RULES FOR HIGH SPEED CRAFT

GUIDANCE FOR HIGH SPEED CRAFT

Rules for High Speed Craft **2020 AMENDMENT NO.1**
Guidance for High Speed Craft **2020 AMENDMENT NO.1**

Rule No.62 / Notice No.34 30 June 2020
Resolved by Technical Committee on 22 January 2020

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

2020 AMENDMENT NO.1

Rule No.62 30 June 2020

Resolved by Technical Committee on 22 January 2020

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Rule No.62 30 June 2020
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

Paragraph 1.1.6 has been amended as follows.

1.1.6 Unscheduled Surveys

The classed ships may be subject to Unscheduled Surveys when the confirmation of the status of the ship by survey is deemed necessary in cases where the Society ~~suspects the ship of not being in continued compliance with the Rules and Regulations of the Society, and of not being properly maintained and operated by the ship owner~~ considers the ship to be subject to **1.4-3** of the **CONDITIONS OF SERVICE FOR CLASSIFICATION OF SHIPS AND REGISTRATION OF INSTALLATIONS**. At Unscheduled Surveys, investigations, examinations or tests are to be made to the satisfaction of the Surveyor with respect to the matters concerned.

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 30 June 2020.

Amendment 1-2

Part 9 MACHINERY INSTALLATIONS

Chapter 2 DIESEL ENGINES

2.2 Safety Devices

2.2.1 Speed Governors and Overspeed Protective Devices

Sub-paragraph -4 has been amended as follows.

1 Diesel engine used as main propulsion machinery in diesel craft is to be provided with a speed governor so adjusted to prevent the engine speed from being exceeded by more than 15% of the maximum continuous revolutions.
2 In addition to the speed governor, each diesel engine used as the main propulsion machinery with a continuous maximum output of 220 *kW* or over which can be declutched or drives controllable pitch propeller, is to be provided with a separate overspeed protective device. In this case, the overspeed protective device and its driving gear are to be independent from the governor required in **-1**, and so adjusted to automatically stop the engine when the speed exceeds more than 20% of the maximum continuous revolutions.
3 Where diesel engines used as the main propulsion machinery for an electric propulsion craft, driving generators used to supply electrical power exclusively to propulsion motors, the engines are to be provided with governers specified in **5.1.2-2, Part H of the Rules for the Survey and Construction of Steel Ships**.
4 Diesel engines to drive generators other than those mentioned in **-3** are to be provided with governors specified in ~~**2.4.2**~~**2.4.1-5, Part ~~H~~D of the Rules for the Survey and Construction of Steel Ships**.
5 In addition to the normal governor, each diesel engine used as the main propulsion machinery of electric propulsion craft and diesel engines used to drive a generator(excluding that of emergency use) with a maximum continuous output of 220 *kW* or over are to be provided with a separate overspeed protective device. In this case, the overspeed protective device and its driving gear are to be independent from that of the governor required in **-3** and **-4**, and so adjusted to automatically stop the engine when the speed exceeds by more than 15% of the maximum continuous revolutions.

Chapter 3 GAS TURBINES

3.3 Safety Devices

3.3.1 Governors and Overspeed Protective Devices

Sub-paragraph -3 has been amended as follows.

1 Gas turbines (excluding those driving emergency generators) are to be provided with an overspeed protective device. This device is to be so adjusted that the output shaft speed may not exceed the maximum continuous speed by more than 15 % and is to have the functions specified in **3.2.2-2**.

2 Gas turbines are to be provided with a speed governor independent of the overspeed protective device specified in **-1** above. The speed governor is to be capable of controlling the speed of the unloaded gas turbine without bringing the overspeed protective device into action.

3 The governors of gas turbines used to drive generators are to comply with the requirements in ~~**2.4.2-1** and **-2**~~**4.3.1-4, Part ~~H~~D of the Rules for the Survey and Construction of Steel Ships**. However, when gas turbines used as main propulsion machinery in electric propulsion ships are used to drive generators to supply electric power exclusively to propulsion motors, the requirements in **5.1.2-2**, **Part H of the Rules for the Survey and Construction of Steel Ships** are to be applied.

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

1. The effective date of the amendments is 30 June 2020.

2. Notwithstanding the amendments to the Rules, the current requirements apply to governors for which the application for approval is submitted to the Society before the effective date.

Amendment 1-3

Part 1 GENERAL RULES

Chapter 1 GENERAL

1.2 Class Notations

1.2.1 General*

Sub-paragraph (3) has been amended as follows.

For craft complying with additional requirements and/or those exempted from any requirements related to the subjects specified in the following paragraphs in accordance with the provisions of this Rules, an appropriate notation is affixed to the Classification Characters in accordance with the provisions of **Chapter 2 of the Regulation for the Classification and Registry of Ships** as follows;

NS* (**(1)**) (**(2)**, **(3)**) (**(4)**) (**(5)**)

(1) Restricted services specified in **1.2.2**
(2) Structural materials for main hull specified in **1.2.3**
(3) Hull construction and equipment, etc. specified in **1.2.4**
(4) Compliance with the special requirements for international voyages specified in **1.2.5**
(5) Application of special survey scheme specified in **1.2.6**

Title of Paragraph 1.2.4 has been amended as follows.

1.2.4 Hull Construction and Equipment, etc.

Sub-paragraph -8 has been renumbered to Sub-paragraph -9, and Sub-paragraph -8 has been added as follows.

8 For ships having a propeller shaft Kind 1*C* complying with the provisions of **5.1.9, Part 9**, the notation of "*1C*" is affixed to the Classification Characters.
~~**8**~~**9** Otherwise specified in the above, for craft where deemed necessary by the Society, an appropriate notation may be affixed to the Classification Characters.

EFFECTIVE DATE AND APPLICATION (Amendment 1-3)

1. The effective date of the amendments is 1 July 2020.
2. Notwithstanding the amendments to the Rules, the current requirements apply to ships other than ships for which the application for issuance of Certificate of Classification is submitted to the Society on or after the effective date.

Amendment 1-4

Part 2 CLASS SURVEYS

Chapter 2 CLASSIFICATION SURVEYS

2.1 Classification Survey during Construction

2.1.2 Submission of Plans and Documents for Approval*

Sub-paragraph -1(2) 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 for the approval by the Society before the work is commenced. Plans and documents may be subjected to examination by the Society prior to the submission of the application for the classification of the craft in accordance with the provision specified otherwise by the Society:

(2) Machinery

((a) is omitted.)

(b) Main and auxiliary engines (including their accessories):

i) ~~Diesel~~ Reciprocating internal combustion engines

Plans and data specified in **2.1.3-1(1), Part 9 of the Rules** as well as documents showing specifications of louvers for emergency generator rooms and closing appliances of ventilators fitted to the rooms (if they are of power-operated type.)

(ii) is omitted.)

((c) to (h) are omitted.)

(i) Selective catalytic reduction systems and associated equipment (if fitted):

Plans and data specified in **21.1.3(1), Part D of the Rules for the Survey and Construction of Steel Ships**

(j) Exhaust gas cleaning systems and associated equipment (if fitted):

Plans and data specified in **22.1.3(1), Part D of the Rules for the Survey and Construction of Steel Ships**

(k) Exhaust gas recirculation systems and associated equipment (if fitted):

Plans and data specified in **23.1.3(1), Part D of the Rules for the Survey and Construction of Steel Ships**

(~~i~~l) List of spare parts

(~~j~~m) Electrical installations

Plans and data specified in **1.1.5, Part 10** of the Rules

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) ~~Diesel~~ 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 (f) are omitted.)

(g) Selective catalytic reduction systems and associated equipment (if fitted):
Plans and data specified in **21.1.3(2), Part D of the Rules for the Survey and Construction of Steel Ships**

(h) Exhaust gas cleaning systems and associated equipment (if fitted):
Plans and data specified in **22.1.3(2), Part D of the Rules for the Survey and Construction of Steel Ships**

(i) Exhaust gas recirculation systems and associated equipment (if fitted):
Plans and data specified in **23.1.3(2), Part D of the Rules for the Survey and Construction of Steel Ships**

((8) and (9) are omitted.)

