19-502

RULES FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS

Rules for the Survey and Construction of Inland Waterway Ships
2019 AMENDMENT NO.1
Guidance for the Survey and Construction of Inland Waterway Ships
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Rule No.47 / Notice No.31 14 June 2019
Resolved by Technical Committee on 30 January 2019

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 THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS

RULES

2019 AMENDMENT NO.1

Rule No.47 14 June 2019

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Rule No.47 14 June 2019
AMENDMENT TO THE RULES FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS

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

Amendment 1-1

Part 2 CLASS SURVEYS

Chapter 1 GENERAL

1.1 Surveys

1.1.3 Intervals of Class Maintenance Surveys*

Sub-paragraph -1(6) has been amended as follows.

1 Periodical Surveys are to be carried out in accordance with the requirements specified in **(1)** through **(6)** below. However, in consideration of the navigating area and operating mode, the intervals of Class Maintenance Surveys may be accordance mutatis mutandis with standards deemed appropriate by the Society.
((1) to (5) are omitted.)
(6) Propeller Shaft and Stern Tube Shaft Surveys
(a) ~~Ordinary~~ Surveys of propeller shafts and stern tube shafts are to be carried out as specified in the following **~~(a~~i)** to **~~(h~~iii)** corresponding to the kind of shaft, etc.,~~:~~ unless alternative means are provided to assure the condition of the propeller shaft assembly.
(~~a~~i) ~~Ordinary~~ Surveys of ~~P~~propeller shafts Kind 1 or stern tube shafts Kind 1 (hereinafter referred to as "shafts Kind 1" in this ~~chapter~~ Part) are to be carried out within 6 *years* from the date of completion (i.e. the survey due date) of the Classification Survey or the previous Ordinary Survey ~~(survey due date)~~.
~~(b) Regardless of **(a)** above, Ordinary Surveys of shafts Kind 1 which have oil lubricated stern tube bearings (hereinafter referred to as "shafts Kind 1B" in this chapter) may be postponed for no longer than 6 *years* from the date of completion of the Partial Surveys specified in **8.1.2-1** provided that the Partial Survey is carried out at the time prescribed in **(a)** above and that proper maintenance by periodical analysis for lubricating oil has been conducted.~~
~~(c) Regardless of **(a)** above, shafts Kind 1 adopting the preventive maintenance system in accordance with the requirements of **8.1.3**, need not be withdrawn at the Ordinary Surveys. The shafts are to be withdrawn for examination at the times required on the basis of the results of the preventive maintenance.~~
(~~d~~ii) Ordinary Surveys of ~~P~~propeller shafts Kind 2 and stern tube shafts Kind 2 (hereinafter referred to as "shafts Kind 2" in this chapter) are to be carried out as prescribed in ~~i~~**1)** and ~~ii~~**2)**.
~~i~~1) Concurrently with Special Surveys; and

~~ii~~2) Concurrently with Intermediate Surveys

~~However, where the construction of the shaft in the stern tube bearing and shaft bracket corresponds to shafts Kind 1 but the construction of the shaft between the stern tube and the shaft bracket corresponds to shafts Kind 2, the shaft may be surveyed at the intervals prescribed in **(a)**, provided that examination required for the part corresponding to shafts Kind 2 is carried out at the times prescribed in **i)** and **ii)**.~~

~~(e) In applying **(a)** above, for Ordinary Surveys completed within 3 *months* before the survey due date, the survey due date will be regarded as the date of completion of this survey.~~

~~(f) In applying **(b)** above, for Partial Surveys or Confirmatory Surveys completed within 1 *month* before the survey due date, the survey due date will be regarded as the date of completion of this survey.~~

~~(~~g~~~~iii) 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 18 *years*. ~~*NDE* generally refers to the magnetic particle method.~~

(b) For oil lubricated or freshwater lubricated shafts Kind 1, the Partial Surveys specified in **8.1.2** can be carried out instead of the Ordinary Surveys specified in **8.1.1**. The survey interval of the Ordinary Surveys specified in **8.1.1** is, however, not to exceed the limits specified separately by the Society.

(c) For the surveys referred to in **i)** and **ii)** of **(a)** as well as in **(b)** above completed within 3 *months* before the survey due date, the next period will start from the survey due date.

(d) Surveys of the propeller shafts and stern tube shafts of ships affixed with the notation "*PSCM*" or "*PSCM・A*" are to be carried out as specified in **8.1.3**.

