RULES FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS

Rules for the Survey and Construction of Inland Waterway Ships
2021 AMENDMENT NO.2
Guidance for the Survey and Construction of Inland Waterway Ships
2021 AMENDMENT NO.2

Rule No.67 / Notice No.64 27 December 2021
Resolved by Technical Committee on 28 July 2021

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NIPPON KAIJI KYOKAI

An asterisk (*) after the title of a requirement indicates that there is also relevant information in the corresponding Guidance.

RULES FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS

RULES

2021 AMENDMENT NO.2

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Rule No.67 27 December 2021
AMENDMENT TO THE RULES FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS

"Rules for the survey and construction of inland waterway ships" has been partly amended as follows:

Amendment 2-1

Part 4 HULL CONSTRUCTION AND EQUIPMENT OF TUGS AND PUSHERS

Chapter 16 EQUIPMENT

16.1 Anchors, Chain Cables and Ropes

Paragraph 16.1.5 has been amended as follows.

16.1.5 Mooring Lines*

~~**1** As for wire ropes and hemp ropes used as mooring lines, the breaking test load specified in **Chapter 4** or **5, Part L of Rules for the Survey and Construction of Steel Ships** is not to be less than the breaking load given in **Table 4.16.1** respectively.~~

~~**2**~~**1** For ships having the ratio of *A* specified in **16.1.2-1(2)** to equipment number (*A/EN*) above 0.9, the following number of mooring lines is to be added to the number required by **Table 4.16.1** for mooring lines.

Where *A/EN* is ~~above~~ greater than 0.9 ~~up to~~but 1.1 or less: 1
Where *A/EN* is ~~above~~ greater than 1.1 ~~up to~~but 1.2 or less: 2
Where *A/EN* is ~~above~~ greater than 1.2: 3

~~**3**~~**2** Application of synthetic fibre ropes for mooring lines is to be as deemed appropriate by the Society.

~~**4**~~**3** For mooring lines connected with powered winches where the rope is stored on the drum, steel cored wire ropes of suitable flexible construction may be used instead of fibre cored wire ropes subject to the approval by the Society.

~~**5**~~**4** The length of individual mooring lines may be reduced by up to 7% of the lengths given in **Table 4.16.1**, provided that the total length of the stipulated number of mooring lines is not less than that obtained from multiplying the length by the number given in **Table 4.16.1**.

Paragraph 16.1.7 has been amended as follows.

16.1.7 Supporting Hull Structures of Anchor Windlasses and Chain Stoppers

1 The supporting hull structures of anchor windlasses and chain stoppers are to be sufficient to accommodate operating loads and sea loads

(1) Operating loads are to be taken as not less than the following:
  (a) For chain stoppers, 80% of the chain cable breaking load
  (b) For windlasses, where no chain stopper is fitted or a chain stopper is attached to the windlass, 80% of the chain cable breaking load
  (c) For windlasses, where chain stoppers are fitted but not attached to the windlass, 45% of the chain cable breaking load

(2) Sea loads are to be taken according to **2.1.6, Section 4, Chapter 11, Part 1 of Part**

CSR-B&T

2 The permissible stresses for supporting hull structures of windlasses and chain stoppers~~, based on gross thicknesses,~~ are not to be greater than the following permissible values:

~~(1) Normal stress: 1.00 R_{eH}~~

~~(2) Shear stress: 0.60 R_{eH}~~

~~R_{eH}: The specified minimum yield stress of the material~~

(1) For strength assessment by means of beam theory or grillage analysis:

(a) Normal stress: 1.00 R_{eH}

(b) Shear stress: 0.60 R_{eH}

R_{eH}: The specified minimum yield stress of the material

(2) For strength assessments using finite element analysis:

(a) Von Mises stress: 1.00 R_{eH}

(3) The normal stress referred to in **(1)** above is the sum of bending stress and axial stress with the corresponding shearing stress acting perpendicular to the normal stress. No stress concentration factors are to be considered.

(4) The followings are recommended to be followed for the strength assessment by means of finite element analysis referred to in **(2) above**.

(a) The geometry is to be idealized as realistically as possible.

(b) The ratio of element length to width is not to exceed 3.

(c) Girders are to be modelled using shell or plane stress elements.

(d) Symmetric girder flanges may be modelled by beam or truss elements.

(e) The element height of girder webs is not to exceed one-third of the web height.

(f) In way of small openings in girder webs the web thickness is to be reduced to a mean thickness over the web height.

(g) Large openings are to be modelled

(h) Stiffeners may be modelled by using shell, plane stress, or beam elements.

(i) Stresses are to be read from the centre of the individual element.

(j) For shell elements the stresses are to be evaluated at the mid-plane of the element.

3 For strength assessments of supporting hull structures, beam theory or finite element analysis using net scantlings is to be applied as appropriate. In addition, the scantlings of supporting hull structure are to be built at least with the gross scantling obtained by adding the corrosion addition 2.0 *mm* to net scantlings obtained by the criteria specified in this section.

Part 5 HULL CONSTRUCTION AND EQUIPMENT OF BARGES

Chapter 14 EQUIPMENT

14.1 Anchors, Chain Cables and Ropes

Paragraph 14.1.5 has been amended as follows.

14.1.5 Tow Lines and Mooring Lines*

~~**1** As for wire ropes and fibre ropes used as tow lines and mooring lines, the breaking test load specified in **Chapter 4** or **5, Part L** is not to be less than the breaking load given in **Table 5.14.1**, and **Table 5.14.2** or **14.1.5-3** respectively.~~

~~**2**~~**1** The number of mooring lines for ships whose equipment numbers do not exceed 2,000 are to be in accordance with **Table 5.14.2.** However, for ships having the ratio *A/EN* above 0.9, the following number of ropes should be added to the number required by **Table 5.14.2** for mooring lines.

