RULES FOR HIGH SPEED CRAFT

GUIDANCE FOR HIGH SPEED CRAFT

Rules for High Speed Craft 2022 AMENDMENT NO.1
Guidance for High Speed Craft 2022 AMENDMENT NO.1

Rule No.54 / Notice No.39 30 June 2022
Resolved by Technical Committee on 26 January 2022

ClassNK
NIPPON KAIJI KYOKAI

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

RULES FOR HIGH SPEED CRAFT

RULES

2022 AMENDMENT NO.1

Rule No.54 30 June 2022

Resolved by Technical Committee on 26 January 2022

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

Rule No.54 30 June 2022
AMENDMENT TO THE RULES FOR HIGH SPEED CRAFT

“Rules for high speed craft” has been partly amended as follows:

Amendment 1-1

Part 2 CLASS SURVEYS

Chapter 1 GENERAL

1.1 Surveys

1.1.1 Classification Surveys

Sub-paragraph -2 has been amended as follows.

2 ~~The new installation of~~ Surveyors are to confirm that materials which contain asbestos ~~is to be prohibited~~ are not being used.

Chapter 2 CLASSIFICATION SURVEYS

2.1 Classification Survey during Construction

2.1.3 Submission of Other Plans and Documents

Sub-paragraph -1(9) has been renumbered to Sub-paragraph -1(10), and Sub-paragraph -1(9) has been added as follows.

1 When it is intended to build a craft to the classification with the Society, the following plans and documents are to be submitted in addition to those required in **2.1.2**:
((1) to (8) are omitted.)
(9) Asbestos-free declarations and supporting documents
(~~9~~10) Other plans and documents may be required where deemed necessary by the Society.

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 30 June 2022.

Amendment 1-2

Part 2 CLASS SURVEYS

Chapter 2 CLASSIFICATION SURVEYS

2.1 Classification Survey during Construction

2.1.3 Submission of Other Plans and Documents

Sub-paragraph -1(7) has been amended as follows.

1 When it is intended to build a craft to the classification with the Society, the following plans and documents are to be submitted in addition to those required in **2.1.2**:
((1) to (6) are omitted)
(7) The following plans and documents related to machinery:
(a) Main and auxiliary engines (including their accessories):
i) Reciprocating internal combustion engines
Plans and data specified in **2.1.3-1~~(2) and (3),~~ Part 9** of the Rules
ii) Gas turbines
Plans and data specified in **3.1.3(2), Part 9** of the Rules
((b)to (i) are omitted)
((8) and (9) are omitted)

Part 9 MACHINERY INSTALLATIONS

Chapter 2 RECIPROCATING INTERNAL COMBUSTION ENGINES

2.1 General

Paragraph 2.1.3 has been amended as follows.

2.1.3 Drawings and Data*

1 Drawings and data to be submitted are generally as follows:

(1) Drawings and data for approval

Drawings and data specified in **Table 9.2.1(a)**

~~(a) Connecting rod bearings (including bolts details) of 4-stroke cycle engines~~

~~(b) High pressure oil pipes for driving exhaust valves with its shielding~~

~~(c) High pressure fuel oil pipes with its shielding and clamping~~

~~(d) Piping arrangements fitted to engine (including fuel oil, lubricating oil, cooling oil, cooling water, pneumatic and hydraulic systems, and information regarding the size, materials and working pressure of pipes)~~

~~(e) The drawings and data as specified in **(3)(d)** to **(f)**~~

~~(f) The drawings and data, etc. as required by the requirements of **2.1.4** (excluding those specified in **2.1.3-1(3)**)~~

~~(g) The following drawings and data for exhaust driven turbochargers:~~

~~i) Category *A* turbochargers (upon request)~~

~~1) Sectional assembly (including principal dimensions and names of components)~~

~~2) Containment test report~~

~~3) Test procedures~~

~~ii) Category *B* turbochargers~~

~~1) Sectional assembly (including principal dimensions and materials of housing components for containment evaluation)~~

~~2) Documentation of containment in the event of the disc fracture~~

~~3) Documentation for the following operational data and limitations~~

~~• Maximum permissible operating speed (*rpm*)~~

~~• Maximum permissible exhaust gas temperature at the turbine inlet~~

~~• Minimum lubrication oil inlet pressure~~

~~• Maximum lubrication oil outlet temperature~~

~~• Maximum permissible vibration levels (self- and externally generated vibration)~~

~~• Alarm level for overspeed (levels are also to be indicated on engine control system diagrams)~~

~~• Alarm level for exhaust gas temperature at the turbine inlet (levels are also to be indicated on engine control system diagrams)~~

~~• Lubrication oil inlet pressure low alarm set point (levels are also to be indicated on engine control system diagrams)~~

~~• Lubrication oil outlet temperature high alarm set point (levels are also to be indicated on engine control system diagrams)~~

~~4) Diagram of lubrication oil systems (diagrams included in piping arrangements fitted to engines may be accepted instead)~~

~~5) Test report of type test (only for type tests)~~
~~6) Test procedure (only for type tests)~~
~~iii) Category *C* turbochargers~~
~~1) Drawings listed in **ii)** above~~
~~2) Drawings of the housing and rotating parts (inlcuding details of blade fixing)~~
~~3) Material specifications (inlcuding mechanical property and chemical composition) of the parts mentioned in **2)** above~~
~~4) Welding details and welding procedures for the parts mentioned in **2)** above, if made of welded construction~~

(2) Drawings and data for reference

Drawings and data specified in **Table 9.2.1(b)**

~~(a) A list containing all drawings and data submitted (with relevant drawing numbers and revision status)~~
~~(b) Gudgeon pins~~
~~(c) Connecting rod bearings (including bolts details) of 2-stroke cycle engines~~
~~(d) Rocker valve gears~~
~~(e) Cylinder cover fixing bolts and valve box fixing bolts~~
~~(f) Engine control system diagram (including the monitoring, safety and alarm systems)~~
~~(g) Construction and arrangement of dampers, detuners, balancers or compensators, bracing as well as calculation sheets related to engine balancing and engine vibration prevention~~
~~(h) Location of measures preventing oil from spraying out from joints in flammable oil piping (if fitted)~~
~~(i) The following drawings and data for exhaust driven turbochargers (only for category *C* turbochargers):~~
~~i) Documentation of safe torque transmission when the disc is connected to the shaft by an interference fit~~
~~ii) Information on expected lifespan (Creep, low cycle fatigue and high cycle fatigue are to be considered.)~~
~~iii) Operation and maintenance manuals~~
~~(j) Other drawings and data deemed necessary by the Society~~

~~(3) Drawings and data for the purpose of inspection and testing of reciprocating internal combustion engines~~
~~(a) A list containing all drawings and data submitted (including relevant drawing numbers and revision status)~~
~~(b) Engine particulars to be in the form designated by the Society~~
~~(c) Material specifications of main parts with information on non-destructive testing and pressure testing as applicable to the material~~
~~(d) Bedplate and crankcase of welded design, with welding details and welding instructions for approval of materials and weld procedure specifications. The weld procedure specification is to include details of pre and post weld heat treatment, weld consumables and fit-up conditions.~~
~~(e) Thrust bearing bedplate of welded design, with welding details and welding instructions for approval of materials and weld procedure specifications. The weld procedure specification is to include details of pre and post weld heat treatment, weld consumables and fit-up conditions.~~
~~(f) Frame/framebox/gearbox of welded design, with welding details and instructions for approval of materials and weld procedure specifications. The weld procedure specification is to include details of pre and post weld heat treatment, weld consumables and fit-up conditions.~~

(g) Crankshaft, assembly and details
(h) Thrust shaft or intermediate shaft (if integral with engine)
(i) Shaft coupling bolts
(j) Bolts and studs for main bearings
(k) Bolts and studs for cylinder heads and exhaust valve (two stroke design)
(l) Bolts and studs for connecting rods
(m) Tie rods
(n) Schematic layout or other equivalent drawings and data on the reciprocating internal combustion engine of the following **i)** to **vii)** (Details of the system so far as supplied by the licensee such as main dimensions, operating media and maximum working pressures).
i) Starting air system
ii) Fuel oil system
iii) Lubricating oil system
iv) Cooling water system
v) Hydraulic system
vi) Hydraulic system (for valve lift)
vii) Engine control and safety system
(o) Shielding of high pressure fuel pipes, assembly (All engines)
(p) Construction of accumulators for hydraulic oil and fuel oil
(q) High pressure parts for fuel oil injection system
The documentation to contain specifications for pressures, pipe dimensions and materials.
(r) Arrangement and details of the crankcase explosion relief valve (only for engines of a cylinder diameter of 200 *mm* or more or a crankcase volume of 0.6 m^3 or more)
(s) Oil mist detection and/or alternative alarm arrangements
(t) Cylinder head
(u) Cylinder block, engine block
(v) Cylinder liner
(w) Counterweights (if not integral with crankshaft), including fastening
(x) Connecting rod with cap
(y) Crosshead
(z) Piston rod
(aa) Piston, assembly, including identification (e.g. drawing number) of components
(ab) Piston head
(ac) Camshaft drive, assembly, including identification (e.g. drawing number) of components
(ad) Flywheel
(ae) Arrangement of foundation (for main engines only)
(af) Fuel oil injection pump
(ag) Shielding and insulation of exhaust pipes and other parts of high temperature which may be impinged as a result of a fuel system failure, assembly
(ah) Construction and arrangement of dampers
(ai) For electronically controlled engines, assembly drawings or arrangements of the following **i)** to **iv)**:
i) Control valves
ii) High pressure pumps
iii) Drive for high pressure pumps
iv) Valve bodies, if applicable

~~(aj) Operation and service manuals~~

~~Operation and service manuals are to contain maintenance requirements (servicing and repair) including details of any special tools and gauges that are to be used with their fitting/settings together with any test requirements on completion of maintenance.~~

~~(ak) Test program resulting from *FMEA* (for engine control system) in cases of engines that rely on hydraulic, pneumatic or electronic control of fuel injection and/or valves~~

~~(al) Production specifications for castings and welding (sequence)~~

~~(am)Certification of an approval of use for environmental tests, control components. Documents modified for a specific application are to be submitted to the Society for information or approval, as applicable.~~

~~(an) Quality requirements for engine production~~

~~(ao) Other drawings and data deemed necessary by the Society~~

2 The drawings and data for the purpose of inspection and testing specified in **-1~~(3)~~** (the items represented by the mark ○ in **Table 9.2.1(a)** and **Table 9.2.1(b)**, hereinafter indicated in the same way throughout this Chapter)~~above~~ are to be submitted in accordance with **2.1.4-1** by the engine manufacturer producing engines with the drawings and data whose approval of use has been obtained in accordance with **2.1.1-2** (hereinafter referred to as "licensee" in this Chapter). Such drawings and data, however,~~but~~ may be submitted by the licensor in accordance with **2.1.4-2**.