(~~h~~c) Regardless of **(a)** to **(~~g~~d)** above, ~~Ordinary~~ ~~S~~surveys of the propeller shafts and stern tube shafts of ships affixed with the notation "*APSS・O*" or "*APSS・W*" are to be carried out as specified separately by the Society.

1.3 Definitions

1.3.1 Terms*

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

The definitions of terms which appear in this Part are as specified in the following. Terms not defined here are as defined in other parts of the Rules.

((1) to (8) are omitted.)

(9) The terminology used in the application of propeller shaft and stern tube shaft surveys is as specified in the following **(a)** to **(~~h~~p)**:

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

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

(c) "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.

(d) "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.

(e) "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.

(f) "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.

(g) "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.

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

(i) "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).

(j) "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.

(k) "Lubricating oil analysis" is the analysis to be carried out as specified in the following **i)** to **iii)**:

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

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

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

(l) "Fresh water sample test" is the test to be carried out in accordance with the following **i)** to **iv)**:

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

ii) Fresh water samples are to be taken in accordance with the following **1)** to **4)**:

1) 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.

2) 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.

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

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

iii) Analysis results are to be retained on board and made available to the Surveyor.

iv) The fresh water sample test is to include the following **1)** to **3)** parameters:

1) chlorides content;

2) pH value; and

3) presence of bearing particles or other particles (only for laboratory analysis, and

not required for tests carried out in the presence of the Surveyor).

(m) "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.

(n) "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.

(o) "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.

(p) "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; this, however, excludes propeller shafts adopting the preventive maintenance system specified in **8.1.3**.

(10) (Omitted)

Chapter 3 ANNUAL SURVEYS

3.3 Annual Surveys for Machinery

Paragraph 3.3.1 has been amended as follows.

3.3.1 General Examinations*

At Annual Surveys for Machinery, a general examination of all the machinery in the engine room ~~and~~ as well as the following ~~inspections~~ **(1)** to **(~~5~~4)** inspections are to be carried out:

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

~~(3) For ships adopting the survey for propeller shafts and stern tube shafts in accordance with the requirements in **1.1.3-1(6)(b)**, the records of periodical analysis for lubricating oil are to be reviewed in order to ascertain that the relevant installations have been well maintained.~~

(~~4~~3) For ships ~~adopting the preventive maintenance system in accordance with the requirements in **8.1.3**~~ affixed with the notation "*PSCM*" or "*PSCM・A*", the records of the parameters monitored are to be reviewed, ~~and~~ in addition to a general examination ~~is to be carried out in order~~, so as to ascertain that the relevant installations ~~have been~~ are well maintained.

(~~5~~4) For ships ~~affixed with the notation "*APSS・O*" or "*APSS・W*" which periodically perform oil analysis or freshwater sample tests~~ other than those referred to in **(3)** above with oil lubricated or freshwater lubricated bearings, it is to be checked as to whether lubricating oil analysis or fresh water sample tests are regularly carried out. In cases where lubricating oil analysis or water sample tests are carried out, ~~a general examination of the shafting system and a review of all the condition monitoring data available on board the ship are to be carried out in order to ascertain that the system is well maintained~~ it is to be checked as to whether the reference standards deemed appropriate by the Society are complied with based upon the lubricating oil analysis or fresh water sample test reports, in addition to a general examination.

Chapter 6 DOCKING SURVEYS

6.1 Docking Surveys

Paragraph 6.1.3 has been amended as follows.

6.1.3 Other Surveys*

1 For ~~each~~ ships ~~adopting the preventive maintenance system for propulsion shafting system in accordance with the requirements in **8.1.3**,~~ affixed with the notation "*PSCM*" or "*PSCM・A*", the records of the parameters monitored are to be reviewed, in addition to a general examination~~ of the shafting system and review of all condition monitoring data available on board the ship on the system are to be carried out in order~~, so as to ascertain that the system is well maintained.

2 For ships ~~affixed with the notation "*APSS・O*" or "*APSS・W*" which periodically perform oil analysis or freshwater sample tests~~ other than those referred to in **-1** above with oil lubricated or freshwater lubricated bearings, it is to be checked as to whether lubricating oil analysis or fresh water sample tests are regularly carried out. In cases where lubricating oil analysis or water sample tests are carried out, ~~a general examination of the shafting system and a review of all the condition monitoring data available on board the ship are to be carried out in order to ascertain that the system is well maintained~~ it is to be checked as to whether the reference standards deemed appropriate by the Society are complied with based upon the lubricating oil analysis or fresh water sample test reports, in addition to a general examination.

Table 2.6.1 has been amended as follows.

