

# RULES

## FOR THE CLASSIFICATION AND CONSTRUCTION OF SEA-GOING SHIPS

ND No. 2-020101-174-E

### RULE CHANGE NOTICE

ENTERS INTO FORCE:

01.01.2024



St. Petersburg  
2023

# **RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF SEA-GOING SHIPS**

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The present Rule Change Notice to the Rules for the Classification and Construction of Sea-Going Ships (hereinafter — RCN) has been approved in accordance with the established approval procedure and contains information on amendments and additions, except for editorial amendments. RCN amendments come into force on 1 January 2024.

**REVISION HISTORY**

**PART I. CLASSIFICATION**

Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 2.2.5.5</a> (new)	Ships to be accepted to the RS class from the class of ACS-IACS member Permissible navigation conditions other than those meeting the RS requirements	New para has been introduced containing description of distinguishing mark for special restricted area of navigation <b>R(special)</b> that may be assigned to the ships to be accepted to the RS class from the class of ACS-IACS member and for which, at the shipowner's discretion, it is necessary to retain the permissible navigation conditions established by the ACS-IACS member and differing from those meeting the RS requirements	

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Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<p><a href="#">Para 2.2.57</a> (new)</p>	<p>Ships</p> <p>Technical documentation</p> <p>Hull scantlings check as well as hull longitudinal strength check and buckling check</p> <p>Check of hull structures according to the Common Structural Rules for Bulk Carriers and Oil Tankers</p> <p>Rudder strength check</p> <p>Check of type C tank structures (for LG carriers)</p>	<p>New para has been introduced containing a description of distinguishing marks <b>ODYSS(Hull)</b>, <b>ODYSS(Rudder)</b>, <b>ODYSS(Tank C)</b> and the possibility of their combination, e.g. <b>ODYSS(Hull, Rudder)</b>.</p> <p>New distinguishing marks are assigned when the Register performs appropriate checks using software developed by the Register</p>	<p>Information on the software developed by the Register is available on the RS website in the Section "Services/Ships under construction/Software for verification of ship structures" (<a href="https://rs-class.org/en/services/program1/">https://rs-class.org/en/services/program1/</a>)</p>
<p><a href="#">Table 2.5, item 1.4</a></p>	<p>Ships to be accepted to the RS class from the class of ACS-IACS member</p> <p>Permissible navigation conditions other than those meeting the RS requirements</p>	<p>New distinguishing mark for special restricted area of navigation <b>R(special)</b> has been introduced</p>	<p>Refer to. 2.2.5.5 of this Part</p>
<p><a href="#">Table 2.5, item 2.33</a> (new)</p>	<p>Ships</p> <p>Technical documentation</p> <p>Hull scantlings check as well as hull longitudinal strength check and buckling check</p> <p>Check of hull structures according to the Common Structural Rules for Bulk Carriers and Oil Tankers</p> <p>Rudder strength check</p> <p>Check of type C tank structures (for LG carriers)</p>	<p>New item 2.33 has been introduced containing requirements for assignment of distinguishing marks <b>ODYSS(Hull)</b>, <b>ODYSS(Rudder)</b> and <b>ODYSS(Tank C)</b>.</p> <p>New distinguishing marks are assigned when the Register performs appropriate checks using software developed by the Register</p>	<p>Information on the software developed by the Register is available on the RS website in the Section "Services/Ships under construction/Software for verification of ship structures" (<a href="https://rs-class.org/en/services/program1/">https://rs-class.org/en/services/program1/</a>)</p>

Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 3.2.2.1</a> , Remark (new)	Ships Technical documentation Determination of scantlings of the hull members as well as longitudinal strength and buckling calculations	New remark has been introduced containing requirements for the scope of information to be included in the project file created using software developed by the Register	

**PART II. HULL**

Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Paras 1.1.1.1</a>	Ships Application of the Rules for the Classification and Construction of Sea Going Ships	Limitations on the possible application of Part II "Hull" of the Rules for the Classification and Construction of Sea Going Ships depending on the ship's portions have been deleted	
<a href="#">Para 1.2.1</a>	Ships Steel grade selection	Requirements regarding the possibility of using for hull structures steels not fully complying with the RS requirements have been specified	
<a href="#">Para 1.4.1.1</a>	Ships Application of the Rules for the Classification and Construction of Sea Going Ships	Reference to para 1.1.1.1 has been deleted	

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Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 1.4.1.2.1</a>	Ships Application of the Rules for the Classification and Construction of Sea Going Ships	Reference to Table 1.1.1.1 has been deleted	
<a href="#">Formula (1.4.6.9-2)</a>	Ships Application of the Rules for the Classification and Construction of Sea Going Ships	Reference to Table 1.1.1.1 has been deleted from the formula explication	
<a href="#">Para 3.3.1.6</a> (deleted)	Bulk carriers, combination carriers and self-unloading bulk carriers Distinguishing mark for Enhanced Survey Programme ( <b>ESP</b> )	Duplicate description of distinguishing mark for enhanced survey programme given in Part I "Classification" of the Rules for the Classification and Construction of Sea-Going Ships has been deleted	Refer to 2.2 of Part I "General Provisions" of the Rules for the Classification Surveys of Ships in Service
<a href="#">Para 3.4.1.4</a> (deleted)	Ore carriers and combination carriers Distinguishing mark for Enhanced Survey Programme ( <b>ESP</b> )	Duplicate description of distinguishing mark for enhanced survey programme given in Part I "Classification" of the Rules for the Classification and Construction of Sea-Going Ships has been deleted	Refer to 2.2 of Part I "General Provisions" of the Rules for the Classification Surveys of Ships in Service
<a href="#">Para 3.5.1.2</a> (deleted)	Oil tankers and chemical tankers Distinguishing mark for Enhanced Survey Programme ( <b>ESP</b> )	Duplicate description of distinguishing mark for enhanced survey programme given in Part I "Classification" of the Rules for the Classification and Construction of Sea-Going Ships has been deleted	Refer to 2.2 of Part I "General Provisions" of the Rules for the Classification Surveys of Ships in Service

**PART III. EQUIPMENT, ARRANGEMENTS AND OUTFIT**

Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 8.5.1.1</a>	Ships Marking of escape routes	Requirements for marking of escape routes have been amended and a reference to the resolution regulating the execution of graphical symbols has been made	Resolutions A.760(18) and A.1116(30)
Paras <a href="#">9.2.1 — 9.2.3</a> , <a href="#">9.2.5, 9.2.8 — 9.2.10</a> , <a href="#">9.3.1</a> and <a href="#">9.3.2</a>	Ships Emergency outfit	Requirements for emergency outfit have been replaced with recommendations	
<a href="#">Chapter 9.4</a> (deleted)	Ships Emergency outfit	Requirements for emergency outfit marking have been deleted	
<a href="#">Chapter 9.5</a> (renumbered)	Ships Emergency outfit	Chapter 9.5 has been renumbered 9.4	

**PART IV. STABILITY**

Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Table 2.1.4.1</a>	Ships of restricted area of navigation <b>R1, R2, R2-RSN, R2-RSN(4,5), R3-RSN</b> Stability criteria Wind pressure and wind gustiness addition	Necessity to apply the requirements established for ships of unrestricted area of navigation has been excluded	

Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 2.2.4</a> (deleted)	Ships Stability criteria Righting lever curve	Requirements for allowable angle of down-flooding have been deleted	2008 IS Code

**PART V. SUBDIVISION**

Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 2.1.2</a>	Passenger ships Cargo ships having the length $L_1 \geq 80$ m, except for type "A" ships and type "B" ships with reduced freeboard not intended for the carriage of deck cargo, oil tankers, chemical tankers, gas carriers, ships intended for the carriage of radioactive agents Probability estimation of subdivision	Reference to IMO resolution has been replaced by the reference to the Guidelines on the Application of Provisions of Chapter II-1 of SOLAS-74	IMO resolution MSC.429(98)/Rev.2
<a href="#">Para 3.3.4</a>	Ships except chemical tankers and supply vessels Damage stability criteria Openings and covers	Hinged watertight doors have been deleted from para 3.3.4.4. New para 3.3.4.5 with regard to hinged watertight doors has been introduced. Existing para 3.3.4.5 has been renumbered 3.3.4.6	



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Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Paras 3.4.11.3 — 3.4.11.5</a> (deleted)	Bulk carriers Combination carriers Ore carriers Cargo holds Flooding detection sensors	Requirements for location of flooding detection sensors have been transferred to 7.6.15 of Part VIII "Systems and Piping". Requirements for the Flooding Detection System Manual have been transferred to 7.10.9 of Part XI "Electrical Equipment"	
<a href="#">Para 3.4.13</a> (deleted)	Single hold cargo ships, except for bulk carriers, ore carriers, combination carriers and tankers Cargo holds Flooding detection sensors	Requirements for location of flooding detection sensors have been transferred to 7.6.15 of Part VIII "Systems and Piping". Requirements for the Flooding Detection System Manual have been transferred to 7.10.9 of Part XI "Electrical Equipment". Paras 3.4.14, 3.4.14.1 — 3.4.14.5 and references thereto are renumbered 3.4.13, 3.4.13.1 — 3.4.13.5 accordingly	

**PART VIII. SYSTEMS AND PIPING**

Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 1.1.4</a>	Ships Application	Requirements have been specified regarding the coastal infrastructure serving the ship	
<a href="#">Para 1.4.7</a> (new)	Ships Piping of ship's systems	New requirements have been introduced for protection of pipelines of all ship's systems against resonance including vibration load calculation standards, vibration monitoring standards, as well construction measures on protection against resonance and excessive stresses from vibration	
<a href="#">Table 2.3.1-1</a>	Ships Metal piping Corrosion addition for steel pipes	Requirement has been specified regarding corrosion addition for steel pipes for new working medium	
<a href="#">Para 5.1.2</a>	Cargo and passenger ships Piping laying Shut-down valves	Requirements have been specified regarding shut-down valves of the pipe dealing with liquid that is piercing the collision bulkhead of the cargo and passenger ships	IMO resolution MSC.474(102)

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Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 7.6.15</a>	Cargo ships Holds Water level detectors	New requirements have been introduced for positioning the water level detectors on the multiple-hold cargo ships. From paras 3.4.11.3, 3.4.13.2 — 3.4.13.4, Part V "Subdivision" the requirements for positioning the water level detectors on the single-hold cargo ship have been transferred	IMO resolution MSC.482(103)
<a href="#">Para 11.3.2.9</a>	Exhaust gas system System for reducing NO <sub>x</sub> emissions Plastic reductant tanks	Requirements for volume of plastic tanks and requirements for application of plastic integral reductant tanks without restrictions on volume have been specified	IACS UR M77 (Rev.4 Feb 2023)
<a href="#">Para 12.2.4</a>	Oil tankers and combination carriers carrying petroleum products with flash point 60 °C and more, passenger ships carrying no more than 36 passengers, special purpose ships carrying no more than 240 persons and berth-connected ships Ventilation system Galley ventilation ducts	Requirement has been specified regarding fitting of the fire damper in galley ventilation ducts passing through accommodation spaces or other spaces containing combustible materials	IMO resolution MSC.365(93)

**PART IX. MACHINERY**

Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Table 4.2.2.7.1.9-1</a>	Gearings	The reference to the applicable ISO standard has been corrected	UR IACS M56 (Rev.4 Corr.2 Mar 2023)