2.1.6 Documents to be Maintained On Board*

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

1 At the completion of a classification survey, the Surveyor confirms that the following drawings, plans, manuals, lists, etc., as applicable, of finished version are on board.

((1) is omitted.)

(2) Other manuals, etc.
(a) Fire Control Plans (**3.5.1, Part 11**)
(b) A copy of the *IGF* Code or national regulations incorporating the provisions of the *IGF* Code (**17.2.2-1, Part GF of the Rules for the Survey and Construction of Steel Ships**)
(c) Total Harmonic Distortion (THD) calculation report (**1.1.6, Part H of the Rules for the Survey and Construction of Steel Ships**)
(d) Harmonic filter operation guide (**1.1.6, Part H of the Rules for the Survey and Construction of Steel Ships**)
(e) Instructions and operation manuals (including cautionary notes for the safety of the operators) for the following equipment when fitted on the ship: selective catalytic reduction systems and associated equipment; exhaust gas cleaning systems and associated equipment; or exhaust gas recirculation systems and associated equipment.

((3) is omitted.)

EFFECTIVE DATE AND APPLICATION (Amendment 1-4)

1. The effective date of the amendments is 1 July 2020.

2. Notwithstanding the amendments to the Rules the current requirements apply to reciprocating internal combustion engines, SCR systems, EGCS or EGR systems whose applications for approval are submitted to the Society before the effective date installed on ships for which the date of contract for construction is before the effective date.

Amendment 1-5

Part 2 CLASS SURVEYS

Chapter 3 PERIODICAL SURVEYS AND PLANNED MACHINERY SURVEYS

3.3 Annual Surveys for Hull

3.3.1 Requirements for Annual Surveys

Sub-paragraph -3(15) has been amended as follows.

3 In addition to the general examinations for arrangements for fire protection, fire extinction and means of escape, general examinations and operation tests of the following **(1)** to **(17)** are to be carried out.
((1) to (14) are omitted.)
(15) Proper operation of the fire dampers of ventilation ducts as well as the means of closing the main inlets and outlets of all ventilation systems is to be confirmed, as far as practicable.
((16) and (17) are omitted.)

3.6 Annual Surveys for Machinery

3.6.2 Performance Tests*

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

At each Annual Survey for Machinery, performance tests for the following items in **(1)** to **(7)** are to be carried out in order to ascertain that they are placed in good order.
(7) Operation tests for the safety devices, etc. specified in the following **(a)** to **(e)** are to be carried out. However, the tests may be omitted at the Surveyor's discretion based on the general examination, and hearing of the working conditions at sea and inspection records taken by the ship's crew.
(a) Main propulsion machinery and auxiliary machinery
Operation tests of the following safety devices and alarm devices for main propulsion machinery and prime movers for driving generators, auxiliary machinery essential for main propulsion and auxiliary machinery for the manoeuvring and the safety are to be carried out.
i) Overspeed protective devices
ii) Automatic shut-off devices and alarm devices in case of loss or low pressure of the lubricating oil
~~iii) Automatic shut-off devices in case of abnormally low pressure of the main condenser vacuum for main steam turbines~~
((b) to (e) are omitted.)

Paragraph 3.6.3 has been added as follows.

3.6.3 Surveys of Selective Catalytic Reduction (SCR) Systems, etc.
At each Annual Survey for ships fitted with selective catalytic reduction (SCR) systems,

exhaust gas cleaning systems or exhaust gas recirculation systems, in addition to the surveys specified in **3.3** and **3.6**, the surveys specified in **3.3.5-1**, **-2** and **-3, Part B of the Rules for the Survey and Construction of Steel Ships** respectively are to be carried out.

3.7 Intermediate Surveys for Machinery

Paragraph 3.7.3 has been added as follows.

3.7.3 Surveys of Selective Catalytic Reduction (SCR) Systems, etc.

At each Intermediate Survey for ships fitted with selective catalytic reduction (SCR) systems, exhaust gas cleaning systems or exhaust gas recirculation systems, in addition to the surveys specified in **3.4** and **3.7**, the surveys specified in **4.3.5, Part B of the Rules for the Survey and Construction of Steel Ships** are to be carried out.

3.8 Special Surveys for Machinery

3.8.1 General Examinations

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

2 In addition to -1, general examinations for the following items in **(1)** to **(3)** are to be carried out.

(1) Main propulsion machinery

~~Diesel~~ Reciprocating internal combustion engines are to be examined in accordance with the following requirements in **(a)** to **(c)**;

((a) to (c) are omitted.)

((2) and (3) are omitted.)

Paragraph 3.8.4 has been added as follows.

3.8.4 Surveys of Selective Catalytic Reduction (SCR) Systems, etc.

At each Special Survey for ships fitted with selective catalytic reduction (SCR) systems, exhaust gas cleaning systems or exhaust gas recirculation systems, in addition to the surveys specified in **3.5** and **3.8**, the surveys specified in **5.3.5, Part B of the Rules for the Survey and Construction of Steel Ships** are to be carried out.

3.10 Planned Machinery Surveys

Table 3.10.1 has been amended as follows.

Table 3.10.1 Open-up Surveys of Machinery and Equipment

Survey items	Particulars of survey
1 ~~Diesel~~ Reciprocating internal combustion engines (main engine)	Cylinder covers, cylinder liners, pistons (including piston pins and piston rods), crosshead pins and bearings, connecting rods, crank pins and their bearings, crank journals and their bearings, camshafts and their driving gears, turbo chargers, scavenge air pumps or blowers, air intercoolers, attached essential pumps (bilge, lubricating oil, fuel oil, cooling water) are to be opened up.
(Omitted)	

EFFECTIVE DATE AND APPLICATION (Amendment 1-5)

1. The effective date of the amendments is 1 July 2020.

Amendment 1-6

Part 9 MACHINERY INSTALLATIONS

Chapter 1 GENERAL

1.2 General Requirements for Machinery Installations

1.2.1 General*

Sub-paragraph -3 has been amended as follows.

3 When the following machinery is fitted singly on board, special consideration is to be given to the reliability of the machinery and its components. For craft in which unconventional machinery is used as the main propulsion machinery and propulsion shafting system, provision of additional machinery capable of ensuring the ship to proceed at navigable speed in the possible event of failure of the machinery may be requested by the Society.

(1) For ~~diesel ships~~ crafts in which reciprocating internal combustion engines are used as main propulsion machinery (excluding electric propulsion crafts):
~~Diesel~~ Reciprocating internal combustion engine~~s used as the main propulsion machinery~~, highly elastic couplings, reduction gears and propulsion shafting systems

(2) For ~~gas turbine ships~~ crafts in which gas turbine are used as main propulsion machinery (excluding electric propulsion crafts):
Gas turbine engines ~~used as the main propulsion machinery~~, compressors, combustors, reduction gears and propulsion shafting systems

(3) For electric propulsion ~~ships~~ crafts (only those specified in **5.1.1-1, Part H of the Rules for the Survey and Construction of Steel Ships**, hereinafter the same in this Part):
Propulsion motors, reduction gears and propulsion shafting systems

Title of Chapter 2 has been amended as follows.

Chapter 2 ~~DIESEL~~ RECIPROCATING INTERNAL COMBUSTION ENGINES

2.1 General

2.1.1 General*

Sub-paragraph -1 has been amended as follows.

1 The requirements of this Chapter apply to the ~~diesel~~ reciprocating internal combustion engines used for main propulsion machinery, electric generators and auxiliary machinery (excluding auxiliary machinery for specific use, etc., hereinafter the same in this chapter).