Table 9.2.1(a) has been added as follows.

Table 9.2.1(a) Drawings and Data for Approval

	Items	For inspection and testing
(1)	Engine particulars (in the format designated by the Society)	○
(2)	Material specifications of main parts with information on non-destructive testing and pressure testing as applicable to the material	○
(3)	Bedplate and crankcase of welded design, with welding details and welding instructions(1)	○
(4)	Thrust bearing bedplate of welded design, with welding details and welding instructions(1)	○
(5)	Frame/framebox/gearbox of welded design, with welding details and instructions(1)	○
(6)	Crankshaft, assembly and details	○
(7)	Thrust shaft or intermediate shaft (if integral with engine)	○
(8)	Shaft coupling bolts	○
(9)	Connecting rod bearings (four-stroke design)	－
(10)	Bolts and studs for connecting rods (four-stroke design)	○
(11)	Schematic layout or other equivalent drawings and data on the reciprocating internal combustion engine of the following **(a)** to **(g)** (details of the system so far as supplied by the licensee such as: main dimensions, operating media and maximum working pressures). (a) Starting air system (b) Fuel oil system (c) Lubricating oil system (d) Cooling water system (e) Hydraulic system (f) Hydraulic system (for valve lift) (g) Engine control and safety system	○
(12)	High pressure oil pipes for driving exhaust valves with its shielding	－
(13)	Shielding of high pressure fuel pipes, assembly (all engines)	○
(14)	High pressure parts for fuel oil injection system The documentation to contain specifications for pressures, pipe dimensions and materials.	○
(15)	Arrangement and details of the crankcase explosion relief valve (only for engines of a cylinder diameter of 200 *mm* or more or a crankcase volume of 0.6 m^3 or more)	○
(16)	Oil mist detection and/or alternative alarm arrangements	○
(17)	Connecting rod with cap (four-stroke design)	○
(18)	Arrangement of foundation (for main engines only)	○
(19)	The drawings, data, etc. required by **2.1.4**.	○

Table 9.2.1(a) Drawings and Data for Approval (continued)

	Items	For inspection and testing
(20)	The following drawings and data for exhaust driven turbochargers: (a) Category *A* turbochargers (upon request) i) Sectional assembly (including principal dimensions and names of components) ii) Containment test report iii) Test procedures (b) Category *B* turbochargers i) Sectional assembly (including principal dimensions and materials of housing components for containment evaluation.) ii) Documentation of containment in the event of the disc fracture iii) Documentation of following operational data and limitations ・Maximum permissible operating speed (*rpm*) ・Maximum permissible exhaust gas temperature at the turbine inlet ・Minimum lubrication oil inlet pressure ・Maximum permissible vibration levels (self- and externally generated vibrations) ・Alarm level for exhaust gas temperature at the turbine inlet (levels are also to be indicated on engine control system diagrams) ・Lubrication oil inlet pressure low alarm set point (levels are also to be indicated on engine control system diagrams) ・Lubrication oil outlet temperature high alarm set point (levels are also to be indicated on engine control system diagrams) iv) Diagram of lubrication oil systems (diagrams included in piping arrangements fitted to engines may be accepted instead) v) Test report of type test (only for type tests) vi) Test procedure (only for type tests) (c) Category *C* turbochargers i) Drawings listed in **(b)** above ii) Drawings of the housing and rotating parts (including details of blade fixing) iii) Material specifications (including mechanical properties and chemical composition) of the parts mentioned in **ii)** above iv) Welding details and welding procedures for the parts mentioned in **ii)** above, if made of welded construction	—
(21)	Other drawings and data deemed necessary by the Society	○

Notes:

(1) For approval of materials and weld procedure specification, the weld procedure specification is to include details of pre- and post-weld heat treatments, weld consumables and fit-up conditions.

Table 9.2.1(b) has been added as follows.

Table 9.2.1(b)　Drawings and Data for Reference

	Items	For inspection and testing
(1)	A list containing all drawings and data submitted (including relevant drawing numbers and revision status)	○
(2)	Bolts and studs for main bearings	○
(3)	Connecting rod bearings (two-stroke design)	–
(4)	Bolts and studs for cylinder heads and exhaust valve (two-stroke design)	○
(5)	Bolts and studs for connecting rods (two-stroke design)	○
(6)	Tie rods	○
(7)	Piston pins	–
(8)	Construction of accumulators for hydraulic oil and fuel oil	○
(9)	Cylinder head fixing bolts and valve box fixing bolts	–
(10)	Rocker valve gears	–
(11)	Cylinder head	○
(12)	Cylinder block, engine block	○
(13)	Cylinder liner	○
(14)	Counterweights (if not integral with crankshaft), including fastening	○
(15)	Connecting rod with cap (two-stroke design)	○
(16)	Crosshead	○
(17)	Piston rod	○
(18)	Piston, assembly, including identification (e.g. drawing number) of components	○
(19)	Piston head	○
(20)	Camshaft drive, assembly, including identification (e.g. drawing number) of components	○
(21)	Flywheel	○
(22)	Fuel oil injection pump	○
(23)	Shielding and insulation of exhaust pipes and other parts of high temperature which may be impinged as a result of a fuel system failure, assembly	○
(24)	Construction and arrangement of dampers	○
(25)	Construction and arrangement of detuners, balancers or compensators, bracings as well as all calculation sheets related to engine balancing and engine vibration prevention	–
(26)	For electronically controlled engines, assembly drawings or arrangements of the following **(a)** to **(d)**: (a) Control valves (b) High-pressure pumps (c) Drive for high pressure pumps (d) Valve bodies, if applicable	○
(27)	Operation and service manuals(1)	○
(28)	Engine control system diagram (including the monitoring, safety and alarm systems)	–
(29)	Test program resulting from FMEA (for engine control system) in cases of engines that rely on hydraulic, pneumatic or electronic control of fuel injection and/or valves	○
(30)	Production specifications for castings and welding (sequence)	○
(31)	Certification of an approval of use for environmental tests, control components(2)	○
(32)	Quality requirements for engine production	○
(33)	Location of measures preventing oil from spraying out from joints in flammable oil piping (if fitted)	–

Table 9.2.1(b) Drawings and Data for Reference (continued)

	Items	For inspection and testing
(34)	The following drawings and data for exhaust driven turbochargers (only for category *C* turbochargers): (a) Documentation of the safe torque transmission when the disc is connected to the shaft by an interference fit (b) Information on expected lifespan (creep, low cycle fatigue and high cycle fatigue are to be considered) (c) Operation and maintenance manuals	—
(35)	Other drawings and data deemed necessary by the Society	○

Notes:

(1) Operation and service manuals are to contain maintenance requirements (servicing and repair) including details of any special tools and gauges that are to be used with their fitting/settings together with any test requirements on completion of maintenance.

(2) Drawings and data modified for a specific application are to be submitted to the Society for information or approval, as applicable.

2.1.4 Approval of Reciprocating Internal Combustion Engines*

Sub-paragraphs -1(1) to (3) have been amended as follows.

1 Reciprocating internal combustion engines are to be approved in accordance with the following **(1)** to **(6)**:

(1) Development of documents and data for engine production

(a) Prior to the start of the reciprocating internal combustion engine approval process in accordance with the following **(c)**~~**(3)**~~ and subsequent sub-paragraphs of this paragraph, a design approval is to be obtained as specified separately by the Society.

(b) Each type of reciprocating internal combustion engine is to be provided with a certificate of approval of use obtained by the licensor in accordance with **2.1.1-2**. For the first engine of a type or for those with no service records, the process of an approval of use and the approval process for production by the licensee may be performed simultaneously.

(c) The licensor is to review the drawings and data of the reciprocating internal combustion engine whose approval of use has been obtained for the application and develop, if necessary, application specific drawings and data for production of reciprocating internal combustion engines for the use of the licensee in developing the reciprocating internal combustion engine specific production drawings and data for the purpose of inspection and testing specified~~listed~~ in **2.1.3-1**~~**(3)**~~.

(d) If substantive modifications to the ~~the~~ drawings and data of the reciprocating internal combustion engine whose approval of use has been obtained have been made in the drawings and data of reciprocating internal combustion engines to be produced, the affected drawings and data are to be resubmitted to the Society as specified separately by the Society.

(2) Drawings and data for the ~~purpose of~~ inspection and testing of reciprocating internal combustion engines

(a) The licensee is to develop the drawings and data for the inspection and testing specified~~listed~~ in **2.1.3-1**~~**(3)**~~ and a comparison list of these drawings and data to the drawings and data of the reciprocating internal combustion engine whose approval of use has been obtained by the licensor and submit these drawings and the comparison list to the Society.

(b) ~~In applying~~As for the drawings and data for the inspection and testing specified in

2.1.3-1~~(3)~~, if there are differences in the technical content on the licensee's production drawings and data of the reciprocating internal combustion engine compared to the drawings and data of the reciprocating internal combustion engine whose approval of use has been obtained by the licensor, the licensee is to submit "Confirmation of the licensor's acceptance of licensee's modifications" approved by the licensor and signed by the licensee and licensor. If the licensor acceptance is not confirmed, the reciprocating internal combustion engine manufactured by the licensee is to be regarded as a different engine type and is **2.1.1-2** is to apply to the reciprocating internal combustion engine.

(c) In applying **(b)** above, modifications applied by the licensee are to be provided with appropriate quality requirements.

(d) The Society returns the drawings and data specified in **(a)** and **(b)** above to the licensee with confirmation that the design has been approved.

(e) The licensee or its subcontractors are to prepare to be able to provide the drawings and data specified in **(a)** and **(b)** above so that the Surveyor can use the information for inspection purposes during manufacture and testing of the reciprocating internal combustion engine and its components.

(3) Additional drawings and data
In addition to the drawings and data <u>for inspection and testing specified</u>~~listed~~ in **2.1.3-1~~(3)~~**, the licensee is to be able to provide to the Surveyor performing the test specified in **2.6.1, Part D of the Rules for the Survey and Construction of Steel Ships** upon request the relevant detail drawings, production quality control specifications and acceptance criteria. These drawings and data are for supplemental purposes to the survey only.

((4) to (6) are omitted)

2.3 Associated Installations

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

Sub-paragraph -1 has been amended as follows.

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, material~~s~~ and non-destructive tests as well as surface inspections and dimension inspections are to be in accordance with **Table D2.~~1~~2, 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~~7, Part D of the Rules for the Survey and Construction of Steel Ships**.

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

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

2. Notwithstanding the amendments to the Rules, the current requirements may apply to reciprocating internal combustion engines for which the application for approval is submitted to the Society before the effective date.

