankers, Ore/Oil Carriers and etc.

SS No. 1 (Age ≤ 5)	SS No. 2 (5 < Age ≤ 10)	SS No. 3 (10 < Age ≤ 15)	SS No. ≥ 4 (Age > 15)
1. One section of deck plating for the full beam of the ship within the cargo area (in way of a ballast tank, if any, or a cargo tank used primarily for water ballast)	1. Within the cargo area: a. Each deck plate b. One Transverse section	1. Within the cargo area: a. Each deck plate b. Two Transverse sections	1. Within the cargo area: a. Each deck plate b. Three Transverse sections c. Each bottom plate
2. Measurements of structural members subject to close-up survey according to Table I 2-5A, for general assessment and recording of corrosion pattern	2. Measurements of structural members subject to close-up survey according to Table I 2-5A, for general assessment and recording of corrosion pattern	2. Measurements of structural members subject to close-up survey according to Table I 2-5A, for general assessment and recording of corrosion pattern	2. Measurements of structural members subject to close-up survey according to Table I 2-5A, for general assessment and recording of corrosion pattern
3. Suspect Areas	3. Suspect Areas	3. Suspect Areas	3. Suspect Areas
	4. Selected wind and water strakes outside the cargo area	4. Selected wind and water strakes outside the cargo area	4. Selected All wind and water strakes outside the cargo area
		5. All wind and water strakes within the cargo area	5. All wind and water strakes within the cargo area
		6. Internals in peak tanks	6. Internals in peak tanks
			7. Exposed superstructure deck plating
			8. Exposed main deck plating full length
			9. The transverse bulkhead (lowest strake in cargo spaces and their internals)
			10. Sea chest plating

[PART I]

Table I 2-3C has been amended as follows:

Table I 2-3C Minimum Requirement for Thickness Measurement at Hull Special Surveys of Bulk Carriers

SS No. 1 (Age ≤ 5)	SS No. 2 (5 < Age ≤ 10)	SS No. 3 (10 < Age ≤ 15)	SS No. ≥ 4 (Age > 15)
1. Suspect Areas	1. Suspect Areas	1. Suspect Areas	1. Suspect Areas
	2. Within the cargo length: a. Two transverse section of deck plating outside line of cargo opening	2. Within the cargo length: a. Each deck plate outside line of cargo hatch openings b. 2 Transverse Sections, one in the amidship area, outside line of cargo hatch opening	2. Within the cargo length: a. Each deck plate outside line of cargo hatch openings b. 3 transverse sections, one in the amidship area, outside line of cargo hatch opening. c. Each bottom plate
	3. Measurement for, general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Table I 2-5B	3. Measurement for, general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Table I 2-5B	3. Measurement for, general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Table I 2-5B
	4. Wind and water strakes in way of the transverse sections considered under point 2 above	4. All wind and water strakes within the cargo length area	4. All wind and water strakes within the cargo length area
		5. Selected wind and water strakes outside the cargo length area	5. Selected All wind and water strakes outside the cargo length area
		6. Vertically corrugated transverse watertight bulkhead between cargo hold Nos. 1 and 2 in accordance with requirements of IACS URs S19 and S23 if applied	6. Vertically corrugated transverse watertight bulkhead between cargo hold Nos. 1 and 2 in accordance with requirements of IACS URs S19 and S23 if applied
		7. Side shell frames and brackets in accordance with requirements of IACS UR S31 if applied	7. Side shell frames and brackets in accordance with requirements of IACS UR S31 if applied
		8. Cargo hatch covers and coaming (plate & stiffener)	8. Cargo hatch covers and coaming (plate & stiffener)
		9. Internals in peak tanks	9. Internals in peak tanks
			10. Exposed superstructure deck plating
			11. Exposed main deck plating full length
			12. The transverse bulkhead (lowest strake in cargo spaces and their internals)
			13. Sea chest plating

Table I 2-17 has been amended as follows:

Age of ship at time of intermediate survey due date		
5 < Age ≤ 10	10 < Age ≤ 15	Age > 15
Overall survey of representative salt-water ballast tanks, selected by the attending Surveyor (the selection is to include fore and aft peak tanks and three other tanks)	Thickness measurements of those areas are same as as for special survey given in Table I 2-18 and Table I 2-19	Thickness measurements of those areas are same as as for special survey given in Table I 2-18 and Table I 2-19
Thickness measurements of those areas found to be Suspect Areas at the previous special survey		

Table I 2-19 has been amended as follows:

Age of ship (in years at time of special survey due date)			
SS No.1 (Age ≤ 5)	SS No.2 (5 < Age ≤ 10)	SS No.3 (10 < Age ≤ 15)	SS No. ≥ 4 (Age > 15)
One section of deck plating for the full beam of the ship within the cargo area	Within the cargo area: a. each deck plate b. one transverse section	Within the cargo area: a. each deck plate b. two transverse sections* ¹ c. all wind and water strakes	Within the cargo area: a. each deck plate b. three transverse sections* ¹ c. each bottom plate d. all wind and water strakes
	Selected wind and water strakes outside the cargo area	Selected wind and water strakes outside the cargo area	Selected All 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 Table I 2-18	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Table I 2-18	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Table I 2-18	Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Table I 2-18
Suspect Areas	Suspect Areas	Suspect Areas	Suspect Areas

*1: At least one section is to be within 0,5L amidships.

AMENDMENT TO THE RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF
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PART II HULL CONSTRUCTION AND EQUIPMENT

List of major changes in Part II from 2013 edition

1.1.7	New	25.1.3	Revised
1.2.1	Revised	Chapter 29	Revised
3.1.1	Revised	29.1.1	Revised
3.4.1	Revised	29.1.2	Deleted
6.5.4	New	29.3.3	New
7.1.3	New	31.1.1	Revised
7.2.2(d)	Revised	31.1.2	Revised
18.1	Revised	31.1.3	Deleted
18.2	Revised	31.2~31.5	Deleted
24.7.2	Revised		

Rules for the construction and classification of steel ships, 2013 has been partly amended as follows:

Chapter 1 General

A new paragraph 1.1.7 has been added after the existing paragraph 1.1.6

1.1.7 Ships are to be built in accordance with controlled and transparent quality production standards with due regard to intellectual property rights. The ship construction quality procedures are to include, but not be limited to, specifications for material, manufacturing, alignment, assembling, joining and welding procedures, surface preparation and coating. All of the industrial standards employed are to be recognized, for example, CNS, ISO, JIS, JSQS, DIN, AWS, IACS Rec.47, etc.

Paragraph 1.2.1 has been amended as follows:

1.2.1 Length of ship (L) is the distance, in meters, on the ~~estimated~~ summer load waterline from the fore side of the stem to the after side of the rudder post, or to the center of the rudder stock if there is no rudder post. L is not to be less than 96 %, and need not be greater than 97 %, of the extreme length on the summer load waterline. The summer load waterline is the designed maximum load line corresponding to the full load condition. In ships without rudder post and stock, L is to be taken equal to 97% of the extreme length on the summer load waterline. In ships with unusual stem or stern arrangements, L is considered on a case by case basis.

Chapter 3 Longitudinal Strength

Paragraph 3.1.1 has been amended as follows:

3.1.1 Ships of $L \geq 65$ ~~90~~ m intended to be classed for unrestricted service are to have longitudinal strength in accordance with the requirements in 3.1 to 3.4 of this Chapter except that ships having one or more of the following characteristics are to be subject to special consideration:

Paragraph 3.4.1 has been amended as follows:

3.4.1 Application

These requirements apply to plate panels and longitudinals subject to hull girder bending and shear stresses, including the following members:

- (a) For the compressive, bending and torsional buckling strength: longitudinal frames, beams and stiffeners; longitudinal bulkhead plating; and strength deck, bottom, and side shell plating of a longitudinal system in the midship part.
- (b) For the shear buckling strength: side shell plating and longitudinal bulkhead plating within a reasonable distance forward and aft of each transverse bulkhead between bottom and deck plating.
- (c) Members other than those in (a) and (b) above, of which the buckling strength is deemed necessary by the Society.