Where *A/EN* is ~~above~~ greater than 0.9 ~~up to~~but 1.1 or less: 1
Where *A/EN* is ~~above~~ greater than 1.1 ~~up to~~but 1.2 or less: 2
Where *A/EN* is ~~above~~ greater than 1.2: 3

EN : Equipment number

A : Value specified in **14.1.3(2)**

~~**3**~~**2** The number and strength of mooring lines whose equipment numbers exceed 2,000 are to be in accordance with ~~the following **(1) to (4);**~~ **Chapter 27, Part C of the Rules for the Survey and Construction of Steel Ships**.

~~(1) Minimum breaking strength (*MBL*) is not to be less than that obtained from the following formula:~~

~~$MBL = 0.1A_1 + 350$ (*kN*)~~

~~A_1: Ship side-projected area specified in **-5.**~~

~~(2) Head lines, stern lines, breast lines or spring lines in the same service are to be of the same characteristics in terms of strength and elasticity. The strength of spring lines is to be the same as that of the head, stern and breast lines.~~

~~(3) The total number of head, stern and breast lines is to be obtained from the following formula and rounded to the nearest whole number:~~

~~$n = 8.3 \times 10^{-4} A_1 + 6$~~

~~(4) The total number of spring lines is to be not less than two.~~

~~**4** Notwithstanding the requirement in **-3**, the number of head, stern and breast lines may be increased or decreased in conjunction with an adjustment to the strength of the lines. The adjusted strength, MBL^*, is to be taken as:~~

~~$MBL^* = 1.2MBL \cdot n/n^* \leq MBL$ (*kN*) for an increased number of lines~~

~~$MBL^* = MBL \cdot n/n^*$ (*kN*) for a reduced number of lines~~

~~n^*: The increased or decreased total number of head, stern and breast lines~~

~~n : The number of lines for the considered ship type as calculated by the formulae specified in **-3(3)** without rounding.~~

~~In the same manner, the strength of head, stern and breast lines may be increased or decreased in conjunction with an adjustment to the number of lines. If the number of head, stern and breast lines is increased in conjunction with an adjustment to the strength of the lines, the number of spring lines is to be likewise increased, but rounded up to the nearest even number.~~

~~**5** The ship side-projected area A_1 is to be obtained from the same formula specified in~~

~~**14.1.3(2)**. However, following **(1)** to **(3)** are to be considered.~~

~~(1) The lightest draft of usual loading conditions is to be considered if the ratio of the freeboard in the lightest draft and the full load condition is equal to or above two.~~

~~(2) Wind shielding of the pier can be considered for the calculation of the side-projected area A_L unless the ship is intended to be regularly moored to jetty-type piers. A height of the pier surface of 3 *m* over waterline may be assumed; in other word, the lower part of the side-projected area with a height of 3 *m* above the waterline for the considered loading condition may be disregarded for the calculation of the side-projected area A_L.~~

~~(3) Deck cargo is to be included for the determination of side-projected area A_L. Deck cargo may not need to be considered if a usual light draft condition without cargo on deck generates a larger side-projected area A_L than the full load condition with cargo on deck. The larger of both side-projected areas is to be chosen as side-projected area A_L.~~

~~**6** The mooring lines specified in **-3** and **-4** are based on the following environmental conditions:~~

~~(1) Maximum current speed: 1.0 *m/s*~~

~~(2) Maximum wind speed v_w: 25.0 *m/s*~~

~~**7** Among the environmental conditions specified in **-6**, the maximum wind speed v_w may be increased and decreased in conjunction with an adjustment to the strength of the lines as the acceptable wind speed v_w^*. In this case, the acceptable wind speed v_w^* is to be obtained from the following formula:~~

~~$$v_w^* = v_w \sqrt{\frac{MBL^*}{MBL}}$$~~

~~MBL^*: The adjusted strength of mooring lines (*kN*)~~

~~However, the maximum wind speed v_w can be decreased where maximum breaking strength, *MBL*, specified in **-3(1)** is more than 1,275 *kN*. The acceptable wind speed v_w^* is to be not less than 21 *m/s*.~~

~~**8** The length of mooring lines for ships whose equipment numbers are less than or equal to 2,000 is to be in accordance with **Table 5.14.2**. For ships whose equipment numbers exceed 2,000, the length of mooring lines is to be taken as 200 *m*.~~

~~**9** Application of fibre ropes for tow lines or mooring lines is to be as deemed appropriate by the Society.~~

~~**10** For mooring lines connected with powered winches where the rope is stored on the drum, steel cored wire ropes of suitable flexible construction may be used instead of fibre cored wire ropes subject to the approval by the Society.~~

~~**11** The length of individual mooring lines may be reduced by up to 7% of the lengths given in **-8**, provided that the total length of the stipulated number of mooring lines is not less than that obtained from multiplying the length by the number given in **-2** or **-3**.~~

Paragraph 14.1.7 has been amended as follows.

14.1.7 Supporting Hull Structure of Anchor Windlasses and Chain Stoppers

1 The supporting hull structures of anchor windlasses and chain stoppers are to be sufficient to accommodate operating loads and sea loads

(1) Operating loads are to be taken as not less than the following:
   (a) For chain stoppers, 80% of the chain cable breaking load
   (b) For windlasses, where no chain stopper is fitted or a chain stopper is attached to the windlass, 80% of the chain cable breaking load
   (c) For windlasses, where chain stoppers are fitted but not attached to the windlass, 45% of the chain cable breaking load

(2) Sea loads are to be taken according to **2.1.6, Section 4, Chapter 11, Part 1 of Part CSR-B&T**

2 The permissible stresses for supporting hull structures of windlasses and chain stoppers~~, based on gross thicknesses,~~ are not to be greater than the following permissible values:

~~(1) Normal stress: 1.00 R_{eH}~~

~~(2) Shear stress: 0.60 R_{eH}~~

~~R_{eH}: The specified minimum yield stress of the material~~

(1) For strength assessment by means of beam theory or grillage analysis:

(a) Normal stress: 1.00 R_{eH}

(b) Shear stress: 0.60 R_{eH}

R_{eH}: The specified minimum yield stress of the material

(2) For strength assessments using finite element analysis:

(a) Von Mises stress: 1.00 R_{eH}

(3) The normal stress referred to in **(1)** above is the sum of bending stress and axial stress with the corresponding shearing stress acting perpendicular to the normal stress. No stress concentration factors are to be considered.