**PART XI. ELECTRICAL EQUIPMENT**

Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 7.3.1.7</a>	Multiple-hold cargo ships, other than bulkers, ore carriers, combination carriers and tankers Cargo holds Water level detectors	Scope of application of the Chapter has been expanded	IMO Resolution MSC.482(103)
<a href="#">Para 7.10.1</a>	Multiple-hold cargo ships, other than bulkers, ore carriers, combination carriers and tankers Cargo holds Water level detectors	Scope of application of the Chapter has been expanded	
<a href="#">Para 7.10.2</a>	Single-hold cargo ships Multiple-hold cargo ships other than tankers Bulkers Passenger ships carrying 36 persons and more Cargo holds Water level detectors	Reference to Part V "Subdivision" has been replaced by reference to Part VIII "Systems and piping"	

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Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 7.10.3</a>	Single-hold cargo ships Multiple-hold cargo ships other than tankers Bulkers Passenger ships carrying 36 persons and more Cargo holds Water level detectors	Reference to Part V "Subdivision" has been replaced by reference to Part VIII "Systems and piping"	
<a href="#">Para 7.10.9</a> (new)	Single-hold cargo ships Multiple-hold cargo ships other than tankers Bulkers Passenger ships carrying 36 persons and more Cargo holds Water level detectors	Requirements for the Fooding Detection System Manual have been introduced	Part V "Subdivision" of the Rules for the Classification and Construction of Sea-Going Ships
<a href="#">Para 20.1.2.1.3</a>	Passenger ships Emergency sources of electrical power Radio equipment and navigational equipment	Reference to the Guidelines on the Application of Provisions of Chapter IV of the International Convention for the Safety of Life at Sea (SOLAS-74) and the Guidelines on the Application of Provisions of Chapter V of the International Convention for the Safety of Life at Sea (SOLAS-74) has been added	

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Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 20.1.2.7.6</a> (deleted)	Passenger ships Emergency sources of electrical power Ship's security alarm system, AIS installation	Requirements for the supply of ship's security alarm and AIS installation from transitional emergency source of power have been deleted	
<a href="#">Para 20.1.2.7</a>	Passenger ships Emergency sources of electrical power Services supplied from transitional emergency source of power	References to paras have been renumbered in the last paragraph	

**PART XIII MATERIALS**

Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 2.5.1</a>	Ships Construction Materials/coatings	For the purpose of a more exact application of the Rules, terminology and requirements for testing of anticorrosive properties in accordance with ISO 12944-6	
<a href="#">Chapter 3.4</a>	Ships Construction Materials/steel pipes and tubes	The Chapter has been completely revised; requirements for technical supervision of steel pipes and tubes of ship systems have been added	

Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 2.5.1</a>	Ships Construction Materials/coatings	For the purpose of a more exact application of the Rules, terminology and requirements for testing of anticorrosive properties in accordance with ISO 12944-6	
<a href="#">Para 3.16.1.8</a>	Ships Construction Materials/steel pipes and tubes	References to paras of Chapter 3.4 have been amended	

**PART XIV. WELDING**

Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 2.1.12</a>	Ships Metal structures Underwater welding Welding of structures having their back side in contact with water	Reference to new Chapter 2.14 containing the requirements for underwater welding and welding of structures having their back side in contact with water has been introduced	

Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Chapter 2.14</a> (new Chapter)	Ships Metal structures Underwater welding Welding of structures having their back side in contact with water	New Chapter has been introduced containing the requirements for: welders' certification, welding consumables, approval of welding procedures, assessment of quality and non-destructive testing of welds	
<a href="#">Para 3.1.2.3</a>	Ships Construction and service Welding/welds testing	The scope of application of the requirements for NDT operators for welds has been expanded to ship repair companies considering the experience of technical supervision and proposals of the surveyors. Provisions of para 3.2 of IACS unified requirement (UR) W33 have been adapted considering the experience in practical activity, but not departing from the meaning of the source text	
<a href="#">Para 4.1.8.1</a>	Ships Construction Welding/welding consumables	Special cases of approval of welding consumables produced by different manufacturers, for example, for a combination "wire — flux", have been supplemented	



Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 4.1.8.9</a>	Ships Construction Welding/welding consumables	New para regulating the procedure for approval of welding consumables produced by different manufactures has been introduced	

**PART XVII. DISTINGUISHING MARKS AND DESCRIPTIVE NOTATIONS IN THE CLASS NOTATION SPECIFYING STRUCTURAL AND OPERATIONAL PARTICULARS OF SHIPS**

Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 1.2.16.1</a>	Polar class ships Hull supporting structures for azimuth thrusters	Requirements have been introduced regarding determination of scantlings of hull supporting structures subject to ice loads from azimuth thrusters	
<a href="#">Para 1.2.16.2</a>	Polar class ships Hull structures	Heading has been introduced	
<a href="#">Para 1.3.5.2</a>	Polar class ships Azimuth thrusters	Reference to the requirements of Section 6 of the Rules for Active Means of Polar Class Ship's Steering that shall be taken into account when designing azimuth thrusters has been introduced	

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Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 7.10.1.1</a>	All ships Distinguishing mark <b>WINTERIZATION(DAT)</b> Cables	Reference to IEC standard 60068-2-1 has been replaced by the reference to 10.7.14.9 of Part IV "Technical Supervision during Manufacture of Products" of the Rules TSDCS which contain the requirements for methodology of test for cold endurance	
<a href="#">Para 9.1.4.23</a> (new)	Ships equipped for using gases or low-flashpoint fuels Technical documentation	New para containing requirements for submission of the Fuel Handling Manual to the Register has been introduced	
<a href="#">Para 9.3.1.14</a>	Ships equipped for using gases or low-flashpoint fuels Spaces that shall be provided with pressure relief systems	Requirements have been specified for spaces that shall be provided with pressure relief systems in connection with coming into force of amendments to regulation 6.7.1.1 of the IGF Code	IMO resolution MSC.475(102)
<a href="#">Para 9.7.2.5</a>	Ships equipped for using gases or low-flashpoint fuels Spaces containing equipment for the fuel preparation	Requirements have been specified for fire protection of spaces containing equipment for the fuel preparation	IACS UI GF13 (Rev.1 May 2023)
<a href="#">Para 9.12.5</a>	Ships equipped for using gases or low-flashpoint fuels Technical documentation	Requirements have been introduced for availability on board and content of the Fuel Handling Manual	

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Paras/Chapters/Sections	Item(s)/Type(s) of supervision and their particulars	Information on amendments	Remarks/References
<a href="#">Para 18.1.1</a>	All ships Distinguishing mark <b>COMF(C)</b> Ship's spaces	Provisions have been introduced determining ships' spaces covered by the indoor climate requirements of Chapter 18.1	
<a href="#">Para 18.1.4.2.1</a>	All ships Distinguishing mark <b>COMF(C)</b> Ship's spaces	Requirements have been introduced for the range of temperatures in ships' spaces at an outside temperature from 15 °C to 40 °C	
<a href="#">Para 26.2.1.1</a>	Sea coastal ships Distinguishing mark <b>RN(SCI)</b> or <b>RN(SCII)</b> Hull	Ship's proportion criterion has been deleted for the purpose of 26.2.1	
<a href="#">Table 26.2.1.1</a> (deleted)	Sea coastal ships Distinguishing mark <b>RN(SCI)</b> or <b>RN(SCII)</b> Hull	Table has been deleted	
<a href="#">Para 26.2.2.2.3.7.3</a> (new)	Sea coastal ships Distinguishing mark <b>RN(SCI)</b> or <b>RN(SCII)</b> Anchor arrangement	New para has been introduced containing requirements in respect of application of anchor chain with a diameter determined in accordance with the requirements for ships of restricted area of navigation <b>R3-RSN</b>	

## PART I. CLASSIFICATION

### 2 CLASS OF A SHIP

#### 2.2 CLASS NOTATION OF A SHIP. MANDATORY AND OPTIONAL DISTINGUISHING MARKS AND DESCRIPTIVE NOTATIONS IN THE CLASS NOTATION ASSIGNED BY RUSSIAN MARITIME REGISTER OF SHIPPING

**New para 2.2.5.5** is introduced reading as follows:

"**2.2.5.5** For ships to be accepted to the RS class from the class of ACS-IACS member, and for which, at the shipowner's discretion, it is necessary to retain the permissible navigation conditions established by the ACS-IACS member and differing from those specified in 2.2.5.1, 2.2.5.3 and 2.2.5.4, the distinguishing mark for special restricted area of navigation **R(special)** may be added to the character of classification with indication in the Classification Certificate and in the Seaworthiness Certificate (if issued on behalf of the Flag State MA) of appropriate restrictions on the wind and wave conditions, the distance from the places of refuge, the permissible distance between the places of refuge, the seasons, etc."

**New para 2.2.57** is introduced reading as follows:

**"2.2.57 Distinguishing marks confirming the use of the Register software:**

**.1 ODYSS(Hull)** is a distinguishing mark that may be added to the character of classification of ships for which the Register software is used to check the hull structures for compliance with the requirements of the RS rules;

**.2 ODYSS(Rudder)** is a distinguishing mark that may be added to the character of classification of ships for which the Register software is used to check rudder strength for compliance with the requirements of the RS rules;

**.3 ODYSS(Tank C)** is a distinguishing mark that may be added to the character of classification of LG carriers for which the Register software is used to check the type C tank structures for compliance with the requirements of the RS rules;**.4** when the check for a ship is made using several Register software mentioned above, the marks in brackets may be combined, for example, **ODYSS(Hull, Rudder)**.

**Note.** The distinguishing marks stated above may be assigned provided the project file (file with the extension \*.ody — for **ODYSS(Hull)**, \*.odyr — for **ODYSS(Rudder)**, \*.odyt — for **ODYSS(Tank C)**) created in the Register software and containing appropriate input data, calculations, etc. is submitted as part of the technical documentation, taking into account 12.4 of Part II "Technical Documentation" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships). The results of calculations performed using the Register software shall be taken into account at the technical documentation review."

**2.5 SUMMARY INFORMATION ON DISTINGUISHING MARKS AND DESCRIPTIVE NOTATIONS IN THE CLASS NOTATION OF A SHIP**

**Table 2.5.** In item 1.4 before the distinguishing marks (**Zone 1 – Zone 4**) for restricted areas of navigation for inland navigation ships, new distinguishing mark **R(special)** is introduced reading as follows:

Distinguishing mark	Brief description	References to additional RS requirements for the distinguishing mark
<b>R(special)</b>	The distinguishing mark is assigned to ships to be accepted to the RS class from the class of ACS-IACS member, and for which, at the shipowner's discretion, it is necessary to retain the permissible navigation conditions established by the ACS-IACS member and differing from those specified in 2.2.5.1, 2.2.5.3 and 2.2.5.4. Appropriate restrictions on the wind and wave conditions, the distance from the places of refuge, the permissible distance between the places of refuge, the seasons, etc. are indicated in the Classification Certificate and in the Seaworthiness Certificate (if issued on behalf of the Flag State MA)	<b>Rules for the Classification and Construction of Sea-Going Ships</b> Part I "Classification", 2.2.5.5

**Table 2.5. New item 2.33** is introduced reading as follows:

**"2.33 ODYSS() — distinguishing marks confirming the use of the Register software**

Distinguishing mark	Brief description	Reference to RS requirements for the distinguishing mark
<b>2.33.1 Distinguishing mark confirming the use of the Register software for checking the hull structures compliance with the requirements of the RS rules</b>		
<b>ODYSS(Hull)</b>	The distinguishing mark is assigned to ships, whose hull structures are checked with the use of the Register software ( <a href="https://rs-class.org/en/services/program1/">https://rs-class.org/en/services/program1/</a> )	<b>Rules for the Classification and Construction of Sea-Going Ships</b> Part I "Classification", 2.2.57 <b>The software can be used to verify compliance with the requirements of the following normative documents (as applicable):</b> <b>Rules for the Classification and Construction of Sea-Going Ships</b> Part II "Hull" Part III "Equipment, Arrangements and Outfit", 2.4, 4.3, 5.3 Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships", Sections 1, 6, 10, 15, 19 Part XVIII "Additional Requirements for Structures of Container Ships and Ships, Dedicated Primary to Carry Their