Chapter 6 Frames

A new paragraph 6.5.4 has been added after the existing paragraph 6.5.3:

6.5.4 Superstructure frames are to be provided in line with every tween deck frame located below and the scantlings are to be determined according to 6.5.2 of this Part.

Chapter 7 Shell Plating

A new paragraph 7.1.3 has been added after the existing paragraph 7.1.2

7.1.3 Plate keels in association with the center girder as required in 5.2 of this Part are to be of the scantling maintained throughout and obtained from the following formulae:

$$t = t_b + 1.5 \quad \text{mm}$$

$$b = 4.0 L + 800 \quad \text{mm}$$

but need not exceed 1,800 mm.

where:

L = Length of ship, in m.

t = Thickness of plate keel, in mm.

t_b = Thickness of bottom plating, in mm.

b = Width of plate keel, in mm.

Paragraph 7.2.2(d) has been amended as follows:

7.2.2 The thickness of the bottom shell plating for the midship 0.4L is not to be less than that obtained from the following formula:

(d) The thickness and width of garboard strake are to be determined from 7.1.3 of this Part.

Chapter 18 Machinery Casings

Paragraph 18.1 has been amended as follows:

18.1 General

18.1.1 Machinery space openings in position 1 or 2 are to be properly framed and efficiently enclosed by steel casings of ample strength, and where the casings are not protected by other structures their strength are to be specially considered. ~~Access openings in such casings are to be fitted with door complying with the requirements of 12.4.2 and 12.4.3 of this Part, the sills of which are to be at least 600 mm above the deck if in position 1, and at least 380 mm above the deck if in position 2.~~ Other openings in such casings are to be fitted with equivalent covers, permanently attached in their proper positions.

~~18.1.2 Where machinery casings are not protected by other structures, double doors (i.e. inner and outer doors complying with 12.4 of this part are to be required for type of ships assigned reduced freeboards. An inner sill of 230 mm in conjunction with the outer sill of 600 mm is to be provided.~~

~~18.1.23 Coamings of any fiddley, funnel or machinery space ventilator in an exposed position on the freeboard or superstructure deck are to be as high above the deck as is reasonable and practicable.~~ In general, ventilators necessary to continuously supply the machinery space are to have coamings of sufficient height to comply with 21.1.6(a) of this part, without having to fit weathertight closing appliances. Ventilators necessary to continuously supply the emergency generator room, if this is considered buoyant in the stability calculation or protecting opening leading below, are to have coamings of sufficient height to comply with 21.1.6(a) of this part, without having to fit weathertight closing appliances.

18.1.34 Where due to ship size and arrangement this is not practicable, lesser heights for machinery space and emergency generator room ventilator coamings, fitted with weathertight closing appliances in accordance with 21.1.6(b) of this part, may be permitted by the Society in combination with other suitable arrangements to ensure an uninterrupted, adequate supply of ventilation to these spaces.

~~18.1.5 Fiddley openings are to be fitted with strong covers of steel or other equivalent material permanently attached in their proper positions and capable of being secured weathertight.~~

[PART II]

Paragraph 18.2 has been amended as follows:

18.2 Construction of Casings

18.2.1 The scantlings of plating and stiffeners of exposed casings protecting machinery openings are to be obtained as for superstructure end bulkheads and deckhouse walls specified in 12.3 of this Part.

18.2.2 For casings within open superstructures, the scantlings of plating and stiffeners are to be obtained from 12.4 of this Part as for an aft end bulkhead.

~~18.2.3 Casing below freeboard deck or within enclosed superstructures~~

~~(a) The thickness of plating of casings below freeboard deck or within enclosed superstructures is not to be less than 6.5 mm in way of cargo spaces and 5 mm in way of accommodation spaces. Where the spacing of stiffeners exceeds 750 mm, the plating thickness is to be increased at the rate of 0.5 mm per 100 mm in spacing.~~

~~(b) The section modulus of stiffeners are not to be less than:~~

~~$$1.25 s l^2 \text{ cm}^3$$~~

~~where:~~

~~l = Length of stiffeners, in m.~~

~~s = Spacing of stiffeners, in m.~~

Chapter 24 Rudders

Paragraph 24.7.2 has been amended as follows:

24.7.2 The length/diameter ratio of the bearing surface is not to be less than 1.0 or greater than 1.2, unless calculations are submitted and approved which show the clearance at both ends of the bearing is acceptable.

Chapter 25 Equipment

Paragraph 25.1.3 has been amended as follows:

25.1.3 The number and mass of anchors and the length and the size of the chain, the towline, and the mooring rope for a classed ship are to be determined from Table II 25-1. For ships having equipment numbers not more than 50 or more than 16,000, anchors, chain cables and mooring lines are to be as determined by the Society.

Chapter 29 Damage Control for Dry Cargo Ships

The title of Chapter 29 has been amended as follows:

Chapter 29 Damage Control for ~~Dry~~ Cargo Ships

Paragraph 29.1.1 has been amended as follows:

29.1.1 The requirements in this chapter are applied to the ~~dry~~ cargo vessels of 500 gross tonnage and over which are engaged in international voyage.

Paragraph 29.1.2 has been deleted:

~~29.1.2 The dry cargo vessels mean the cargo ships except the ships engaged in carrying liquids.~~

Paragraph 29.3.3 has been added after the existing paragraph 29.3.2

29.3.3 Damage Stability Information

Ships subject to Chapter 30A of this Part are to be provided with damage stability information deemed appropriate by the Society.

Chapter 31 Ship Recycling

Paragraph 31.1.1 has been amended as follows:

31.1.1 Application

The requirement in this chapter is applicable to new and existing ships for which the optional Ship Recycling notation **SRE** has been applied. ~~requested. Obtaining this notation will assist in complying with regulation 5 of the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ship, 2009 (SR/CONF/45).~~

Paragraph 31.1.2 has been amended as follows:

31.1.2 Notation

~~Ships which have had the ship details and Part 1 of the Inventory of their "Statement on Inventory of Hazardous Materials" (hereinafter referred to as the Statement, refer to 31.2.1 of this chapter) prepared and certified to the requirements of this chapter to the satisfaction of the Surveyors to the Society comply with the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ship, 2009 (SR/CONF/45) and its amendments will be eligible to receive may be assigned with the notation **SRE** (Ship Recycling).~~

Ships which comply with the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ship, 2009 (SR/CONF/45) and its amendments may be assigned with the notation **SRE** (Ship Recycling).

Paragraph 31.1.3 has been deleted:

~~31.1.3 Definitions~~

Paragraph 31.2~31.5 have been deleted:

~~**31.2 Statement on Inventory of Hazardous Materials (the Statement)**
31.3 Requirement for New Ships
31.4 Requirement for Existing Ships
31.5 Certification, Maintenance and Survey~~

AMENDMENT TO THE RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF
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PART IV MACHINERY INSTALLATIONS – CONSTRUCTION AND SHAFTING

List of major changes in Part IV from 2013 edition

3.4.5(a) Revised

Rules for the construction and classification of steel ships, 2013 has been partly amended as follows:

Chapter 3 Diesel Engines

Paragraph 3.4.5(a) has been amended as follows:

3.4.5 Crankcase Oil Mist Detection Arrangements

(a) Crankcase oil mist detection arrangements are required for diesel engines of 2250 kW maximum continuous power and above or having cylinders of more than 300mm bore, and in cases of engine failure, the following means are automatically employed. However, in cases where alternative devices (e.g. engine bearing temperature monitors or equivalent devices) deemed appropriate by the Society are provided, such devices may be used instead of crankcase oil mist detection arrangements.

- (i) In the case of low speed (crosshead) engines, alarms are to activate, and speed be reduced automatically or manually.
- (ii) In the case of medium/high speed (trunk piston) engines, alarms are to activate and diesel engines are to be stopped or have their fuel supply shut off automatically.