Amendment 1-3

Part 9 MACHINERY INSTALLATIONS

Chapter 2 RECIPROCATING INTERNAL COMBUSTION ENGINES

2.1 General

2.1.2 Terminology

Sub-paragraph -2 has been amended as follows.

2 The terminology used in the application of ~~**-1(3)** and **-2 of**~~ **2.1.3** ~~as well as~~and **2.1.4** is as specified in the following **(1)** to **(36)**:
((1) to (25) are omitted)
(26) "Quality assurance" means all the planned and systematic activities implemented within the quality system, and demonstrated as needed to provide adequate confidence that an entity will fulfil requirements for quality. Refer to *ISO* ~~9000 series~~9001:2015.
((27) to (36) are omitted)

EFFECTIVE DATE AND APPLICATION (Amendment 1-3)

1. The effective date of the amendments is 1 July 2022.
2. Notwithstanding the amendments to the Rules, the current requirements may apply to reciprocating internal combustion engines whose type is the same type of those for which the application for approval of use is submitted to the Society before the effective date.

Amendment 1-4

Part 10 ELECTRICAL INSTALLATIONS

Chapter 1 GENERAL

1.2 Testing

1.2.1 Shop Tests*

Sub-paragraphs -1 and -3 have been amended as follows.

1 Electrical equipment specified below is to be tested in accordance with the respective requirements in **Chapter 2, Part H of the Rules for the Survey and Construction of Steel Ships** at the manufacturer's works or at other works which provide with the adequate apparatus for testing and inspections.

(1) Rotating machines for propulsion and their control equipment
(2) Craft service generators of not less than 50 *kVA*
(3) Switchboards with input power of not less than 50 *kVA*
(4) Motors of not less than 50 *kW* for auxiliary machinery specified in **1.1.6-1(1)** to **(3), Part D of the Rules for the Survey and Construction of Steel Ships**, and their control gears
(5) Transformers of single phase not less than 30 *kVA* and three phase not less than 50 *kVA* excluding those for special services such as one for a Suez Canal Search Light
(6) Semiconductor converters for power of not less than 50 *kW* and their respective accessories that are used for supplying power to the electrical equipment specified in **(1)** to **(3)** above
(~~6~~7) Other electrical equipment as deemed necessary by the Society

2 (Omitted)

3 Cables for power, lighting and internal communications and semiconductor converters for power of not less than 50 *kW* used for supplying power to the electrical equipment specified in **-1(4)** are to be subjected to type test for each type of product~~s~~. However, in cases where it is inadequate to deal with them under the requirements for type tests (e.g. those used only for specific ships or purposes with little possibility of continued use, or items for which the acquisition of individual test/inspection certificates is desired), tests and inspections of individual products may be accepted in place of type tests when requested by application.

4 (Omitted)

Chapter 2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

2.1 General

2.1.3 Construction, Materials, Installations, etc.*

Sub-paragraph -9 has been added as follows.

9 Electrical equipment allowed in paint stores and adjacent areas are to comply with the requirements in **2.1.3-11, Part H of the Rules for the Survey and Construction of Steel Ships**.

2.2 System Design - General

2.2.5 Feeder Circuits

Sub-paragraph -5 has been amended as follows.

5 A final sub-circuit of rating exceeding 1~~5~~6 *A* is not to supply more than one appliance.

2.2.7 Lighting Circuits

Sub-paragraphs -1 to -3 have been amended as follows.

1 Final sub-circuits used for ~~L~~lighting circuits are to be supplied ~~by final sub-circuits~~ separately from those for heating and power except in cases where such sub-circuits are used for cabin fans and electrical appliances for domestic use.
2 The number of lighting points supplied by ~~a~~ final sub-circuits of rating 1~~5~~6 *A* or less is not to exceed:
(1) 10 for the circuits up to ~~50~~55 *V*
(2) 14 for the circuits from ~~51~~56 *V* up to ~~130~~120 *V*
(3) 24 for the circuits from ~~131~~121 *V* up to 250 *V*
In cases where the number of lighting points and total load current are invariable, ~~more than the~~ a number of points greater than those specified above may be connected to ~~the~~ final sub-circuits~~,~~ provided that the aggregate load currents do~~es~~ not exceed 80 % of the ratings of protective devices in ~~the~~ such circuits.
3 In ~~a~~ final sub-circuits of ratings not exceeding 10 *A* for panel lighting and electric signs, in cases where lampholders are closely grouped, the number of points supplied is unrestricted.
4 (Omitted)

2.2.10 Circuits for Electric Heating and Cooking Equipment

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

1 Each item of electric heating and cooking equipment is to be connected to a separate final sub-circuit except that up to 10 small electric heaters of aggregate current rating not exceeding 1~~5~~6 *A* may be connected to single final sub-circuit.
2 Electric heating and cooking equipment are to be controlled by the multipole linked switches mounted in the vicinity of the equipment. However, small electric heaters connected to a final

sub-circuit of rating not exceeding 1~~5~~6 *A* may be controlled by a single-pole switch.

2.5 Switchboards, Section Boards and Distribution Boards

Paragraph 2.5.4 has been amended as follows.

2.5.4 Busbars~~*~~

Busbars and connecting conductors are to comply with the requirements in **2.5.4, Part H of the Rules for the Survey and Construction of Steel Ships**.

~~**1** Busbars are to be of copper or of copper-surrounded aluminum alloy.~~

~~**2** Busbar conections are to be so made as to inhibit corrosion and oxidization.~~

~~**3** Busbars and busbar connections are to be so supported as to withstand the electromagnetic force resulted from short-circuiting.~~

~~**4** Temperature rises of busbars, connecting conductors and their connections are not to exceed 45*K* at ambient temperatures of 45°C in cases where they are carrying full load currents. However, in cases where deemed appropriate by the Society, these requirements do not apply.~~

~~**5** Air clearances (phase-to-phase, pole-to-pole and phase-to-earth) of non-insulated busbars are not to be less than the values given in **Table 10.2.2**.~~

Table 10.2.2 has been deleted.

~~Table 10.2.2 Minimum Air Clearances for Busbars~~

~~Rated voltage (*V*)~~	~~Air clearance (*mm*)~~
250 or less	15
over 250 to 690 inclusive	20
over 690 to 1,000 inclusive	35

2.7 Cables

Paragraph 2.7.1 has been amended as follows.

2.7.1 General

Cables are to comply with one of *IEC* ~~60092~~ standards listed in the following **(1)** to **(7)** or equivalent thereto. However, cables such as flexible cables, fibre-optic cables, etc. used for special purposes may be accepted provided they comply with relevant standards deemed appropriate by the Society or any equivalent thereto. Installation of cables is to comply with the requirements in this **2.7**.

(1) *IEC* 60092-350:2020
(2) *IEC* 60092-352:2005
(3) *IEC* 60092-353:2016
(4) *IEC* 60092-354:2020
(5) *IEC* 60092-360:2014
(6) *IEC* 60092-370:2019
(7) *IEC* 60092-376:2017

2.8 Accumulator Batteries

2.8.1 General*

Sub-paragraph -1 has been amended as follows.

1 The requirements in this **2.8.1** apply to all permanently installed vented type secondary batteries ~~of vented type~~. ~~A vented type secondary battery means one in which the electrolyte can be replaced and which may release gas while operating on charge and overcharge.~~ However, the requirements specified in **2.8.5-4** are also applicable to valve-regulated sealed type batteries.

2.8.5 Ventilation*

Sub-paragraph -4 has been added as follows.

4 The ventilation arrangements for installation of vented type batteries which have charging power higher than 2 *kW* are to be such that the quantity of air expelled is at least equal to:

$Q = 110 \times I \times n \ (l/h)$

I : Maximum current delivered by the charging equipment during gas formation, but not less than 25 % of the maximum obtainable charging current in amperes

n : Number of cells in series

Q : Quantity of air expelled in litres/hour

The ventilation rate for compartments containing valve-regulated sealed type batteries may be reduced to 25 % of that given above.

Section 2.12 has been deleted.

~~**2.12 Semiconductor Converters for Power**~~

~~Semiconductor converters for power is to be in accordance with requirements in **2.12, Part H of Rules for the Survey and Construction of Steel Ships.**~~

EFFECTIVE DATE AND APPLICATION (Amendment 1-4)

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

Amendment 1-5

Part 1 GENERAL RULES

Chapter 1 GENERAL

1.2 Class Notations

Paragraph 1.2.6 has been deleted.

~~**1.2.6 Application of Special Survey Scheme**~~

~~**1** The notation "*Alternative Propeller Shaft Survey・Oil*" (abbreviated as *APSS・O*) is affixed to the classification characters of ships having oil lubricated stern tube bearings whose propeller shaft surveys use the alternative survey methods specified in **3.9.2-5, Part 2.**~~

~~**2** The notation of "*Alternative Propeller Shaft Survey・Water*" (abbreviated as *APSS・W*) is affixed to the classification characters, of ships having freshwater lubricated stern tube bearings utilising inboard freshwater whose propeller shaft surveys use the alternative surveys methods specified in **3.9.2-5, Part 2.**~~

Part 2 CLASS SURVEYS

Chapter 3 PERIODICAL SURVEYS AND PLANNED MACHINERY SURVEYS

3.2 Intervals of Periodical Surveys and Planned Machinery Surveys

(3.2.1 to 3.2.4 are omitted.)

Paragraph 3.2.5 has been amended as follows.

3.2.5 Propeller Shaft and Stern Tube Shaft Surveys

Propeller Shaft and Stern Tube Shaft Surveys are to be carried out at intervals specified in **3.9.~~1~~2**.

(3.2.6 and 3.2.7 are omitted.)

3.6 Annual Surveys for Machinery

3.6.1 Requirements for Annual Surveys*

Sub-paragraph -1 has been amended as follows.

((1) and (2) are omitted.)

(3) The clearance between the bush of stern tube bearing or shaft bracket bearing and propeller shaft or stern tube shaft, or the bearing weardown is to be measured. ~~For waterjet propulsion systems, the wearing condition of the bearing is to be ascertained by the means deemed appropriate by the Society.~~

(4) The stern tube sealing devices or the shaft bracket sealing device, if any, are to be examined. ~~For waterjet propulsion systems, the forward sealing device for the main shaft is to be examined.~~

(5) The propellers ~~(including impellers for waterjet propulsion systems)~~ are to be examined. In the case where a controllable pitch propeller is fitted, it is to be ascertained that the pitch control device is in good working order.

((6) to (8) are omitted.)

3.6.2 Performance Tests*

Sub-paragraph (5) has been amended as follows.

((1) to (4) are omitted.)