Chapter 5 SHAFTINGS, PROPELLERS, WATERJET PROPULSION SYSTEMS AND TORSIONAL VIBRATION OF SHAFTINGS

5.1 Shaftings

5.1.2 Drawings and Data

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

Drawings and data to be submitted are generally as follows:

(1) Drawings for approval (including specifications of material)
- (a) Shafting arrangement
- (b) Thrust shaft
- (c) Intermediate shaft
- (d) Stern tube shaft
- (e) Propeller shaft
- (f) Stern tube
- (g) Stern tube bearing; this drawing may be included in the drawings and data specified in **6.1.2(1)(l), Part D of the Rules for the Survey and Construction of Steel Ships** in the case of propeller shafts Kind 1*C*.
- (h) Stern tube sealing device; this drawing may be included in the drawings and data specified in **6.1.2(1)(l), Part D of the Rules for the Survey and Construction of Steel Ships** in the case of propeller shafts Kind 1*C*.
- (i) Shaft bracket bearing
- (j) Shaft couplings and coupling bolts
- (k) Shafts which transmit power to generators or auxiliaries
- (l) In the case of propeller shafts Kind 1*C*, the drawings and data specified in **6.1.2(1)(l), Part D of the Rules for the Survey and Construction of Steel Ships**

((2) is omitted.)

5.2 Propeller

5.2.3 Materials, Construction and Strength

Sub-paragraph -3 has been amended as follows.

1 (Omitted)
2 (Omitted)
3 Notwithstanding the requirement in **2**, the blade thickness for propellers fitted onto propeller shafts with a shaft rake of 5 degrees or more and for rudder propellers may be reduced to the value given by the following formula.

$$t = \sqrt{\frac{2K_1 H}{K_2 Z N_0 \ell}}$$

Where:

t : Thickness of blades (excluding the fillet of blade root (cm))
H : Maximum continuous output of main propulsion machinery (kW)
Z : Number of blades

N_0 : Number of maximum continuous revolutions (*rpm*) ~~per minute~~ divided by 100 ~~(*rpm* /100)~~

ℓ : Width of blade at radius in question (*cm*)

K_1 : Coefficient given by the following formula at radius in question

$$K_1 = \frac{30.3}{\sqrt{1 + k_1\left(\frac{P'}{D}\right)^2}}\left(k_2\frac{D}{P} + k_3\frac{P'}{D}\right)$$

D: Diameter of propeller (*m*)

k_1, k_2 and k_3 : Values given in **Table 9.5.1**

P': Pitch at radius in question (*m*)

P: Pitch at radius of $0.7R$ (*m*), (R = Radius of propeller (*m*))

Table 9.5.1 Values of k_1, k_2, k_3, k_4 and k_5
(Table is omitted.)

K_2: Coefficient given by the following formula

$$K_2 = K - \left(k_4\frac{E}{t_0} + k_5\right)\frac{D^2N_0^2}{1000}$$

k_4 and k_5 : Values given in **Table 9.5.1**

E : Rake at tip of the blade (Measuring from face side base line, and taking positive value for backward rake) (*cm*)

t_0 : Imaginary thickness of blade at propeller shaft centreline ($t_0$may be obtained by producing the each side line which connects the blade tip thickness with the thickness at $0.25R$, or $0.35R$ for a controllable pitch propeller, in the projection of blade section along maximum blade thickness line.) (*cm*)

K : Value depending upon the type of the propeller material given in **Table 9.5.2**

Table 9.5.2 has been amended as follows.

Table 9.5.2 Values of K

~~Material~~	~~Copper alloy castings~~			
	~~*KHBsC1*~~	~~*KHBsC2*~~	~~*KAlBC3*~~	~~*KAlBC4*~~
~~*K*~~	~~1.15~~	~~1.15~~	~~1.3~~	~~1.15~~

Material		*K*
Copper alloy castings	*KHBsC*1	1.15
	*KHBsC*2	
	*KAlBC*3	1.3
	*KAlBC*4	1.15
Stainless steel forgings for propellers	*KSCSP*1, *KSCSP*2, *KSCSP*3	1.0
	*KSCSP*4	0.9

Notes:

(1) For the blades of materials different from those specified in the above ~~T~~table, the value of *K* is to be ~~determined in each case~~ as deemed appropriate by the Society.

(2) For propellers having a diameter of 2.5 *metres* or less, the value of *K* may be taken as the value in the above Table multiplied by the following factor:
$2 - 0.4\text{D}$ for $2.5 \geq \text{D} > 2.0$
1.2 for $2.0 \geq \text{D}$

5.4 Torsional Vibration of Shaftings

Paragraph 5.4.1 has been amended as follows.

5.4.1 Scope

The requirements of this Chapter apply to power transmission systems and shafting for propulsion (excluding a part of waterjet propulsion system and propeller), shaftings transmitting power from the main engine to generators, crank shaft of ~~diesel~~ reciprocating internal combustion engines used for main propulsion and shaftings of generating systems using ~~diesel~~ reciprocating internal combustion engine.

Chapter 8 PIPING SYSTEMS

8.8 Fuel Oil Systems

8.8.1 General

Sub-paragraph -8 has been amended as follows.

8 Union joints used for connection of fuel oil injection pipes of ~~diesel~~ reciprocating internal combustion engines or the pipes of burning systems of boilers are to be of rigid construction and to have metal contact capable of providing sufficient oil tightness.

Paragraph 8.8.7 has been amended as follows.

8.8.7 Fuel Oil Systems for ~~Diesel~~ Reciprocating Internal Combustion Engines

1 Number and capacity of fuel oil supply pumps for the main propulsion machinery are to comply with the following requirements **(1)** or **(2)**:

(1) Two sets of main fuel oil supply pumps are to be provided with sufficient total capacity enough to maintain the supply of the fuel oil at the maximum continuous output of the main propulsion machinery, and each of which has sufficient capacity to obtain navigable speed of the craft.

(2) Where two or more main propulsion machinery are provided, such system that each of main propulsion machinery has an exclusive main fuel oil supply pump may be accepted providing that it is possible to give a navigable speed even if one of them is out of use.

2 ~~Diesel~~ Reciprocating internal combustion engines for driving electrical generators and auxiliary machinery for which duplication is required are to be provided with two fuel oil supply pumps of sufficient total capacity to maintain the supply of oil at the maximum continuous output of the engine and each of which has sufficient capacity to obtain navigable speed of the craft. However, such a system that each engine is provided with an exclusive fuel oil supply pump may be accepted.

3 Fuel oil filters are to be provided on fuel oil supply piping lines for ~~diesel~~ reciprocating internal combustion engines. The filters for ~~diesel~~ reciprocating internal combustion engines used as main propulsion machinery are to be capable of being cleaned without stopping the supply of filtered oil. The fuel oil filters are to be provided with valves or cocks for depressurizing before being opened.

4 (Omitted)

8.9 Lubricating Oil Systems and Hydraulic Oil Systems

8.9.2 Lubricating Oil Pumps

Sub-paragraph -2 has been amended as follows.

2 ~~Diesel~~ Reciprocating internal combustion engines for driving electrical generators and auxiliary machinery for which duplication is required are to be provided with two lubricating oil pumps of sufficient total capacity to maintain the supply of oil at the maximum continuous output of the engine, and each of which has sufficient capacity to obtain navigable speed of the craft. However, such a system that each engine is provided with an exclusive lubricating oil pump may be accepted.

8.11 Cooling Systems

8.11.1 Cooling Pumps

Sub-paragraph -2 has been amended as follows.

2 ~~Diesel~~ Reciprocating internal combustion engines for driving electrical generators and auxiliary machinery for which duplication is required are to be provided with two cooling pumps of sufficient total capacity to maintain the supply of water (oil) at the maximum continuous output of the engine, and each of which has sufficient capacity to obtain navigable speed of the craft. However, such a system that each engine is provided with an exclusive cooling pump may be accepted.

Paragraph 8.11.3 has been amended as follows.