Note: For the purpose of this requirement, the following definitions apply:

Low speed engines means diesel engines having a rated speed of less than 300 rpm.

Medium speed engines means diesel engines having a rated speed of 300 rpm and above, but less than 1400 rpm.

High speed engines means diesel engines having a rated speed of 1400 rpm and above.

AMENDMENT TO THE RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF
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PART VI PIPING AND PUMPING SYSTEMS

List of major changes in Part VI from 2013 edition

4.4.3(r)(ii)	Revised	6.2.3	Revised
4.4.3(r)(v)	New		

Rules for the construction and classification of steel ships, 2013 has been partly amended as follows:

Chapter 4 Machinery Piping Systems

Paragraph 4.4.3(r)(ii) has been amended, and 4.4.3(r)(v) has been added after the existing paragraph 4.4.3(r)(iv) as follows :

4.4.3 Fuel oil pumps, pipes, fittings, tanks, etc.

(r) Fuel oil service tanks

- (i) An fuel oil service tank is an fuel oil tank which contains only the required quality of fuel ready for immediate use.
- (ii) ~~Two fuel oil service tanks, for each type of fuel used on board, necessary for propulsion and vital systems or equivalent arrangements, are to be provided. Each tank is to have a capacity for at least eight hours' operation, at sea, at maximum continuous rating of the propulsion plant and normal operating load of the generating plant associated with that tank.~~
Two fuel oil service tanks or equivalent arrangements are to be provided for each type of fuel used on board which is necessary for propulsion and vital systems. Each tank is to have a capacity for operation at least 8 hours at sea for the propulsion plant at maximum continuous rating and for the generating plant at normal load with that tank.
- (iii) The arrangement of fuel oil service tanks is to be such that one tank can continue to supply fuel oil when the other is being cleaned or opened up for repair.
- (iv) For ships of less than 500 gross tonnage, the capacity of each fuel oil service tank required by 4.4.3(r)(ii) may be less than for eight hours operation, where the class notation includes a service restriction.
- (v) Equivalent arrangement noted in 4.4.3 (r) can refer to IACS UI SC123.

Chapter 6 Equipment and Arrangement for Oil Pollution Prevention

Paragraph 6.2.3 has been amended as follows:

6.2.3 Bilge water holding tanks, if fitted

~~Bilge water holding tanks are to satisfy the following requirements:~~

The minimum required capacity (C) of bilge water holding tanks are recommended as follows : (not compulsory)

AMENDMENT TO THE RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF
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PART IX FIRE PROTECTION, DETECTION AND EXTINCTION

List of major changes in Part IX from 2013 edition

1.1.1	Revised	1.5	New
1.1.2	Revised	Chapter 2~3	Revised
1.3	Revised	Chapter 4	New
1.5~1.22	Deleted		

Rules for the construction and classification of steel ships, 2013 has been partly amended as follows:

Chapter 1 General

Paragraph 1.1.1 has been amended as follows:

1.1.1 Self-propelled ~~ocean-going cargo ships of 500 gross tonnage and upwards~~ ships engaged on International voyage classed or to be classed with the Society are to comply with ~~the provisions of Chapter II-2 of International Convention for the Safety of Life at Sea, as amended,~~ this Part.

Paragraph 1.1.2 has been amended as follows:

~~1.1.2 Ships below 500 gross tonnage or ships of restricted or special services or ships not propelled by mechanical means, the requirements in this Part may be modified to the satisfaction of the Society.~~

1.1.2 Cargo ships of less than 500 gross tonnage(GT), the requirements in Chapter 4, as applicable, are to be complied with.

Paragraph 1.3 has been amended as follows:

1.3 Definitions

For terms used in this Part, the definitions as given in Regulation 3 of Chapter II-2 of SOLAS 1974, as amended, apply.

Paragraph 1.5 has been deleted and replaced by new paragraph as follows:

~~1.5 Fire Pumps, Fire Mains, Hydrants and Hoses~~

1.5 Materials Containing Asbestos

Installation of materials which contain asbestos is prohibited.

Paragraph 1.6~1.22 have been deleted.

~~1.6 Fixed Gas Fire Extinguishing Systems~~

~~1.7 Fire Extinguishers~~

~~1.8 Fire Extinguishing Arrangements in Machinery Spaces~~

~~1.9 Fixed Low Expansion Foam Fire Extinguishing Systems in Machinery Spaces~~

~~1.10 Fixed High Expansion Foam Fire Extinguishing Systems in Machinery Spaces~~

~~1.11 Fixed Pressure Water Spraying Fire Extinguishing Systems in Machinery Spaces~~

~~1.12 Special Arrangements in Machinery Spaces~~

~~1.13 Automatic Sprinkler, Fire Detection and Fire Alarm Systems~~

~~1.14 Fixed Fire Detection and Fire Alarm Systems~~

~~1.15 Sample Extraction Smoke Detection Systems~~

~~1.16 Fixed Fire Detection and Fire Alarm Systems for Periodically Unattended Machinery Spaces~~

~~1.17 Arrangements for Oil Fuel, Lubricating Oil and other Flammable Liquids~~

~~1.18 Ventilation Systems~~

~~1.19 Personnel Protection~~

~~1.20 International Shore Connections~~

~~1.21 Fire Control Plans~~

~~1.22 Miscellaneous Items~~

Chapter 2 Fire Safety Measures for Cargo Ships

Chapter 2 has been deleted and replaced by new paragraph as follows:

~~Chapter 2 Fire Safety Measures for Cargo Ships~~

Chapter 2 Cargo Ships

2.1 All Ships

For all cargo ships as defined in Regulation 3.7 are applicable to the relevant requirements in Part B: Regulation 4 thru 6, Part C: Regulations 7 thru 11, Part D: Regulation 13 and Part G: Regulations 19 & 20, Chapter II-2 of SOLAS 1974, as amended.

2.2 Tankers

For tankers as defined in Regulation 3.48, the following requirements are additional to Regulation 5.1 of Chapter II-2 of SOLAS 1974, as amended.

2.2.1 Low Flash Point Cargoes

For tankers intended for the carriage of cargoes having a flash point of 60°C (140°F) or less, are applicable to the relevant requirements in Part A: Regulation 1; Part B: Regulation 4; Part C: Regulations 9 thru 11; and Part E: Regulations 16, Chapter II-2 of SOLAS 1974, as amended. Furthermore, the requirements of Chapters 2, 14 and 15 of the Fire Safety Systems Code are also applicable.

For tankers with bow or stern loading and unloading connections, the provisions of SOLAS Regulations II-2/4.5.1.6, II-2/4.5.2.1 to II-2/4.5.2.3 inclusive and II-2/9.2.4.2.5 are to apply, unless alternative arrangements are acceptable to the Administration. This applies to the exterior boundaries of superstructures and deckhouses enclosing accommodation spaces which face the cargo shore connection, the overhanging decks which support such accommodation, the outboard sides of the superstructures and deckhouses for the specific distances from the boundaries which face the cargo shore connection.

2.2.2 High Flash Point Cargoes

For tankers intended for the carriage of cargoes having a flash point above 60°C (140°F), the requirements in 2.1 are applicable, except that in lieu of the fixed fire extinguishing system required by Regulation II-2/10.7.1.3 they are to be fitted with a fixed deck foam system which is to comply with Chapter 14 of the Fire Safety Systems Code.

Chapter 3 Fire Safety Measures for Tankers

Chapter 3 has been deleted and replaced by new paragraph as follows:

~~Chapter 3~~
~~Fire Safety Measures for Tankers~~

Chapter 3
Passenger Ships

3.1 Passenger Ships

For passenger ships as defined in Regulation 3.37 are applicable to the relevant requirements in Part B: Regulation 4 thru 6, Part C: Regulations 7 thru 11, Part D: Regulation 13 and Part G: Regulations 19 & 20, Chapter II-2 of SOLAS 1974, as amended.