Distinguishing mark	Brief description	Reference to RS requirements for the distinguishing mark
		Load in Containers", Section S11A "Longitudinal Strength Standard for Container Ships" <b>IACS Unified Requirement S6</b> <b>Guidelines on Fatigue Assessment of Ships</b> <b>Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk</b> <b>Common Structural Rules for Bulk Carriers and Oil Tankers</b>
<b>2.33.2 Distinguishing mark confirming the use of the Register software for checking the rudder strength compliance with the requirements of the RS rules</b>		
<b>ODYSS(Rudder)</b>	The distinguishing mark is assigned to ships, whose rudder strength is checked with the use of the Register software ( <a href="https://rs-class.org/en/services/program1/">https://rs-class.org/en/services/program1/</a> )	<b>Rules for the Classification and Construction of Sea-Going Ships</b> Part I "Classification", 2.2.57 <b>The software can be used to verify compliance with the requirements of the following normative documents (as applicable):</b> <b>Rules for the Classification and Construction of Sea-Going Ships</b> Part III "Equipment, Arrangements and Outfit", Section 2 <b>IACS Unified Requirement S10</b>
<b>2.33.3 Distinguishing mark confirming the use of the Register software for checking the type C tank structures compliance with the requirements of the RS rules</b>		
<b>ODYSS(Tank C)</b>	The distinguishing mark is assigned to LG carriers, whose type C tank structures are checked with the use of the Register software ( <a href="https://rs-class.org/en/services/program1/">https://rs-class.org/en/services/program1/</a> )	<b>Rules for the Classification and Construction of Sea-Going Ships</b> Part I "Classification", 2.2.57 <b>The software can be used to verify compliance with the requirements of the following normative documents (as applicable):</b> <b>Rules for the Classification and Construction of Sea-Going Ships</b> Part X "Boilers, Heat Exchangers and Pressure Vessels", Section 2 <b>Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk</b> Part II "Ship Arrangement", Section 2 2 Part IV "Cargo Containment", 23.2.1, 23.2.3, 23.3, 28.1, 28.2

### 3 TECHNICAL DOCUMENTATION

#### 3.2 DESIGN DOCUMENTATION

**Para 3.2.2.1. In column "Remark"** new remark is introduced reading as follows:

"Where the Register software is used for checking the hull structures compliance with the requirements of the RS rules, the scope of information included in the project file (file with the extension \*.ody) shall comply with the requirements of 12.4 of Part II "Technical Documentation" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships."

## PART II. HULL

### 1 DESIGN PRINCIPLES

#### 1.1 GENERAL

Para 1.1.1.1 is replaced by the following text:

"1.1.1.1 Unless provided otherwise, requirements of this Part of the Rules for the Classification and Construction of Sea-Going Ships<sup>1</sup> apply to steel ships of welded construction, from 12 to 350 m in length whose proportions are taken within the limits given in Table 1.1.1.1.

Table 1.1.1.1

Proportion of ship	Area of navigation						
	Unrestricted	R1	R2	R2-RSN	R2-RSN(4,5)	R3-RSN	R3
<i>L/D</i>	18	19	20	21	21	22	23
<i>B/D</i>	2,5	2,5 <sup>1</sup>	3 <sup>2</sup>	3	3	3	4 <sup>3</sup>
<sup>1</sup> For vessels of dredging fleet, not more than 3. <sup>2</sup> For vessels of dredging fleet, not more than 4. <sup>3</sup> For floating cranes, not less than 4,5.							

The requirements of this Part (except for 3.10) do not apply to double hull oil tankers of 150 m in length and above and to bulk carriers of 90 m in length and above, contracted for construction on or after 1 July 2015. The scantlings of hull members, essential to the strength of hull and the construction of the said ships are regulated by the Common Structural Rules for Bulk Carriers and Oil Tankers<sup>2</sup>.

<sup>1</sup> Hereinafter referred to as "these Rules".

<sup>2</sup> Hereinafter referred to as "the Common Structural Rules".

#### 1.2 MATERIALS

Para 1.2.1 is replaced by the following text:

##### "1.2.1 General.

The materials used for hull structures regulated by this Part shall comply with the requirements of Part XIII "Materials".

The possibility of using steels not fully complying with the requirements of Part XIII "Materials" for some structures not involved in the longitudinal strength, shall be determined by the Register in accordance with 3.1.4 of Part XIII "Materials".

#### 1.4 LONGITUDINAL STRENGTH

Para 1.4.1.1 is replaced by the following text:

"1.4.1.1 The requirements of this Chapter apply to ships of unrestricted service and of restricted areas of navigation **R1** and **R2**, 65 m in length and upwards, as well as to ships of restricted areas of navigation **R2-RSN**, **R2-RSN(4,5)**, **R3-RSN** and **R3**, 60 m in length and upwards, whose proportions are stated in 1.1.1.1.

Ships with large deck openings and vessels of dredging fleet shall comply additionally with the requirements of 3.1 and 3.6 respectively.

The requirements of this Chapter do not apply to container ships and ships dedicated primarily to carry their load in containers, both with a length  $L$  of 90 m and greater and operated in unrestricted service.

When assessing the longitudinal strength of these ship types, the requirements of Part XVIII "Additional Requirements for Structures of Container Ships and Ships Dedicated Primarily to Carry their Load in Containers" shall be applied."

**Para 1.4.1.2.1** is replaced by the following text:

"**1** proportion  
 $L/B \leq 5$ ;  
 $B/D \geq 2,5$  (for ships of restricted areas of navigation **R2**, **R2-RSN**, **R2-RSN(4,5)**, **R3-RSN** and **R3** the ratio  $B/D \geq 4,0$  is obtained from Table 1.1.1.1);"

**Formula (1.4.6.9-2)** is replaced by the following one:

$$\varphi_0 = \varphi \eta \frac{18}{L/D} \quad (1.4.6.9-2)$$

where for  $\varphi$ , refer to Table 1.4.4.3;  
 for  $\eta$ , refer to 1.1.4.3;  
 ~~$(L/D)_{\max}$  = maximum permissible value of  $L/D$  for the area of navigation under consideration, obtained from Table 1.1.1.1."~~

### 3 REQUIREMENTS FOR STRUCTURES OF SHIPS OF SPECIAL DESIGN

#### 3.3 BULK CARRIERS AND OIL OR BULK DRY CARGO CARRIERS

**Paras 3.3.1.6, 3.3.1.6.1, 3.3.1.6.2 and 3.3.1.6.3** as well as references thereto are deleted.

#### 3.4 BULK CARRIERS AND OIL OR BULK DRY CARGO CARRIERS

**Paras 3.4.1.4, 3.4.1.4.1, 3.4.1.4.2 and 3.4.1.4.3** as well as references thereto are deleted.

#### 3.5 TANKERS

**Paras 3.5.1.2, 3.5.1.2.1 and 3.5.1.2.2** as well as references thereto are deleted.

### PART III. EQUIPMENT, ARRANGEMENTS AND OUTFIT

#### 8 ARRANGEMENT AND EQUIPMENT OF SHIP'S SPACES. OTHER ARRANGEMENTS AND EQUIPMENT

**Para 8.5.1.1** is replaced by the following text:

**8.5.1.1** Location and arrangement of exits, doors, corridors, stairways and vertical ladders shall ensure the possibility of quick, safe and free access from spaces to the embarkation stations of lifeboats and liferafts.

~~Additional means for outdoor escape shall be clearly marked, where necessary, to ensure accessibility, and be provided with a proper design to be used in emergency.~~

Escape routes, emergency exits, assembly stations shall be marked.



For escape routes marking, as well as on safety plans, graphical symbols shall be used in accordance with the recommendations of resolution A.760(18), as amended by resolution A.1116(30)."

## 9 EMERGENCY OUTFIT

**Para 9.2.1** is replaced by the following text:

**"9.2.1** ~~All ships~~ It is recommended that emergency outfit of ships, except those specified in 9.2.4 and 9.2.6, shall have emergency outfit be provided in the scope not less than listed in Table 9.2.1.

~~For the unmanned non-self-propelled ships, no emergency outfit is required no recommendations were made in respect of emergency outfit. The manned non-self-propelled ships shall be supplied with the emergency outfit~~ It is recommended that emergency outfit for manned non-self-propelled ships be provided in accordance with 9.2.10 ~~like floating docks with no permanent direct communication with the shore like for floating docks with no permanent direct communication with the shore.~~"

**Table 9.2.1** remains unamended.

**Para 9.2.2** is replaced by the following text:

**"9.2.2** Additional set of emergency outfit, above that listed in Table 9.2.1, ~~shall~~ may be provided:

in accordance with Table 9.2.2-1 for passenger and special purpose ships, of 70 m in length and over, except for fiber-reinforced plastic ships;

in accordance with Table 9.2.2-2 for fiber reinforced plastic ships."

**Tables 9.2.2-1** and **9.2.2-2** remain unamended.

**Para 9.2.3** is replaced by the following text:

**"9.2.3** The sets of rigging and fitter's tools specified in Table 9.2.1 ~~shall~~ may be completed according to Table 9.2.3."

**Table 9.2.3** remains unamended.

**Para 9.2.5** is replaced by the following text:

**"9.2.5** For **Arc5**, **Arc6**, **Arc7**, **Arc8** and **Arc9** ice class ships, equipment with emergency outfit and materials ~~shall be~~ are established as for the nearest higher group of ship's division according to their length as per Table 9.2.1."

**Paras 9.2.8 — 9.2.10** are replaced by the following text:

**"9.2.8** ~~The~~ It is recommended that the tugs of restricted area of navigation **R3** ~~need not be equipped with emergency outfit, except~~ be provided with the sets of rigging and fitter's tools ~~required in accordance with~~ taking into account Table 9.2.3.

**9.2.9** ~~For~~ It is recommended that for tugs of unrestricted service and restricted area of navigation **R1** with ice class **Arc5** and higher category equipment with emergency outfit and materials ~~shall be~~ established as for the nearest higher group according to Table 9.2.1.

**9.2.10** The floating docks which are not in permanent direct communication with the shore ~~shall~~ may have emergency outfit as indicated under items 5, 6, 19 — 26, 32 — 34 and 37 of Table 9.2.1, length of the floating dock  $L$  being taken in this case instead of the ship's length  $L$ .

The floating docks which are in permanent direct communication with the shore need not be provided with emergency outfit."

**Paras 9.3.1 and 9.3.2** are replaced by the following text:

**"9.3.1** The emergency outfit indicated in 9.2 ~~shall be is~~ stored at least in two emergency stations, one of which shall be situated in the machinery space. Emergency stations may be special spaces, boxes or places allocated on the deck or in spaces.

~~In the emergency station of the machinery space the~~ The outfit necessary for carrying out the emergency operations inside the machinery space shall be is stored in the emergency station of that machinery space; the rest of the emergency outfit ~~shall generally be is~~ stored in the emergency stations located above the bulkhead deck; in ships of less than 45 m in length it is allowed to locate the emergency station below the bulkhead deck on condition that free access to this station is provided at all times.

In ships of 31 m in length and below it is allowed to store the emergency outfit only in one emergency station.