(4) The followings are recommended to be followed for the strength assessment by means of finite element analysis referred to in **(2) above**.

(a) The geometry is to be idealized as realistically as possible.

(b) The ratio of element length to width is not to exceed 3.

(c) Girders are to be modelled using shell or plane stress elements.

(d) Symmetric girder flanges may be modelled by beam or truss elements.

(e) The element height of girder webs is not to exceed one-third of the web height.

(f) In way of small openings in girder webs the web thickness is to be reduced to a mean thickness over the web height.

(g) Large openings are to be modelled

(h) Stiffeners may be modelled by using shell, plane stress, or beam elements.

(i) Stresses are to be read from the centre of the individual element.

(j) For shell elements the stresses are to be evaluated at the mid-plane of the element.

3 For strength assessments of supporting hull structures, beam theory or finite element analysis using net scantlings is to be applied as appropriate. In addition, the scantlings of supporting hull structure are to be built at least with the gross scantling obtained by adding the corrosion addition 2.0 *mm* to net scantlings obtained by the criteria specified in this section.

EFFECTIVE DATE AND APPLICATION (Amendment 2-1)

1. The effective date of the amendments is 1 January 2022.

2. Notwithstanding the amendments to the Rules, the current requirements apply to ships for which the date of contract for construction* is before the effective date.

* "contract for construction" is defined in the latest version of IACS Procedural Requirement (PR) No.29.

IACS PR No.29 (Rev.0, July 2009)

1. The date of "contract for construction" of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding.

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

For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a "series of vessels" if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided:

(1) such alterations do not affect matters related to classification, or

(2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval.

The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed.

3. If a contract for construction is later amended to include additional vessels or additional options, the date of "contract for construction" for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a "new contract" to which **1.** and **2.** above apply.

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

Note:
This Procedural Requirement applies from 1 July 2009.

Amendment 2-2

Part 7 MACHINERY INSTALLATIONS

Chapter 2 RECIPROCATING INTERNAL COMBUSTION ENGINES

2.1 General

2.1.1 General*

Sub-paragraph -3 has been deleted.

~~**3** Electronically-controlled reciprocating internal combustion engines which are used as the main propulsion machinery are to be in accordance with the requirements specified otherwise by the Society in addition to those in this Chapter.~~

2.1.2 Terminology

Sub-paragraph -3 has been added as follows.

3 For electronically-controlled engines, the terminology is as specified in the following **(1)** to **(10)**:

(1) "Electronically-controlled engines" are engines whose fuel injection and/or Exhaust valve operation etc. are electronically controlled.

(2) "Accumulators" are small pressure vessels fitted to cylinders which provide hydraulic oil to those actuators attached to fuel injection devices or exhaust valve driving gears.

(3) "Common accumulators" are pressure vessels common to all cylinders for providing hydraulic oil or pressurized fuel oil.

(4) "Control valves" are components to control the delivery of hydraulic oil to drive actuators. The name control valve is generic for on-off-controlled solenoid valves, proportional-controlled valves or variable-controlled valves, etc.

(5) "Fuel oil pressure pumps" are pumps which provide pressurized fuel oil for common accumulators.

(6) "Hydraulic oil pressure pumps" are pumps to provide hydraulic oil for equipment, e.g. fuel injection devices, exhaust valve driving gears or control valves, through common accumulators.

(7) "Functional blocks" are blocks used to classify by function all items making up whole systems into the groups of systems, sub-systems, components, assemblies and parts.

(8) "Reliability block diagrams" are logical figures showing the relationship between functional blocks on an analytic level.

(9) "Normal operation" of main propulsion machinery means those operations at normal out-put conditions, using governors and all safety devices.

(10) "High-pressure" piping means piping in the down-stream of fuel oil pressure pumps or hydraulic oil pressure pumps.

2.2 Materials, Construction and Strength

2.2.2 Construction, Installation and General*

Sub-paragraph -8 has been added as follows.

8 Essential components are to be so arranged that normal operation of main propulsion machinery is capable of being sustained or restored even though one of these components becomes inoperable, except in cases where special consideration and approval is given by the Society to the reliability of single arrangements. Single components provided for cylinders, which do not require a spare, may be acceptable in cases where any failed parts can be isolated.

2.5 Associated Installations

Paragraphs 2.5.7 to 2.5.11 have been added as follows.

2.5.7 Control Valves for Electronically-controlled Engines which are used as the Main Propulsion Machinery

1 Control valves are to be capable of retaining their expected ability to function properly for a period of time set by manufacturers.

2 Control valves are to be independently provided for each function (e.g. fuel injection, exhaust valve driving).

3 Means are to be provided to prevent fuel oil from continuously flowing into cylinders due to control valve failure.

2.5.8 Accumulators and Common Accumulators for Electronically-controlled Engines which are used as the Main Propulsion Machinery

1 Accumulators and common accumulators are to comply with the requirements in **Chapter 10, Part D of the Rules for the Survey and Construction of Steel Ships**. However, notwithstanding this requirement, materials and non-destructive tests as well as surface inspections and dimension inspections are to be in accordance with **Table D2.1, Part D of the Rules for the Survey and Construction of Steel Ships** and hydrostatic tests are to be in accordance with **Table D2.6, Part D of the Rules for the Survey and Construction of Steel Ships**.

2 Accumulators are to be capable of retaining their expected ability to function properly for a period of time set by manufacturers.

3 In principle, at least two common accumulators are to be provided. However, in cases where results of fatigue analysis upon fluctuating stress are submitted and approved by the Society, a single arrangement may be acceptable.