Table 2.6.1 Requirements for Docking Surveys

Items	Examinations
(Omitted)	
4 ~~After end of stern bush~~ Bush of stern tube bearing or shaft bracket bearing	・The wear down of the bearing ~~is to be measured,~~ or the clearance between the propeller shaft or stern tube shaft and the ~~after~~ bearing ~~of the stern tube or the shaft bracket bearing~~ is to be measured and recorded.
5 Sealing devices for stern tube and shaft bracket bearing	・In the case of oil or freshwater lubricated stern tube bearings, the efficiency of the oil or freshwater gland is to be checked.
6 Propeller	・Propellers are to be examined. Where a controllable pitch propeller is fitted, the pitch control device is to be examined without dismantling.
(Omitted)	

Chapter 8 PROPELLER SHAFT AND STERN TUBE SHAFT SURVEYS

Section 8.1 has been amended as follows.

8.1 Propeller Shaft and Stern Tube Shaft Surveys

8.1.1 Ordinary Surveys*

Ordinary Surveys of propeller and stern tube shafts are to be carried out in accordance with **Table 2.8.1**.

8.1.2 Partial Surveys

~~At~~ Partial Surveys for propeller shafts Kind 1 ~~of~~ with oil lubricated or freshwater lubricated stern tube bearings~~, the examinations specified in the following (1) to (3)~~ 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 **8.1.1** is to be carried out.
   (a) In the case of keyed connections, the examinations specified in item 2 of **Table 2.8.1** 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 item 6 of **Table 2.8.1** 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 item 9 of **Table 2.8.1** are to be carried out.
   (h) The examinations specified in items 12 and 13 of **Table 2.8.1** 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 shafts and/or propellers is to

be carried out.

~~(1) Visual inspection of all accessible parts of the shafting system~~

~~(2) Verification that the main engines have not been operated within the barred speed range for torsional vibration.~~

~~(3) Examinations specified in 2, 6, 9, 12 and 13 in **Table 2.8.1** as well as the following **(a)** to **(c)**. However, the requirements of 2 and 9 in **Table 2.8.1** may be omitted for shafts having keyless propeller attachments or coupling flanges at their aft end, if general examinations are proved satisfactory.~~

~~(a) Checking and recording measurements of the bearing weardown of the propeller shaft or the stern tube shaft at the after bearing of the stern tube~~

~~(b) Seal liner found to be or placed in a satisfactory condition~~

~~(c) Verification of the satisfactory conditions of inboard and outboard seals~~

8.1.3 Preventive Maintenance System*

Notwithstanding the requirements in **8.1.1** above, where the ship is equipped with oil lubricated stern tube bearings and appropriate stern tube oil sealing devices as approved by the Society, the survey items of ~~-~~1, ~~-~~3, ~~-~~4, ~~-~~5~~,~~ and -7 ~~and -8~~ in **Table 2.8.1** may be replaced with a general examination of the shafting system and, for the weardown measuring and recording specified in item 8 in **Table 2.8.1**, they may be carried out while the propeller is installed in lieu of the timing after re-installation; this, however, is provided that all condition monitoring data taken according to the approved preventive maintenance system is found to be within permissible limits. ~~For requirements other than -1, -3, -4, -5, -7 and -8~~ Furthermore, omission of the survey items of 2, 9 and 10 in **Table 2.8.1**~~, the propeller shaft may be examined in accordance with the requirements for the partial surveys of propeller shafts Kind 1*B*~~ may be allowed except in the case of keyed connections. ~~The examination required by survey item -9 in **Table 2.8.1** may be partly dispensed with where deemed appropriate by the Society.~~

(1) Based upon Society approved preventive maintenance systems, at least the following **(a)** through **(d)** are to be properly monitored and recorded for diagnosing lubricating conditions of shafting systems and performing preventive system maintenance. Moreover, the notation "*Propeller Shaft Condition Monitoring System*" (abbreviated as "*PSCM*") is to be affixed to the classification characters of ships whose preventive maintenance systems are approved by the Society.

(a) Lubricating oil sampling and analysis is to be carried out regularly at intervals not exceeding 6 *months*, with at least the following **i)** through **iv)** being analy~~z~~sed each time:

i) ~~W~~water content;

ii) ~~S~~salinity (~~S~~sodium);

iii) ~~C~~content of shaft metal and bearing metal particles; and

iv) ~~O~~oxidation of oil.