**9.3.2** ~~A~~ It is recommended that a free passage shall be provided in front of the emergency station; the passage width ~~shall be is~~ selected depending on the overall dimensions of the outfit stored in the station but not less than 1,2 m. In ships of less than 70 m in length the passage width is allowed to be reduced to 0,8 m and in ships of 31 m in length and below to 0,6 m.

The passages to the emergency stations shall be as straight and short as practicable."

**Chapter 9.4** is deleted. **Chapter 9.5** is renumbered **9.4**.

## PART IV. STABILITY

### 2 GENERAL REQUIREMENTS FOR STABILITY

#### 2.1 WEATHER CRITERION

**Table 2.1.4.1** is replaced by the following one:

"Table 2.1.4.1

Area of navigation	Assumed wind pressure $p_v$ , in Pa	Wind gustiness addition $m$
Unrestricted	504	0,5
Restricted <b>R1</b>	353	0,5
Restricted <b>R2</b>	252	0,52
Restricted <b>R2-RSN</b>	252	0,52
Restricted <b>R2-RSN(4,5)</b>	166	0,54
Restricted <b>R3-RSN</b>	119	0,55

**Note.** If the ship of restricted area of navigation is covered by the International Code on Intact Stability (2008 IS Code), assumed wind pressure and wind gustiness addition shall be taken equal to that for the ship of unrestricted area of navigation.

## 2.2 RIGHTING LEVER CURVE

Para 2.2.4 is deleted.

## PART V. SUBDIVISION

### 2 PROBABILITY ESTIMATION OF SUBDIVISION

#### 2.1 GENERAL

Para 2.1.2 is replaced by the following text:

"2.1.2 When checking the probabilistic requirements for such ships the regulations of Explanatory Notes to SOLAS Chapter II-1 shall be taken into consideration (refer to ~~IMO resolution MSC.429(98)/Rev. 1~~ the Guidelines on the Application of Provisions of Chapter II-1 of SOLAS-74).".

### 3 DAMAGE TRIM AND STABILITY

#### 3.3 REQUIREMENTS FOR DAMAGE TRIM AND STABILITY CHARACTERISTICS

Para 3.3.4 is replaced by the following text:

"3.3.4 Before, during and after equalization, the damage waterline shall be at least 0,3 m or  $0,1 + (L_1 - 10)/150$  m (whichever is less) below the openings in the bulkheads, decks and sides through which progressive flooding could take place. Such openings include the outlets of air and vent pipes and those which are closed by means of weathertight doors and covers.

These do not necessarily include:

.1 non-opening side and deck scuttles;  
.2 manholes having covers with closely space bolts;  
.3 cargo tank hatchways in tankers;  
.4 remotely controlled sliding doors, ~~watertight doors with indication systems (except ships specified in 1.1.1.2, 1.1.1.5, 1.1.1.6 and 1.1.1.8)~~ and access hatches normally closed at sea;

.5 hinged watertight access doors with open/closed indication locally and at the navigation bridge, of the quick-acting or single-action type that are normally closed at sea, hinged watertight doors that are permanently closed at sea (except ships specified in 1.1.1.5 and 1.1.1.8);

~~.56~~ openings in subdivision bulkheads intended for the passage of vehicles during cargo handling operations which are permanently closed with strong watertight covers while at sea. Such openings are only permitted for ro-ro ships.

The position and arrangement of closures of openings shall meet the requirements of Section 7 of Part III "Equipment, Arrangement and Outfit".

The location of spaces for emergency sources of electrical power shall comply with the requirements of 9.2.1 of Part XI "Electrical Equipment".

#### 3.4 ADDITIONAL REQUIREMENTS FOR DAMAGE TRIM AND STABILITY

Paras 3.4.11.3 — 3.4.11.5 are deleted.

Para 3.4.13 is deleted. Paras 3.4.14, 3.4.14.1 — 3.4.14.5 and references thereto are renumbered 3.4.13, 3.4.13.1 — 3.4.13.5 accordingly.

## PART VIII. SYSTEMS AND PIPING

### 1 GENERAL

#### 1.1 APPLICATION

Para 1.1.4 is replaced by the following text:

**1.1.4** Pumps, fans, compressors and their electric drives used in systems covered by the requirements of this Part shall also comply with the requirements of Part IX "Machinery" and Part XI "Electrical Equipment".

Control and monitoring devices of piping systems shall comply with the requirements of Part XV "Automation".

Heat exchangers and pressure vessels used in ships systems shall comply with the requirements of Part X "Boilers, Heat Exchangers and Pressure Vessels".

When pumps, fans, compressors, etc. and their electric drives used in systems are part of the coastal infrastructure serving the ship, then these systems shall meet the requirements of this Part only with respect to the piping laying on the ship and agreement of the calculations of these systems.

#### 1.4 PROTECTION AND INSULATION OF PIPING

New para 1.4.7 is introduced reading as follows:

**1.4.7 Protection of pipelines against resonant vibrations.**

**1.4.7.1** Pipelines of all ship's systems for all types of ships shall be protected against resonance by adjusting the pipeline natural frequencies  $f_i$  from frequencies of exciting loads  $f_{ip}$ . The criterion for providing protection of ship's systems against resonance is the fulfillment of condition for the first three modes of the pipeline vibrations:

$$f_{ip}/f_i \leq 0,75 \quad \text{or} \quad f_{ip}/f_i \geq 1,3 \quad (1.4.7.1)$$

where  $i = 1, 2, 3 \dots$  mode of pipeline vibrations (harmonic number);  
 $f_i$  shall be determined according to 1.4.7.5;  
 $f_{ip}$  shall be determined according to 1.4.7.6.

**1.4.7.2** The pipeline natural frequencies  $f_i$  may be calculated according to 1.4.7.5 or determined by other methods agreed with the Register. Frequencies of exciting loads  $f_{ip}$  may be calculated according to 1.4.7.6 or determined by direct measurement.

**1.4.7.3** Where necessary, the pipeline natural frequencies  $f_i$  may be adjusted from the frequencies of exciting loads  $f_{ip}$  by changing the distance between supports or other available methods:

- selection of type of supports and their rigidity;
- change of location of concentrated masses, if any;
- change of the pipeline configuration due to straightening and reduction of bends;
- variation of the pipeline diameter.

To remove resonance, the elastic supports may be used in order to reduce the pipeline system rigidity and the pipeline natural frequencies  $f_i$ .

**1.4.7.4** Concentrated masses having independent supports shall be considered as separators of the pipeline system into separate spans with closures at the points of connection.

**1.4.7.5** For the pipelines with a constant cross-section on two supports, the natural frequency  $f_i$ , Hz, corresponding to the  $i$ -th mode of natural vibrations, shall be determined by the formula

$$f_i = \frac{k_i^2}{2\pi L^2} \sqrt{\frac{EI}{m}} \quad (1.4.7.5)$$

where  $k_i$  = frequency factor depending on the pipeline fixing conditions and the mode of vibration (refer to Table 1.4.7.5);

$L$  = length of the pipeline between supports, m;

$m$  = pipeline mass per meter considering insulation and working medium, kg/m;

$E$  = modulus of longitudinal elasticity of the material, MPa;

$I$  = moment of inertia of the pipe cross-section, m<sup>4</sup>;

$$I = \pi(D_{out}^4 - D_{in}^4)/64$$

where  $D_{out}$  = pipe outer diameter, m;

$D_{in}$  = pipe internal diameter, m.

Main design diagrams and values of frequency factor  $k_i$  for single-span pipelines are given in Table 1.4.7.5. When determining the natural frequencies of complex branched pipelines, the latter shall be represented as a set of single-span pipelines. For branched ship's systems, the calculation methods based on computer programs agreed with the Register may be used.

Table 1.4.7.5

**Frequency factors  $k_i$  for calculation of pipeline natural frequencies**

Pipeline design diagram	Formulae for calculation of $k_i$ , where $i = 1, 2, 3, \dots$	Value of $k_i$ for frequency		
		1	2	3
Freely supported pipe (hinge – hinge)	$\pi i$	3,14	6,28	9,42
Clamped end and freely supported end (hinge – rigid fixing)	$\pi (i + 0,25)$	3,93	7,07	10,21
Clamped ends (rigid fixing – rigid fixing)	$\pi (i + 0,5)$	4,71	7,85	11,0
Clamped end and free end (console)	for $i = 1$ for $i = 2, 3, \dots$ $\pi(i - 0,5)$	1,88	4,7	7,86

Note:

On board the ship:

Rigid fixing is the fixed support with a pivot clamp fixing the pipe to the hull structures and equipment using flange connections or welding (bulkhead glands, bottom and side branches, flange connection with machinery, heat exchangers, tanks, etc.)

Hinge is the fixed support without pivot clamp allowing free rotation of the pipeline.

Free end is a section or connecting piece (compensators of different design) for perception of the pipeline deformations due to its compliance.

**1.4.7.6** Frequencies of exciting loads generated by piston and centrifugal machines  $f_{ip}$  shall be determined by the formula

$$f_{ip} = i \cdot m \cdot n / 60, \quad (1.4.7.6)$$

where  $i = 1, 2, 3...$  mode of pipeline vibrations (harmonic number);  
 $n$  = shaft speed, rpm;  
 $m$  = number of cylinders of piston machines or number of operating elements of pumps (gear teeth, centrifugal and vortex blades, damper pump plates). For screw pumps,  $m = Z_{st} \cdot Z_{scr}$  where  $Z_{st}$  = number of screw starts,  $Z_{scr}$  = number of screws)."

## 2 METAL PIPING

### 2.3 METAL PIPE WALL THICKNESS

Table 2.3.1-1 is replaced by the following text:

"Table 2.3.1-1

#### Allowance $c$ for corrosion for steel pipes

Working medium, piping service	$c$ , mm
Superheated steam	0,3
Saturated steam	0,8
Heating steam coils for water and fuel oil products in tanks and cargo tanks	2,0
Feed water in open circuit systems	1,5
Feed water in closed circuit systems	0,5
Blow-down of boilers	1,5
Compressed air	1,0
Hydraulic oil systems	0,3
Lubricating oil	0,3
Fuel oil	1,0
Cargo pipelines	2,0
Liquefied gas	0,3
Refrigerant piping	0,3
Fresh water	0,8
Sea water	3,0
Ambient air	1,0

Notes: 1. On agreement with the Register, the allowance for corrosion may be reduced for pipes protected against corrosion by special coatings, linings, etc.  
 2. Where pipes of steel with sufficient corrosion resistance are used, the allowance for corrosion may be reduced to zero.  
 3. For pipes passing through tanks and on the open decks the table values shall be increased by the allowance for the influence of the external medium, which is assumed for the appropriate medium in accordance with the Table.

## 5 PIPING LAYING

### 5.1 PIPING LAYING THROUGH WATERTIGHT AND FIRE-PROOF DIVISIONS

Para 5.1.2 is replaced by the following text:

**5.1.2** In cargo ships of 80 m in length and more and in passenger ships irrespective of their length the collision bulkhead may be pierced below the bulkhead deck by not more than one pipe for dealing with liquid in the forepeak tank. This pipe, at its piercing the collision bulkhead, shall be fitted with the normally closed shut-down valves directly on the collision

bulkhead, shall be fitted with the normally closed shut-down valves directly on the collision bulkhead inside the forepeak operated from a readily accessible place above the bulkhead deck of passenger ships and the freeboard deck of cargo ships. If the remote control system should fail during operation of the valve, the valve shall close automatically or be capable of being closed manually from a position above the bulkhead deck of passenger ships and the freeboard deck of cargo ships.