2.5.9 Fuel Oil Piping Systems and Hydraulic Oil Piping Systems for Electronically-controlled Engines which are used as the Main Propulsion Machinery

1 At least two fuel oil pressure pumps and hydraulic oil pressure pumps are to be provided for their respective lines and are to be capable of supplying a sufficient amount of oil at the maximum continuous output of main propulsion machinery. In such cases, even though a single one of these pumps may become inoperable, the remaining pumps are to be capable of supplying a sufficient amount of fuel under normal service conditions. In cases where one or more of these pumps are provided as a stand-by pump, the pumps are to always be connected and ready for use.

2 Piping arrangements from fuel oil pressure pumps to the fuel injection devices and from

hydraulic oil pressure pumps to exhaust valve driving gears are to be protected with jacketed piping systems or oil tight enclosures, to prevent any spread of oil from igniting.

3 Two common piping arrangements from fuel oil pressure pumps or a hydraulic oil pressure pumps to common accumulators, from one common accumulator to another common accumulator and from common accumulators to those positions where distribution to cylinders are to be respectively provided. In cases where results of fatigue analysis upon fluctuating stress are submitted and approved by the Society, a single arrangement may be acceptable.

4 Valves or cocks provided on piping connected to equipment, e.g. accumulators or pumps, are to be located as close to such equipment as practicable.

5 In high-pressure piping, high-pressure alarms are to be provided. Relief valves are also to be provided at proper positions, so as to lead any released oil to lower-pressure sides.

6 In cases where pressure gauges using bourdon-tubes are provided in high-pressure piping, such gauges are to be ones that comply with recognized industrial standards, e.g. *JIS*, and be vibration-proof and heat-resistant types.

2.5.10 Electronic Control Systems for Electronically-controlled Engines which are used as the Main Propulsion Machinery

1 Systems are to be so arranged that the function of an entire system is capable of being sustained or restored in cases where there is a single failure in any equipment part or circuit.

2 Controllers for systems are to comply with the following:

(1) At least two main controllers which are integrated to control every function, e.g. fuel injection, exhaust valve drive, cylinder lubrication and supercharge, are to be provided.

(2) Notwithstanding the requirement in **(1)** above, a single main controller may be acceptable, in cases where normal operation of main propulsion machinery is available by using control systems independent from main controllers.

3 At least two sensors essential for the operation of main propulsion machinery, e.g. for the following uses, are to be independently provided. In cases where normal operation of main propulsion machinery is available without any feedback from such sensors, single arrangements may be acceptable.

(1) Number of revolutions

(2) Crank angles

(3) Fuel pressure in common accumulators

4 Power for control systems is to be supplied from two independent sources, one of which is to be supplied from a battery, and through two independent circuits.

5 Power for driving solenoid valves is to be supplied from two independent sources, and through two independent circuits.

6 Electronic-control systems of main propulsion machinery which comply with the requirements given in **-1** through **-5** above are regarded as the same as those which comply with the following requirements.

(1) **18.2.4-5(1), Part D of the Rules for the Survey and Construction of Steel Ships**.

(2) **18.3.2-3(3), Part D of the Rules for the Survey and Construction of Steel Ships**.

2.5.11 Failure Mode Effect Analysis for Electronically-controlled Engines which are used as the Main Propulsion Machinery

Failure Mode Effect Analysis (FMEA) is to be carried out, for electronic control systems, in order to confirm that any one equipment or circuits in such systems which lose function may not cause any malfunction or deterioration in other equipment or circuits, in accordance with the following:

(1) Systems are to be divided into functional blocks and drawn out in reliability block diagrams in which such functional blocks are systematically organized.

(2) Analytic levels are to be sufficient up to the extent of those functional blocks regarding sub-systems and components.
(3) FMEA results are to be created in table form as shown in **Table 7.2.6** or be of equivalent forms thereto.
(4) If FMEA results show that corrective action is demanded, then FMEA is to be carried out again after the corrective action to confirm the effectiveness of the corrective action.
(5) For failure modes, every possible failure from minor to catastrophic is to be considered.

Table 7.2.6 has been renumbered to Table 7.2.7, and Table 7.2.6 has been added as follows.

Table 7.2.6 Failure Mode Effect Analysis Table for Electronically-controlled Engines which are used as the Main Propulsion Machinery

Systems					Elements								
ID Number	Component	Sub-system	Operating mode	Failure mode	Failure cause	Failure detection Means	Alarm / Notification Means	Effect of failure			Failure severity	Corrective action	Remarks
								On component	On sub-system	On system			

Examples of Operating Mode: ack-up operations, fuel cost priority operations, NOx reduction operations, etc.
Examples of Failure Mode: piston pin stuck, connecting rod broken, lubricating oil leaked out, etc.(Failed parts are to be shown.)
Failure Severity:
(a) Catastrophic: loss of complete function, explosion, loss of life (Design change is to be compulsory.)
(b) Major: loss or deterioration of part of the ability to function properly (Possible design change is to be investigated.)
(c) Minor: negligible affect on ability to function properly (Design change may not be required.)

2.6 Tests

2.6.1 Shop Tests*

Sub-paragraph -1 has been amended as follows.

1 For components or accessories specified in **Table 7.2.~~6~~7**, hydrostatic tests are to be carried out on the water or oil side of the component at the pressures shown in the Table. In cases deemed necessary by the Society, tests may also be required for any components not specified in **Table 7.2.~~6~~7**.

Table 7.2.~~6~~7 Hydrostatic Test Pressure

(Table is omitted.)

Chapter 14 AUTOMATIC AND REMOTE CONTROL

14.1 General

14.1.1 Scope*

Sub-paragraph -3 has been amended as follows.

3 Computer based systems, including the hardware and software which constitute such systems, are to be in accordance with ~~requirements specified otherwise by the Society~~ **Annex 18.1.1, Part D of the Rules for the Survey and Construction of Steel Ships** in addition to those specified in **-1** and **-2** above and throughout the rest of this chapter for design, construction, commissioning, maintenance, etc.

14.1.3 Drawings and Data*

Sub-paragraphs (1) and (2) have been amended as follows.