(5) Main and auxiliary steering gears ~~(including deflectors and reversers for waterjet propulsion systems)~~ together with their associated equipment and control systems are to be subjected to the performance tests.

((6) and (7) are omitted.)

3.7 Intermediate Surveys for Machinery

Paragraph 3.7.3 has been amended as follows.

3.7.3 Open-up Examinations

~~At each Intermediate Survey for Machinery, open-up examinations for the following items in **(1)** and **(2)** are to be carried out;~~

~~(1) Waterjet propulsion systems~~

~~Deflectors and Reversers are to be opened up and examined.~~

~~(2) Boilers and thermal oil heaters~~

Boilers and thermal oil heaters are to be examined as follows;

(~~a~~1) (Omitted)

(~~b~~2) (Omitted)

(~~c~~3) (Omitted)

(~~d~~4) (Omitted)

(~~e~~5) (Omitted)

(~~f~~6) (Omitted)

(~~g~~7) (Omitted)

(~~h~~8) The safety devices, alarm devices and automatic combustion control devices are to be tested in accordance with the requirements in **Chapter 9, Part D of the Rules for the Survey and Construction of Steel Ships** in order to ascertain that they are to in good working conditions after the examinations specified in **(~~a~~1)** to **(~~g~~7)** above.

(~~i~~9) When direct visual internal inspection at the examinations specified in **(~~a~~1)** to **(~~c~~3)** above is not feasible due to the limited size of the internal spaces, such as for small boilers and/or narrow internal spaces, this may be replaced by a hydrostatic pressure test or by alternative verifications as deemed appropriate by the Society.

Section 3.9 has been amended as follows.

3.9 Propeller Shaft and Stern Tube Shaft Surveys

~~**3.9.1 General**~~

~~**1** At each Propeller Shaft and Stern Tube Shaft Survey, corresponding to the type and kind of shafts, the requirements which are specified in this section, are to be complied with.~~

~~**2** The terminology used in the application of propeller shaft and stern tube shaft surveys is as specified in the following **(1)** to **(16)**:~~

~~(1) "Shafts" mean propeller shafts as specified in the following **(2)** and stern tube shafts as specified in the following **(3)** but exclude the intermediate shaft(s) which is(are) considered part of the propulsion shafting inside the vessel.~~

~~(2) "Propeller shaft" is the part of the propulsion shaft to which the propeller is fitted.~~

~~(3) "Stern tube shaft" is a shaft placed between the intermediate shaft and propeller shaft, normally arranged within a stern tube or running in open water.~~

~~(4) "Stern tube" is a tube or pipe fitted in the shell of a ship at the stern (or rear part of the ship), through which passes the stern tube shaft or aftermost section of the propeller shaft. "Stern tube" is the housing of the shaft bearings that sustain the shaft and also accommodates the shaft sealing arrangement.~~

~~(5) "Stern tube sealing system" means the equipment installed on the inboard extremity and, for oil or freshwater lubricated bearings, at outboard extremity of the stern tube. An "inboard seal" is the device fitted on the fore part of the stern tube that achieves the sealing against the possible leakage of the lubricant media into the ship internal. An "outboard seal" is the~~

~~device fitted on the aft part of the stern tube that achieves the sealing against the possible sea water ingress and the leakage of the lubricant media.~~

~~(6) "Oil lubricated" means closed loop oil lubricating systems which use oil to lubricate the bearings and are sealed against the environment by adequate sealing or gland devices.~~

~~(7) "Freshwater lubricated" means closed loop water lubricating systems which use fresh water to lubricate the bearings and are sealed against the environment by adequate sealing or gland devices.~~

~~(8) "Water lubricated" means open water lubricating systems where bearings are cooled and lubricated by water (salt or fresh) which are exposed to the environment.~~

~~(9) "Service records" are regularly recorded data showing in-service conditions of the shaft(s) and include, as applicable: lubricating oil temperature, bearing temperature and oil consumption records (for oil lubricated bearings) or water flow, water temperature, salinity, pH, make-up water and water pressure (for closed loop fresh water lubricated bearings depending on design).~~

~~(10) "Oil sample examination" is a visual examination of the stern tube lubricating oil taken in the presence of the Surveyor with a focus on water contamination.~~

~~(11) "Lubricating oil analysis" is the analysis to be carried out as specified in the following **(a)** to **(c)**:~~

~~(a) The lubricating oil analysis is to be carried out at regular intervals not exceeding 6 *months*.~~

~~(b) The documentation on lubricating oil analysis is to be available on board.~~

~~(c) Oil samples to be submitted for the analysis are, in principle, to be taken under service conditions.~~

~~(12) "Fresh water sample test" is the test to be carried out in accordance with the following **(a)** to **(d)**:~~

~~(a) The fresh water sample test is, in principle, to be carried out at regular intervals not exceeding 6 *months*.~~

~~(b) Fresh water samples are to be taken in accordance with the following **i)** to **iv)**:~~

~~i) The sample is to be taken under service conditions (i.e. with a rotating shaft and the system at service temperature) and are to be representative of the water circulating within the stern tube.~~

~~ii) The sample is to be taken from the same agreed position in the system, before the filters, if any fitted in the freshwater lubrication system, which is to be positively identified.~~

~~iii) At time of survey the sample for the test is to be taken in the presence of the Surveyor.~~

~~iv) The sample, unless supervised by the Surveyor, is to be collected under the direct supervision of the Chief Engineer.~~

~~(c) Analysis results are to be retained on board and made available to the Surveyor.~~

~~(d) The fresh water sample test is to include the following **i)** to **iii)** parameters:~~

~~i) chlorides content;~~

~~ii) pH value; and~~

~~iii) presence of bearing particles or other particles (only for laboratory analysis, and not required for tests carried out in the presence of the Surveyor).~~

~~(13) "Keyless connection" is the forced coupling methodology between the shaft and the propeller without a key achieved through interference fit of the propeller boss on the shaft tapered end.~~

~~(14) "Keyed connection" is the forced coupling methodology between the shaft and the propeller with a key and keyway achieved through the interference fit of the propeller boss on the shaft tapered end.~~

(15) "Flanged connection" is the coupling methodology, between the shaft and the propeller, achieved by a flange, built in at the shaft aft end, bolted to the propeller boss.

(16) "Alternative means" means shafting arrangements such as, but not limited to, an approved condition monitoring scheme and/or other reliable approved means for assessing and monitoring the condition of the tail shaft, bearings, sealing devices and the stern tube lubricant system capable to assure the condition of the propeller shaft assembly with an equivalent level of safety as obtained by survey methods specified in this Part.

3.9.2 Survey Intervals*

1 Surveys of propeller shafts and stern tube shafts are to be carried out at intervals specified in the following **(1)** or **(2)** corresponding to the kind of shaft, etc. in accordance with **3.9.3**, unless alternative means are provided to assure the condition of the propeller shaft assembly.

(1) Ordinary Surveys for propeller shafts Kind 1 or stern tube shafts Kind 1 (hereinafter referred to as "shafts Kind 1" in this Chapter) are to be carried out within 5 *years* from the date of completion (i.e. the survey due date) of the Classification Survey or the previous Ordinary Survey.

(2) Ordinary Surveys for propeller shafts Kind 2 or stern tube shafts Kind 2 (hereinafter referred to as "shafts Kind 2" in this Chapter) are to be carried out at the following times:

(a) Concurrently with Special Surveys; and

(b) Within 36 *months* from the date of completion (i.e. the survey due date) of the Classification Survey or the previous Ordinary Survey (survey due date)

2 For keyless connection shafts lubricated with water lubricated bearings, the maximum interval between two consecutive dismantling and verifications of the shaft cone by means of non-destructive examination (*NDE*) is not to exceed 15 *years*.

3 For oil lubricated or freshwater lubricated shafts Kind 1, the Partial Surveys specified in **3.9.4** can be carried out instead of the Ordinary Surveys specified in **3.9.3**. It is, however, not allowed to carry out Partial Surveys consecutively.

4 For the surveys referred to in **(1)** and **(2)** of **-1** as well as in **-3** above completed within 3 *months* before the survey due date, the next period will start from the survey due date.

5 Regardless of **-1** to **-4** above, surveys of the propeller shafts and stern tube shafts of ships affixed with the notation "*APSS-O*" or "*APSS-W*" (excluding the main shaft of water jet propulsion systems) are to be carried out as specified separately by the Society.

3.9.3 Ordinary Surveys

1 Ordinary Surveys of propeller and stern tube shafts (excluding main shafts of waterjet propulsion systems) are to be carried out in accordance with the following **(1)** to **(13)**:

(1) Drawing out of the propeller shaft and the stern tube shaft

(a) For shafts with oil or freshwater lubricated bearings, the propeller shaft and the stern tube shaft are to be drawn and the entire shafts, seals system and bearings are to be examined.

(b) For shafts with water lubricated bearings, the propeller shaft and the stern tube shaft are to be drawn and the entire shaft (including liners, corrosion protection system and stress reducing features, where provided), inboard seal system and bearings are to be examined.

(2) The shaft in way of the propeller fitting area is to be examined as follows.

(a) For keyed connections, the propeller is to be removed to expose the forward end of the taper, and a non-destructive examination (*NDE*) by an approved surface crack detection method deemed appropriate by the Surveyor is to be performed all around the shaft in way of the forward portion of the taper section, including the keyway. For shafts provided with liners, the *NDE* is to be extended to the after edge of the liner except as required by **3.9.4-1(1)(a)**.

(b) For keyless connections, the propeller is to be removed to expose the forward end of

the taper, and a non-destructive examination (*NDE*) by an approved surface crack-detection method deemed appropriate by the Surveyor is to be performed all around the shaft in way of the forward portion of the taper section. For shaft provided with liners the *NDE* is to be extended to the after edge of the liner except as required by **3.9.4.1(1)(a)**. For shafts with water lubricated bearings, it is recommended that the survey specified in **3.9.2.2** also be carried out in cases where the date 15 *years* after the date of completion of the previous survey specified in **3.9.2.2** is earlier than the next survey due date. When the propeller is force fitted to the shaft, it is to be ascertained that the pull-up length is within the upper and lower limits given by **5.2.5.1, Part 9**.

(c) For flanges connections, whenever the coupling bolts of any type of flange connected shaft are removed or the flange radius is made accessible in connection with overhaul, repairs or when deemed necessary by the Surveyor, the coupling bolts and flange radius are to be examined by means of an approved surface crack detection method deemed appropriate by the Surveyor.

(3) The sleeves, the fillet of the coupling flange to the intermediate shaft or to the stern tube shaft and the coupling bolts are to be examined with the shaft drawn from the stern tube bearings. However, coupling bolts are to be examined by an efficient crack detection method in cases where the Surveyor deems such testing necessary based on the external examination results. In addition, anti-corrosion covers are to be removed for shafts Kind 2.