A new chapter 4 has been added after existing chapter 3:

Chapter 4

Cargo ships of less than 500 gross tonnage

4.1 Application

Requirements of this Chapter apply to the following ships:

- Cargo ships of less than 500 gross tonnage(GT);

4.2 Fire Pumps and Fire Main Systems

4.2.1 Purpose

The purpose of this section is to suppress and swiftly extinguish a fire in the space of origin. For this purpose, the following functional requirements are to be met:

- fixed fire extinguishing systems are to be installed, as applicable, having due regard to the fire growth potential of the protected spaces; and
- fire extinguishing appliances are to be readily available.

(a) Capacity

The total capacity of the main fire pump(s) is not to be less than:

$$Q = (0.145 (L (B+D))^{1/2} + 2.170)^2$$

but need not exceed 25m³/hour

Where

B = greatest moulded breadth of ships, in metres

D = moulded depth to bulkhead deck, in metres

L = Freeboard Length, in metres

Q = total capacity, in m³/hour

(b) Fire pumps

Generally one main power pump and one portable fire pump are to be provided as specified below.

- (i) Sanitary, ballast, bilge or general service pumps may be accepted as fire pumps, provided that they are not normally used for pumping oil, and that, if they are subject to occasional duty for the transfer or pumping of fuel oil, suitable changeover arrangements are fitted.
- (ii) A power pump is a fixed pump driven by a power source other than by hand.
- (iii) In cargo ships classed for navigation in ice, the fire pump sea inlet valves are to be provided with ice clearing arrangements.
- (iv) Relief valves are to be provided in conjunction with any fire pump if the pump is capable of developing a pressure exceeding the design pressure of the water service pipes, hydrants and hoses. These valves are to be so placed and adjusted as to prevent excessive pressure in any part of the fire main system.
- (v) Where a centrifugal pump is provided in order to comply with this section, a non-return valve is to be fitted in the pipe connecting the pump to the fire main.

(c) Portable fire pumps

- (i) Portable fire pumps are to comply with the following:
 - (1) The pump is to be self-priming.
 - (2) The total suction head and the net positive suction head of the pump are to be determined taking account of actual operation, i.e. pump location when used.
 - (3) The portable fire pump, when fitted with its length of discharge hose and nozzle, are to be capable of maintaining a pressure sufficient to produce a jet throw of at least 12 m, or that required to enable a jet of water to be directed on any part of the engine room or the exterior boundary of the engine room and casing, whichever is the greater.
 - (4) Except for electric pumps, the pump set should have its own fuel tank of sufficient capacity to operate the pump for three hours. For electric pumps, their batteries should have sufficient capacity for three hours.
 - (5) Except for electric pumps, details of the fuel type and storage location are to be carefully considered. If the fuel type has a flashpoint below 60°C, further consideration to the fire safety aspects are to be given.
 - (6) The pump set is to be stored in a secure, safe and enclosed space, accessible from open deck and clear of the Category 'A' machinery space.
 - (7) The pump set is to be easily moved and operated by two persons and be readily available for immediate use.
 - (8) Arrangements are to be provided to secure the pump at its anticipated operating position(s).
 - (9) The overboard suction hose is to be non-collapsible and of sufficient length, to ensure suction under all operating conditions. A suitable strainer is to be fitted at the inlet end of the hose.
 - (10) Any diesel-driven power source for the pump is to be capable of being readily started in its cold condition by hand (manual) cranking. If this is impracticable, consideration is to be given to the provision and maintenance of heating arrangements, so that readily starting can be ensured.
- (ii) Alternatively to the paragraph of 4.2.1(c)(i) a fixed fire pump may be fitted, which is to comply with the following:

- (1) The pump, its source of power and sea connection is to be located in accessible positions, outside the compartment housing the main fire pump.
 - (2) The sea valve is to be capable of being operated from a position near the pump.
 - (3) The room where the fire pump prime mover is located is to be illuminated from the emergency source of electrical power, and is to be well ventilated.
 - (4) Pump is required to supply water for a fixed fire-extinguishing system in the space where the main fire pump is situated, it is to be capable of simultaneously supplying water to this system and the fire main at the required rates.
 - (5) The pump may also be used for other suitable purposes, subject to the approval in each case.
 - (6) Pressure and quantity of water delivered by the pump being sufficient to produce a jet of water, at any nozzle, of not less than 12 m in length. For ships of less than 150 GT, the jet of water may be specially considered.
- (iii) For ships less than 150 GT fitted with an approved fixed fire-fighting system in the engine room, portable pumps may be omitted.
- (iv) Means to illuminate the stowage area of the portable pump and its necessary areas of operation are to be provided from the emergency source of electrical power.

4.2.2 Fire main

- (a) The diameter of the fire main is to be based on the required capacity of the fixed main fire pump(s) and the diameter of the water service pipes are to be sufficient to ensure an adequate supply of water for the operation of at least one fire hose.
- (b) The wash deck line may be used as a fire main provided that the paragraph of this sub-Section are satisfied.
- (c) All exposed water pipes for fire-extinguishing are to be provided with drain valves for use in frosty weather. The valves are to be located where they will not be damaged by cargo.

4.2.3 Pressure in the fire main

- (a) When the main fire pump is delivering the quantity of water required by **4.2.1(a)**, or the fire pump described in **4.2.1(c)(ii)**, through the fire main, fire hoses and nozzles, the pressure maintained at any hydrant are to be sufficient to produce a jet throw at any nozzle of not less than 12 m in length. (For ships less than 150 GT, the jet of water may be specially considered).

4.2.4 Fire Hydrants

(a) Number and position of hydrants

- (i) For ships less than 150 GT the number and position of the hydrants are to be such that at least one jet of water may reach any part normally accessible to the crew, while the cargo ship is being navigated and any part of any cargo space when empty. Furthermore, such hydrants are to be positioned near the accesses to the protected spaces. (At least one hydrant is to be provided in each Category 'A' machinery space).
- (ii) For ships equal or greater than 150 GT the number and position of hydrants are to be such that at least two jets of water not emanating from the same hydrant, one of which is to be from a single length of hose, may reach any part of the ship normally accessible to the crew while the ship is being navigated and any part of any cargo spaces when empty. Furthermore, such hydrants are to be positioned near the accesses to the protected spaces. Other Requirements specified by the Administration may be considered.

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(b) Pipes and hydrants

(i) Materials readily rendered ineffective by heat are not to be used for fire mains. Where steel pipes are used, they are to be galvanized internally and externally. Cast iron pipes are not acceptable. The pipes and hydrants are to be so placed that the fire-hoses may be easily coupled to them. The arrangement of pipes and hydrants are to be such as to avoid the possibility of freezing. In ships where deck cargo may be carried, the positions of the hydrants are to be such that they are always readily accessible and the pipes are to be arranged, as far as practicable, to avoid risk of damage by such cargo. There are to be complete interchangeability of hose couplings and nozzles.

(ii) A valve is to be fitted at each fire hydrant so that any fire-hose may be removed while the fire pump is at work.

(iii) Where a fixed fire pump is fitted outside the engine room, in accordance with 4.2.1(c)(ii):

(1) an isolating valve is to be fitted in the fire main so that all the hydrants in the ship, except that or those in the Category 'A' machinery space, can be supplied with water. The isolating valve is to be located in an easily accessible and tenable position outside the Category 'A' machinery space; and

(2) the fire main is not re-enter the machinery space downstream of the isolating valve.

4.2.5 Fire-hoses

(a) Fire-hoses are to be of approved non-perishable material. The hoses are to be sufficient in length to project a jet of water to any of the spaces in which they may be required to be used. Their length, in general, is not to exceed 18 m. Each hose is to be provided with a nozzle and the necessary couplings. Fire-hoses, together with any necessary fittings and tools, are to be kept ready for use in conspicuous positions near the water service hydrants or connections.