Drawings and data to be submitted are generally, as follows. However, other drawings and data may be required in cases where deemed necessary by the Society.

(1) Drawings and ~~date~~ data for approval:
((a) to (e) are omitted.)
(f) Drawings and data ~~deemed necessary by the Society~~ listed in **1.2(1), Annex 18.1.1, Part D of the Rules for the Survey and Construction of Steel Ships** for computer based systems specified in **14.1.1-3.** With respect to computer based systems which have been already approved by the Society in accordance with **Chapter 8, Part 7 of the Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use**, only drawings and data on parts that differ from ship to ship need to be submitted.

(2) Drawings and ~~date~~ data for reference:
Drawings and data ~~deemed necessary by the Society~~ listed in **1.2(2), Annex 18.1.1, Part D of the Rules for the Survey and Construction of Steel Ships** for computer based systems specified in **14.1.1-3.** With respect to computer based systems which have been already approved by the Society in accordance with **Chapter 8, Part 7 of the Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use**, only drawings and data on parts that differ from ship to ship need to be submitted; this, however, excludes those specified in **1.2(2)(a)** of the Annex.

EFFECTIVE DATE AND APPLICATION (Amendment 2-2)

1. The effective date of the amendments is 1 January 2022.

Amendment 2-3

Part 7 MACHINERY INSTALLATIONS

Chapter 7 BOILERS, ETC. AND INCINERATORS

7.1 General

Paragraph 7.1.1 has been amended as follows.

7.1.1 Scope

1 The requirements in this Chapter apply to ~~boilers excluding those given in the following **(1)** and **(2)**, thermal oil heaters and incinerators:~~ the following.

(1) Boilers (excluding the following **(a)** and **(b)**)

(~~1~~a) Steam boilers with a design pressure not exceeding 0.1 *MPa* and heating surface not exceeding 1 m^2

(~~2~~b) Hot water boilers with a design pressure not exceeding 0.1 *MPa* and heating surface not exceeding 8 m^2

(2) Thermal oil heaters

(3) Incinerators

2 The requirements in **7.2** may be applied to the boilers referred to in the preceding **-1(1)** with a design pressure not exceeding 0.35 *MPa* (hereinafter referred to as “small boilers”).

Paragraph 7.1.2 has been amended as follows.

7.1.2 Terminology

Terms used in this Part are defined as follows:

(1) “Boilers” are plants which generate steam or hot water by means of flame, combustion gases or other hot gases and include superheaters, reheaters, economizers and exhaust gas economizers, etc.

(2) “Main boiler” means boilers which supply steam to steam turbines used for the main propulsion of ships.

(~~2~~3) “Essential auxiliary boilers” are boilers which supply steam necessary for the operation of auxiliary machinery essential for main propulsion, auxiliary machinery for manoeuvring and safety as well as for generators.

(~~3~~4) “Exhaust gas boilers” are boilers which generates steam or hot water using only exhaust gases from reciprocating internal combustion engines, have independent steam spaces or hot wells and have outlets for steam or hot water.

(~~4~~5) “Exhaust gas economizers” are those equipment which generates steam or hot water using only exhaust gases from reciprocating internal combustion engines and do not have independent steam spaces or hot wells.

(~~5~~6) “Heating surfaces of boilers” are those areas calculated on combustion gas side surfaces where one side is exposed to combustion gas and the other side to water. Unless specified otherwise, the heating surfaces of superheaters, reheaters, economizers or exhaust gas economizers are excluded.

(~~6~~7) “Approved working pressures of boilers” and “nominal pressure of boilers with built-in superheaters” are as defined in **2.1.22** and **2.1.23, Part 1**.

(~~7~~8) “Design pressures” are those pressure used in the calculations made to determine the scantlings of each component and are the maximum permissible working pressure of a

component. Design pressures of boiler drums are not to be less than the approved working pressure of their respective boilers.

(9) "Fittings" are items directly attached (i.e. welded) to boilers (e.g. nozzles) as well as items not directly attached but connected to boilers (e.g. valve boxes (including safety valves) and water level gauges) that receive pressure.

(10) "End plates" means the plates that cover both ends of the shells.

(11) "Tube plates" means end plates to which the smoke tubes are attached in the case of smoke tube boilers, or end plates to which the water tubes are attached in the case of water tube boilers.

Paragraph 7.1.3 has been amended as follows.

7.1.3 Drawings and Data to be Submitted*

Drawings and data to be submitted are generally as follows:

(1) Drawings (with materials and scantlings)

((a) to (l) are omitted.)

(2) Data

(a) Particulars of the boiler (design pressure, design temperature, maximum steam evaporation, heating surface, etc.)

((b) to (d) are omitted.)

7.2 Construction etc. of Boilers

7.2.1 General

Sub-paragraph -1 has been amended as follows.

1 Boilers with design pressures that do not exceed 0.35 *MPa* ~~(hereinafter referred to as the "small boilers") are to~~may be compl~~y~~ied with the requirements specified in **7.2.2** and **7.2.3**.

EFFECTIVE DATE AND APPLICATION (Amendment 2-3)

1. The effective date of the amendments is 1 January 2022.

2. Notwithstanding the amendments to the Rules, the current requirements apply to ships for which the date of contract for construction is before the effective date.

3. Notwithstanding the provision of preceding **2.**, the amendments to the Rules may apply to ships for which the date of contract for construction is before the effective date upon request of the owner.

Amendment 2-4

Part 7 MACHINERY INSTALLATIONS

Chapter 10 PIPES, VALVES, PIPE FITTINGS AND AUXILIARIES

10.1 General

Paragraph 10.1.6 has been amended as follows.

10.1.6 Use of Special Materials*

Notwithstanding the provisions in **10.1.5** above, special materials such as rubber hoses, plastic pipes~~,~~ (including vinyl pipes) complying with **Annex 12.1.6, Part D of the Rules for the Survey and Construction of Steel Ships**, aluminum alloys, etc. may be used~~, after taking into account safety against fire and flooding as well as their service conditions,~~ in cases where approved by the Society in accordance with provisions specified otherwise after taking into account their safety against fire and flooding as well as their service conditions.