(b) Lubricating oil consumption rate

(c) Bearing temperature

(d) Weardown of the propeller shaft ~~or the stern tube shaft~~ at ~~the after bearing of~~ the stern tube

(2) Based upon Society approved preventive maintenance systems, at least the following **(a)** to **(e)** are to be properly monitored and recorded for diagnosing lubricating conditions of shafting systems and performing preventive system maintenance. Moreover, the notation "*Propeller Shaft Condition Monitoring System・A*" (abbreviated as "*PSCM・A*") is to be affixed to the classification characters of ships whose preventive maintenance systems are approved by the Society.

(a) Lubricating oil sampling and analysis is to be carried out regularly at intervals not exceeding 6 *months*, with at least the following **i)** to **iv)** being analy~~z~~sed each time:

i) ~~W~~water content;
ii) ~~S~~salinity (~~S~~sodium);
iii) ~~C~~content of shaft metal and bearing metal particles; and
iv) ~~O~~oxidation of oil.

(b) The monthly onboard checking of lubricating oil water content. Such checking, however, may be omitted when the oil sampling and analysis specified in **(a)** above is carried out regularly at intervals not exceeding 3 *months*.
(c) Lubricating oil consumption rate
(d) Bearing temperature
(e) Weardown of the propeller shaft ~~or the stern tube shaft~~ at ~~the after bearing of~~ the stern tube

8.1.4 Propeller Shaft and Stern Tube Shaft Surveys of Ships Affixed with Notation "*APSS ・O*" or "*APSS ・W*"*

Notwithstanding the requirements in **8.1.1** to **8.1.3** above, propeller shaft and stern tube shaft surveys of ships affixed with the notation "*APSS ･O*" or "*APSS ･W*" are to be carried out as specified separately by the Society.

Table 2.8.1 Ordinary Surveys of Propeller Shaft and Stern Tube Shaft

Items	Examinations
1 Drawing out of the propeller shaft and the stern tube shaft	
-1 for oil or freshwater lubricated bearings	Drawing the propeller shaft and the stern tube shaft and examining the entire shafts, seals system and bearings
-2 for water lubricated bearings	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 Propeller connections	
-1 ~~Shafts having keyed propeller~~ Keyed connections	Removing the propeller to expose the forward end of the taper~~s~~, and performing a non-destructive examination (*NDE*)[4] by an approved surface crack-detection method deemed appropriate by the Surveyor 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.
-2 ~~Shafts having keyless propeller~~ Keyless connections	Removing the propeller to expose the forward end of the taper~~s~~, and performing a non-destructive examination (*NDE*)[4] by an approved surface crack-detection method deemed appropriate by the Surveyor all around the shaft in way of the forward portion of the taper section. For shafts provided with liners, the *NDE* is to be extended to the after edge of the liner.~~[3]~~[4] 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 in **5.3.1-1, Part 7**.
-3 ~~Shafts having lange~~ Flanged 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 ~~s~~Surveyor, the coupling bolts and flange radius are to be examined by means of an approved surface crack detection method[4] deemed appropriate by the Surveyor.
3 Propeller shaft, stern tube shaft, and coupling bolts	Examination of the sleeves, the fillet of the coupling flange to the intermediate shaft or to the stern tube shaft and the coupling bolts 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~~s~~, based on the results of external examinations, deems such addition testing to be necessary. In addition, anti-corrosion covers are to be removed for shafts ~~of~~ Kind 2.
4 Stern tube bearing[1]	Examination of the stern tube bearings
5 Clearances between bush of the stern tube bearing[2] and either the propeller shaft or the stern tube shaft ~~and the after bearing of the stern tube~~	Checking and recording the bearing clearances between the bush and the shaft
6 Propellers	Verification that the propeller is free of damages which may cause the propeller to be out of balance
7 ~~Stern tube~~ ~~s~~Sealing ~~systems~~ device for stern tube[3]	Verification of the satisfactory conditions of inboard and outboard seals during the re-installation of the shaft and propeller

Table 2.8.1 Ordinary Surveys of Propeller Shaft and Stern Tube Shaft (continued)

Items	Examinations
8 For oil lubricated or freshwater lubricated stern tube bearings, weardown of the propeller shaft or the stern tube shaft at ~~the after bearing of~~ the stern tube bearing	Measuring and ~~R~~recording the bearing weardown ~~measurements~~ (after re-installation)
9 Propeller boss surfaces in contact with the propeller shaft taper	Examination of the propeller boss surface~~s~~
10 Controllable pitch propeller connections	Examination of the pitch control gear and working parts as well as, by an efficient crack detection method, the propeller blade fixing bolts
11 Water lubrication lines	Where water lubricated stern tube bearings are adopted, the water piping for lubrication is to be examined.
12 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 or lubricating freshwater circulation pumps, etc.	Where oil or freshwater lubricated stern tube bearings are adopted, examination of the systems for verifying whether ~~of~~ stern tube bearings are being maintained in good working condition
13 Lubricating oil or lubricating freshwater	~~Where oil or freshwater lubricated stern tube bearings are adopted, e~~Examination of the lubricating oil or lubricating freshwater record book