(b) For ship less than 150 GT, one hose is to be provided for each hydrant. In addition one spare hose is to be provided onboard.

(c) Ship equal or greater than 150 GT is to be provided with fire hoses the number of which is to be one for each 30 m length of the ship and one spare, but in no case less than three in all. Unless one hose and nozzle is provided for each hydrant in the ship, there is to be complete interchangeability of hose couplings and nozzles.

4.2.6 Nozzles

(a) For the purpose of this Chapter, standard nozzle sizes are 12 mm, 16 mm or 19 mm, or as near thereto as possible, so as to make full use of the maximum discharge capacity of the fire pump(s).

(b) For accommodation and service spaces, the nozzle size need not exceed 12 mm.

(c) The size of nozzles used in conjunction with a portable fire pump need not exceed 12 mm.

(d) All nozzles are to be of an approved dual purpose type (i.e. spray/jet type) incorporating a shut-off.

4.3 Fire Safety Measures

4.3.1 Purpose

The purpose of this section should contain a fire in the space of origin. For this purpose, the following requirements

are to be met:

- the ship is to be subdivided by thermal and structural boundaries;
- thermal insulation of boundaries should have due regard to the fire risk of the space and adjacent spaces;
- the fire integrity of the divisions are to be maintained at openings and penetrations.

(a) Structural fire protection

The minimum fire integrity of bulkheads and decks are to be as prescribed in Table IX 4-1.

Table IX 4-1 Minimum fire integrity of bulkheads and decks

[Item]	Space	Separation By	From Space
[(1)]	Machinery Space Class 'A'	A-60	Accommodation / control stations / corridors / staircases / service spaces of high fire risk / ro-ro spaces / vehicle spaces
[(2)]	Machinery Space Class 'A'	A-0	Other than above [item (1)]
[(3)]	Galley	A-0	Unless specified otherwise
[(4)]	Service space of high fire risk other than galley	B-15	Unless specified above [item (1)]
[(5)]	Corridor Staircase	B-0	Unless specified above [item (1)]
[(6)]	Cargo Space (other than ro-ro spaces and vehicle space)	A-0	Unless specified above [item (1)]
[(7)]	Ro-ro space and vehicle space (except weather deck)	A-60	Control stations/machinery spaces of category 'A'
[(8)]	Ro-ro space and vehicle space (except weather deck)	A-0	Unless specified above [item (1)]

Note:

Category 'A' machinery spaces are to be enclosed by A-60 Class divisions, where adjacent to:

1. Accommodation spaces
 2. Control stations
 3. Corridors and staircases
 4. Service spaces of high fire risk,
- and by A-0 Class divisions elsewhere.

The divisions used to separate spaces, not mentioned above, are to be of non-combustible material.

- (i) The hull, superstructure, structural bulkheads, decks and deckhouses are to be constructed of steel or other equivalent material. For the purpose of applying the definition of steel or other equivalent material, as given in SOLAS, the 'applicable fire exposure' is to be one hour. Ships built of materials other than steel are to be specially considered.
- (ii) Stairways are to be enclosed, at least at one level, by divisions and doors or hatches, in order to restrict the free

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flow of smoke to other decks in the ship and the supply of air to the fire. Doors forming such enclosures are to be self-closing.

- (iii) Openings in 'A' Class divisions are to be provided with permanently attached means of closing which are to be at least as effective for resisting fires as the divisions in which they are fitted.
- (iv) Interior stairways serving machinery spaces, accommodation spaces, service spaces or control stations are to be of steel or other equivalent material.
- (v) Doors are to be self-closing in way of Category 'A' machinery spaces and galleys, except where they are normally kept closed.
- (vi) Where 'A' Class divisions are penetrated for the passage of electric cables, pipes, trunks, ducts, etc., or for girders, beams or other structural members, arrangements are to be made to ensure that the fire resistance is not impaired. Arrangements should also prevent the transmission of heat to un-insulated boundaries at the intersections and terminal points of the divisions and penetrations by insulating the horizontal and vertical boundaries or penetrations for a distance of 450 mm.

(b) Materials

- (i) Paints, varnishes and other finishes used on exposed interior surfaces should not be capable of producing excessive quantities of smoke, toxic gases or vapours and are to be of the low flame spread type in accordance with the IMO FTP Code, Annex 1, Parts 2 and 5.
- (ii) Except in cargo spaces or refrigerated compartments of service spaces, insulating materials are to be non-combustible.
- (iii) Where pipes penetrate 'A' or 'B' Class divisions, the pipes or their penetration pieces are to be of steel or other approved materials having regard to the temperature and integrity requirements such divisions are required to withstand.
- (iv) Pipes conveying oil or combustible liquids through accommodation and service spaces are to be of steel or other approved materials having regard to the fire risk.
- (v) Materials readily rendered ineffective by heat are not to be used for overboard scuppers, sanitary discharges and other outlets which are close to the waterline, and where the failure of the material in the event of fire would give rise to the danger of flooding.
- (vi) Primary deck coverings within accommodation spaces, service spaces and control stations are to be of a type which will not readily ignite, or give rise to toxic or explosive hazards at elevated temperatures in accordance with the IMO FTP Code, Annex 1, Parts 2 and 6.
- (vii) Materials used for insulating pipes, etc., in machinery spaces and other compartments containing high fire risks are to be non-combustible. Vapour barriers and adhesives used in conjunction with insulation, as well as the insulation of pipe fittings, for cold service systems need not be of non-combustible materials, but they are to be kept to the minimum quantity practicable and their exposed surfaces should have low flame spread characteristics.

(c) Surface of insulation

In spaces where penetration of oil products is possible, the surface of the insulation is to be impervious to oil or oil

vapours. Insulation boundaries are to be arranged to avoid immersion in oil spillage.

(d) Ventilation systems

- (i) Ventilation fans are to be capable of being stopped and main inlets and outlets of ventilation systems closed from outside the spaces being served.
- (ii) Ventilation ducts for Category 'A' machinery spaces, ro-ro spaces and vehicle spaces should not pass through accommodation spaces, galleys, service spaces or control stations, unless the ducts are constructed of steel and arranged to preserve the integrity of the division.
- (iii) Ventilation ducts for accommodation spaces, service spaces or control stations should not pass through Category 'A' machinery spaces or galleys unless the ducts are constructed of steel and arranged to preserve the integrity of the division.
- (iv) Ventilation arrangement for store rooms containing highly flammable products are to be specially considered.
- (v) Ventilation systems serving Category 'A' machinery spaces and galley exhaust ducts are to be independent of systems serving other spaces.
- (vi) Ventilation is to be provided to prevent the accumulation of gases that may be emitted from batteries.
- (vii) Ventilation openings may be fitted in and under the lower parts of cabin, mess and dayroom doors in corridor bulkheads. The total net area of any such openings is not to exceed 0.05 m². Balancing ducts are not to be permitted in fire divisions.