If the forepeak is divided by a longitudinal bulkhead into two watertight compartments to hold two different kinds of liquids, the collision bulkhead may be allowed to be pierced below the bulkhead deck by two pipes, each of which is fitted with such valve. Such valve may be fitted on the after side of the collision bulkhead provided that the valve is readily accessible under all service conditions and the space in which it is located is not a cargo space.

~~On passenger ships, the replacement of the screw-down valve by butterfly valve is not allowed. Cargo ships are allowed to use a butterfly valve if it is flanged or attached to the collision bulkhead separately from the pipe connected to it.~~

~~As butterfly valves must be capable of being remotely operated the following shall apply:~~

- ~~.1 — the actuator shall be of a double acting type;~~
- ~~.2 — when subject to loss of power, the actuator shall remain in its current position;~~
- ~~.3 — when subject to loss of power, the valve shall be able to be manually operated.~~

On pipes piercing the collision bulkhead above the bulkhead deck or freeboard deck a screw shut-down valve may be omitted.

For cargo ships, Figs. 5.1.2-1 and 5.1.2-2 show examples of suitable butterfly valve arrangements."

**Figs. 5.1.2-1 and 5.1.2-2** remain as it stands.

## 7 BILGE SYSTEM

### 7.6 DRAINAGE OF CARGO SPACES

**Para 7.6.15** is replaced by the following text:

~~"7.6.15 The cargo spaces of bulk carriers and single hold cargo ships shall be provided with alarms complying with the requirements of 2.4, Part XV "Automation", located on the navigating bridge, as well as 7.10, Part XI "Electrical Equipment".~~

~~The alarm system detectors shall be positioned at two levels:~~

~~at a height of 0,5 m above the inner bottom;~~

~~at a height of 15 % of the depth of cargo space but not more than 2 m above the inner bottom.~~

~~The visual signals of each cargo space and each level shall be clearly distinguishable.~~

~~For cargo holds, which are used for water ballast, an alarm overriding device may be installed to be activated when ballast is loaded thereinto.~~

The holds of cargo ships shall be fitted with the water level detectors giving alarms according to 7.6.15.1 — 7.6.15.5.

7.6.15.1 The detectors shall be positioned at two levels:

.1 for bulk carriers, ore carriers and combination carriers:

at a height of 0,5 m above the inner bottom;

at a height of 15 % of the depth of the hold but not more than 2 m;

.2 for single-hold cargo ships other than bulk carriers, ore carriers and combination carriers:

at a height of 0,3 m above the inner bottom;

at a height of 15 % of the average depth of the hold but not more than 2 m above the inner bottom.

The detectors indicated in 7.6.15.1.2 may be omitted in case the detectors are installed according to 7.6.15.1.1, as well as to 7.9.8 and 7.9.9, or the watertight side compartments extending vertically from at least the inner bottom to the freeboard deck are provided at the full length of the hold at each side;

.3 for multiple-hold cargo ships other than bulk carriers, ore carriers, combination carriers and tankers:

at a height of 0,3 m above the hold bottom;

at a height of 15 % of the depth of the hold but not more than 2 m.

The detectors shall be installed in each hold intended for dry cargoes.

The detectors are not required for the holds located entirely above the freeboard deck.

As an alternative to the water level detector indicated in 7.6.15.1.3, a bilge level sensor (refer to 7.10.6, Part XI "Electrical Equipment") may be provided being installed in the hold bilge wells or other suitable location at a height of not less than 0,3 m at the aft end of the hold and giving audible and visual alarms complying with the requirements in 7.6.15.3.

The audible and visual alarms at the navigation bridge shall be clearly distinctive from the alarms given by the water level detector fitted in the hold.

7.6.15.2 The detectors shall be fitted in the aft end of the cargo hold above the inner bottom or above its lowest part where the inner bottom is not parallel to the designed waterline. The detectors shall be located in the protected space as close to the centerline, as practicable, or at both the port and starboard sides of the cargo hold. Where webs or partial watertight bulkheads are fitted above the inner bottom, the fitting of additional sensors may be required. It is allowed to use one sensor vertically instead of two, provided its design allows giving alarm at both levels of hold flooding.

7.6.15.3 Alarm shall comply with the requirements of 2.4, Part XV "Automation", as well as 7.10, Part XI "Electrical Equipment" and shall be located on the navigating bridge.

7.6.15.4 The visual signals of each cargo space hold and each level shall be clearly distinguishable

7.6.15.5 For cargo-holds, which are used for water ballast, an alarm-overriding device may be installed to be activated when ballast is loaded thereinto."

## 11 EXHAUST GAS SYSTEM

### 11.3 SYSTEMS FOR REDUCING NO<sub>x</sub> EMISSIONS

**Para 11.3.2.9** is replaced by the following text:

**".9** reductant tanks shall be of steel or other equivalent material with a melting point above 925 °C. Plastic integral tanks with volume below of 500 l are allowed. Plastic integral tanks without restrictions on volume are allowed on FRP ships if they comply with the requirements of 1.7, Part VI "Fire Protection" as well as for FRP ships, e.g., yachts, fast patrol, navy vessels, etc., generally of less than 500 gross tonnage.

Piping shall be of steel or other equivalent material with a melting point above 925 °C, except downstream of the tank valve, provided this valve is metal seated and arranged as fail-to-closed or with quick closing from a safe position outside the space in the event of fire. In such case, type approved plastic piping may be accepted even if it has not passed a fire endurance test. Reductant tanks and piping systems shall be made with a material compatible with reductant or coated with appropriate anti-corrosion coating;"



## 12 VENTILATION SYSTEM

### 12.2 VENTILATION SYSTEMS OF CARGO SHIPS OF 500 GROSS TONNAGE AND UPWARDS, OIL TANKERS AND COMBINATION CARRIERS CARRYING PETROLEUM PRODUCTS WITH FLASH POINT 60 °C AND MORE, PASSENGER SHIPS CARRYING NO MORE THAN 36 PASSENGERS, SPECIAL PURPOSE SHIPS CARRYING NO MORE THAN 240 PERSONS AND BERTH-CONNECTED SHIPS

Para 12.2.4 is replaced by the following text:

"12.2.4 Galley ventilation systems shall be separate from the ventilation systems serving other spaces.

The exhaust ducts from galley ranges shall be constructed of "A" class divisions where they pass through accommodation spaces or spaces containing combustible materials.

Each galley ventilation duct passing through accommodation spaces or other spaces containing combustible materials shall be fitted with:

a grease trap readily removable for cleaning;

a fire damper located in the lower end of the duct and, in addition, a fire damper located in the upper end of the duct; at the junction between the duct and the galley range hood which is automatically and remotely operated and, in addition, a remotely operated fire damper located in the upper end of the duct close to the outlet of the duct;

fixed means for extinguishing fire within the duct;

arrangements, operable from within the galley, for shutting off the exhaust fans (refer also to 5.8.2, Part XI "Electrical Equipment")."

## PART IX. MACHINERY

### 4 GEARS, DISENGAGING AND ELASTIC COUPLINGS

#### 4.2 GEARING

Table 4.2.2.7.1.9-1 is replaced by the following text:

"Table 4.2.2.7.1.9-1

#### Values of the factor $K_1$ for the calculation of the factor $K_v$

	$K_1$ According to GOST 1643-81 (ISO <del>1328-2:2020</del> 1328-1:2013)					
	3	4	5	6	7	8
Spur gears	2,1	3,9	7,5	14,9	26,8	39,1
Helical gears	1,9	3,5	6,7	13,3	23,9	34,8

## PART XI. ELECTRICAL EQUIPMENT

### 7 INTERNAL COMMUNICATION AND SIGNALLING

#### 7.3 SIGNALLING. GENERAL

Para 7.3.1.7 is replaced by the following text:

"7 cargo hold water level alarm on bulk carriers, ore carriers, combination carriers, passenger ships carrying 36 persons and more and single-hold or multiple-hold cargo ships other than bulk carriers, ore carriers, combination carriers and tankers;"

#### 7.10 CARGO HOLD WATER LEVEL ALARM SYSTEM

Para 7.10.1 is replaced by the following text:

"

**7.10.1** The requirements of this Chapter apply to bulk carriers, passenger ships carrying 36 persons and more and single-hold cargo ships other than bulk carriers.

**7.10.1** The requirements of this Chapter apply to bulk carriers, ore carriers, combination carriers, passenger ships carrying 36 persons and more, single-hold or multiple-hold cargo ships other than bulk carriers ~~as well as multiple-hold cargo ships other than bulk carriers and tankers~~, ore carriers, combination carriers and tankers.

"

Para 7.10.2 is replaced by the following text:

"

**7.10.2** Unless otherwise specified in this Chapter, the cargo hold water level alarm system shall meet the requirements of 7.3 of this Part, as well as 3.4.11, Part V "Subdivision" and 7.9.9, Part VIII "Systems and Piping".

**7.10.2** Unless otherwise specified in this Chapter, the cargo hold water level alarm system shall meet the requirements of 7.3 of this Part, as well as ~~3.4.11, Part V "Subdivision"~~ 7.6.15 and 7.9.9 Part VIII "Systems and Piping".

"

Para 7.10.3 is replaced by the following text:

"

**7.10.3** The alarm system shall provide warning and emergency visual and audible alarms to indicate water level in cargo holds and for the ballast tanks and dry spaces, forward of the collision bulkhead — only emergency visual and audible alarms. The warning alarm shall be activated when the water reaches the lower level with the emergency alarm activated when the water reaches the upper level as mentioned in 7.9.9, Part VIII "Systems and Piping". It is allowed to use one sensor to initiate warning and emergency alarms.

**7.10.3** The alarm system shall provide warning and emergency visual and audible alarms to indicate water level in cargo holds and for the ballast tanks and dry spaces, forward of the collision bulkhead — only emergency visual and audible alarms. The warning alarm shall be activated when the water reaches the lower level with the emergency alarm activated when the water reaches the upper level as mentioned in 7.6.15 and 7.9.9, Part VIII "Systems and Piping". It is allowed to use one sensor to initiate warning and emergency alarms.

<p>The error in the water level determination by detectors shall not exceed 100 mm. The warning and emergency audible alarms shall be dissimilar. The system shall provide clear identification of spaces from which the alarm has been released. The audible alarm shall be silenced from the alarm panel installed on the navigation bridge.</p>	<p>The error in the water level determination by detectors shall not exceed 100 mm. The warning and emergency audible alarms shall be dissimilar. The system shall provide clear identification of spaces from which the alarm has been released. The audible alarm shall be silenced from the alarm panel installed on the navigation bridge.</p>
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**New para 7.10.9** is introduced reading as follows:

**"7.10.9** On ships the Flooding Detection System Manual shall be provided, which includes, as a minimum:

- .1 the flooding detection system specification, including a list of procedures for checking the operability, as far as practicable, of each element at any stage of the ship service;
- .2 the Type Approval Certificate issued for the flooding detection system;
- .3 the single-line diagram of the flooding detection system with the location of equipment indicated in the ship's general arrangement plan;
- .4 the instructions indicating the location, securing, protection and testing of the flooding detection system equipment;
- .5 the list of cargos, in the 50-% mixture of which with seawater, detectors covered by guard remain operable;
- .6 the procedures to be followed in case of failure of the flooding detection system;
- .7 the maintenance requirements for the flooding detection system equipment.

The Manual shall be in the working language of the ship officers, as well as in English."