8.11.3 Cooling Systems for ~~Diesel~~ Reciprocating Internal Combustion Engines

Where sea water is used for the direct cooling of the propulsion machinery, or ~~diesel~~ reciprocating internal combustion engines driving electrical generators or auxiliary machinery for which duplication is required, strainers which are arranged to be capable of being cleaned without stopping the supply of filtered cooling water to the respective engines are to be provided between the sea suction valve and the cooling sea water pump.

8.15 Exhaust Gas Piping Arrangement

Sub-paragraph -3 has been amended as follows.

3 Open ends of exhaust gas piping are to be arranged so that exhaust gas is prevented to flow into air intakes of ~~diesel~~ reciprocating internal combustion engines, gas turbines, etc.~~.~~

Chapter 13 SPARE PARTS, TOOLS AND INSTRUMENTS

13.1 General

13.1.1 Scope

Sub-paragraph -1 has been amended as follows.

1 The requirements in this chapter apply to spare parts, tools and instruments for the following machinery installations.

(1) ~~Diesel~~ Reciprocating internal combustion engines ~~for~~ used as main propulsion machinery
(2) ~~Diesel~~ Reciprocating internal combustion engines ~~to drive~~ driving generators or auxiliary machinery essential for main propulsion
(3) Boilers and thermal oil installations
(4) Pumps

13.2 Spare Parts, Tools and Instruments

13.2.1 Spare Parts

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

1 The following parts are to be provided as the spare parts for a ~~diesel~~ reciprocating internal combustion engine ~~for~~ used as main propulsion machinery.
((1) to (7) are omitted.)

2 The following parts are to be provided as the spare parts for a ~~diesel~~ reciprocating internal combustion engine ~~to drive~~ driving a generator or ~~an~~ auxiliary machinery essential for main propulsion.
((1) to (8) are omitted.)

EFFECTIVE DATE AND APPLICATION (Amendment 1-6)

1. The effective date of the amendments is 1 July 2020.
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 1-7

Part 9 MACHINERY INSTALLATIONS

Chapter 1 GENERAL

1.2 General Requirements for Machinery Installations

1.2.1 General*

Sub-paragraph -10 has been amended as follows.

10 The exhaust gas treatment systems specified in the following **(1)** and **(2)** fitted onto machinery installations are to ~~be to the satisfaction of the Society~~ comply with the requirements specified in **Chapter 21** and **Chapter 22, Part D of the Rules for the Survey and Construction of Steel Ships**.
(1) Selective catalytic reduction (SCR) systems
(2) Exhaust gas cleaning systems (EGCS) (excluding those specified in **2.1.1-4**)

EFFECTIVE DATE AND APPLICATION (Amendment 1-7)

1. The effective date of the amendments is 1 July 2020.
2. Notwithstanding the amendments to the Rules the current requirements apply to SCR systems or EGCS whose applications for approval are submitted to the Society before the effective date installed on ships for which the date of contract for construction is before the effective date.

Amendment 1-8

Part 9 MACHINERY INSTALLATIONS

Chapter 1 GENERAL

1.2 General Requirements for Machinery Installations

Paragragh 1.2.8 has been added as follows.

1.2.8 Rating Plates for *A.C.* Generating Sets

Rating plates which comply with the requirements in **1.3.10** of **Part D** are to be installed on *A.C.* generating sets.

EFFECTIVE DATE AND APPLICATION (Amendment 1-8)

1. The effective date of the amendments is 1 July 2020.

2. Notwithstanding the amendments to the Rules, the current requirements apply to *A.C.* generating sets whose applications for approval are submitted to the Society before the effective date installed on ships for which the date of contract for construction* is before the effective date.

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

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

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

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

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

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

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

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

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

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

Note:
This Procedural Requirement applies from 1 July 2009.

Amendment 1-9

Part 9 MACHINERY INSTALLATIONS

Chapter 1 GENERAL

1.3 Tests

1.3.1 Shop Tests

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

Before installation on board, machinery installations are to be tested according to the following requirements at the plants.

(1) The tests for ~~diesel~~ reciprocating internal combustion engines are to be carried out in accordance with **2.6.1, Part D of the Rules for the Survey and Construction of Steel Ships**.

((2) to (10) are omitted.)

1.3.2 Tests after Installation On Board*

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

After installation on board, the following tests are to be carried out.

((1) is omitted.)

(2) Performance tests for overspeed protective devices, fuel oil leaking alarms from the injection pipes, lubricating oil low pressure alarming and automatic stopping devices, emergency stopping devices and cooling water high temperature alarming devices of ~~diesel~~ reciprocating internal combustion engines.

((3) to (17) are omitted.)

Title of Chapter 2 has been amended as follows.

Chapter 2 ~~DIESEL~~ RECIPROCATING INTERNAL COMBUSTION ENGINES

2.2 Safety Devices

Paragraph 2.2.1 has been amended as follows.

2.2.1 Speed Governors and Overspeed Protective Devices

1 For crafts in which ~~Diesel~~ reciprocating internal combustion engines are used as main propulsion machinery (excluding electric propulsion crafts), ~~in diesel craft~~ each reciprocating internal combustion engine is to be provided with a speed governor so adjusted to prevent the engine speed from being exceeded by more than 15% of the maximum continuous revolutions.

2 In addition to ~~the~~ this speed governor, each ~~diesel~~ reciprocating internal combustion engine as specified in **1** above ~~used as the main propulsion machinery with~~ that has a continuous maximum output of 220 *kW* or ~~over~~ above, and which can be declutched or drives a controllable pitch

propeller, is to be provided with a separate overspeed protective device. ~~In this case, t~~The overspeed protective device and its driving gear are to be independent from the governor required in **-1**, and so adjusted to automatically stop the engine when the speed exceeds more than 20 % of the maximum continuous revolutions.

3 Where ~~diesel~~ reciprocating internal combustion engines are used as the main propulsion machinery ~~for~~ of an electric propulsion craft, driving generators used to supply electrical power exclusively to propulsion motors, the engines are to be provided with governers specified in **5.1.2-2, Part H of the Rules for the Survey and Construction of Steel Ships**.

4 ~~Diesel~~ Reciprocating internal combustion engines used to drive generators other than those mentioned in **-3** are to be provided with the governors specified in **2.4.2, Part H of the Rules for the Survey and Construction of Steel Ships**.

5 In addition to the normal governor, each ~~diesel~~ reciprocating internal combustion engine used as the main propulsion machinery of an electric propulsion craft and ~~diesel~~ reciprocating internal combustion engines used to drive a generator (excluding that of emergency use) with a maximum continuous output of 220 *kW* or over are to be provided with a separate overspeed protective device. In this case, the overspeed protective device and its driving gear are to be independent from that of the governor required in **-3** and **-4**, and so adjusted to automatically stop the engine when the speed exceeds by more than 15 % of the maximum continuous revolutions.

Paragraph 2.2.3 has been amended as follows.

2.2.3 Relief Valves for Cylinders

Each cylinder of ~~a diesel~~ reciprocating internal combustion engines having a bore exceeding 230 *mm* is to be provided with a relief valve adjusted to be activated at not more than 40 % above the maximum combustion pressure at the maximum continuous output, and so arranged that when discharged no damage to operators can occur. The relief valves may be replaced by effective warning devices for overpressure in each cylinder.

2.3 Associated Installations

2.3.2 Starting Arrangements

Sub-paragraph -3 has been amended as follows.

3 For main propulsion engines which are arranged for starting by battery and for the starting arrangement of ~~diesel~~ reciprocating internal combustion engines driving generators or auxiliaries, the requirements specified in **2.5.3-3** and **-4, Part D of the Rules for the Survey and Construction of Steel Ships** are to be complied with.

2.3.4 Lubricating Oil Arrangements

Sub-paragraph -1 has been amended as follows.

1 The lubricating oil arrangements of ~~diesel~~ reciprocating internal combustion engines (excluding emergency generator engines) with maximum continuous output exceeding 37 *kW* are to be provided with alarm devices which give visible and audible alarms in the event of failure of lubricating oil supply or appreciable reduction in lubricating oil pressure, and also with devices to stop the engine automatically by low pressure after the function of alarms.