(Notes)

1 This includes shaft bracket bearings. The same applies hereinafter in this Chapter.

2 This includes bush of shaft bracket bearings. The same applies hereinafter in this Chapter.

3 This includes sealing devices for shaft bracket bearings. The same applies hereinafter in this Chapter.

~~1 *NDE* or approved surface crack detection method generally refers to the magnetic particle method.~~

~~2~~4 For shafts with water lubricated bearings, it is recommended that the survey specified in **1.1.3-1(6)~~(g)~~(a)iii)** also be carried out in cases where ~~the next survey due date is less than~~ the date 18 *years* after the date of completion of the previous survey specified in **1.1.3-1(6)~~(g)~~(a)iii)** is earlier than the next survey due date.

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 14 June 2019.

2. Notwithstanding the amendments to the Rules, 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 Rules 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 1-2

Part 7 MACHINERY INSTALLATIONS

Chapter 2 DIESEL ENGINES

2.1 General

2.1.1 General*

Sub-paragraph -5 has been added as follows.

5 Gas-fuelled engines are to be in accordance with the requirements specified otherwise by the Society in addition to those in this chapter.

Chapter 9 WELDING FOR MACHINERY INSTALLATIONS

Section 9.2 has been amended as follows.

9.2 Welding Procedure and Related Specifications ~~Qualification Tests~~

Welding procedures and related specifications are to be in accordance with the requirements specified in **11.2, Part D of the Rules for the Survey and Construction of Steel Ships**.

~~**9.2.1 Requirements for Tests***~~

~~**1** Manufacturers are to conduct welding procedure qualification tests, if they plan to carry out for the first time the following welding work:~~

~~(1) Welding work for boilers, pressure vessels of Group I and Group II~~

~~(2) Welding work for the principal components of prime movers, etc. (these principal components are specified in **Table 7.2.1** and **3.2.1-1**; hereinafter, this definition applies throughout this Chapter)~~

~~(3) Welding work using special materials~~

~~(4) Welding work using special welding procedures~~

~~**2** Except for minor changes in welding conditions, in cases where any part of a welding procedure approved by an approval test as specified in **-1** is modified, a welding procedure qualification test is to be carried out.~~

~~**3** Whenever manufacturers conduct an approval test for a welding procedure, they are to submit detailed data in connection with this welding work to the Society for approval.~~

~~**9.2.2 Kinds of Tests**~~

~~**1** The types of tests are as follows:~~

~~(1) Mechanical tests~~

~~(a) Butt welding~~

~~i) Tensile test for joints~~

~~ii) Guided bend test or rolled bend test~~

~~iii) Impact test (the middle welded part, the boundary between the base metal and the welded part as well as the heat affected zone)~~

~~(b) Fillet weldings~~

~~Fracture test~~

~~(2) Visual inspection and hardness test~~

~~(3) Macroscopic and microscopic examinations (the middle part of weld metal, the boundary between the base metal and the welded part as well as the heat affected zone)~~

~~(4) Radiographic examination~~

~~**2** In cases where welding is made to a base metal which has no impact value requirement, the impact test may be omitted subject to Society approval.~~

~~**3** In the case of fillet weldings, microscopic examinations and radiographic examinations may be omitted.~~

~~**4** For welding procedure qualification tests on materials used at high temperatures, the Society may require a creep test or a high temperature tensile test.~~

~~**5** In cases where special materials are used, or special welding procedures are employed, the Society may require other tests matching the specific requirements of such special materials or special welding procedures.~~

~~**9.2.3 Welding of Test Assemblies**~~

~~**1** The shape and dimensions of test assemblies are to be as specified in **Fig. 7.9.1**.~~

2 Test assemblies are to be of the same or equivalent material used in actual welding work.
3 In cases where the test assemblies of rolled steel plates for low temperature service are butt welded, the direction of the welding generally is to be in parallel with the direction of the rolling.
4 In general, the thickness of the test assemblies for welding procedure qualification tests is to be equal to the maximum thickness of the materials to be used in the actual welding work.
5 The welding of test assemblies is to be carried out under the same or similar conditions experienced in the actual work.