(4) The stern tube bearings (including the shaft bracket bearings. The same applies hereinafter in this section.) are to be examined.

(5) Clearances between bush of the stern tube bearing (including bush of shaft bracket bearings. The same applies hereinafter in this section.) and either the propeller shaft or the stern tube shaft are to be checked and recorded.

(6) For propellers, it is to be verified that the propeller is free of damages which may cause the propeller to be out of balance.

(7) The satisfactory conditions of inboard and outboard seals (including shaft bracket sealing devices. The same applies hereinafter in this section.) are to be verified during the re-installation of the shaft and propeller.

(8) Where oil or freshwater lubricated bearings are adopted, the weardown of the propeller shaft or the stern tube shaft at the stern tube (after re-installation) is to be measured and recorded.

(9) The propeller boss surfaces in contact with the propeller shaft taper is to be examined.

(10) For controllable pitch propeller connections, the principal part of pitch control gear and working parts are to be opened and examined, and the propeller blade fixing bolts are to be examined by an efficient crack detection method.

(11) Where water lubricated stern tube bearings are adopted, the water piping for lubrication is to be examined.

(12) Where oil or freshwater lubricated stern tube bearings are adopted, the low oil level alarms of the lubricating oil or lubricating freshwater tanks, lubricating oil or lubricating freshwater temperature measuring devices, oil or freshwater lubrication lines as well as lubricating oil circulating or lubricating freshwater pumps are to be examined for verifying whether stern tube bearings are being maintained in good working condition.

(13) Where oil or freshwater lubricated stern tube bearings are adopted, the lubricating oil or lubricating freshwater record book is to be examined.

2 Where waterjet propulsion systems are adopted, examinations specified in **(1)** to **(6)** below are to be carried out, the main shaft being drawn out from the forward main shaft bearing tube or sealing device tube.

(1) General examination of the main shaft and coupling bolts. However, coupling bolts are to be

examined by an efficient crack detection method, in cases where Surveyors consider such testing necessary based on the external examination results.

(2) General examination of the main parts of the forward and after main shaft bearings

(3) General examination of the main parts of the forward main shaft sealing assembly

(4) Open-up examination of the thrust bearings

(5) Examination of the contacting faces of the impeller boss and the main shaft (when installed with a key or spline)

(6) General examination of the impeller

3.9.4 Partial Surveys

1 Partial Surveys for propeller shafts Kind 1 with oil lubricated or freshwater lubricated stern tube bearings are to be carried out in accordance with the following **(1)** and **(2)**:

(1) Examinations are to be carried out in accordance with the following **(a)** to **(i)**, after confirming that the results of the examinations specified in the following **(2)** are satisfactory. In cases where the results of the examinations specified in the following **(2)** or the examinations specified in the following **(a)** to **(i)** are not satisfactory, the Ordinary Survey specified in **3.9.3** is to be carried out.

(a) In the case of keyed connections, the examinations specified in **3.9.3-1(2)** are to be carried out.

(b) Checking and recording the bearing weardown measurements are to be carried out.

(c) A visual inspection of all accessible parts of the shafting system is to be carried out.

(d) The examinations specified in **3.9.3-1(6)** are to be carried out.

(e) Confirmation that the seal liner is found to be or placed in a satisfactory condition is to be carried out.

(f) Verification of satisfactory conditions of inboard and outboard seals, and of the satisfactory installation of the propeller is to be carried out.

(g) In the case of keyed connections, the examinations specified in **3.9.3-1(9)** are to be carried out.

(h) The examinations specified in **(12)** and **(13)** of **3.9.3-1** are to be carried out.

(i) Verification that the main engines have not been operated within the barred speed range for torsional vibration is to be carried out.

(2) The examinations required by **(1)** above are to be carried out in accordance with the following **(a)** to **(d)**:

(a) Review of service records is to be carried out. Confirmation of bearing temperature may, however, be omitted in cases where the installation of devices to measure temperature is not required.

(b) The review specified in the following **i)** and **ii)** is to be carried out.

i) For oil lubricated shafts, review of test records of the lubricating oil analysis is to be carried out to confirm that the reference standards deemed appropriate by the Society are complied with.

ii) For freshwater lubricated shafts, review of test records of the fresh water sample test is to be carried out to confirm that the reference standards deemed appropriate by the Society are complied with.

(c) An oil sample examination (for oil lubricated shafts) or fresh water sample test (for closed system fresh water lubricated shafts) is to be carried out.

(d) Verification of no reported repairs by grinding or welding of shaft and/or propeller is to be carried out.

2 In the case of propeller shafts Kind 1*C*, the "Record for Monitoring System of Stern Tube Bearing and Oil Sealing Devices" is to be examined in addition to the examinations specified in **-1.**

3.9.1 Definitions

The terms which appear in this chapter are defined as follows.

(1) "Shafts" mean propeller shafts and stern tube shafts as specified in the following **(2)** and **(3)** but does not include intermediate shafts which are considered part of the propulsion shafting inside the ship.

(2) "Propeller shaft" is the part of the propulsion shaft to which the propeller is fitted.

(3) "Stern tube shaft" is a shaft placed between the intermediate shaft and propeller shaft, normally arranged within a stern tube or running in open water.

(4) "Shaft Kind 1" is a propeller shaft which is effectively protected against corrosion by sea water, outboard fresh water and inboard fresh water with a means approved by the Society or which is made of corrosion resistant materials approved by the Society.

(5) "Shaft Kind 1*A*" is "Shaft Kind 1" with water lubricated stern tube bearing.

(6) "Shaft Kind 1*B*" is "Shaft Kind 1" with oil lubricated stern tube bearing.

(7) "Shaft Kind 1*C*" is "Shaft Kind 1*B*" satisfying the requirements in **6.2.11, Part D**.

(8) "Shaft Kind 1*W*" is "Shaft Kind 1" with fresh water lubricated stern tube bearing.

(9) "Shaft Kind 2" is a propeller shaft other than "Shaft Kind 1".

(10) "Stern tube shaft" is a shaft placed between the intermediate shaft and propeller shaft, normally arranged within a stern tube or running in open water.

(11) "Stern tube" is a tube or pipe fitted in the shell of a ship at the stern (or rear part of the ship), through which passes the stern tube shaft or aftermost section of the propeller shaft.

(12) "Stern tube sealing system" means the sealing system installed for the following **(a)** or **(b)**, depending on the kind of shaft. The sealing system for the inboard extremity of the stern tube prevents the possible leakage of the lubricant media into the ship internal. The sealing system for the outboard extremity of the stern tube prevents any the possible sea water ingress or leakage of the lubricant media.

(a) "Shaft Kind 1*A*" or "Shaft Kind 2": Inboard extremity of stern tube

(b) "Shaft Kind 1*B*", "Shaft Kind 1*C*" or "Shaft Kind 1*W*": Inboard and outboard extremity of stern tube

(13) "Oil lubricated" means closed loop oil lubricating systems which use oil to lubricate the bearings and are sealed against the environment by adequate sealing devices.

(14) "Water lubricated" means open water lubricating systems where bearings are lubricated by water (sea water or outboard fresh water) and cooled.

(15) "Fresh water lubricated" means closed loop water lubricating systems which use fresh water to lubricate the bearings and are sealed against the environment by adequate sealing devices.

(16) "Service records" are regularly recorded data showing in-service conditions of the shafts and stern tube include the following (as applicable): service conditions of lubricating water pumps (for "Shaft Kind 1*A*" or "Shaft Kind 2"), lubricating oil temperature, bearing temperature and oil consumption records (for "Shaft Kind 1*B*" or "Shaft Kind 1*C*") or water flow, water temperature, salinity, pH, make-up water and pressure of lubricating fresh water pumps (for "Shaft Kind 1*W*").

(17) "Oil sample examination" is a visual examination of the stern tube lubricating oil taken in the presence of a surveyor with a focus on water contamination.

(18) "Lubricating oil analysis" is the analysis to be carried out in accordance with the following **(a)** to **(c)**:

(a) The lubricating oil analysis is to be carried out at regular intervals not exceeding 6 *months*.

(b) The documentation on lubricating oil analysis is to be available on board.

(c) Oil samples to be submitted for the analysis are to be taken in accordance with following **i)** to **ii)**:

i) The sample is to be taken from the same identified position in the system under service conditions.
ii) The sample, unless supervised by a surveyor, is to be collected under the direct supervision of the chief engineer and to be identified.

(19) "Fresh water sample test" is the test to be carried out in accordance with the following **(a)** to **(d)**:
(a) The fresh water sample test is to be carried out at regular intervals not exceeding 6 *months*.
(b) Fresh water samples are to be taken in accordance with the following **i)** to **iv)**:
i) The sample is to be taken under service conditions (i.e. with a rotating shaft and the system at service temperature) and are to be representative of the water circulating within the stern tube.
ii) The sample is to be taken from the same agreed position in the system, before the filters, if any fitted in the fresh water lubrication system, which is to be positively identified.
iii) At time of survey the sample for the test is to be taken in the presence of a surveyor.
iv) The sample, unless supervised by a surveyor, is to be collected under the direct supervision of the chief engineer.
(c) Analysis results are to be retained on board and made available to the surveyor.
(d) The fresh water sample test is to include the following **i)** to **iii)** parameters:
i) chlorides content;
ii) pH value; and
iii) presence of bearing particles or other particles (only for laboratory analysis, and not required for tests carried out in the presence of a surveyor).

(20) "Keyless connection" is the forced coupling methodology between the shaft and the propeller without a key achieved through the interference fit of the propeller boss on the shaft tapered end.

(21) "Keyed connection" is the forced coupling methodology between the shaft and the propeller with a key and keyway achieved through the interference fit of the propeller boss on the shaft tapered end.

(22) "Flanged connection" is the coupling methodology, between the shaft and the propeller, achieved by a flange, built in at the shaft aft end, bolted to the propeller boss

(23) "Alternative means" means shafting arrangements such as an approved condition monitoring scheme or other reliable approved means for assessing and monitoring the condition of the shafts, sealing devices and the stern tube lubricant system capable to assure the condition of the propeller shaft assembly with an equivalent level of safety as obtained by survey methods specified in this part.

3.9.2 Surveys of Water Lubricated Shafts

1 Surveys of Shafts Kind 1*A*

(1) Surveys of shafts kind 1*A* are to be the Ordinary Survey specified in **Table 3.9.2** and are to be carried out within 5 years from the date of completion (survey due date) of the Classification Survey or the previous Ordinary Survey.