## 9 EMERGENCY ELECTRICAL INSTALLATIONS

### 9.3 EMERGENCY SOURCES OF ELECTRICAL POWER IN CARGO SHIPS

**Para 9.3.1.4** is replaced by the following text:

**".4** radio equipment and navigational equipment according to the requirements of Part IV "Radio Equipment" and Part V "Navigational Equipment" of the Rules for the Equipment of Sea-Going Ships, the Guidelines on the Application of Provisions of Chapter IV of the International Convention for the Safety of Life at Sea (SOLAS-74) and the Guidelines on the Application of Provisions of Chapter V of the International Convention for the Safety of Life at Sea (SOLAS-74), whichever is applicable, where the emergency source of power is a diesel generator;"

**Para 9.3.7.5** is replaced by the following text:

**".5** ~~command broadcast apparatus in accordance with item 11 of Table 2.3.4, Part IV "Radio Equipment" of the Rules for the Equipment of Sea-Going Ships 2.1.4, Part II "Life-Saving Appliances" of the Rules for the Equipment of Sea-Going Ships or regulation III/6.5 of the International Convention for the Safety of Life at Sea (SOLAS-74), whichever is applicable;~~"

**Para 9.3.7.7** is deleted.

The last paragraph of **para 9.3.7** is replaced by the following text:

"Services listed under 9.3.7.2 — 9.3.7.7~~6~~ may not be supplied from the transitional source if they have their own accumulator batteries, by which they are supplied during the required period of time."

## **20 REQUIREMENTS FOR ELECTRICAL EQUIPMENT PROCEEDING FROM SHIP PURPOSE**

### **20.1 PASSENGER SHIPS**

**Para 20.1.2.1.3** is replaced by the following text:

".3 radio equipment and navigational equipment according to the requirements of Parts IV "Radio Equipment" and V "Navigational Equipment" of the Rules for the Equipment of Sea-Going Ships, the Guidelines on the Application of Provisions of Chapter IV of the International Convention for the Safety of Life at Sea (SOLAS-74) and the Guidelines on the Application of Provisions of Chapter V of the International Convention for the Safety of Life at Sea (SOLAS-74), whichever is applicable, where the emergency source of power is a diesel generator;"

**Para 20.1.2.7.6** is deleted.

The last paragraph of **para 20.1.2.7** is replaced by the following text:

"Services listed under 20.1.2.7.2 — 20.1.2.7.6~~5~~ may be supplied from their own accumulator batteries, which shall ensure their supply during the time necessary".

## **PART XIII. MATERIALS**

### **2 PROCEDURES OF TESTING**

#### **2.5 TESTING OF ICE-RESISTANT COATINGS**

**Para 2.5.1** is replaced by the following text:

**"2.5.1 Assessment of anticorrosive properties in sea water environment.**

**2.5.1.1** Tests shall be carried out in compliance with ISO 12944-6 for a corrosivity category Im2 in compliance with ISO 12944-2.

The duration of testing shall be set for the coating lifetime of 15 years.

Durability shall be assessed as high on condition of obtaining results complying with the requirements specified in 2.5.1.6, for salt spray test — in accordance with 2.5.1.4 and for water immersion test — in accordance with 2.5.1.5."

### 3 STEEL AND CAST IRON

Chapter 3.4 is replaced by the following text:

#### "3.4 STEEL TUBES AND PIPES

##### **3.4.1. Steel pipes and tubes of ship systems.**

###### **3.4.1.1 General.**

**3.4.1.1.1** These requirements apply to hot- and cold-formed steel pipes and tubes intended for boilers, heat exchangers, pressure vessels, ship systems and piping and subject to survey by of the Register.

**3.4.1.1.2** The steel pipes and tubes shall be manufactured in accordance with international and national standards or other technical documentation shall meet the requirements of this Chapter.

**3.4.1.1.3** The welded pipes and tubes may be manufactured by means of electric induction welding, pressure contact welding or fusion welding.

###### **3.4.1.2 Chemical composition.**

**3.4.1.2.1** The chemical composition of the steel for pipes and tubes shall be chosen on the basis of standards proceeding from the required mechanical properties at room of elevated design temperature; the content of base elements in % shall not exceed the values stated below:

for carbon and carbon-manganese steel (ladle analysis), %:

sulphur and phosphorus — 0,04, manganese — 1,50, chromium, nickel, silicon — 0,50, copper — 0,30, carbon — 0,23;

For low-alloy steel (ladle analysis), %:

sulphur and phosphorus — 0,035, manganese — 1,00, chromium — 2,50, silicon — 0,50, molybdenum — 1,20, carbon — 0,20, vanadium — 0,35.

**3.4.1.2.2** The steel shall be killed. Rimming steel is not permitted for manufacturing pipes and tubes. Using semi-killed steel is not recommended and shall be justified. The treatment of steel with grain- refining elements is also permitted. Carbon and carbon-manganese steel intended for working temperatures above 400 °C shall not contain aluminium.

**3.4.1.2.3** The use of steel, in which the base elements content exceeds the above limits, as well as steel containing other base alloying elements than those stated above may be permitted in accordance with the national and international standards recognized by the Register.

**3.4.1.2.4** The chemical composition shall be determined from the heat analysis (ladle analysis);

determination of chemical composition on a tubular billet is permitted.

###### **3.4.1.3 Mechanical and technological properties.**

**3.4.1.3.1** At room and elevated design temperature the mechanical and technological properties of steel intended for pipes and tubes shall be in accordance with standards for pipes and tubes.

**3.4.1.3.2** In the process of manufacture the pipes and tubes shall undergo the following tests: tensile test (tensile strength, yield stress and elongation being determined) according to 2.2.2; tensile test at elevated temperature (proof stress being determined);

flattening test according to 2.2.5.2, or tensile test of rings according to 2.2.5.4;

expanding test according to 2.2.5.3.

Tensile test at elevated temperature, flattening test, tensile test of rings and expanding test shall be carried out when required by standards for pipes or by technical documentation approved by the Register on the basis of which the test results are estimated. When provided for by the relevant parts of the Rules or by standards, the results of testing the steel intended

for pipes and tubes for determining the average stress to produce rupture at elevated temperature shall be submitted.

**3.4.1.4 Heat treatment.**

The pipes and tubes shall be heat treated, when stipulated by the relevant parts of the Rules, by standards or technical design documentation approved by the Register. The cold-formed and electrically welded pipes and tubes shall in any case be heat treated, normalized, normalized and tempered or quenched and tempered. The method and conditions of heat treatment shall be chosen by the manufacturer, reported to the Register and stated in the certificate.

**3.4.1.5 Sampling.**

Unless stated otherwise, sampling for specimens shall be made from one end of not less than two pipes or tubes of the batch.

**3.4.1.6 Scope of testing.**

The pipes and tubes shall be tested by batches. A batch shall consist of pipes and tubes of the same size manufactured from steel of the same heat and heat treated under similar conditions.

The number of pipes or tubes in a batch shall not exceed:

400 in the case of pipes or tubes with an outer diameter of 76 mm or less;

200 in the case of pipes or tubes with an outer diameter over 76 mm.

A rest of pipes or tubes, which is less than half the number stated, shall be included in a relevant batch and one which is half and over, — shall be considered a separate batch.

For testing purposes, out of each sample one specimen for the tensile test, one specimen for the flattening test or the tensile test of rings (when welded pipes and tubes are tested — 2 specimens, during the testing of one of the specimens the welded joint shall be in the tension zone), one specimen for the expanding test shall be cut. All the pipes and tubes shall be tested by hydraulic pressure. The test pressure shall be in accordance with standards for pipes and tubes or with documentation agreed with the Register, but, in any case, it shall not be less than that stated in 21.2, Part VIII "Systems and Piping" and in 1.7, Part X "Boilers, Heat Exchangers and Pressure Vessels".

Hydraulic tests may be omitted if all the pipes and tubes undergo ultrasonic or other equivalent testing. All the welds in welded pipes and tubes shall undergo the ultrasonic testing.

**3.4.1.7 Inspection.**

All the pipes and tubes shall undergo visual testing.

The surface of the pipes and tubes shall be free from cracks, skins, fissures and laps.

A certain number of minor nicks and dents, marks, thin layers of scale, traces of defects grinding and small skins are permitted if due to them the wall thickness would not exceed the allowable under-thickness tolerances.

**3.4.1.8 Marking and documentation.**

Identification, marking and issued documentation — in accordance with the requirements of 1.4. Branding of rolled and section rolled steel products may be performed on a label. At that the manufacturer shall confirm the identification system of every rolled product in a bundle.

**3.4.2 Steel structural tubes.**

**3.4.2.1 General.**

**3.4.2.1.1** These requirements apply to hot- and cold-formed steel tubes and welded tubes intended for manufacture of hull structures subject to survey by the Register.

**3.4.2.1.2** Steel structural tubes shall comply with the requirements of this Chapter and be manufactured in accordance with international and national standards or technical documentation approved by the Register.

**3.4.2.1.3** Steel structural tubes shall be manufactured at works recognized in accordance with the requirements of 1.3.1.2 by the procedure approved by the Register.

If rolled steel products used for manufacture of welded tubes are produced at separate works, the steel rolled products manufacturer shall also be recognized by the Register in accordance with the requirements of 1.3.1.2.

**3.4.2.1.4** Requirements of 3.2, 3.5, 3.13 and 3.14 for relevant steel grades shall apply to the steel of structural tubes.

**3.4.2.1.4.1** For welded tubes, the requirements of 3.4.1.4 apply only to rolled plates used for their manufacture. At that the manufactured tube shall be subject to testing required by international or national standard or technical documentation approved by the Register.

**3.4.2.1.4.2** Hot- and cold-formed steel tubes are tested in the same scope as the rolled products for welded tubes in accordance with 3.4.1.4.

**3.4.2.1.5** Requirements for corrosion resistant steel products are specified in 3.16.

**3.4.2.1.6** In case of technical reasons preventing the fulfillment of testing required by the Rules of the Register, repair, inspection etc., replacement is permitted after being confirmed by the Register as equivalent.

**3.4.2.2** Inspection and non-destructive testing.

**3.4.2.2.1** All the tubes shall undergo visual testing.

**3.4.2.2.2** Quality of surface and defects grinding of surface of manufactured tubes shall comply with the requirements of 3.2.7.

**3.4.2.2.3** Thickness tolerances of manufactured tubes shall comply with the requirements of 3.2.8.

**3.4.2.2.4** All welds of welded tubes shall undergo non-destructive testing.

**3.4.2.3** Marking and documentation.

**3.4.2.3.1** Identification, marking and issued documentation shall be in accordance with the requirements of 3.2.9.

**3.4.2.3.2** Branding of tubes may be performed on a label. At that the manufacturer shall confirm the identification system of every tube in a bundle."

### **3.16 STAINLESS STEEL**

**Para 3.16.1.8.** In the ninth paragraph references "3.4.5" and "3.4.6" are replaced by "3.4.1.5" and "3.4.1.6" accordingly.

## **PART XIV. WELDING**

### **2 TECHNOLOGICAL REQUIREMENTS FOR WELDING**

#### **2.1 GENERAL**

**Para 2.1.12** is replaced by the following text:

**"2.1.12** Welding and cutting under water as well as welding operations on structures with water present on the reverse side during the welding process may be allowed by the Register approved technological instructions and/or the standards of the manufacturer, including the control methods approved by the Register taking into account requirements of 2.14."

New **Chapter 2.14** is introduced reading as follows:

## **"2.14 UNDERWATER WELDING AND WELDING OF STRUCTURES HAVING THEIR BACK SIDE IN CONTACT WITH WATER**

### **2.14.1 Terms and definitions.**

**2.14.1.1** The following terms and definitions have been adopted in this Chapter.

**Diving semi-bell** is an enclosure for diving of the diver-welder under the water and his/her recovery, made as a watertight dome with open lower part providing gas cushion inside where the diver-welder may breathe without using the breathing apparatus.