EFFECTIVE DATE AND APPLICATION (Amendment 2-4)

1. The effective date of the amendments is 1 July 2022.

2. Notwithstanding the amendments to the Rules, the current requirements apply to plastic piping systems other than those which fall under the following:

(1) plastic piping systems for which the application for approval of use is submitted to the Society on or after the effective date;

(2) plastic piping systems for which the date of renewal of approval of use is on or after the effective date; or

(3) plastic piping systems used on ships for which the date of contract for construction is on or after the effective date.

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS

GUIDANCE

2021 AMENDMENT NO.2

Notice No.64 27 December 2021

Resolved by Technical Committee on 28 July 2021

Notice No.64 27 December 2021
AMENDMENT TO THE GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS

"Guidance for the survey and construction of inland waterway ships" has been partly amended as follows:

Amendment 2-1

Part 2 CLASS SURVEYS

Chapter 8 PROPELLER SHAFT AND STERN TUBE SHAFT SURVEYS

8.1 Propeller Shaft and Stern Tube Shaft Surveys

8.1.2 Partial Surveys

Sub-paragraph -1(2) has been amended as follows.

1 The "reference standards deemed appropriate by the Society" referred to in **8.1.2(2)(b)i), Part 2 of the Rules** means the reference standards specified in the following **(1)** and **(2)**:

(1) (Omitted)

(2) The following **(a)** and **(b)** upper limits for IR Oxidation and separated water; however, in the case of environmentally acceptable lubricants (EAL), regardless of the following **(a)**, observation of any trends (such as TAN (total acid number), viscosity and change in colour etc.) based on periodical oil analysis ~~can~~ may be made. In such cases, observations of TAN trends are to be made based on sequential analysis in conjunction with limits for continued use in service defined by oil makers.

(a) IR oxidation @ 5.85μm: 10 (*Abs.unit*/*cm*)

(b) Separated water: 1.0 *%*

Table 2.8.1.3-1 has been amended as follows.

Table 2.8.1.3-1 Approval Procedure of Preventive Maintenance System for Oil Lubricated Propeller Shafts

Item	Procedures
1. General	(Omitted)
2. Application	(Omitted)
3. Approval and Notation	(Omitted)
4. Approval Conditions	(Omitted)
5. After Approval	(-1 to -3 are omitted.) -4 The ship is, no later than the survey due date specified in **1.1.3-1(6)(a)i), Part 2 of the Rules**[1, 2], to be subject to a Partial Survey in accordance with **(a)** to **(i)** of **8.1.2(1)**, **Part 2 of the Rules**[3, 4] after the examinations specified in the following (1) to (4) are carried out and the shaft condition is to be confirmed satisfactory. However, for propeller shafts with keyless connections, the maximum interval of two consecutive surveys according to the requirements applied to Partial Surveys, including survey items 2 and 9 specified in **Table 2.8.1, Part 2 of the Rules** or Ordinary Surveys (specified in **8.1.1, Part 2 of the Rules**) is not to exceed 18 *years*[5, 6]. In all cases where the results of the examinations specified in the following (1) to (4) or the Partial Survey are not satisfactory, an Ordinary Survey specified in **8.1.1, Part 2 of the Rules** is to be carried out. (1) Review of service records, including those specified in (2) and (3) of 4.-3, is to be carried out. (2) Review of test records of the lubricating oil analysis is to be carried out to confirm that the reference standards specified in 4.-3 are complied with. In the case of environmentally acceptable lubricants (EAL), however, observations of trends (such as TAN (total acid number), viscosity and colour change, etc.) based on periodical oil analysis may be made instead regardless of the criteria for the parameters in 4-3. In such cases, observations of TAN trends are to be made based on sequential analysis in conjunction with the limits for continued use in service defined by oil makers. (3) An oil sample examination is to be carried out. (4) Verification of no reported repairs by grinding or welding of shafts and/or propellers is to be carried out.
6. Cancellation of Approval	(Omitted)

Part 7 MACHINERY INSTALLATIONS

Chapter 2 RECIPROCATING INTERNAL COMBUSTION ENGINES

2.1 General

2.1.1 General

Sub-paragraph -2 has been deleted.

~~**2 The wording "the requirements specified otherwise by the Society" in 2.1.1-3, Part 7 of the Rules means "GUIDANCE FOR THE ADDITIONAL REQUIREMENTS ON ELECTRONICALLY CONTROLLED ENGINES" in Annex D2.1.1, Part D of the Guidance for the Survey and Construction of Steel Ships.**~~

Sub-paragraph -3 has been renumbered to Sub-paragraph -2, and has been amended as follows.

~~**3**~~**2** The wording "the requirements specified otherwise by the Society" in **2.1.1-~~6~~5, Part 7 of the Rules** means **Annex 3** "**GUIDANCE FOR HIGH PRESSURE DUAL FUEL ENGINES**" or **Annex 4** "**GUIDANCE FOR LOW PRESSURE DUAL FUEL ENGINES**" of **Part N** for gas-fuelled engines to which **Chapter 16, Part N of the Rules** apply, and **Annex 3** "**GUIDANCE FOR HIGH PRESSURE GAS-FUELLED ENGINES**" or **Annex 4** "**GUIDANCE FOR LOW PRESSURE GAS-FUELLED ENGINES**" of **Part GF** for gas-fuelled engines to which **Chapter 16, Part N of the Rules** does not apply (**Part GF of the Rules** apply instead).

Chapter 14 AUTOMATIC AND REMOTE CONTROL

14.1 General

14.1.1 Scope

Sub-paragraph -2 has been deleted.

~~**2 The "requirements specified otherwise by the Society" referred to in 14.1.1-3, Part 7 of the Rules** means **Annex D18.1.1 "COMPUTER-BASED SYSTEMS", Part D of the Guidance for the Survey and Construction of Steel Ships.**~~

Paragraph 14.1.3 has been deleted.