(2) In addition to **(1)** above, surveys for shafts Kind 1*A* which are used corrosion resistant materials specified in **6.2.7-1.(3), Part D of the Rules** are to be the Partial Surveys specified in **Table 3.9.2** and are to be carried out within 36 *months* from the date of completion (survey due date) of the Classification Survey or the previous Ordinary Survey specified in **(1)** above. In cases where the results of the Partial Survey are not satisfactory, the Ordinary Survey specified in **Table 3.9.2** is to be carried out.

(3) For the surveys referred to **(1)** and **(2)** above completed with 3 *months* prior to the survey due

date, the next period is to start from the survey due date.

(4) The survey due date may be extended in cases where a survey is carried out in accordance with following **(a)** to **(d)** and the shafts condition is confirmed to be satisfactory. The interval of the Ordinary Survey specified in **Table 3.9.2** is not to exceed 6 *years*.

(a) The survey due date may be extended for up to 1 *year* in cases where the 1Year Extension Survey specified in **Table 3.9.2** is carried out. No further extension survey may be carried out.

(b) The survey due date may be extended for up to 3 *months* in cases where the 3Month Extension Survey specified in **Table 3.9.2** is carried out. No further 3Month Extension Surveys may be carried out. In the event an additional extension is requested, the survey due date, prior to the previous extension, may be extended for up to 1 *year* in cases where the 1Year Extension Survey specified in **Table 3.9.2** is carried out.

(c) The period of extension counts from the survey due date in cases where the extension survey is carried out within 1 *month* within the survey due date.

(d) The period of extension counts from the date on which the extension survey in cases where the extension survey is carried out more than 1 *month* prior to the survey due date.

2 Surveys of Shafts Kind 2

(1) Surveys of shafts Kind 2 are to be the Ordinary Surveys specified in **Table 3.9.2** and are to be carried out in accordance with the following **(1)** and **(2)** periods (survey due dates).

(a) Concurrently with Special Surveys; and

(b) Within 36 *months* from the date of completion of the Classification Survey or the previous Ordinary Survey

(2) For the surveys referred to **(1)** above completed with 3 *months* prior to the survey due date, the next period is to start from the survey due date.

Table 3.9.2 Surveys of Water Lubricated Shafts – Shafts Kind 1*A* and Kind 2

Items	Examinations	Ordinary Survey	Partial Survey	Extension Survey	
				1 year	3 months
1 Drawing out of the shafts -1 Entirely drawing out	(1) Drawing the propeller shaft and the stern tube shaft and examining the entire shaft (including liners, corrosion protection system and stress reducing features, where provided), inboard seal system and bearings.	○			
-2 Partially drawing out	(1) Drawing the propeller shaft to confirm the contacting parts to stern tube bearing. The propeller shaft may be withdrawn with the condition fitting propeller to propeller shaft.		○		
2 Propeller connections -1 Keyed connections	(1) Removing the propeller to expose the forward end of the taper. (2) Performing a non-destructive examination (*NDE*) to all around the shaft in way of the forward portion of the taper section, including the keyway with the method deemed appropriate by a surveyor. (When shafts are provided with liners, the *NDE* is to be extended to the after edge of the liner.)	○			
-2 Keyless connections	(1) Removing the propeller to expose the forward end of the taper. (2) Performing a non-destructive examination (*NDE*) to all around the shaft in way of the forward portion of the taper section with the method deemed appropriate by a surveyor. For shafts provided with liners, the *NDE* is to be extended to the after edge of the liner. (3) Notwithstanding **(2)** above, with the interval not to exceed 15 *years*, performing a non-destructive examination (*NDE*) to whole corn parts of shaft including the forward portion of the taper section with the method deemed appropriate by a surveyor.	○			
-3 Flanged connections	(1) Whenever the coupling bolts of any type of flange-connected shaft are removed or the flange radius is made accessible in connection with overhaul, repairs or when deemed necessary by a surveyor, performing a non-destructive examination (*NDE*) to the coupling bolts and flange radius with the method deemed appropriate by the surveyor.	○			
3 Clearance between bush of the stern tube bearing and propeller shaft	(1) Checking and recording the clearance between bush of the stern tube and propeller shaft. (2) Confirm the clearance dose not exceed the following value. (a) Shaft diameter no more than 230*mm*: 6 *mm* (b) Shaft diameter more than 230*mm* but no more than 305*mm*: 8 *mm* (c) Shaft diameter more than 305*mm*: 9.5 *mm*	○	○	○	

Table 3.9.2 Surveys of Water Lubricated Shafts – Shafts Kind 1*A* and Kind 2 (Continued)

Items	Examinations	Ordinary Surveys	Partial Survey	Extension Survey	
				1 year	3 months
4 Propeller	(1) Verification that the propeller is free of damages which may cause the propeller to be out of balance. (For extension survey, the information is confirmed by the record etc.) (2) For ordinary surveys, checking propeller fitting condition to shaft. When the propeller shaft with keyless connection is force fitted to the shaft, it is to be ascertained that the pull-up length is within the upper and lower limits given in **7.3.1-1, Part D**.	○	○	○	○
5 Sealing device for stern tube	(1) Verification of the satisfactory conditions of inboard seals during the re-installation of the shaft and propeller. (For ordinary surveys, the verification is carried out during the re-installation of the shaft and propeller.)	○	○	○	○
6 Shaft and coupling bolts	(1) Examination of shaft and coupling bolts (For extension survey, visual inspection of accessible parts of shaft and coupling bolts.). However, performing a non-destructive examination (*NDE*) to coupling bolts with the method deemed appropriate by a surveyor in cases where the surveyor, based on the results of external examinations, deems such addition examination to be necessary. In addition, anti-corrosion covers are to be removed for shafts Kind 2.	○		○	○
7 Stern tube bearing	(1) Examination of the stern tube bearings.	○			
8 Propeller boss surfaces in contact with the propeller shaft taper	(1) Examination of the propeller boss surface.	○			
9 Controllable pitch propeller connections (Only applies to shafts with flanged connections)	(1) Open-up examination of the pitch control gear and working parts as well as performing a non-destructive examination (*NDE*) to the propeller blade fixing bolts with the method deemed appropriate by a surveyor.	○			
10 Water lubrication lines	(1) Examination of water lubrication lines.	○	○	○	○
11 Review of records etc.	(1) Review of following **(a)** to **(d)**. (a) Previous clearance recording (b) Service records (c) No report to repairs by grinding or welding of shafts or propellers (d) The information of the shafting arrangement is in good working condition by the chief engineer			○	○

3.9.3 Surveys of Oil Lubricated Shafts

Surveys of Shaft Kind 1*B* and 1*C*

(1) Surveys of Shaft kind 1*B* and Shaft kind 1*C* are to be the Ordinary Surveys specified in **Table 3.9.3** carried out within 5 years from the date of completion (survey due date) of the Classification Survey or the previous Ordinary Survey.

(2) Notwithstanding **(1)** above, for shafts which are subject to the lubricating oil analysis specified in **3.9.1(18)**, the Partial Survey specified in **Table 3.9.3** may be carried out instead of the Ordinary Survey. In cases where the results of the Partial Survey are not satisfactory, the Ordinary Survey specified in **Table 3.9.3** is to be carried out.

(3) Notwithstanding **(1)** and **(2)** above, for shafts with keyless or flanged connections and which are subject to the lubricating oil analysis specified in **3.9.1(18)**, Simplified Partial Survey specified in **Table 3.9.3** can be carried out instead of Ordinary Survey or Partial Survey. In cases where the results of the Simplified Partial Survey are not satisfactory, the Ordinary Survey specified in **Table 3.9.3** is to be carried out.

(4) Notwithstanding **(2)** and **(3)** above, for Shaft kind 1*B* and Shaft kind 1*C*, the interval of Ordinary Survey specified in **Table 3.9.3** above is not to exceed 15 *years*. This interval may be extended for up to 3 *months*. No further extension may be granted.

(5) For the surveys referred to **(1)** to **(4)** above completed with 3 *months* prior to the survey due date, the next period is to start from the survey due date.

(6) For shafts which are carried out lubricating oil analysis specified in **3.9.1(18)**, the survey due date may be extended in cases where a survey is carried out in accordance with following **(a)** to **(e)**.

  (a) The survey due date may be extended for up to 2.5 *years* in cases where the 2.5Year Extension Survey specified in **Table 3.9.2** is carried out. No further extension survey may be carried out.

  (b) The survey due date may be extended for up to 1 *year* in cases where the 1Year Extension Survey specified in **Table 3.9.2** is carried out. No further extension survey may be carried out.

  (c) The survey due date may be extended for up to 3 *months* in cases where the 3Month Extension Survey specified in **Table 3.9.2** is carried out. No further 3Month Extension Surveys may be carried out. In the event an additional extension is requested, the survey due date, prior to the previous extension, may be extended for up to 1 *year* in cases where the 1Year Extension Survey specified in **Table 3.9.2** is carried out.

  (d) The period of extension counts from the survey due date in cases where the extension survey is carried out within 1 *month* within the survey due date.

  (e) The period of extension counts from the date on which the extension survey in cases where the extension survey is carried out more than 1 *month* prior to the survey due date.

Table 3.9.3 Surveys of Oil Lubricated Shafts – Shafts Kind 1*B* or 1*C*

Items	Examinations	Ordinary Survey	Partial Survey	Simplified Partial Survey	Extension Survey		
					2.5 years	1 year	3 months
1 Drawing out of the shafts	(1) Drawing the propeller shaft and the stern tube shaft and examining the entire shafts, seals system and bearings. (2) Checking and recording the bearing clearances between the bush and the shafts.	○					
2 Propeller connections -1 Keyed connections	(1) Removing the propeller to expose the forward end of the taper. (2) Performing a non-destructive examination (*NDE*) to all around the shaft in way of the forward portion of the taper section, including the keyway with the method deemed appropriate by a surveyor. (When shafts are provided with liners, the *NDE* is to be extended to the after edge of the liner.)	○	○				
-2 Keyless connections	(1) Removing the propeller to expose the forward end of the taper. (2) Performing a non-destructive examination (*NDE*) to all around the shaft in way of the forward portion of the taper section with the method deemed appropriate by a surveyor. (When shafts provided with liners, the *NDE* is to be extended to the after edge of the liner.)	○	○				
-3 Flanged connections	(1) Whenever the coupling bolts of any type of flange-connected shaft are removed or the flange radius is made accessible in connection with overhaul, repairs or when deemed necessary by a surveyor, performing a non-destructive examination (*NDE*) to the flange radius and coupling bolts with the method deemed appropriate by the surveyor.	○	○				
3 Weardown of shaft at the stern tube bearing	(1) Checking and recording the weardown (For extension surveys, the checking and recording are to be carried out as far as practicable.) (2) Confirm the weardown value does not exceed 0.3 *mm* (0.3 *mm* is standard value). In addition, factors such as the characteristics of the lubricating oil, the temperature fluctuation history of the lubricating oil or bearing material are to be taken into account.	○	○	○	○		
4 Propeller	(1) Verification that the propeller is free of damages which may cause the propeller to be out of balance. (For extension surveys, the information is to be confirmed by records etc.) (2) For ordinary surveys, checking propeller fitting condition to shaft. When the propeller shaft with keyless connection is force fitted to the shaft, it is to be ascertained that the pull-up length is within the upper and lower limits given in **7.3.1-1, Part D of the Rules for the Survey and Construction of Steel Ships**.	○	○	○	○	○	