**Diver-welder** is a person who performs the welding under hyperbaric conditions.

**Confirmation weld** is a test weld made at the underwater work site prior to production welding. The confirmation weld is intended to demonstrate proper functioning of the welding system (e.g. power supply and welding leads) under actual conditions (e.g., wave action, visibility, current). It is not intended to be used as requalification of the welding procedure or welder.

**Wet welding** is a welding in wet environment at pressure exceeding the atmospheric pressure, with no mechanical barrier between the arc and water.

**Underwater chamber (caisson)** is a sealed enclosure surrounding the work areas from which the water has been displaced by a gaseous medium for performance of the welding condition in a dry working environment.

**Dry welding** is an underwater welding in dry work environment where the gaseous atmosphere affecting the welding arc and joint is under normal (atmospheric) or increased pressure determined by a diving depth.

**2.14.2** Underwater welding that may be admitted by RS is divided into dry welding performed, for example, in a caisson or diving semi-bell, and wet welding performed directly in water environment.

**2.14.3** From the edges of the parts to be welded, oil, scale, rust, paint and other contaminating substances shall be removed. Fouling shall be removed from the near-weld area prior to wet welding.

### **2.14.4 Classification of welds.**

**2.14.4.1** A weld class specifies a level of serviceability and a set of required properties, as defined by non-destructive examination and mechanical tests, to which welds of a given class shall conform.

In accordance with AWS D3.6M:2017, three classes of welds are established for underwater welding: classes A, B and O.

**2.14.4.2** Class A welds are covered by the requirements for welds performed at the air under normal atmospheric pressure. The requirements for Class A welds including requirements for assessment of quality according to non-destructive testing methods, are given in Section 9 of AWS D3.6M:2017.

**2.14.4.3** Class B welds are intended for less critical applications where lower level of mechanical properties of the weld metal, moderate porosity, and other limited discontinuities can be tolerated. The requirements for Class B welds including requirements for assessment of quality according to non-destructive testing methods, are given in Section 10 of AWS D3.6M:2017.

**2.14.4.4** Class O welds shall meet the requirements of applicable standards or normative documentation to cope with the underwater welding environment. The requirements for Class O welds including requirements for assessment of quality according to non-destructive testing methods, are given in Section 11 of AWS D3.6M:2017.



**2.14.5 Welding of structures having their back side in contact with water.**

Welding of structures having their back side in contact with water is permitted for repair works and shall be carried out taking into account the provisions and requirements given below.

The main factor of risk in welding under conditions mentioned above is a higher probability of cold cracking in the weld and adjoining metal resulting from high speed of cooling of the weld and adjoining metal causing formation of structures with higher hardness; possibility of the presence of condensate and other types of moisture on edges to be welded.

In welding operations on structures having their back side in contact with water, the following measures shall be taken:

.1 it is necessary to use welding consumables with controllable content of diffusive hydrogen with classification index not higher than H10. Welding electrodes shall be calcinated prior to welding;

.2 when welding steels of normal and higher strength it is necessary in all cases to carry out drying and preheating of edges to be welded using a gas burner to remove condensate and other traces of moisture. This operation shall be performed with the lowest possible interval of time between the drying and welding. The welding technology shall provide measures to reduce the cooling rate of the weld and near-weld area after the welding;

.3 when welding steels of higher strength with carbon equivalent  $C_{eq} \geq 0,45$  % and/or yield strength not exceeding 355 MPa, it is necessary to conduct additional tests for approval of welding procedure on samples, which simulate actual conditions of joints welding, according to the program approved by the Register;

.4 approval of welding procedure is required in case where the repair with application of welding of structures with water on opposite side is not a unique case (more than two within 6 months);

.5 welding of high-strength steels on structures having contact with water on the back side of their welds is not permitted;

.6 non-destructive testing of welds shall be performed by means of visual testing to the extent of 100% of the weld length and ultrasonic testing (for thicknesses of 8 mm and more) or radiographic testing (if possible) to the extent not less than 20 % of the length of welded joints with full penetration according to the testing plan approved by the Register;

.7 welds performed on structures with water on opposite side shall comply with the requirements for Class A welds (as for the welds carried out at the air) in accordance with AWS D3.6M:2017 or requirements of 3.4.

**2.14.6 Welding and cutting of structures under water.**

Welding and cutting of structures under water may be allowed by the Register for performance of repair works (including prompt repair) as well as works on maintenance of underwater hull (for example, replacement of protectors) when ship lifting is obstructed or impossible. Welding of hull structures under water shall be performed according to the RS-approved technological instructions as well as approved welding procedures taking into account the provisions and requirements given below.

**2.14.6.1** Thermal cutting and welding of structures under water by "wet method" (without isolation of the welding zone from the surrounding environment) may be used in extreme and rescue and emergency cases. About execution of such operations the Register shall be informed immediately, and the welded joints made by wet welding shall be removed and replaced during docking of the ship as soon as possible using the procedure approved by the Register.

According to the technology agreed by the Register, the welding under water by a "wet method" is allowed for secondary attachment elements to the hull that do not contribute to the hull local and overall strength and do not affect tightness of the hull, for example, attachment of protectors of electrochemical protection, grills of sea chests, etc., without removal or

replacement. Welded connections of such structures (elements) may comply with the requirements for Class B or O welds in accordance with AWS D3.6M:2017 whatever is applicable. In this case RS shall approve assignment of weld class. In case the Register has approved application of class B welds, welding consumables shall be tested for performance of such class welds in accordance with the requirements of Section 10 in AWS D3.6M:2017 and shall have relevant Certificate for Approval of Welding Consumables.

**2.14.6.2** If it is necessary to perform some work in welding of essential structures contributing to the hull overall strength under water, the "dry method" of welding shall be used, which provides complete isolation of the welding area with the use of various facilities (caissons, special welding chambers, etc.). In this case, the welded connections shall comply with the requirements for class A welds (for welds performed in air at normal atmospheric pressure) in accordance with AWS D3.6M:2017 or requirements of 3.4.

**2.14.6.3** The welding procedures are subject to the Register approval in accordance with Part II of Section 7 in AWS D3.6M:2017 or other RS-approved standards. Prior to tests, the program shall be submitted to the Register for review, that provides conduction of the tests under conditions simulating in the largest degree the actual conditions: they shall take into account the composition and pressure of the medium in the isolating device, length of power feeder cables, particular features of heat removal and cooling, techniques for drying and preheating of edges to be welded, etc.

**2.14.6.4** Underwater wet welding may be admitted for application by the following welding processes:

- manual metal arc welding (metal arc welding with covered electrode) (111);
- self-shielded tubular-cored arc welding (114).

Underwater dry welding may be admitted for application by following welding processes applied in shipbuilding, such as:

- manual metal arc welding (metal arc welding with covered electrode) (111);
- electrode arc welding in protected gases (131, 135, 136, 138);
- tungsten inert gas welding (141);
- plasma arc welding (15).

**2.14.6.5** Certification of divers-welders for underwater welding shall be carried out in certification centers recognized by the Register in accordance with ISO 15618-1:2016 (for hyperbaric wet welding), ISO 15618-2:2001 (for hyperbaric dry welding) or Part III, Section 7 in AWS D3.6M:2017.

The scope of approval of divers-welders' certification regarding depth is determined in accordance with Table 7.3 of AWS D3.6M:2017.

The scope of approval of divers-welders certified for class A welds shall also cover certification of classes B and O welds according to AWS D3.6M:2017.

**2.14.6.6** Criteria for quality assessment of classes A, B and O welds by non-destructive testing and requirements for mechanical tests for certification of welders and approval of welding procedures shall apply according to Sections 9 — 11 of AWS D3.6M:2017.

**2.14.6.7** Welding consumables for underwater welding including for wet welding, shall be approved by the Register with the drawing up of Certificate for Approval of Welding Consumables according to the applicable provisions of Section 4. The testing program shall be submitted to the Register for review and shall be approved prior to testing.

Welding consumables for dry welding shall have a classification index of diffusible hydrogen not higher than H5.

Welding consumables for wet welding shall provide satisfactory conduction of arc welding in water environment, satisfactory forming of the weld and edge fusion of welded elements as well as requirements for performance of tests for class B welds of AWS D3.6M:2017 or for class O welds of the same standard complying with the developed technical conditions.

Welding consumables for wet welding of class B welds of AWS D3.6M:2017 shall be tested and shall have a classification index of diffusible hydrogen not higher than H25.

Welding consumables for wet welding of structures made of normal and higher strength steel may be assigned the following categories: 2B, 2O, 2YB and 2YO, where digit 2 means performance of impact tests at temperature 0 °C, indices B and O indicate weld class determined by testing, Y applies for welding consumables with minimum yield stress 375 MPa.

**2.14.6.8** Prior to production underwater welding, a confirmation weld test shall be satisfactorily completed at the job site. The weld shall be satisfactorily completed at the particular job site and at the depth at which production welding will take place. At least one confirmation weld shall be satisfactorily completed for each welding system to be used during production. The confirmation test weld shall be a fillet weld with length not less than 200 mm. Where the production weld shall be made in only one welding position, the confirmation weld shall be made in that position. Where welding in more than one position is necessary, the confirmation weld shall be made in the position in production in which the majority of welding will be done.

**2.14.6.9** Non-destructive testing of welds performed by underwater welding shall be carried out by means of visual testing to the extent of 100 % of the weld length and ultrasonic testing (for thicknesses of 8 mm and more) or radiographic testing (if possible) to the extent not less than 20 % of the length of welded joints with full penetration according to the testing plan approved by the Register. In addition, as required by RS for welded connections made by wet welding, the magnetic particle testing may be assigned in case of possibility of its performance.

Main conditions of magnetic particle testing shall include the following:

there shall be no heavy current or movement in water around the inspection areas;

the water around the magnetic particle testing area shall have good visibility (transparence);

the detection medium (magnetic powder) shall be approved for under water use;

for underwater magnetic particle testing, the continues magnetization method shall be used.

Procedures for application of NDT methods of welds made by underwater welding shall be agreed with the Register."

### 3 WELDS TESTING

#### 3.1 GENERAL

**Para 3.1.2.3** is replaced by the following text:

**"3.1.2.3** The shipbuilder/ship repair yard or its subcontractors shall have a supervisor or supervisors, responsible for the appropriate execution of NDT operations and for the professional standard of the operators and their equipment, including the professional administration of the working procedures. The shipbuilder/ship repair yard or its subcontractors shall employ, on a full-time basis, at least one supervisor independently certified to Level 3 in the method(s) concerned as per the requirements of 3.1.2.4. It is not permissible to appoint Level 3 personnel; they must be certified by an accredited certification body. ~~Shipbuilder or its subcontractors may not directly employ a Level 3 in all the stated methods practiced. In such cases, it is permissible to employ an external, independently certified, Level 3 in those methods not held by the full-time Level 3(s) of the shipbuilder or its subcontractors. The shipbuilder/ship repair yard may employ full-time Level 3 personnel not certified for all NDT methods. In this case, it is permissible to employ an external Level 3 for NDT methods not held by the full-time Level 3(s) of the company.~~

The supervisor shall be directly involved in review and acceptance of NDT Procedures, NDT reports, calibration of NDT equipment and tools. The supervisor shall on behalf of the

shipbuilder/ship repair yard or its subcontractors re-evaluate the qualification of the operators annually."