2.3.5 Cooling Arrangements

Sub-paragraph -1 has been amended as follows.

1 Cooling arrangements of ~~diesel~~ reciprocating internal combustion engines (excluding emergency generator engines) with maximum continuous output exceeding 37 kW are to be provided with alarm devices which give visible and audible alarms when water temperature becomes abnormally high.

EFFECTIVE DATE AND APPLICATION (Amendment 1-9)

1. The effective date of the amendments is 1 July 2020.

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

Amendment 1-10

Part 9 MACHINERY INSTALLATIONS

Title of Chapter 2 has been amended as follows.

Chapter 2 ~~DIESEL~~ RECIPROCATING INTERNAL COMBUSTION ENGINES

2.1 General

2.1.1 General*

Sub-paragraph -2 has been amended as follows.

2 For each type of ~~diesel~~ reciprocating internal combustion engines, an approval of use is to be obtained by the engine designer (hereinafter referred to "licensor" in this Chapter) as specified separately by the Society.

2.1.3 Drawings and Data*

Sub-paragraph -1(3) has been amended as follows.

1 Drawings and data to be submitted are generally as follows:
((1) and (2) are omitted.)
(3) Drawings and data for the purpose of inspection and testing of ~~diesel~~ reciprocating internal combustion engines
  (a) A list containing all drawings and data submitted (including relevant drawing numbers and revision status)
  ((b) to (m) are omitted.)
  (n) Schematic layout or other equivalent drawings and data on the ~~diesel~~ 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) to vii) are omitted.)
  ((o) to (ao) are omitted.)

Paragraph 2.1.4 has been amended as follows.

2.1.4 Approval of ~~Diesel~~ Reciprocating Internal Combustion Engines*

1 ~~Diesel~~ 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 ~~diesel~~ reciprocating internal combustion engine approval process in accordance with the following **(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 ~~diesel~~ 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 ~~diesel~~ 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 ~~diesel~~ reciprocating internal combustion engines for the use of the licensee in developing the ~~diesel~~ reciprocating internal combustion engine specific production drawings and data listed in **2.1.3-1(3)**.

(d) If substantive modifications to the the drawings and data of the ~~diesel~~ reciprocating internal combustion engine whose approval of use has been obtained have been made in the drawings and data of ~~diesel~~ 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 ~~diesel~~ reciprocating internal combustion engines

(a) The licensee is to develop the drawings and data listed in **2.1.3-1(3)** and a comparison list of these drawings and data to the drawings and data of the ~~diesel~~ 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 **2.1.3-1(3)**, if there are differences in the technical content on the licensee's production drawings and data of the ~~diesel~~ reciprocating internal combustion engine compared to the drawings and data of the ~~diesel~~ 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 ~~diesel~~ 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 ~~diesel~~ reciprocating internal combustion engine.

((c) and (d) are omitted.)

(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 ~~diesel~~ reciprocating internal combustion engine and its components.

((3) and (4) are omitted.)

(5) Engine assembly and testing

The licensee is to assemble and test the ~~diesel~~ reciprocating internal combustion engine according to the Society's technical rules each of the ~~diesel~~ reciprocating internal combustion engine assembly and testing procedure is to be witnessed by the Surveyor unless the manufacturer of the ~~diesel~~ reciprocating internal combustion engine is one approved in accordance with the **Rules for Approval of Manufacturers and Service Suppliers** and use of a mass production system is agreed between the manufacturer and the Society.

(6) Issue of certificates of ~~diesel~~ reciprocating internal combustion engines and components

((a) and (b) are omitted.)

2 In applying **-1** above, for those cases when a licensor - licensee agreement does not apply, a "licensor" is to be understood as the following **(1)** or **(2)**:

(1) The entity that has the design rights for the ~~diesel~~ reciprocating internal combustion engine type; or

(2) The entity that is delegated by the entity having the design rights of **(1)** above to modify the design.

3 Components of licensor's design which are covered by the certificate of approval of use of the

relevant engine type are regarded as approved whether manufactured by the ~~diesel~~ reciprocating internal combustion engine manufacturer or sub-supplied.

4 (Omitted)

EFFECTIVE DATE AND APPLICATION (Amendment 1-10)

1. The effective date of the amendments is 1 July 2020.

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

Amendment 1-11

Part 9 MACHINERY INSTALLATIONS

Title of Chapter 2 has been amended as follows.

Chapter 2 ~~DIESEL~~ RECIPROCATING INTERNAL COMBUSTION ENGINES

2.1 General

2.1.1 General*

Sub-paragraph -3 has been amended as follows.

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

EFFECTIVE DATE AND APPLICATION (Amendment 1-11)

1. The effective date of the amendments is 1 July 2020.

2. Notwithstanding the amendments to the Rules, the current requirements apply to electronically controlled engines for which the application for approval is submitted to the Society before the effective date.

Amendment 1-12

Part 9 MACHINERY INSTALLATIONS

Title of Chapter 2 has been amended as follows.

Chapter 2 ~~DIESEL~~ RECIPROCATING INTERNAL COMBUSTION ENGINES

2.1 General

2.1.1 General*

Sub-paragraph -4 has been amended as follows.

4 ~~Diesel~~ Reciprocating internal combustion engines fitted with exhaust gas recirculation (EGR) systems are to be in accordance with requirements specified ~~otherwise by the Society~~ in **Chapter 23, Part D of the Rules for the Survey and Construction of Steel Ships** in addition to those in this Chapter.

EFFECTIVE DATE AND APPLICATION (Amendment 1-12)

1. The effective date of the amendments is 1 July 2020.

2. Notwithstanding the amendments to the Rules, the current requirements apply to EGR systems whose applications for approval are submitted to the Society before the effective date installed on ships for which the date of contract for construction is before the effective date.

Amendment 1-13

Part 9 MACHINERY INSTALLATIONS

Chapter 2 DIESEL ENGINES

2.1 General

2.1.1 General*

Sub-paragraphs -4 and -5 have been renumbered to Sub-paragraphs -5 and -6, and Sub-paragraph -4 has been added as follows.

4 The requirements of exhaust driven turbochargers specified in this chapter also apply, in principle, to engine driven chargers.
~~4~~5 (Omitted)
~~5~~6 (Omitted)

2.1.3 Drawings and Data*

Sub-paragraph -1 has been amended as follows.

1 Drawings and data to be submitted are generally as follows:
(1) Drawings and data for approval
((a) to (f) are omitted.)
(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 ~~(only for category *B* or *C* turbochargers with novel design features or no service records)~~
3) Documentation for the following operational data and limitations ~~Particulars (only for category *B* or *C* turbochargers)~~
・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
~~iv~~2) Drawings of the housing and rotating parts (~~only for category *C* turbochargers~~inlcuding details of blade fixing)
~~v~~3) Material specifications (~~only for category *C* turbochargers.~~ including mechanical properties and chemical composition) of the parts mentioned in ~~**iv**~~**2)** above
~~vi~~4) Welding details and welding procedures for the parts mentioned in ~~**iv**~~**2)** above, if made of welded construction ~~(only for category *C* turbochargers with novel design features or no service records)~~

(2) Drawings and data for reference

((a) to (h) are omitted.)

(i) The following drawings and data for exhaust driven turbochargers (only for category *C* turbochargers):

i) Documentation of the safe torque transmission when the disc is connected to the shaft by an interference fit ~~(only for category *C* turbochargers with novel design features or no service records)~~
ii) Information on expected lifespan (~~only for category *C* turbochargers with novel design features or no service records~~ Creep, low cycle fatigue and high cycle fatigue are to be considered.)
iii) Operation and ~~service~~ maintenance manuals ~~(only for category *C* turbochargers with novel design features or no service records)~~

(j) Other drawings and data deemed necessary by the Society

(3) (Omitted)

2.3 Associated Installations

Paragraph 2.3.6 has been deleted.