~~**14.1.3 Drawings and Data**~~

~~**1** The "drawings and data deemed necessary by the Society" stipulated in **14.1.3(1)(f), Part 7 of the Rules** refer to the items specified in **1.2(1), Annex D18.1.1 "COMPUTER-BASED SYSTEMS", Part D of the Guidance for the Survey and Construction of Steel Ships** as a standard. With respect to computer-based systems which have been already approved by the Society in accordance with **Chapter 8, Part 7 of the Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use**, only drawings and data on parts that differ from ship to ship need to be submitted.~~

~~**2** The "drawings and data deemed necessary by the Society" stipulated in **14.1.3(2), Part 7 of the Rules** refer to the items specified in **1.2(2), Annex D18.1.1 "COMPUTER-BASED SYSTEMS", Part D of the Guidance for the Survey and Construction of Steel Ships** as a standard. With respect to computer-based systems which have been already approved by the Society in accordance with **Chapter 8, Part 7 of the Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use**, only drawings and data on parts that differ from ship to ship need to be submitted; this, however, excludes those specified in **1.2(2)(a)** of the Annex.~~

EFFECTIVE DATE AND APPLICATION (Amendment 2-1)

1. The effective date of the amendments is 1 January 2022.

Amendment 2-2

Part 4 HULL CONSTRUCTION AND EQUIPMENT OF TUGS AND PUSHERS

Chapter 16 EQUIPMENT

16.1 Anchors, Chain Cables and Ropes

16.1.5 Mooring Lines

Sub-paragraphs -1 and -2 have been amended as follows.

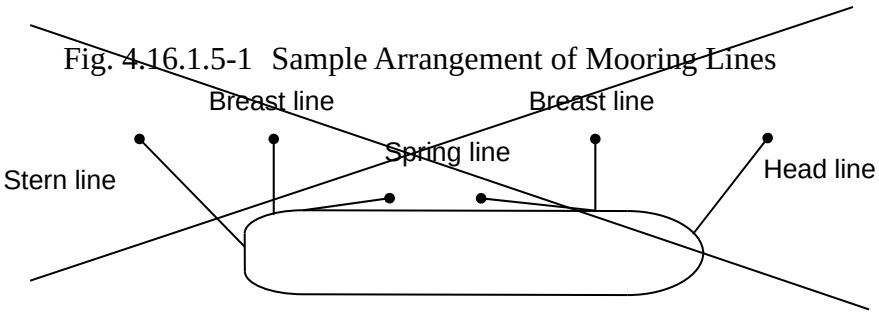
1 With respect to the provisions of **16.1.5, Part 4 of the Rules**, deck cargo ~~as given by the Loading Manual~~ at the ship nominal condition is to be included for the determination of side-projected area *A*. The ship nominal capacity condition is defined as the theoretical condition in which the maximum possible amount of deck cargoes (in their respective positions) is included in the ship arrangement. For ships carrying containers, the ship nominal capacity condition represents the theoretical condition in which the maximum possible number of containers (in their respective positions) is included in the ship arrangement.

2 Fibre ropes used for mooring lines are to be not less than 20 *mm* in diameter. The minimum breaking strength specified in **16.1.5, Part 4 of the Rules** is to be increased by 20 % for polyamide ropes and by 10 % for other synthetic ropes to account for any strength loss due to ~~aging~~ rope age degradation and wear, etc.

3 For synthetic fibre ropes, it is recommended to use lines which have a reduced risk of recoil (snap-back) to mitigate the risk of injuries or fatalities in the cases where the line may break.

Fig.4.16.1.5-1 has been deleted.

Fig. 4.16.1.5-1 Sample Arrangement of Mooring Lines



Part 5 HULL CONSTRUCTION AND EQUIPMENT OF BARGES

Chapter 14 EQUIPMENT

14.1 Anchors, Chain Cables and Ropes

Paragraph 14.1.5 has been amended as follows.

14.1.5 Tow Lines and Mooring Lines

1 With respect to the provisions of **14.1.5-2, Part 5 of the Rules**, deck cargo ~~as given by the loading manual~~ at the ship nominal capacity condition is to be included for the determination of side-projected area *A*. The ship nominal capacity condition is defined as the theoretical condition in which the maximum possible amount of deck cargoes (in their respective positions) is included in the ship arrangement. For ships carrying containers, the ship nominal capacity condition represents the theoretical condition in which the maximum possible number of containers (in their respective positions) is included in the ship arrangement.

2 Fibre ropes used for mooring lines are not to be less than 20 *mm* in diameter. For polyamide ropes the minimum breaking strength specified in **14.1.5, Part 5 of the Rules** is to be increased by 20 % and for other synthetic ropes by 10 % to account for any strength loss due to~~, among others, aging~~ rope age degradation and wear, etc.

3 For synthetic fibre ropes, it is recommended to use lines with reduced risk of recoil (snap-back) to mitigate the risk of injuries or fatalities in the case of breaking mooring lines.

~~**4** "Breast line", "head line", "stern line" and "spring line" referred to in **14.1.5, Part 5 of the Rules** are defined as follows.~~

~~(1) Breast line: A mooring line that is deployed perpendicular to the ship, restraining the ship in the off-berth direction.~~

~~(2) Spring line: A mooring line that is deployed almost parallel to the ship, restraining the ship in fore or aft direction.~~

~~(3) Head/Stern line: A mooring line that is oriented between the longitudinal and transverse directions, restraining the ship in the off-berth and in the fore or aft directions. The amount of restraint in the fore or aft and off-berth directions depends on the line angle relative to these directions.~~