9.2.4 Test Specimens and Test Procedures

The shape and dimensions of test specimens and test procedures are to comply with the requirements in **Chapter 3, Part M of the Rules for the Survey and Construction of Steel Ships**. However, the requirements of other appropriate Codes or Standards may be applied subject to Society approval.

9.2.5 Retests

1 In cases where a tested part fails to meet the requirements, a retest may be performed by testing multiple test specimens of the same part. If all these additional tests are satisfactory, the part is considered to have passed the test.
2 Test specimens for retests are to be taken from either the same test assembly as the first test or from a test assembly newly welded under the same welding conditions as the first test assembly.
3 In cases where a retested part also fails to meet the requirements, tests may be performed over again after changing the welding conditions. In this case, where all of the tests specified for the test assembly have been carried out and their results are in compliance with the requirements, the tests are to be accepted as successful.

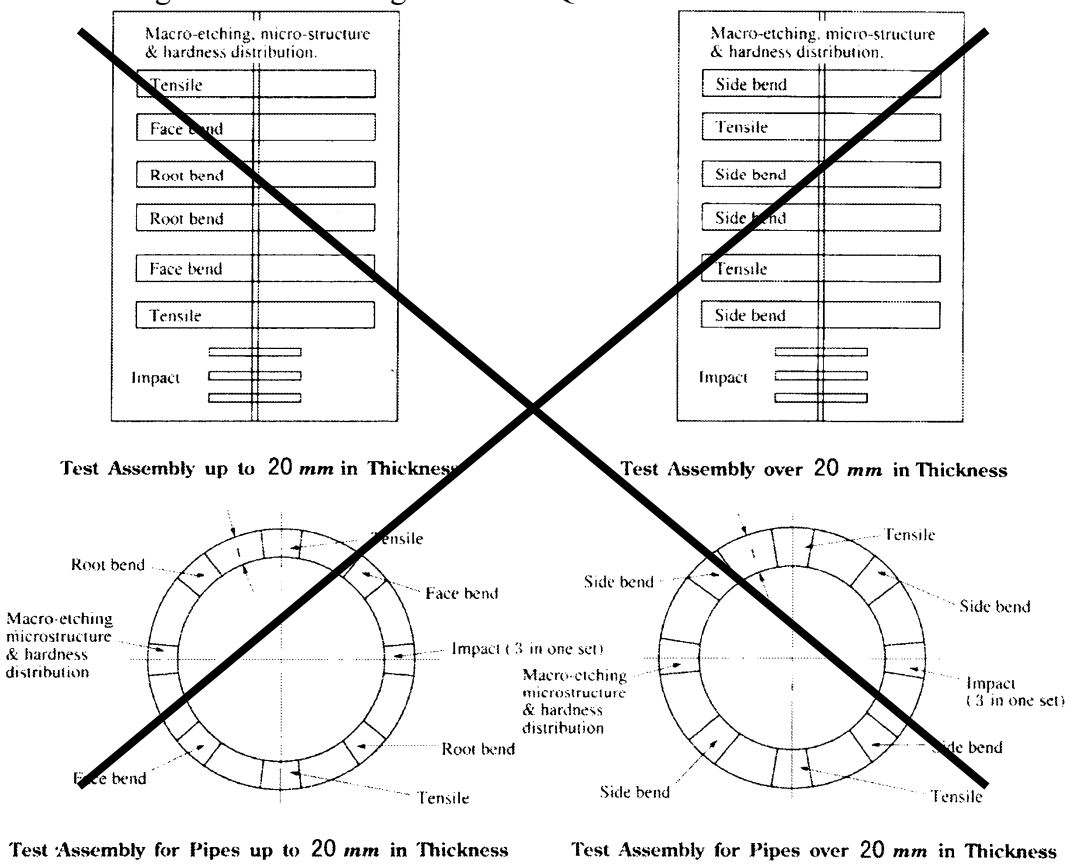
9.2.6 Test Records

Test results are to be summarized and be submitted to the Society as the test records.

9.2.7 Omission of Tests

In cases where test records, deemed appropriate by the Society, are available and the test results are considered to be satisfactory, a part or all of the tests may be omitted.

~~Fig. 7.9.1 Welding Procedure Qualification Test Assemblies~~



EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

1. The effective date of the amendments is 14 June 2019.

Amendment 1-3

Part 7 MACHINERY INSTALLATIONS

Chapter 2 DIESEL ENGINES

2.1 General

2.1.4 Approval of Diesel Engines*

Sub-paragraph -1(4) has been amended as follows.

1 Diesel engines are to be approved in accordance with the following **(1)** to **(6)**:
((1) to (3) are omitted.)
(4) Licens~~or~~ee approval
((a) and (b) are omitted.)
((5) and (6) are omitted.)