~~**2.3.6 Engine Driven Chargers**~~

~~Engine driven chargers are, in principle, to be in accordance with the requirements of exhaust driven turbochargers specified in **2.3.1.**~~

EFFECTIVE DATE AND APPLICATION (Amendment 1-13)

1. The effective date of the amendments is 1 July 2020.

2. Notwithstanding the amendments to the Rules, the current requirements apply to turbochargers with novel design features or no service records for which the application for approval is submitted to the Society before the effective date.

Amendment 1-14

Part 9 MACHINERY INSTALLATIONS

Title of Chapter 2 has been amended as follows.

Chapter 2 ~~DIESEL~~ RECIPROCATING INTERNAL COMBUSTION ENGINES

2.1 General

Paragraph 2.1.5 has been amended as follows.

2.1.5 Materials, Construction and Strength*

1 Materials intended for the principal components of ~~diesel~~ reciprocating internal combustion engines and their non-destructive test are to conform to the requirements specified in **2.2.1, Part D of the Rules for the Survey and Construction of Steel Ships**.

2 Where the principal components of ~~diesel~~ reciprocating internal combustion engines are of welded construction, they are to comply with the requirements specified in **Chapter 11, Part D of the Rules for the Survey and Construction of Steel Ships**.

3 ~~Diesel~~ Reciprocating internal combustion engines are to be designed to have construction and strength adequate for the service for which they are intended, the working conditions to which they are subjected and the environmental conditions on board. Crankshafts other than those for emergency generator engines are to comply with the requirements specified in **2.3, Part D of the Rules for the Survey and Construction of Steel Ships**.

4 Installation of ~~diesel~~ reciprocating internal combustion engines in ships is to be in accordance with the following **(1)** to **(4)**.

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

5 (Omitted)

6 The ambient reference conditions for the purpose of determining the power of ~~diesel~~ reciprocating internal combustion engines intended for main propulsion machinery, electric generators or auxiliary machinery are to be as follows:

Total barometric pressure: 0.1 *MPa*
Air temperature: 45 °C
Relative humidity: 60 %
Seawater temperature: 32 °C (at charge air intercooler inlet)

EFFECTIVE DATE AND APPLICATION (Amendment 1-14)

1. The effective date of the amendments is 1 July 2020.

2. Notwithstanding the amendments to the Rules, the current requirements apply to reciprocating internal combustion engines or crank shafts whose applications for approval are submitted to the Society before the effective date.

GUIDANCE FOR HIGH SPEED CRAFT

GUIDANCE

2020 AMENDMENT NO.1

Notice No.34 30 June 2020
Resolved by Technical Committee on 22 January 2020

Notice No.34 30 June 2020
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 3 PERIODICAL SURVEYS AND PLANNED MACHINERY SURVEYS

3.6 Annual Surveys for Machinery

3.6.1 Requirements for Annual Surveys

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

1 In general examinations specified in **3.6.1, Part 2 of the Rules**, for ships where harmonic filters are installed on the main busbars of electrical distribution systems, except in cases where the filters are installed for single application frequency drives such as pump motors, it is to be ascertained that the harmonic filters are placed in good order and either of the following **(1)** or **(2)** is to be verified.

(1) For ships fitted with facilities to continuously monitor the Total Harmonic Distortion (THD) values experienced by the main busbars as specified in **2.~~12.4-1~~3.13-1, Part H of the Rules for the Survey and Construction of Steel Ships**, records of THD values are to be verified.

(2) (Omitted)

Part 9 MACHINERY INSTALLATIONS

Chapter 1 GENERAL

1.2 General Requirements for Machinery Installations

1.2.1 General

Sub-paragraph -3 has been added as follows.

3 When designing and constructing machinery installations that are adequate for the service for which they are intended in accordance with **1.2.1-2, Part 9 of the Rules**, the properties (e.g. viscosity, cold flow property) of the fuel oils intended to be used by the machinery installations are to be taken into account, and fuel oil heaters and fuel oil coolers are to be provided when deemed necessary.

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 30 June 2020.
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 1-2

Part 11 FIRE PROTECTION, DETECTION, EXTINCTION AND MEANS OF ESCAPE

Chapter 4 has been added as follows.

Chapter 4 ADDITIONAL REQUIREMENTS FOR MACHINERY SPACES

4.1 Additional Requirements for Machinery Spaces

4.1.1 Fuel and Other Flammable Fluid Tanks and Systems

The use of materials other than steel may be accepted as a "material satisfactory to the Society" specified in **4.1.4-4, Part 11 of the Rules** provided that the material complies with the requirements in **R4.2.2-11 of Part R of the Guidance for the Survey and Construction of Steel Ships**.

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

1. The effective date of the amendments is 30 June 2020.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to ships the keels of which were laid or which were at *a similar stage of construction* before 1 July 2017.

(Note) The term "*a similar stage of construction*" means the stage at which the construction identifiable with a specific ship begins and the assembly of that ship has commenced comprising at least 50 *tonnes* or 3% of the estimated mass of all structural material, whichever is the less.

Amendment 1-3

Part 2 CLASS SURVEYS

Chapter 2 CLASSIFICATION SURVEYS

2.3 Sea Trials and Stability Experiments

2.3.1 Sea Trials

Sub-paragraph (9) has been amended as follow.

Details of each test to be carried out during sea trials are to be in accordance with the following requirements.
((1) to (8) are omitted.)
(9) Measurement of the torsional vibration for the shafting systems
Measurement of the torsional vibration for the shafting systems are to be carried out in accordance with the following **(a)** to **(c)**:
(a) Measurement is to be in accordance with the requirement specified in **5.4, Part 9 of the Rules**.
(b) For low pressure (i.e. pressure less than 1 MPa) gas-fuelled dual fuel engines, the measurements specified in **(a)** are to be carried out for both the diesel and gas mode. However, measurements in either diesel mode or in the gas mode (but not both modes) may be omitted where considered appropriate by the Society based upon relevant torsional vibration calculation sheets of diesel and gas mode.
(c) For high pressure gas-fuelled dual fuel engines, the requirements for low pressure gas-fuelled dual fuel engines specified in **(b)** apply mutatis mutandis.
((10) is omitted.)

Part 9 MACHINERY INSTALLATIONS

Title of Chapter 2 has been amended as follows.

Chapter 2 ~~DIESEL~~ RECIPROCATING INTERNAL COMBUSTION ENGINES

2.1 General

2.1.1 General

Sub-paragraph -2 has been amended as follows.

2 The wording "the requirements specified otherwise by the Society" in **2.1.1-3**, **Part 9 of the Rules** means "**GUIDANCE FOR THE ADDITIONAL REQUIREMENTS ON ELECTRONICALLY-CONTROLLED ~~DIESEL~~ ENGINES**" in **Annex D2.1.1, Part D of the Guidance for the Survey and Construction of Steel Ships**.

EFFECTIVE DATE AND APPLICATION (Amendment 1-3)

1. The effective date of the amendments is 1 July 2020.

2. Notwithstanding the amendments to the Guidance, the current requirements 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 2 CLASS SURVEYS

Chapter 2 CLASSIFICATION SURVEYS

2.3 Sea Trials and Stability Experiments

2.3.1 Sea Trials

Sub-paragraph (11) has been amended as follow.

(11) Other tests where deemed necessary by the Society
At least following tests **(a)** to **(~~e~~d)** are to be included in this test
((a) to (c) are omitted.)
(d) For ships having exhaust gas recirculation systems, running tests of engines are to be carried out with exhaust gas recirculation systems in operation, and the satisfactory operation of the engine and exhaust gas recirculation system is to be confirmed.

Part 9 MACHINERY INSTALLATIONS

Title of Chapter 2 has been amended as follows.

Chapter 2 ~~DIESEL~~ RECIPROCATING INTERNAL COMBUSTION ENGINES

2.1 General

2.1.1 General

Sub-paragraph -3 has been deleted, and Sub-paragraph -4 renumbered to Sub-paragraph -3.