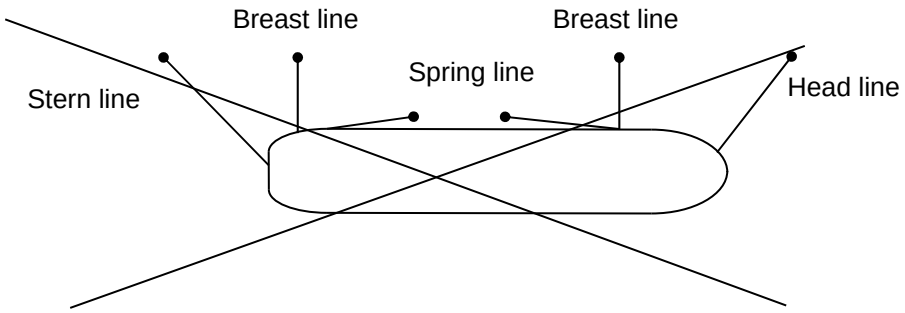
~~**5** Maximum wind speed, acceptable wind speed and maximum current speed referred to in **14.1.5-6, Part 5 of the Rules** are based on the following **(1)** to **(2)**.~~

~~(1) The wind speed is considered representative of a 30 second mean speed from any direction and at a height of 10 *m* above the ground.~~

~~(2) The current speed is considered representative of the maximum current speed acting on bow or stern (±10°) and at a depth of one-half of the mean draft. Furthermore, it is considered that ships are moored to solid piers that provide shielding against cross currents.~~

Fig. 5.14.1.5-1 has been deleted.

Fig. 5.14.1.5-1 Sample Arrangement of Mooring Lines



EFFECTIVE DATE AND APPLICATION (Amendment 2-2)

1. The effective date of the amendments is 1 January 2022.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to ships for which the date of contract for construction* is before the effective date.

* "contract for construction" is defined in the latest version of IACS Procedural Requirement (PR) No.29.

IACS PR No.29 (Rev.0, July 2009)

1. The date of "contract for construction" of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding.

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

For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a "series of vessels" if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided:

(1) such alterations do not affect matters related to classification, or

(2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval.

The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed.

3. If a contract for construction is later amended to include additional vessels or additional options, the date of "contract for construction" for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a "new contract" to which **1.** and **2.** above apply.

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

Note:
This Procedural Requirement applies from 1 July 2009.

Amendment 2-3

Part 7 MACHINERY INSTALLATIONS

Chapter 1 GENERAL

1.1 General

Paragraph 1.1.3. has been deleted.

~~**1.1.3 Machinery Installations with Novel Design Features**~~

~~For installations in ships having main and essential auxiliary boilers that burn coal as fuel, the requirements specified in **Annex D1.1.3** "Guidance for the Survey and Construction of Coal Burning Installations in Ships", **Part D of the Guidance for the Survey and Construction of Steel Ships** are to apply; however, these requirements (excluding in **1.1.3**, **1.1.5** and **1.1.6**) may be regarded as reference for considering plans.~~

EFFECTIVE DATE AND APPLICATION (Amendment 2-3)

1. The effective date of the amendments is 1 January 2022.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to ships for which the date of contract for construction is before the effective date.

Amendment 2-4

Part 7 MACHINERY INSTALLATIONS

Chapter 10 PIPES, VALVES, PIPE FITTINGS AND AUXILIARIES

10.1 General

Paragraph 10.1.6 has been amended as follows.

10.1.6 Use of Special Materials

1 The wording "requirements specified otherwise" in **10.1.6-1, Part 7 of the Rules** means as follows.

(1) In cases where rubber hoses, Teflon hoses or nylon hoses are used for the following pipes~~:~~, ~~those~~ only materials approved ~~under the requirements of~~ in accordance with the ~~"~~**Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use**~~"~~ are to be used~~:~~.

(~~1~~a) Pipes of Group I or Group II

(~~2~~b) Pipes likely to cause fire or flooding in cases where they rupture

~~**2**~~(2) ~~In cases where~~ Only plastic pipes (including vinyl pipes) approved by the Society in accordance with **Chapter 6, Part 6 of the Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use** are to be used~~, the requirements specified in **Annex D12.1.6-2 "GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF PLASTIC PIPES", Part D of the Guidance for the Survey and Construction of Steel Ships** are to be complied with~~.

~~**3**~~(3) In cases where aluminum alloy pipes are used; the following requirements are to be complied with:

(~~1~~a) As a rule, aluminum alloy pipes are to be in accordance with the requirements of the code deemed appropriate by the Society, and are to be of seamless drawn pipes or seamless extruded pipes.

(~~2~~b) Aluminum alloy pipes are not to be used for any of the following applications:

(~~a~~i) As a rule, pipes with a design temperature exceeding 150 °C.

(~~b~~ii) Any pipes which penetrates either an "*A*-Class division" or a "*B*-Class division."

(~~c~~iii) Piping in which the use of copper alloy pipes is prohibited by **Table 7.10.2, Part 7 of the Rules**.

(~~3~~c) The required thickness of aluminum alloy pipes subject to internal pressure are to be in accordance with the following requirements:

Pipe thickness is to be determined using the formula in **10.2.1-1, Part 7 of the Rules**. In this case, allowable stress (*f*) is to be the smallest of the following values. However, in cases where the design temperature is not in the creep region of the material, no consideration needs to be given to the value of f_3.

$f_1 = \frac{R_{20}}{4.0},\ f_2 = \frac{E_t}{1.5},\ f_3 = \frac{S_R}{1.6}$

where

R_{20}: ~~Rule-required~~ Specified minimum tensile strength (N/mm^2) of the material at room temperature (less than 50 °C)

E_t: 0.2 % proof stress (N/mm^2) of the material at design temperature

S_R: Mean value of creep breaking stress (N/mm^2) of the material after 100,000 *hours* at design temperature

EFFECTIVE DATE AND APPLICATION (Amendment 2-4)

1. The effective date of the amendments is 1 July 2022.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to plastic piping systems other than those which fall under the following:

(1) plastic piping systems for which the application for approval of use is submitted to the Society on or after the effective date;

(2) plastic piping systems for which the date of renewal of approval of use is on or after the effective date; or

(3) plastic piping systems used on ships for which the date of contract for construction is on or after the effective date.