Table 3.9.3 Surveys of Oil Lubricated Shafts – Shafts Kind 1*B* or 1*C* (Continued)

Items	Examinations	Ordinary Surveys	Partial Surveys	Simplified Partial Survey	Extension Survey		
					2.5 years	1 year	3 months
5 Sealing device for stern tube	(1) Verification of the satisfactory conditions of inboard and outboard seals. (For ordinary surveys, the verification is carried out during the re-installation of the shaft and propeller.) For 3month extension surveys, verification of inboard seals may be accepted. (2) Confirmation that the seal liner is placed in a satisfactory condition. For extension, this examination is not applied.	○	○	○	○	○	○
6 Shaft and coupling bolts	(1) Examination of shaft and coupling bolts (For the surveys except Ordinary Survey, visual inspection of accessible parts of shaft and coupling bolts.). However, performing a non-destructive examination (*NDE*) to coupling bolts with the method deemed appropriate by a surveyor in cases where the surveyor, based on the results of external examinations, deems such addition examination to be necessary.	○	○	○	○	○	○
7 Stern tube bearing	(1) Examination of the stern tube bearings.	○					
8 Propeller boss surfaces in contact with the propeller shaft taper	(1) Examination of the propeller boss surface.	○					
9 Controllable pitch propeller connections (Only applies to shafts with flanged connections)	(1) Open-up examination of the pitch control gear and working parts as well as performing a non-destructive examination (*NDE*) to the propeller blade fixing bolts with the method deemed appropriate by a surveyor.	○	○				
10 Low oil level alarms of the lubricating oil tanks, lubricating oil temperature measuring devices, oil lubricating lines and lubricating oil circulating pumps, etc.	(1) Examination of the systems for verifying whether stern tube bearings are being maintained in good working condition.	○	○	○	○	○	○

Table 3.9.3 Surveys of Oil Lubricated Shafts – Shafts Kind 1*B* or 1*C* (Continued)

Items	Examinations	Ordinary Surveys	Partial Surveys	Simplified Partial Survey	Extension Survey		
					2.5 years	1 year	3 months
11 Review of records etc.	(1) Examinations are to be carried out in accordance with the following **(a)** to **(g)**. (a) Service records are to be reviewed. (b) Review of test records of the lubricating oil analysis is to be carried out to confirm that the reference standards specified in following **i)** and **ii)** are complied with. i) Metal particles (upper limit) *1 : 1) Iron (Fe): 50 *ppm* 2) Tin (Sn): 20 *ppm* 3) Lead (Pb): 20 *ppm* 4) Sodium (Na): 80 *ppm* ii) IR oxidation and separated water*2: 1) IR oxidation @ 5.85*μm*: 10 (*Abs.unit*/*cm*) 2) Separated water: 1.0 % (c) Oil sample examination is to be carried out. (d) Verification of no reported repairs by grinding or welding of shafts or propellers is to be carried out. (e) Examination of the lubricating oil record book. (f) For 1year and 3month extension surveys, review of the previous clearance recordings is to be carried out. (g) Confirmation from the chief engineer that the shafting arrangement is in good working condition is to be obtained.		○	○	○	○	○

Notes

*1: If the test results of the oil analysis suggest that the sample oil does not represent the lubricating oil in the stern tube and is suspected to be invalid (e.g., when only iron (Fe) exceeds the upper limit of **(b)i)**, item **11**, it is suspected that rust in the lubricating oil tank is the cause.), the surveyor is to instruct the shipowner (or the ship management company) to promptly re-perform the oil analysis and to be verified the test results of the oil analysis by the time of the first periodical survey (excluding those specified in **1.1.3-1(5), Part B of the Rules for the Survey and Construction of Steel Ships**) on or after the day 3 *months* after the day of receiving the said instruction.

*2: Notwithstanding **(b)ii)**, item **11**, in the case of environmentally acceptable lubricants (EAL), observation of any trends (such as TAN (total acid number), viscosity and change in colour etc.) based on periodical oil analysis may be made. In such cases, observations of TAN trends are to be made based on sequential analyssis in conjunction with limits for continued use in service defined by oil makers.

3.9.4 Surveys of Fresh Water Lubricated Shafts

Surveys of Shafts Kind 1*W*

(1) Surveys for shafts Kind 1*W* are to be the Ordinary Surveys specified in **Table 3.9.4** and are to be carried out within 5 years from the date of completion (survey due date) of the Classification Survey or the previous Ordinary Survey (survey due date).

(2) Notwithstanding **(1)** above, for shafts which are subject to the lubricating oil analysis specified in **3.9.1(19)**, the Partial Survey specified in **Table 3.9.4** may be carried out instead of an Ordinary Survey. In cases where the results of the Partial Survey are not satisfactory, the Ordinary Survey specified in **Table 3.9.4** is to be carried out.

(3) Notwithstanding **(1)** and **(2)** above, for shafts with keyless or flanged connections and which are subject to the lubricating oil analysis specified in **3.9.1(19)**, the Simplified Partial Survey specified in **Table 3.9.4** may be carried out instead of an Ordinary Survey or Partial Survey. In cases where the results of the Simplified Partial Survey are not satisfactory, the Ordinary Survey specified in **Table 3.9.4** is to be carried out.

(4) Notwithstanding **(2)** and **(3)** above, the interval of Ordinary Survey specified in **Table 3.9.4** above is not to exceed 15 *years*. This interval may be extended for up to 3 *months*. No further extension may be granted.

(5) For the surveys referred to **(1)** to **(4)** above completed with 3 *months* prior to the survey due date, the next period is to start from the survey due date.

(6) For shafts which are carried out lubricating fresh water analysis specified in **3.9.1(19)**, the survey due date may be extended in cases where a survey is carried out in accordance with following **(a)** to **(e)**.

  (a) The survey due date may be extended for up to 2.5 *years* in cases where the 2.5Year Extension Survey specified in **Table 3.9.4** is carried out. No further extension survey may be carried out.

  (b) The survey due date may be extended for up to 1 *year* in cases where the 1Year Extension Survey specified in **Table 3.9.4** is carried out. No further extension survey may be carried out.

  (c) The survey due date may be extended for up to 3 *months* in cases where the 3Month Extension Survey specified in **Table 3.9.4** is carried out. No further 3Month Extension Survey may be carried out. In the event an additional extension is requested, the survey due date, prior to the previous extension, may be extended for up to 1 *year* in cases where the 1Year Extension Survey specified in **Table 3.9.4** is carried out.

  (d) The period of extension counts from the survey due date in cases where the extension survey is carried out within 1 *month* within the survey due date.

  (e) The period of extension counts from the date on which the extension survey in cases where the extension survey is carried out more than 1 *month* prior to the survey due date.

Table 3.9.4 Surveys of Fresh Water Lubricated Shafts – Shafts Kind 1*W*

Items	Examinations	Ordinary Survey	Partial Survey	Simplified Partial Survey	Extension Survey		
					2.5 years	1 year	3 months
1 Drawing out of the shafts	(1) Drawing the propeller shaft and the stern tube shaft and examining the entire shafts, seals system and bearings. (2) Checking and recording the bearing clearances between the bush and the shafts.	○					
2 Propeller connections -1 Keyed connections	(1) Removing the propeller to expose the forward end of the taper. (2) Performing a non-destructive examination (*NDE*) to all around the shaft in way of the forward portion of the taper section, including the keyway with the method deemed appropriate by a surveyor. (When shafts are provided with liners, the *NDE* is to be extended to the after edge of the liner.)	○	○				
-2 Keyless connections	(1) Removing the propeller to expose the forward end of the taper. (2) Performing a non-destructive examination (*NDE*) to all around the shaft in way of the forward portion of the taper section with the method deemed appropriate by a surveyor. (When shafts are provided with liners, the *NDE* is to be extended to the after edge of the liner.)	○	○				
-3 Flanged connections	(1) Whenever the coupling bolts of any type of flange-connected shaft are removed or the flange radius is made accessible in connection with overhaul, repairs or when deemed necessary by a surveyor, performing a non-destructive examination (*NDE*) to the flange radius and coupling bolts with the method deemed appropriate by the surveyor.	○	○				
3 Weardown of shaft at the stern tube bearing	(1) Checking and recording the weardown (For extension surveys, the checking and recording are to be carried out as far as practicable.) (2) Confirm the weardown value is not exceed 0.3 *mm* (0.3 *mm* is standard value). In addition, factors such as the characteristics of the lubricating oil, the temperature fluctuation history of the lubricating oil or bearing material are to be taken into account.	○	○	○	○		
4 Propeller	(1) Verification that the propeller is free of damages which may cause the propeller to be out of balance. (For extension survey, the information is confirmed by the record etc.) (2) For ordinary surveys, checking propeller fitting condition to shaft. When the propeller shaft with keyless connection is force fitted to the shaft, it is to be ascertained that the pull-up length is within the upper and lower limits given in **7.3.1-1, Part D of the Rules for the Survey and Construction of Steel Ships**.	○	○	○	○	○	

Table 3.9.4 Surveys of Fresh Water Lubricated Shafts – Shafts Kind 1*W* (Continued)

Items	Examinations	Ordinary Surveys	Partial Surveys	Simplified Partial Survey	Extension Survey		
					2.5 years	1 year	3 months
5 Sealing device for stern tube	(1) Verification of the satisfactory conditions of inboard and outboard seals. (For ordinary surveys, the verification is carried out during the re-installation of the shaft and propeller.) For 3months extension surveys, verification of inboard seals may be accepted. (2) Confirmation that the seal liner is placed in a satisfactory condition. For extension, this examination is not applied.	○	○	○	○	○	○
6 Shaft and coupling bolts	(1) Examination of shaft and coupling bolts (For the surveys except Ordinary Survey, visual inspection of accessible parts of shaft and coupling bolts.). However, performing a non-destructive examination (*NDE*) to coupling bolts with the method deemed appropriate by a surveyor in cases where the surveyor, based on the results of external examinations, deems such addition examination to be necessary.	○	○	○	○	○	○
7 Stern tube bearing	(1) Examination of the stern tube bearings.	○					
8 Propeller boss surfaces in contact with the propeller shaft taper	(1) Examination of the propeller boss surface.	○					
9 Controllable pitch propeller connections (Only applies to shafts with flanged connections)	(1) Open-up examination of the pitch control gear and working parts as well as performing a non-destructive examination (*NDE*) to the propeller blade fixing bolts with the method deemed appropriate by a surveyor.	○	○				
10 Low level alarms of the lubricating fresh water tanks, lubricating fresh water temperature measuring devices, fresh water lubricating lines and lubricating fresh water circulating pumps, etc.	(1) Examination of the systems for verifying whether stern tube bearings are being maintained in good working condition.	○	○	○	○	○	○