## 4 WELDING CONSUMABLES

### 4.1 GENERAL

**Para 4.1.8.1** is replaced by the following text:

**"4.1.8.1** Referred to special cases of approval of welding consumable are:  
upgrading/uprating of welding consumables at manufacturer's request;  
approval of welding consumables for compliance with international or national standards;  
approval of welding consumables for compliance with the properties guaranteed by the manufacturer, which exceed or supplement the requirements of the Register Rules or appropriate standards;  
approval of welding consumables fabricated under license or manufacturer's subsidiary companies;  
approval of welding consumables based on the tests carried out in the course of approval by the Register of the welding procedures of the company using the welding consumables;  
approval of welding consumables based on the results of the tests carried out by other classification societies or technical supervision authorities;  
single permits for use of welding consumables having an approval of other classification societies or technical supervision authorities;  
approval of combinations of welding consumables produced by different manufacturers."

**New para 4.1.8.9** is introduced reading as follows:

**"4.1.8.9** In cases when welding consumables of a combination "wire — flux" are manufactured by different manufacturers, this combination shall be approved according to 4.4 considering the fact, that the Certificate of Approval for Welding Consumables applicant manufacturer producing one of the component in the combination "wire — flux" submits to the Register for approval technical specifications for combination with the other component, checks the quality of operating characteristics of the combination, determines chemical composition of deposited metal, performs mechanical tests and issues the quality certificate based on their results.

After the receipt of the Certificate of Approval for Welding Consumables, the applicant manufacturer guarantees the quality of the whole combination "wire — flux" and may supply to the consumer batches of the whole combination or one of its components after confirmation of the proper quality. The supply of combination "wire — flux" batches is permitted in case of satisfactory results of its testing in accordance with 5.3.3.3 and 5.3.3.4, Part III "Technical Supervision during Manufacture of Materials" of the Rules TSDCS.

When drawing up the Certificate of Approval for Welding Consumables for manufacturers producing only one component of the combination "wire — flux", after the designation of the trade mark of the other component the name of the firm of its manufacturer is indicated in brackets and the Certificate covers only these particular components of the combination."

## PART XVII. DISTINGUISHING MARKS AND DESCRIPTIVE NOTATIONS IN THE CLASS NOTATION SPECIFYING STRUCTURAL AND OPERATIONAL PARTICULARS OF SHIPS

### 1 REQUIREMENTS FOR POLAR CLASS SHIPS

#### 1.2 STRUCTURAL REQUIREMENTS FOR POLAR CLASS SHIPS

Para 1.2.16.1 is replaced by the following text:

~~1.2.16.1 For the purpose of transferring ice-induced loads to supporting structure (bending moments and shear forces), local design details shall comply with the RS requirements.~~ Hull supporting structures for equipment and machinery located in way of ice strengthening region.

1.2.16.1.1 Hull supporting structures for azimuth thrusters.

1.2.16.1.1.1 The supporting structures for azimuth thrusters shall withstand loads transmitted to them from azimuth thrusters. Scantlings of supporting structures shall be checked using direct calculation methods. This shall include a check that there are no stresses exceeding the allowable stresses and a buckling strength check.

1.2.16.1.1.2 When finite element analysis is used, the design model shall include all structures of thruster compartment including bulkheads forming its boundaries as well as framing at least up to the first deck above the thruster compartment. The size of the model shall be sufficient to avoid the effect of boundary conditions.

1.2.16.1.1.3 When carrying out direct calculations, the following permanent loads shall be taken into account:

gravitational force;

buoyancy force;

maximum load determined from orientation of the thruster to the maximum angle at which the azimuth thruster can be oriented on each side when the ship navigates at its maximum speed;

lateral pressure calculated for all possible thruster orientations up to the maximum rotation angle on each side when the ship navigates at its maximum speed. The design lateral pressure is defined as the greatest pressure taken from obtained values for all possible orientations of the azimuth thruster on each side when the ship navigates at its maximum speed. The total force acting on the propulsion system is calculated by integrating the lateral pressure on the external surface of the azimuth thruster;

maximum loads calculated for the crash stop of the ship obtained through inversion of the propeller rotation;

maximum loads calculated for the crash stop of the ship obtained through a 180° rotation of the pod.

1.2.16.1.1.4 Loads.

Ice loads are calculated in accordance with 6.2.2 and 6.2.3 of the Rules for Active Means of Polar Class Ships' Steering.

1.2.16.1.1.5 Allowable stresses.

When making calculations, the following criterion shall be met:

$$\sigma_{VM} \leq 1,25 \sigma_{ALL}$$

where  $\sigma_{VM}$  = Von Mises equivalent stress, in MPa;

$\sigma_{ALL} = 65/\eta$  – allowable stress, in MPa;

$\eta$  = factor indicating application of steel mechanical properties determined in accordance with 1.1.4.3, Part II "Hull" of these Rules.

For design cases related to the crash stop of the ship, the following criterion shall be met:

$$\sigma_{VM} \leq \sigma_{CRASH}$$

where  $\sigma_{CRASH} = 1,25\sigma_{ALL}$ .

When models with fine mesh (size of a finite element is approximately equal to 50 mm x 50 mm) are used for calculation, the following criteria shall be met:

$$\sigma_{VM} \leq 1,53 \sigma_{CRASH} \text{ – for elements not adjacent to welds;}$$

$$\sigma_{VM} \leq 1,34 \sigma_{CRASH} \text{ – for elements adjacent to welds.}$$

Where the criteria are not met, the  $\sigma_{VM}$  values may be assumed taking into account their location and particulars of the design model. Such possibility is determined in each particular case."

**Para 1.2.16.2** is replaced by the following text:

**"1.2.16.2 Structures in way of cut-outs.**

The loads carried by a member in way of cut-outs shall not cause ~~instability~~buckling. Where necessary, the structure shall be stiffened."

### **1.3 MACHINERY REQUIREMENTS FOR POLAR CLASS SHIPS**

**Para 1.3.5.2.** The last paragraph is replaced by the following text:

"Azimuth thrusters shall also be designed for estimated loads due to thruster body/ice interaction as per ~~4.2.15~~Section 6 of the Rules for Active Means of Polar Class Ships' Steering."

## **7 REQUIREMENTS FOR SHIP EQUIPMENT TO ENSURE LONG-TERM OPERATION AT LOW TEMPERATURE**

### **7.10 ELECTRICAL, RADIO AND NAVIGATIONAL EQUIPMENT**

**Para 7.10.1.1** is replaced by the following text:

**"7.10.1.1** Cables to be installed on the open decks and in the open unheated spaces shall be tested for cold endurance according to ~~IEC 60068-2-1~~10.7.14.9 of Part IV "Technical Supervision during Manufacture of Products" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships at the working temperature in the chamber equal to the design ambient temperature."

## **9 REQUIREMENTS FOR SHIPS EQUIPPED FOR USING GASES OR LOW-FLASHPOINT FUELS**

### **9.1 GENERAL**

**New para 9.1.4.23** is introduced reading as follows:

**".23** Fuel Handling Manual (AG)."

### 9.3 DESIGN OF GAS FUEL TANKS

Para 9.3.1.14 is replaced by the following text:

"9.3.1.14 All fuel storage tanks shall be provided with a pressure relief system appropriate to the design of the fuel containment system and the fuel being carried. Fuel storage hold spaces, interbarrier spaces, and tank connection spaces and tank cofferdams, which may be subject to pressures beyond their design capabilities, shall also be provided with a suitable pressure relief system. Pressure relief system shall be independent of the pressure control systems specified in 9.4."

### 9.7 FIRE PROTECTION

Para 9.7.2.5 is replaced by the following text:

"9.7.2.5 Any space containing equipment for the fuel preparation such as pumps, compressors, heat exchangers, vaporizers and pressure vessels shall be regarded as a machinery space of category A and provided with respect to their structural fire protection and protection of a fixed fire-extinguishing system complying with the requirements of 3.1.2, of Part VI "Fire Protection" taking into account necessary concentrations/application rate required for extinguishing gas fires. The requirements for escape routes from machinery spaces of category A shall not apply to these spaces."

### 9.12 PERSONNEL PROTECTION

Para 9.12.5 is replaced by the following text:

"9.12.5 ~~The following operating documentation shall be available on board:~~

- ~~.1 gas fuel bunkering instructions;~~
- ~~.2 inerting and gas freeing instructions;~~
- ~~.3 instructions for using gas fuel;~~
- ~~.4 instructions describing the crew actions in emergencies which may arise during operations with gas fuel.~~

The ship shall be provided with operational procedures including a suitably detailed Fuel Handling Manual containing at least the following data:

- .1 overall operation of the ship from dry-dock to dry-dock, including procedures for system cool down and warm up, bunkering and, where appropriate, discharging, sampling, inerting and gas freeing;
- .2 temperature and pressure control during bunkering, alarm and safety systems;
- .3 system limitations, cool down rates and maximum fuel storage tank temperatures prior to bunkering, including minimum fuel temperatures, maximum tank pressures, transfer rates, filling limits and sloshing limitations;
- .4 operation of inert gas systems;
- .5 firefighting and emergency procedures: operation and maintenance of fire extinguishing systems and use of extinguishing media;
- .6 specific fuel properties and special equipment needed for the safe handling of the particular fuel;
- .7 fixed and portable gas detection operation and maintenance of equipment;
- .8 emergency shutdown and emergency release systems, where fitted; and
- .9 a description of the procedural actions to take in an emergency situation, such as leakage, fire or potential fuel stratification in fuel storage tank resulting in rollover."

## 18 INDOOR HYGIENE AND SANITARY CONDITIONS

### 18.1 INDOOR CLIMATE

Para 18.1.1 is replaced by the following text:

#### "18.1.1 General.

Ships complying with the indoor climate requirements of this Chapter may be assigned the distinguishing mark **COMF(C)** added to the character of classification.

The requirements of this Chapter apply to ship's passenger and crew spaces including accommodation spaces (cabins, corridors, offices, hospitals, lounges, mess rooms, shopping rooms, sanitary spaces, games, recreation and entertainment rooms, and other similar spaces), navigation bridge, main machinery control room and other spaces where the continuous or prolonged presence of persons is required for normal operational conditions."

Para 18.1.4.2.1 is replaced by the following text:

~~"18.1.4.2.1 Band width between 20 to 24 °C at outside temperature ≤15 °C and between 24 to 28 °C at outside temperature ≥ 40 °C shall be provided. Depending on the outside temperature, temperature conditions in ship's spaces shall be provided in accordance with Table 18.1.4.2.1.~~

Table 18.1.4.2.1

Outside temperature, $T_{out}$ , °C	Inside temperature, $T_{in}$ , °C	
	minimum	maximum
15 and less	20	24
more than 15°C, but less than 40°C	$0,16T_{out} + 17,6$	$0,16T_{out} + 21,6$
40 and more	24	28

## 26 ADDITIONAL REQUIREMENTS FOR SEA COASTAL SHIPS IN RESTRICTED AREAS RN(SCI) AND RN(SCII)

### 26.2 TECHNICAL REQUIREMENTS

Para 26.2.1.1 is replaced by the following text:

#### "26.2.1.1 General.

Requirements of 26.2.1 apply to steel ships of welded construction, from 12 to 140 m in length whose proportions are taken within the limits given in Table 26.2.1.1."

Table 26.2.1.1 is deleted.

New para 26.2.2.3.7.3 is introduced reading as follows:

".3 if the anchor chain diameter calculated according to Formula (26.2.2.3.7-1) exceeds the value for ships of restricted area of navigation **R3-RSN**, determined in accordance with 3.1.3 of Part III "Equipment, Arrangements and Outfit", it is allowed to apply the anchor chain with a diameter determined in accordance with 3.1.3 of Part III "Equipment, Arrangements and Outfit" for ships of restricted area of navigation **R3-RSN**."



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