(e) Oil fuel arrangements

- (i) In a cargo ship in which oil fuel is used, the arrangements for the storage, distribution and utilization of the oil fuel are to be such as to ensure the safety of the ship and persons on board.
- (ii) Oil fuel tanks situated within the boundaries of Category 'A' machinery spaces should not contain oil fuel having a flashpoint of less than 60°C.
- (iii) Oil fuel, lubricating oil and other flammable oils should not be carried in fore peak tanks.
- (iv) For ships of 150 GT or more, and as far as practicable:
 - (1) oil fuel lines are to be arranged far apart from hot surfaces, electrical installations or other sources of ignition and are to be screened or otherwise suitably protected to avoid oil spray or oil leakage onto the sources of ignition. The number of joints in such piping systems are to be kept to a minimum.
 - (2) surfaces with temperatures above 220°C which may be impinged as a result of a fuel system failure is to be properly insulated. Precautions are to be taken to prevent any oil that may escape under pressure from any pump, filter or heater from coming into contact with heated surfaces.
 - (3) External high-pressure fuel delivery lines between the high pressure fuel pumps and fuel injectors are to be protected with a jacketed piping system capable of containing fuel from a high-pressure line failure. A suitable enclosure on engines having an output of 375 kW or less having fuel injection pumps serving more than one injector may be used as an alternative to the jacketed piping system.
- (f) Special arrangements in Category 'A' machinery spaces and where necessary other machinery spaces

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- (i) The number of skylights, doors, ventilators, openings in funnels to permit exhaust ventilation and other openings to machinery spaces is to be reduced to a minimum consistent with the needs of ventilation and the proper and safe working of the cargo ship.
- (ii) Skylights are to be of steel and are not to contain glass panels. Suitable arrangements are to be made to permit the release of smoke, in the event of fire, from the space to be protected.
- (iii) Windows are not to be fitted in machinery space boundaries. This does not preclude the use of glass in control rooms within the machinery spaces.
- (iv) Means of control are to be provided for:
 - (1) opening and closure of skylights, closure of openings in funnels which normally allow exhaust ventilation, and closure of ventilator dampers;
 - (2) permitting the release of smoke;
 - (3) closing power-operated doors or actuating release mechanism on doors other than power-operated watertight doors;
 - (4) stopping ventilating fans; and
 - (5) stopping forced and induced draught fans, oil fuel transfer pumps, oil fuel unit pumps and other similar fuel pumps.
- (v) The controls required in 4.3.1(f)(iv) are to be located outside the space concerned, where they will not be cut off in the event of fire in the space they serve. Such controls and the controls for any required fire-extinguishing system are to be situated at one control position or grouped in as few positions as possible. Such positions should have a safe access from the open deck.

(g) Arrangements for gaseous fuel for domestic purposes

Where gaseous fuel is used for domestic purposes, the arrangements for the storage, distribution and utilization of the fuel are to be specially considered.

(h) Space heating

Space heaters, if used, are to be fixed in position and so constructed as to reduce fire risks to a minimum. The design and location of these units are to be such that clothing, curtains or other similar materials cannot be scorched or set on fire by heat from the unit.

4.3.2 Means of escape

Purpose

The purpose of this paragraph is to provide means of escape so that persons onboard can safely and swiftly escape to the lifeboat and liferaft embarkation deck. For this purpose, the following functional requirements are to be met:

- safe escape routes are to be provided;
- escape routes are to be maintained in a safe condition, clear of obstacles; and
- additional aids for escape are to be provided as necessary to ensure accessibility, clear marking, and

adequate design for emergency situations.

- (a) Stairways, ladders and corridors serving crew spaces and other spaces to which the crew normally have access are to be arranged so as to provide ready means of escape to a deck from which embarkation into survival craft may be effected.
- (b) There are to be at least two means of escape, as widely separated as possible, from each section of accommodation and service spaces and control stations.
- (i) The normal means of access to the accommodation and service spaces below the open deck is to be arranged so that it is possible to reach the open deck without passing through spaces containing a possible source of fire (e.g. machinery spaces, storage spaces of flammable liquids).
- (ii) The second means of escape may be through portholes or hatches of adequate size and preferably leading directly to the open deck.
- (iii) Dead-end corridors having a length of more than 7m should not be accepted.
- (c) At least two means of escape are to be provided from machinery spaces, except where the small size of a machinery space makes it impracticable. Escape is to be by steel ladders that are to be as widely separated as possible.

4.4 Fixed fire detection and fire-alarm systems

An approved and fixed fire detection system is to be installed in all Category 'A' machinery spaces and cargo pump rooms.

4.5 Fire-Extinguishing Arrangements

Purpose

The purpose of this section should suppress and swiftly extinguish a fire in the space of origin. For this purpose, the following functional requirements are to be met:

- fixed fire-extinguishing systems are to be installed, as applicable, having due regard to the fire growth potential of the protected spaces; and
- fire-extinguishing appliances are to be readily available.

4.5.1 Fixed Fire-extinguishing arrangements in Category 'A' machinery spaces

Machinery spaces of category 'A' on ships with GT greater than or equal to 150 and operating in unrestricted or restricted waters, are to be provided with an approved fixed fire-extinguishing system, as specified in paragraph 4.5.2

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Machinery spaces of category 'A' on ships operating in protected areas may be exempted from this paragraph.

4.5.2 Fixed Fire-extinguishing systems

Fixed fire-fighting systems where required, are to be in accordance with the requirements of the IMO FSS Code.

4.5.3 Protection of paint lockers and flammable liquid lockers

The paragraphs for the protection of paint lockers and flammable liquids lockers are to be specially considered.

4.5.4 Fixed Fire-extinguishing systems not required by this Chapter

If such a system is installed, it is to be of an approved type.

4.5.5 Portable Fire-extinguishers (UNRESTRICTED, RESTRICTED and PROTECTED)

PORTABLE FIRE EXTINGUISHERS Accommodation and service spaces. Ships greater than or equal to 150 GT Ships less than 150 GT (see 4.5.5(f))	≥ 3 ≥ 1
Machinery spaces (one extinguisher per every 375 kW of internal combustion engine power)	$\geq 2, \leq 6$

(a) Approved types

All fire-extinguishers are to be of approved types and designs.

(b) Extinguishing medium

- (i) The extinguishing media employed is to be suitable for extinguishing fires in the compartments in which they are intended to be used.
- (ii) The extinguishers required for use in the machinery spaces of cargo ships using oil as fuel are to be of a type discharging foam, carbon dioxide gas, dry powder or other approved media suitable for extinguishing oil fires.

(c) Capacity

- (i) The capacity of required portable fluid extinguishers should not exceed more than 13.5 litres but not less than 9 litres. Other extinguishers are to be at least as portable as the 13.5 litre fluid extinguishers, and should have a fire-extinguishing capability at least equivalent to a 9 litre fluid extinguisher.
- (ii) The following capacities may be taken as equivalents:
 - (1) 9 litre fluid extinguisher (water or foam).
 - (2) 5 kg dry powder.
 - (3) 5 kg carbon dioxide.

(d) Spare charges

A spare charge is to be provided for each required portable fire-extinguisher that can be readily recharged on board. If this cannot be done, duplicate extinguishers are to be provided.

(e) Location

(i) The extinguishers are to be stowed in readily accessible positions and are to be spread as widely as possible and not be grouped.

(ii) One of the portable fire-extinguishers intended for use in any space are to be stowed near the entrance to that space.

(f) Portable fire-extinguishers in accommodation spaces, service spaces and control stations

Accommodation spaces, service spaces and control stations are to be provided with a sufficient number of portable fire-extinguishers to ensure that at least one extinguisher will be readily available for use in every compartment of the crew spaces. In any case, their number are to be not less than three, except where this is impractical for very small ships, in which case one extinguisher is to be available at each deck having accommodation or service spaces, or control stations.

4.6 Fire Fighting Equipment

The fire fighting equipment should comply with the minimum requirements as specified below, regardless of UNRESTRICTED, RESTRICTED or PROTECTED service.

4.6.1 Fire blanket

A fire blanket is to be provided.

4.6.2 Fire-fighter's outfit (which includes an axe)

All cargo ships greater than or equal to 150 GT should carry at least one firefighter's outfit complying with the Requirements of the IMO FSS Code.