Table 3.9.4 Surveys of Fresh Water Lubricated Shafts – Shafts Kind 1*W* (Continued)

Items	Examinations	Ordinary Surveys	Partial Surveys	Simplified Partial Survey	Extension Survey		
					2.5 years	1 year	3 months
11 Review of records etc.	(1) Examinations are to be carried out in accordance with the following **(a)** to **(g)**. (a) Service records are to be reviewed. (b) Review of test records of the fresh water analysis is to be carried out to confirm that the reference standards specified in following **i)** and **ii)** are complied with. i) Chloride content and sodium content (Upper limit) : 1) Chloride: 60 *ppm* 2) Sodium (Na): 70 *ppm* ii) pH : Lower limit values determined based upon characteristics of the correction inhibitors used, but not to be less than 11 iii) Metal particles (upper limit) : 1) Iron (Fe): 25 *ppm* 2) Chromium (Cr): 5 *ppm* 3) Nickel (Ni): 5 *ppm* 4) Copper (Cu): 40 *ppm* 5) Silicon (Si): 30 *ppm* iv) Bearing particles (non-metallic content) : No polymer resins are to be found by micro-filter or microscopic testing (c) Fresh water sample test is to be carried out. (d) Verification of no reported repairs by grinding or welding of shafts or propellers is to be carried out. (e) Examination of the lubricating fresh water record book. (f) For 1year and 3month extension surveys, review of the previous clearance recordings is to be carried out. (g) Confirmation from the chief engineer that the shafting arrangement is in good working condition is to be obtained.		○	○	○	○	○

Section 3.14 has been added as follows.

3.14 Surveys of Water jet Propulsion Systems, etc.

3.14.1 Annual Surveys

For ships fitted with water jet propulsion systems, the annual surveys are to be carried out in accordance with the surveys specified in **3.3.4**, **Part B of the Rules for the Survey and Construction of Steel Ships**.

3.14.2 Intermediate Surveys

For ships fitted with water jet propulsion systems, the intermediate surveys are to be carried out in accordance with the surveys specified in **4.3.4**, **Part B of the Rules for the Survey and Construction of Steel Ships**.

3.14.3 Special Surveys

For ships fitted with water jet propulsion systems, the special surveys are to be carried out in accordance with the surveys specified in **5.3.4**, **Part B of the Rules for the Survey and Construction of Steel Ships**.

3.14.4 Docking Surveys

For ships fitted with water jet propulsion systems, the docking surveys are to be carried out in accordance with the surveys specified in **6.1.1-2**, **Part B of the Rules for the Survey and Construction of Steel Ships**.

EFFECTIVE DATE AND APPLICATION (Amendment 1-5)

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

GUIDANCE FOR HIGH SPEED CRAFT

GUIDANCE

2022 AMENDMENT NO.1

Notice No.39 30 June 2022

Resolved by Technical Committee on 26 January 2022

Notice No.39 30 June 2022
AMENDMENT TO THE GUIDANCE FOR HIGH SPEED CRAFT

“Guidance for high speed craft” has been partly amended as follows:

Amendment 1-1

Part 2 CLASS SURVEYS

Chapter 1 GENERAL

1.1 Surveys

Paragraph 1.1.1 has been added as follows.

1.1.1 Registration Surveys

With respect to **1.1.1-2, Part 2 of the Rules**, surveyors are to confirm the asbestos-free declarations and supporting documents specified in **2.1.3-1(9), Part 2 of the Rules**.

1.2 Preparation for Surveys and Others

Paragraph 1.2.5 has been added as follows.

1.2.5 Procedure for Tests, Wear and Tear, etc.

With respect to **1.2.5-4, Part 2 of the Rules,** surveyors are to confirm at periodical surveys that asbestos-free declarations and supporting documents are provided for any replaced or newly installed fittings, equipment, parts, etc.

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 30 June 2022.

Amendment 1-2

Part 2 CLASS SURVEYS

Chapter 2 CLASSIFICATION SURVEYS

2.3 Sea Trials and Stability Experiments

2.3.1 Sea Trials

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

Details of each test to be carried out during sea trials are to be in accordance with the following requirements.

(1) (Omitted)

(2) Astern test

The astern test is to be carried out in accordance with the following **(a)** to **(d)**:

(a) While the main propulsion machinery is running ahead at its maximum continuous output, an order for full astern is issued and the reversing operation from ahead run to full astern run is carried out as quickly as possible, and the astern performance and stopping performance of craft are to be verified. In applying this provision, the tests are to be carried out from all control positions where there are multiple control positions for the reversing operation to astern run.

(b) It is to be confirmed that the machinery is functioning normally while the ship is running astern. The main engine is to be kept at a rate of more than 70% of the maximum continuous revolutions until the astern speed (rotational speed in rpm) stabilizes.

(c) For low pressure gas-fuelled dual fuel engines, the confirmation specified in **(b)** is to be carried out for all operating modes (gas mode, diesel mode, etc.). <u>This test is to be carried out at the maximum power available in gas mode.</u>

(d) To high pressure gas-fuelled dual fuel engines, the requirements for low pressure gas-fuelled dual fuel engines specified in **(c)** apply mutatis mutandis.

(3) (Omitted)

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

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

2. Notwithstanding the amendments to the Guidance, the current requirements apply to gas-fuelled engines other than those which fall under the following:

(1) gas-fuelled engines for which the application for approval of use is submitted to the Society on or after the effective date; or

(2) gas-fuelled engines for which the date of renewal of approval of use is on or after the effective date.

Amendment 1-3

Part 9 MACHINERY INSTALLATIONS

Chapter 2 RECIPROCATING INTERNAL COMBUSTION ENGINES

2.1 General

2.1.3 Drawings and Data

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

For the following data, those represented by two sizes in a generic range of turbochargers (i.e. the same components, materials, etc., with the only difference being the size) are acceptable.

(1) The documentation of safe torque transmission specified in **(34)(a), Table 9.2.1(b) ~~2.1.3-1(2)(i)i)~~, Part 9 of the Rules**.

(2) The operation and maintenance manuals listed in **(34)(c), Table 9.2.1(b)~~2.1.3-1(2)(i)iii)~~, Part 9 of the Rules**.

EFFECTIVE DATE AND APPLICATION (Amendment 1-3)

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

2. Notwithstanding the amendments to the Guidance, the current requirements may apply to reciprocating internal combustion engines for which the application for approval is submitted to the Society before the effective date.

Amendment 1-4

Part 9 MACHINERY INSTALLATIONS

Chapter 4 has been added as follows.

Chapter 4 POWER TRANSMISSION SYSTEMS

4.1 General

4.1.4 General Construction of Gears

The word "sufficient" in **4.1.4, Part 9 of the Rules** means being designed in accordance with national or international standards such as *JIS.*

EFFECTIVE DATE AND APPLICATION (Amendment 1-4)

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

2. Notwithstanding the amendments to the Guidance, the current requirements apply to all gears previously approved by the Society prior to the effective date for which no failure has occurred, and no changes related to strength, such as the scantlings of the gear meshes, materials, etc. have been made.

Amendment 1-5

Part 10 ELECTRICAL INSTALLATIONS

Chapter 1 GENERAL

1.2 Testing

1.2.1 Shop Tests

Sub-paragraph -5 has been deleted.

~~**5** For cables where it is inadequate to deal with them under the requirements of type test, tests and inspection on individual product items may be accepted by application in place of a type tests.~~

Chapter 2 ELECTRICAL INSTALLATION AND SYSTEM DESIGN

2.5 Switchboards, Section Boards and Distribution Boards

Paragraph 2.5.4 has been deleted.

~~**2.5.4 Busbars**~~

~~**1** Busbars and the contact faces of busbars and linking conductors are to be protected against corrosion or oxidization by means of silver plating, tin plating or dippling in a solder bath, etc.~~

~~**2** Current rating of busbars may generally be determined by **Table 10.2.5.4-1**.~~

~~**3** The wording "in cases where deemed appropriate by the Society" in **2.5.4-4**, **Part 10 of the Rules** refers to cases where documents which show that there are no adverse effects on any of the following **(1)** to **(5)** are submitted to and approved by the Society in cases where the temperature rises of any busbars, connecting conductors and their connections that are carrying full-load currents exceed 45*K* at an ambient temperature of 45°C.~~

~~(1) Mechanical strength of the conducting material~~

~~(2) Possible effect on adjacent equipment~~

~~(3) Permissible temperature limits of the insulating materials in contact with the conductor~~

~~(4) Effect of the temperature of the conductor on the apparatus connected to busbars~~

~~(5) For plug-in contacts, the nature and surface treatment of the contact material~~

Table 10.2.5.4-1 has been deleted.

Table 10.2.5.4-1 Current Rating of Busbars

Type			Current rating
For generators	In cases where only one generator is feeding power to the busbars.		100% or more of the rated current of the generator.
	In cases where two or more generators are feeding power at their full capacities to the busbars.	Subdivided busbar arrangement (distribution systems consisting of multiple busbars)	For each busbar (including spare circuits), ((100% of the large capacity rated currents (e.g. bow thrusters, etc.)) + (75% of the sum of the rated currents of the rest of the feeding circuits)) or more
		Single busbar arrangement (distribution system consisting of a single busbar)	((100% of the rated current of one generator of the largest capacity) + (80% of the sum of the rated currents of generators)) or more
For power feeding	In the case of general power feeding circuits.		75% or more of the sum of the rated currents of the feeding circuits (including spare circuits). However, there is no need of exceeding the capacity of the generator busbars.
	In cases where feeding circuits have only one load circuit, or where power is fed to groups of motors under continuous service.		The total load current or more.

EFFECTIVE DATE AND APPLICATION (Amendment 1-5)

1. The effective date of the amendments is 1 July 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 1-6

Part 2 CLASS SURVEYS

Chapter 3 PERIODICAL SURVEYS AND PLANNED MACHINERY SURVEYS

Section 3.9 has been deleted.

~~**3.9 Propeller Shaft and Stern Tube Shaft Surveys**~~

(Paragraph 3.9.2 and 3.9.4 are omitted.)

EFFECTIVE DATE AND APPLICATION (Amendment 1-6)

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