2.2 Materials, Construction and Strength

2.2.1 Materials

1 Materials intended for the principal components of diesel engines and their non-destructive tests as well as surface inspections and dimension inspections are to conform to the requirements given in **Table 7.2.1**. However, with respect to ultrasonic testing as well as surface inspections and dimension inspections, submission or presentation of test results to the Surveyor may be considered sufficient. In cases where deemed necessary by the Society, tests or inspections may also be required for any parts not specified in **Table 7.2.1**.
2 (Omitted)

Table 7.2.1 has been amended as follows.

Table 7.2.1 Application of Materials and Non-destructive Tests as well as Surface Inspections and Dimension Inspections to Principal Components of Diesel Engines

Principal components			Cylinder bore D (*mm*)								
			$D \leq 300$			$300 < D \leq 400$			$400 < D$		
			I	II	III	I	II	III	I	II	III
1	Welded bedplate		○	○		○	○		○	○	
2	Bearing transverse girders (cast steel)		○	○		○	○		○	○	
3	Welded frame box		○	○		○	○		○	○	
4	Welded cylinder frames (5)		○	○		○	○		○	○	
5	Engine block (spheroidal graphite cast iron)(6)		○			○			○		
6	Cylinder liner					○(7)			○(7)		
7	Cylinder head (cast steel or forged steel)					○	○		○	○	
8	Piston crown (cast steel or forged steel)								○	○	
9	Crankshaft	made in one piece	○	○	○	○	○	○	○	○	○
		Web, pin and journal for all built-up and semi-built-up types	○	○	○	○	○	○	○	○	○
		Others (including coupling bolts)	○	○	○	○	○	○	○	○	○
10	Piston rod								○	○(8)	
11	Cross head (5)		○	○(8)		○	○(8)		○	○(8)	
12	Connecting rods together with connecting rod bearing caps		○	○	○	○	○	○	○	○	○
13	Bolts and studs (for cylinder heads, connecting rods, main bearings)					○	○	*TR*(9)	○	○	*TR*(9)
14	Tie rod (5)		○	○	*TR*(9)	○	○	*TR*(9)	○	○	*TR*(9)
15	High pressure fuel injection pipes including common fuel rail					○			○		
16	High pressure common servo oil system					○			○		
17	Heat exchanger, both sides (9,10)					⊜△			⊜△		
18	Accumulator of common rail fuel or servo oil system (11,10)		○			○			○		
19	Piping, pumps, actuators, etc. for hydraulic drive of valves (12,4)		○(13)			○(13)			○(13)		
20	Pipes, valves and fittings attached to engines classified in **Chapter 10,12** as either Group I or Group II. (excluding items listed in this table)		○			○			○		
21	Bearings for main, crosshead, and crankpin (12,4)		*TR*(14,2)	*TR*(15,3)	○	*TR*(14,2)	*TR*(15,3)	○	*TR*(14,2)	*TR*(15,3)	○
22	Turbine discs, blades, blower impellers and rotor shafts of exhaust driven turbochargers (16,4)		○	○		○	○		○	○	
23	Casings of exhaust driven turbochargers (16,4)		○(17,5)			○(17,5)			○(17,5)		

Notes:

(1) Materials intended for the components marked by "○" ~~a circle~~ in Column I are to comply with the requirements in **Part K of the Rules for the Survey and Construction of Steel Ships**. In addition, materials intended for the components marked by "△" in Column I are to comply with the requirements in **Chapter 8**.

(2) Materials intended for the components marked by "○" ~~a circle~~ in Column II are to be tested by a magnetic particle test or a liquid penetrant test as well as an ultrasonic test.

(3) Materials intended for the components marked by "○"~~a circle~~ in Column III are to be tested by a surface inspection and a dimension inspection.

(4) For items marked by *TR*, submission of a test report which compiles all test and inspection results in an acceptance protocol issued by the manufacturer may be accepted. The test report is to be signed by the manufacturer and state that components comply with specifications stipulated by the manufacturer. Such specifications are to be submitted to the Society in advance. Tests or inspections may be carried out on samples from the current production.

(5) Only for crosshead diesel engines.

(6) Only when engine power exceeds 400 *kW*/*cyl*. Chemical composition analysis may be omitted.

(7) Materials which comply with the requirements of national or international standards such as *ISO*, *JIS*, etc. may be used, except when used for steel parts.

(8~~7~~) After final machining, a magnetic particle test or a liquid penetrant test is to be carried out again.