4.6.3 Fire control plans

(a) Description of plans

(i) In all cargo ships, general arrangement plans are to be permanently exhibited for the guidance of the ship's officers, using graphical symbols that are in accordance with IMO Resolution A.952(23), which show clearly for each deck the control stations, the various fire sections enclosed by steel or 'A' Class divisions, together with particulars of:

- (1) the fire detection and fire-alarm systems;
- (2) fixed fire-fighting system;
- (3) the fire-extinguishing appliances;
- (4) the means of access to different compartments, decks, etc.;

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- (5) the position of the fireman's outfits;
 - (6) the ventilating system, including particulars of the fan control positions, the position of dampers and identification numbers of the ventilating fans serving each section; and
 - (7) the location and arrangement of the emergency stop for the oil fuel unit pumps and for closing the valves on the pipes from oil fuel tanks.
- (ii) Alternatively, the details required by 4.6.3(a)(i) may be set out in a booklet, a copy of which is to be supplied to each officer, and one copy is at all times to be available on board in an accessible position.
- (iii) The plans and booklets are to be kept up to date, any alterations being recorded thereon as soon as practicable. Description in such plans and booklets are to be in the official language of the Flag State and in the language as shown in the following **Table IX 4-2**. In addition, instructions concerning the maintenance and operation of all the equipment and installations on board for the fighting and containment of fire is to be kept under one cover, readily available in an accessible position.

Table IX 4-2 Language in Fire Control Plan

Service Restrictions	Language
UNRESTRICTED	English
RESTRICTED PROTECTED	Official language(s) of the Administration(s) concerned with the ship's service, or language(s) recognized by such Administration(s) (possibly English) However, description in such plans and booklets for ships engaged in domestic service only may be in the official language of the Flag State only.

- (iv) In all cargo ships greater than or equal to 150 GT, a duplicate set of fire-control plans or a booklet containing such plans are to be permanently stored in a prominently marked weathertight enclosure outside the deckhouse for the assistance of shoreside fire-fighting personnel.

4.7 Additional Fire Safety Measures for tankers

4.7.1 General

The requirements for tankers of SOLAS Chapter II-2 should apply to tankers carrying crude oil and petroleum products, having a flash point not exceeding 60°C, and other liquid products having a similar fire hazard.

4.7.2 Application

(a) The additional requirements for tankers of SOLAS Chapter II-2 should apply to tankers carrying crude oil and petroleum products having a flash point not exceeding 60°C (closed cup test), as determined by an approved flash point apparatus, and a Reid vapour pressure which is below atmospheric pressure, and other liquid products having a similar fire hazard.

(b) Tankers carrying petroleum products having a flashpoint exceeding 60°C (closed cup test), as determined by an approved flashpoint apparatus, should comply with the provisions of 4.7.3.

4.7.3 Cargo area deck protection

(a) At least one mobile foam appliance is to be provided for use on the cargo tank deck including the cargo manifolds. It is to be capable of simple and rapid operation. Where the appliance is of the inductor type it should comply with 4.7.3(b) of the paragraph. Self-contained appliances should have a foam solution capacity of at least 135 litres.

(b) A portable foam applicator unit should consist of an air foam nozzle of an inductor type capable of being connected to the fire main by a fire hose, together with a portable tank containing at least 20 litres of foam-making liquid and one spare tank. The nozzle is to be capable of producing effective foam, suitable for extinguishing an oil fire, at the rate of at least 1.5 m³/min.

(c) The type of foam used is to be suitable for the cargoes to be carried.

4.8 Alternative design and arrangements

4.8.1 Purpose

The purpose of this section should provide a methodology for alternative design and arrangements for fire safety.

4.8.2 General

(a) Fire safety design and arrangements may deviate from 4.2 to 4.7 of this Chapter, provided that the design and arrangements meet the fire safety objectives.

(b) When fire safety design or arrangements deviate from this Chapter, engineering analysis, evaluation and approval of the alternative design and arrangements are to be carried out in accordance with this regulation*.

* Reference can be made to MSC/Circ. 1002 Guidelines on alternative design and arrangements for fire safety

4.8.3 Engineering analysis

(a) The engineering analysis is to be prepared and submitted to the Society, based on the guidelines developed by the International Maritime Organization and should include, as a minimum, the following elements:

(i) determination of the ship type and space(s) concerned;

(ii) identification of requirement(s) with which the ship or the space(s) will not comply;

(iii) identification of the fire and explosion hazards of the ship or the space(s) concerned:

(1) identification of the possible ignition sources;

(2) identification of the fire growth potential of each space concerned;

(3) identification of the smoke and toxic effluent generation potential for each space concerned;

(4) identification of the potential for the spread of fire, smoke or of toxic effluents from the space(s) concerned to other spaces;

(iv) determination of the required fire safety performance criteria for the ship or the space(s) concerned:

(1) performance criteria is to be based on the fire safety objectives and on the functional requirements of this Chapter;

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- (2) performance criteria is to provide a degree of safety not less than that achieved the requirements in 4.2 to 4.7; and
- (3) performance criteria is to be quantifiable and measurable;
- (v) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions; and
- (vi) technical justification demonstrating that the alternative design and arrangements meet the required fire safety performance criteria.

4.8.4 Evaluation of the alternative design and arrangements

- (a) The engineering analysis required in paragraph 4.8.3 is to be evaluated and approved by the Society taking into account the guidelines developed by the International Maritime Organization.
- (b) A copy of the documentation, as approved by the Society, indicating that the alternative design and arrangements comply with this regulation is to be carried onboard the ship.

4.8.5 Re-evaluation due to change of conditions

If the assumptions, and operational restrictions that were stipulated in the alternative design and arrangements are changed, the engineering analysis are to be carried out under the changed condition and are to be approved by the Society.

4.9 Fire extinguishing Recommendations for ships not fitted with propelling machinery

4.9.1 Basic Recommendations

Arrangements for fire protection, detection and extinction in ships not fitted with propelling machinery are to be specially considered in each case and should depend on the size and purpose of the ship and the presence of accommodation spaces, machinery and combustible materials on board.

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PART X REFRIGERATED CARGO INSTALLATIONS

List of major changes in Part X from 2013 edition

4.2.7	Revised	Table X2-2	Revised
9.2.4	Revised		

Rules for the construction and classification of steel ships, 2013 has been partly amended as follows:

Chapter 2 Design Criteria

Table X 2-2 has been amended as follows:

Table X 2-2 Minimum Design Pressures

Refrigerant	Pressure (MPa)	
	High Pressure Side	Low Pressure Side
R22	2.10	1.70
R134a	1.37	1.11
R290	1.85	1.50
R404A	2.53	2.05
R407C	2.40	1.94
R410A	3.52 3.31	2.85 2.99
R507A	2.58	2.09
R600a	0.65	0.53
R717	2.16	1.75
R744	See 2.5.6	

Chapter 4 Refrigeration Plant, Pipes, Valves and Fittings

Paragraph 4.2.7 has been amended as follows:

4.2.7 The dimensions of crankwebs are to be such that Bt^2 is to be not less than given by the following formulae:

0.4d³, for the web adjacent to the bearing

0.75d³, for intermediate webs where a single intermediate web is common to two adjacent crankthrows

Chapter 9 Electrical Installation

Paragraph 9.2.4 has been amended as follows:

9.2.4 Electrical equipment not a certified safe-type is to de-energize automatically if the ammonia concentration within the space exceeds ~~300~~10000 ppm.

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PART XI MATERIALS

List of major changes in Part XI from 2013 edition

9.1	Revised	Table XI 9-3	New
9.3	New	Table XI 9-4	New

Rules for the construction and classification of steel ships, 2013 has been partly amended as follows:

Chapter 9 Stainless Steels and Clad Steels

Paragraph 9.1 has been amended as follows:

9.1 Stainless Steels

9.1.1 The requirements are to apply to rolled products, castings, forgings and pipes in austenitic stainless steels and austenitic/ferrite duplex stainless steel (hereinafter referred to as duplex stainless steel) intended for use in the construction of tanks, pressure vessels and piping systems in ships for low temperature or corrosion - resisting services. These steels may also be used for the construction of machinery and accepted for elevated temperature service in boilers.

9.1.2 Austenitic stainless steel and duplex stainless steel rolled products, pipes, castings and materials for forging are to be manufactured at works or foundries which have been approved by the Society in compliance with the requirements given in 1.2 of this Part.

...

9.1.7 The chemical composition of each grade of austenitic stainless steel and duplex stainless steel are to comply with the requirements given in Table XI 9-1 and Table XI 9-3.