~~**3 The wording "requirements specified otherwise by the Society" referred to in 2.1.1-4, Part 9 of the Rules** means **Annex D2.1.1-5** "Guidance for the Survey and Construction of Exhaust Gas Recirculation Systems and Associated Equipment", **Part D of the Guidance for the Survey and Construction of Steel Ships**.~~

~~4~~3 The wording "the requirements specified otherwise by the Society" in **2.1.1-5, Part 9 of the Rules** means **Annex 3** "**GUIDANCE FOR HIGH PRESSURE GAS-FUELLED ENGINES**" or **Annex 4** "**GUIDANCE FOR LOW PRESSURE GAS-FUELLED ENGINES**" **of Part GF**.

EFFECTIVE DATE AND APPLICATION (Amendment 1-4)

1. The effective date of the amendments is 1 July 2020.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to EGR systems whose applications for approval are submitted to the Society before the effective date installed on ships for which the date of contract for construction is before the effective date.

Amendment 1-5

Part 2 CLASS SURVEYS

Chapter 2 CLASSIFICATION SURVEYS

2.5 Alterations

2.5.1 Requirements of Surveys

Sub-paragraph -5 has been added as follows.

5 In applying the provisions of **2.5.1, Part 2 of the Rules**, for ships where selective catalytic reduction systems, exhaust gas cleaning systems or exhaust gas recirculation systems are newly installed, applicable surveys to the relevant systems are to be carried out in accordance with **2.1, Part 2 of the Rules**.

Chapter 3 PERIODICAL SURVEYS AND PLANNED MACHINERY SURVEYS

3.10 Planned Machinery Surveys

3.10.1 Survey Intervals, etc.

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

The Planned Machinery Survey, in principle, applies to surveys of machinery and equipment of well experience. However, it does not apply to the following machinery, equipment and survey items.

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

(5) Measurement of crankshaft deflections of ~~main diesel~~ reciprocating internal combustion engines used as main propulsion machinery and clearances of stern tubes or shaft bracket bearings at their aft ends.

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

3.10.2 Continuous Machinery Surveys (*CMS*)

Sub-paragraph -5(4) has been amended as follows.

5 Substitution for open-up examinations

For the machinery and equipment listed below, open-up examinations may be exempted by carrying out the following examinations, provided the satisfactory condition of these items is ascertained by examining records such as the logbooks. However, when defects are found during the examinations, or if the maintenance condition is judged to be questionable as a result of an examination of the logbooks or other records, open-up examinations may be requested.

((1) to (3) are omitted.)

(4) Auxiliary ~~diesel~~ reciprocating internal combustion engines that are not normally used at sea and those that the total running time is less than 7,000 *hrs* from the last open-up examination Visual examinations under their operating conditions. However, an open-up examination is required when the total running hour becomes 7,000 *hrs* counting from the last open-up examination.

Sub-paragraphs -6(1) and (2) have been amended as follows.

6 Confirmatory Survey

In ships deemed by the Society as maintaining their machinery and equipment well, overhaul inspections according to the *CMS* Program specified in **-3** by the shipowner (or the ship management company) may forgo the open-up examination performed in the presence of Surveyors by conducting the following confirmatory surveys, provided that the machinery and equipment are overhauled as part of the ship's maintenance practices and the records from such overhauls are kept in good order. In this case, the due date of the next open-up examination is 5 *years* from the date of its last overhaul and inspection.

(1) Procedure of the confirmatory survey

((a) to (c) are omitted.)

(d) Visual examinations of lubricating oil conditions are to be carried out through open-up inspections, etc. of the lubricating oil filters of crankshafts, main bearings, crankpin bearings, crankpin bolts, as well as ~~main diesel engines~~ camshafts and ~~main diesel engine~~ camshaft driving devices of reciprocating internal combustion engines used as main propulsion machinery.

((e) to (g) are omitted.)

(2) Items applicable to the confirmatory survey

Items of machinery and equipment applicable to the confirmatory surveys are as follows:

(a) ~~Main diesel~~ Reciprocating internal combustion engines used as main propulsion machinery

(b) ~~Diesel~~ Reciprocating internal combustion engines used for driving generators, auxiliary machinery essential for main propulsion or auxiliary machinery for the manoeuvring and the safety of the ship

((c) and (d) are omitted.)

(3) (Omitted)

3.10.3 Planned Machinery Maintenance Scheme (*PMS*)

Sub-paragraph -4(4) has been amended as follows.

4 Approval of *PMS*

Conditions for approval of *PMS* are as follows:

((1) to (3) are omitted.)

(4) Machinery Maintenance Records

Machinery maintenance records are to include at least the following items, and are to be programmed and maintained by the Maintenance management system. These records are to be retained on board the ship at all times.

((a) to (g) are omitted.)

(h) Results of visual examinations of lubricating oil conditions carried out through open-up examinations of the lubricating oil filters, etc. of crankpins, crank journals, thrust shafts and bearings of ~~main diesel~~ reciprocating internal combustion engines used as main

propulsion machinery (in cases where the principle components of such engines were inspected through independent open-up surveys conducted by chief engineers)

((5) to (7) are omitted.)

EFFECTIVE DATE AND APPLICATION (Amendment 1-5)

1. The effective date of the amendments is 1 July 2020.

Amendment 1-6

Part 2 CLASS SURVEYS

Chapter 3 PERIODICAL SURVEYS AND PLANNED MACHINERY SURVEYS

3.9 Propeller Shaft and Stern Tube Shaft Surveys

Paragraph 3.9.4 has been amended as follows.

3.9.4 Partial Surveys

1 The "reference standards deemed appropriate by the Society" referred to in **3.9.4-1(2)(b)i), Part 2 of the Rules** means the reference standards specified in the following **(1)** and **(2)**:

(1) The following **(a)** to **(d)** upper limits for ~~M~~metal particles ~~(upper limits)~~; however, 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 **(a)** below, it is suspected that rust in the lubricating oil tank is the cause.), the Surveyor 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 on or after the day 3 *months* after the day of receiving the said instruction. In order to avoid the need to receive such instructions, the Society recommends that periodic oil analysis be performed at intervals shorter than those specified in **3.9.1-2(11)(a), Part 2 of the Rules** so that the oil analysis to be re-performed by the shipowner (or the ship management company) in preparation for the above cases is performed at intervals not exceeding 6 *months* from the date of the last valid oil analysis. In either case, the re-performed lubricant analysis is considered to comply with the requirements of this paragraph if the test results for metal particles satisfy the following upper limits.
   (a) Iron (Fe): 50 *ppm*
   (b) Tin (Sn): 20 *ppm*
   (c) Lead (Pb): 20 *ppm*
   (d) Sodium (Na): 80 *ppm*

(2) The following **(a)** and **(b)** upper limits for IR Oxidation and separated water ~~(upper limits)~~; however, in the case of environmentally acceptable lubricants (EAL), regardless of the following **(a)**, observation of any trends (such as TAN (total acid number), viscosity and change in colour etc.) based on periodical oil analysis can be made.
   (a) IR oxidation @ 5.85μm: 10 ($Abs.unit/cm$)
   (b) Separated water: 1.0 %

2 The "reference standards deemed appropriate by the Society" referred to in **3.9.4-1(2)(b)ii), Part 2 of the Rules** means the reference standards specified in the following **(1)** ~~and~~ to ~~(2)~~**(3)**:

(1) The following **(a)** and **(b)** upper limits for ~~C~~chloride content and sodium content ~~(upper limits)~~
   ((a) and (b) are omitted.)

(2) pH
   Lower limit values determined based upon characteristics of the corrosion inhibitors used, but not to be less than 11

(3) Bearing particles and other particles
   (a) The following **i)** and **v)** upper limits for ~~M~~metal particles ~~(upper limits)~~
      i) Iron (Fe): 25 *ppm*

ii) Chromium (Cr): 5 *ppm*
iii) Nickel (Ni): 5 *ppm*
iv) Copper (Cu): 40 *ppm*
v) Silicon (Si): 30 *ppm*

((b) is omitted.)