...

9.1.9 The mechanical properties and test requirements for each grade of austenitic stainless steels and duplex stainless steel are to comply with the requirements given in Table XI 9-2 and Table XI 9-4.

...

9.1.11 Where deemed necessary by the Society, an intercrystalline corrosion test in accordance with the appropriate standard may be required in addition to the specified tests referred to 9.3 .

9.1.12 Low temperature service stainless steels

(a) The austenitic stainless steels are generally applicable for low temperature service with design temperature not to be lower than -165°C . Therefore the duplex stainless steels covered by this section may generally be used for the construction of structural members where the design temperature is 0°C to 300°C .

(b) Where applicable design temperature is below -105°C , the austenitic stainless steel is to be subjected to an additional Charpy V impact test required by (c) below.

(c) One set of 3 impact test specimens is to be taken in the frequency same as those of tensile test required in Table XI 9-2. The test temperature is to be -196°C and the average absorbed energy is not to be less than 41J for test specimens taken longitudinally or 27J for test specimens taken transversely. The impact test specimen for duplex stainless steel is also taken the same as austenitic stainless steel and its test temperature is to be -20°C , the average absorbed energy is not to be less than 41J for test specimens taken longitudinally or 27J for test specimens taken transversely.

Table XI 9-3 and Table XI 9-4 have been added after Table XI 9-2:

Table XI 9-3 Chemical Composition of Duplex Stainless Steels

Material Grade (Rolled Stainless steels)	Chemical Composition (%)								
	C	Mn	Si	P	S	Cr	Ni	Mo	Other elements
S329J1	0.08 max.	1.00 max.	1.50 max.	0.040 max.	0.03 max.	23.00~28.00	1.00~3.00	3.00~6.00	---
S329J3L	0.03 max.	1.00 max.	2.00 max.	0.040 max.	0.03 max.	21.00~24.00	2.50~3.50	4.50~6.50	---
S329J4L	0.03 max.	1.00 max.	1.50 max.	0.040 max.	0.03 max.	24.00~26.00	2.50~3.50	5.50~7.50	---

Table XI 9-4 Mechanical Properties and Test Requirements of Duplex Stainless Steels

Material Grade (Rolled Stainless steels)	Tensile Test			Hardness Test			No. of Test Specimens
	Tensile Strength min (N/mm ²)	Yield Stress or 0.2% Proof Stress min. (N/mm ²)	Elongation on $L=5.65\sqrt{A}$ min. (%)	Brinell max. (HBN)	Rockwell C max. (HRC)	Vicker's max. (HV)	
S329J1	590	390	18	277	29	292	1 set from each steel which is of the same charge and is heat treated simultaneously

Paragraph 9.3 has been added after the existing paragraph 9.2:

9.3 Intercrystalline corrosion tests of stainless steel

Intercrystalline corrosion tests of stainless steel are mainly used to evaluate basic corrosion-resisting properties of austenitic and duplex stainless steel products. The corrosion test is to be carried out in compliance with standard ASTM A262 Practice E, or other recognized standards.

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PART XII WELDING

List of major changes in Part XII from 2013 edition

1.3.2 (b)

Revised

Fig. XII 1-1

Revised

Rules for the construction and classification of steel ships, 2013 has been partly amended as follows:

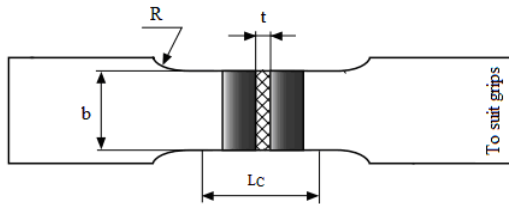
Chapter 1 General

Paragraph 1.3.2(b) has been amended as follows:

1.3.2 Tensile tests

(b) Transverse tensile test specimens for butt weld tests are to be machined to the dimensions shown in Fig. XII 1-1. ~~The upper and lower surfaces of the weld are to be filed, ground or machined flush with the surface of the plate. The thickness of test specimens is to be of full thickness of the test assemblies. Where the thickness exceeds 25 mm, the breadth in way of parallel portion of test specimens may be reduced from 30 mm to 25 mm.~~ The weld is to be filed, machined or ground flush with the surface of the plate.

Fig XII 1-1 has been amended as follows:



Notes :

- t : Thickness of the welded plate, in mm
- b : Equal to 12 mm for $t \leq 2$ mm
25 mm for $t > 2$ mm
- L_c : Width of the weld + 60 mm
- R > 25 mm

Fig. XII 1-1 Dimensions of Transverse Tensile Test Specimens for Butt Weld Test

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PART XIII NAVIGATIONAL SAFETY SYSTEMS

List of major changes in Part XIII from 2013 edition

3.1.4	Deleted	3.1.5~3.1.10	Renumbered
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Rules for the construction and classification of steel ships, 2013 has been partly amended as follows:

Chapter 3 Bridge Working Environment

Paragraph 3.1.4 has been deleted:

~~3.1.4 Noise~~

~~(a) Uncomfortable levels of noise, or noise which may affect safe and efficient bridge operation, is not to occur in the bridge area. Both short and long term effects are to be avoided.~~

~~(b) The noise level produced by bridge equipment is not to interfere with verbal communication, mask audible alarms or be uncomfortable to bridge personnel. (Not exceed 60 dB(A)/1 m)~~

Paragraph 3.1.5, 3.1.6, 3.1.7, 3.1.8, 3.1.9, 3.1.10 have been renumbered as 3.1.4, 3.1.5, 3.1.6, 3.1.7, 3.1.8, 3.1.9, respectively:

3.1.4~~5~~ Lighting

3.1.5~~6~~ Temperature

3.1.6~~7~~ Ventilation

3.1.7~~8~~ Surfaces

3.1.8~~9~~ Colours

3.1.9~~10~~ Safety of personnel

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PART XIV GOAL-BASED SHIP CONSTRUCTION STANDARDS SHIPS

List of major changes in Part XIV from 2013 edition

2.7.11	New	3.2~3.6	Revised
3.1.3	New		

Rules for the construction and classification of steel ships, 2013 has been partly amended as follows:

Chapter 2 Complements to CSR-H

A new paragraph 2.7.11 has been added after the existing paragraph 2.7.10:

2.7.11 The corrosion additions for materials other than carbon-manganese steels, stainless steels, stainless clad steels and aluminium alloys, which are used as ship structures, are to be considered by this Society on a case-by-case basis.

Chapter 3 Human Element Considerations

A new paragraph 3.1.3 has been added after the existing paragraph 3.1.2:

3.1.3 Where ILO MLC Title 3 Standard A3.1 is required in this Chapter for lighting, ventilation, noise and vibration, reference can be made to IACS/ Rev.0 2013 "MLC, 2006".

Paragraph 3.2~3.6 have been amended as follows:

3.2 Permanent Means of Access

3.2.1 Stairs, vertical ladders, ramps, walkways and work platforms used for permanent means of access and/or for inspection and maintenance operations are to comply with the following provisions.

(a) Chapter 13 and 28 of Part II of these Rules.

...

...

(j) IACS Rec. 132.

3.3 Lighting

3.3.1 The lighting requirements are to comply with the following provisions.

(a) Part VII of these Rules.

...

...

(d) IACS Rec. 132.

3.4 Ventilation

3.4.1 The ventilation requirements are to comply with the following provisions.

(a) Part VII and IX of these Rules.

...

...

(f) IACS Rec. 132.

3.5 Noise and Vibration

3.5.1 The noise and vibration requirements are to comply with the following provisions.

(a) 1.6.11 of the Part IV of these Rules: Protection against noise.

...

...

(h) IACS Rec. 132.

3.6 Emergency Egress

3.6.1 The emergency egress requirements are to comply with the following provisions.

(a) 19.5.3, 19.5.10 and 27.1.3 of Part II of these Rules.

...

...

(e) IACS Rec. 132.