EFFECTIVE DATE AND APPLICATION (Amendment 1-6)

1. The effective date of the amendments is 1 July 2020.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to ships other than ships the delivery of which is on or after 1 January 2016 until the first propeller shaft and stern tube shaft surveys scheduled on or after 1 January 2016 are completed.

3. Notwithstanding the provision of preceding **2.**, the amendments to the Guidance may apply, upon request of the owner, to ships other than ships the delivery of which is on or after 1 January 2016 before the first propeller shaft and stern tube shaft surveys scheduled on or after 1 January 2016 are completed.

Amendment 1-7

Part 9 MACHINERY INSTALLATIONS

Chapter 1 GENERAL

1.2 General Requirements for Machinery Installations

Paragraph 1.2.1 has been amended as follows.

1.2.1 General

~~**1**~~ The wordings "navigable speed" in **1.2.1-3 of the Rules** means a speed at which the ship is capable of steering and being kept navigability for an extended period of time (the period required to get the nearest port for repairs). Normally, 7 *knots* or a speed corresponding to 1/2 of the speed specified in **2.1.8, Part 1 of the Rules** at the ship's full loaded draught, whichever is smaller, may be regarded as a navigable speed.

~~**2** With respect to the wording "the satisfaction of the Society" specified in **1.2.1-10, Part 9 of the Rules**, the following **(1)** and **(2)** apply:~~

~~(1) Selective catalytic reduction (SCR) systems are to comply with **Annex D1.3.1-5(1)** "GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF SELECTIVE CATALYTIC REDUCTION SYSTEMS AND ASSOCIATED EQUIPMENT", **Part D of the Guidance for the Survey and Construction of Steel Ships**.~~

~~(2) Exhaust gas cleaning systems (EGCS) are to comply with **Annex D1.3.1-5(2)** "GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF EXHAUST GAS CLEANING SYSTEMS AND ASSOCIATED EQUIPMENT", **Part D of the Guidance for the Survey and Construction of Steel Ships**.~~

EFFECTIVE DATE AND APPLICATION (Amendment 1-8)

1. The effective date of the amendments is 1 July 2020.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to SCR systems or EGCS whose applications for approval are submitted to the Society before the effective date installed on ships for which the date of contract for construction is before the effective date.

Amendment 1-8

Part 9 MACHINERY INSTALLATIONS

Chapter 2 DIESEL ENGINES

2.1 General

2.1.1 General

Sub-paragraphs -3 and -4 have been amended as follows.

3 The wording "requirements specified otherwise by the Society" referred to in **2.1.1-~~4~~5, Part 9 of the Rules** means **Annex D2.1.1-5** "Guidance for the Survey and Construction of Exhaust Gas Recirculation Systems and Associated Equipment", **Part D of the Guidance for the Survey and Construction of Steel Ships**.

4 The wording "the requirements specified otherwise by the Society" in **2.1.1-~~5~~6, Part 9 of the Rules** means **Annex 3** "**GUIDANCE FOR HIGH PRESSURE GAS-FUELLED ENGINES**" or **Annex 4** "**GUIDANCE FOR LOW PRESSURE GAS-FUELLED ENGINES**" **of Part GF**.

Paragraph 2.1.3 has been amended as follows.

2.1.3 Drawings and Data

For ~~engines equipped with exhaust driven turbochargers,~~ the following ~~drawings and~~ data ~~specified in **2.1.3, Part 9 of the Rules** are to~~ ,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. ~~include the following items according to the category of turbocharger specified in **2.1.2, Part 9 of the Rules**. However, this applies only to turbochargers with novel design features or no service records.~~

~~(1) Category *A* turbochargers~~

~~(a) The sectional assembly listed in **2.1.3-1(1)(g)i), Part 9 of the Rules** is to include principal dimensions and names of components. The submission of the drawings may be omitted where deemed appropriate by the Society.~~

~~(2) Category *B* turbochargers~~

~~(a) The sectional assembly listed in **2.1.3-1(1)(g)i), Part 9 of the Rules** is to include principal dimensions and materials of housing components for containment evaluation.~~

~~(b) The turbocharger particulars listed in **2.1.3-1(1)(g)ii), Part 9 of the Rules** are to include the following items:~~

~~i) Maximum permissible operating speed (*rpm*);~~

~~ii) Maximum permissible exhaust gas temperature at the turbine inlet;~~

~~iii) Minimum lubrication oil inlet pressure;~~

~~iv) Maximum lubrication oil outlet temperature; and~~

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

~~(c) The engine control system diagram listed in **2.1.3-1(2)(f), Part 9 of the Rules** is to contain the following items:~~

~~i) Alarm level for overspeed;~~

~~ii) Alarm level for exhaust gas temperature at the turbine inlet;~~

~~iii) Lubrication oil inlet pressure low alarm set point; and~~

~~iv) Lubrication oil outlet temperature high alarm set point;~~

~~(3) Category C turbochargers~~

~~(a) The items as listed in **(2)** above are to be included.~~

(~~b~~1) The documentation of safe torque transmission specified in **2.1.3-1(2)(i)i), Part 9 of the Rules** ~~may be for any two sizes within a series of turbocharger which is of the same design, but sealed to each other.~~

~~(c) the information on expected lifespan listed in **2.1.3-1(2)(i)ii), Part 9 of the Rules** is to consider creep, low cycle fatigue and high cycle fatigue.~~

(~~d~~2) The operation and ~~service~~ maintenance manuals listed in **2.1.3-1(2)(i)iii), Part 9 of the Rules** ~~are to contain the guidance for the operation and maintenance of exhaust driven turbochargers. This guidance may be for any two sizes within a series of turbocharger which is of the same design, but sealed to each other.~~

EFFECTIVE DATE AND APPLICATION (Amendment 1-8)

1. The effective date of the amendments is 1 July 2020.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to turbochargers with novel design features or no service records for which the application for approval is submitted to the Society before the effective date.

Amendment 1-9

Part 9 MACHINERY INSTALLATIONS

Title of Chapter 2 has been amended as follows.

Chapter 2 ~~DIESEL~~ RECIPROCATING INTERNAL COMBUSTION ENGINES

2.1 General

Title of Paragraph 2.1.4 has been amended as follows.

2.1.4 Approval of ~~Diesel~~ Reciprocating Internal Combustion Engines

Sub-paragraph -3 has been amended as follows.

3 The wording "the drawings and data of the ~~diesel~~ engine whose approval of use has been obtained" specified in **(1)(c)**, **(1)(d)**, **(2)(a)** and **(2)(b)** of **2.1.4-1, Part 9 of the Rules** means those listed in **8.2.2, Part 6 of Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use**.

Title of Fig.2.1.4-1 has been amended as follows.

Fig. 2.1.4-1 Flow of Approval of ~~Diesel~~ Reciprocating Internal Combustion Engines

EFFECTIVE DATE AND APPLICATION (Amendment 1-9)

1. The effective date of the amendments is 1 July 2020.
2. Notwithstanding the amendments to the Guidance, the current requirements apply to reciprocating internal combustion engines whose type is the same type of those for which the application for approval is submitted to the Society before the effective date.

Amendment 1-10

Part 10 ELECTRICAL INSTALLATIONS

Chapter 2 ELECTRICAL INSTALLATION AND SYSTEM DESIGN

2.3 System Design - Protection

2.3.5 Protection of Generators

Sub-paragraph -3 has been amended as follows.

3 The adjusting values of reverse power protection are to be as specified below as a standard:
(1) ~~Turbine driven g~~Generators driven by turbines: 2 - 6 %
(2) ~~Diesel driven g~~Generators driven by reciprocating internal combustion engines: 6 - 15 %

EFFECTIVE DATE AND APPLICATION (Amendment 1-10)

1. The effective date of the amendments is 1 July 2020.
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.