(9~~8~~) Only for threaded bolts and studs used for connecting rods or tie rods.

(10~~9~~) Charge air coolers need only be tested on the water side.

(11~~0~~) Only when capacity exceeds 0.5*l*.

(12~~1~~) Only when engine power exceeds 800 *kW*/*cyl*.

(13) Materials which comply with the requirements of national or international standards such as *ISO*, *JIS*, etc. may be used for pumps and actuators.

(14~~2~~) Mechanical property test may be omitted.

(15~~3~~) Magnetic particle tests and liquid penetrant tests may be omitted. An ultrasonic test is to be carried out for full contact between the base material and bearing metal

(16~~4~~) In cases where the manufacturer has a quality system deemed appropriate by the Society, materials and non-destructive tests ~~as well as surface inspections and dimension inspections~~ for categories *A* and *B* turbochargers may not require the presence of a Society surveyor ~~be substituted for by tests deemed necessary by the manufacturer~~. In such cases, the submission or presentation of test records may be required by the Society.

(17~~5~~) Chemical composition analysis may be omitted.

EFFECTIVE DATE AND APPLICATION (Amendment 1-3)

1. The effective date of the amendments is 14 June 2019.

2. Notwithstanding the amendments to the Rules, the current requirements apply to the principal components of diesel engines for which the application for survey is submitted to the Society before the effective date.

3. Notwithstanding the provision of preceding **2.**, the amendments to the Rules may apply to the principal components of diesel engines for which the application for survey is submitted to the Society before the effective date upon request of the owner or the engine manufacturer.

Amendment 1-4

Part 8 ELECTRICAL INSTALLATIONS

Chapter 2 ELECTRICAL INSTALLATIONS AND SYSTEM DESIGN

2.4 Rotating Machines

2.4.5 Overload Capability*

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

Rotating machines are to withstand the following excess current or torque tests by maintaining their voltage, rotating speed and frequency as near to their rated values as possible. In the case of special types of deck machinery motors (winch, windlass, capstan, etc.), overload scaling may be dealt with as considered appropriate by the Society.

(1) Excess current capability

(a) *A.C.* generators

150 % of rated current for ~~*2 minutes*~~30 *seconds*

(b) *A.C.* motors

150 % of rated current for 2 *minutes*.

However, in the case of *A.C.* motors having rated outputs exceeding 315 *kW* or rated voltages exceeding 1 *kV*, the load and time of excess current capability may be increased or decreased in consideration of use conditions and the like.

(~~b~~c) *D.C.* generators

150% of rated current

Rated output (*kW*) / Rated rotating speed (*rpm*) ≤ 1 for 45 *seconds*

Rated output (*kW*) / Rated rotating speed (*rpm*) > 1 for 30 *seconds*

((2) is omitted.)

EFFECTIVE DATE AND APPLICATION (Amendment 1-4)

1. The effective date of the amendments is 14 June 2019.

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

Amendment 1-5

Part 2 CLASS SURVEYS

Chapter 1 GENERAL

1.1 Surveys

1.1.8 Machinery Verification Runs

Sub-paragraph -3 has been added as follows.

1 At the time of a special survey, a dock trial in the presence of the attending surveyor is to be carried out to confirm the satisfactory operation of main and auxiliary machinery. If significant repairs have been carried out to main or auxiliary machinery or steering gear, the Surveyor may require a river trial.
2 At the time of extended dry docking, a dock trial may be required at the discretion of the attending surveyor to confirm the satisfactory operation of main and auxiliary machinery. If significant repairs have been carried out to main or auxiliary machinery or steering gear, the Surveyor may require a river trial.
3 For electric propulsion ships, at the time of the machinery verification runs specified in **-1** and **-2** above, the satisfactory operation of electric propulsion plants is to be confirmed.

1.3 Definitions

1.3.1 Terms*

Sub-paragraphs (11) and (12) have been added as follows.

The definitions of terms which appear in this Part are as specified in the following. Terms not define here are as defined in other parts of the Rules.
((1) to (10) are omitted.)
(11) "Electric propulsion ships" are ships which rely solely on electric propulsion motors for their propulsion.
(12) "Electric propulsion plants" are the following electrical installations of electric plopalsion ships.
  (a) Generating plants for propulsion
  (b) Electric motors for propulsion
  (c) Electrical installations that are necessary for the satisfactory operation of **(a)** and **(b)** (e.g. control gears for motors, semiconductor converters, and transformers)

Chapter 3 ANNUAL SURVEYS

3.3 Annual Surveys for Machinery

Paragraph 3.3.1 has been amended as follows.

3.3.1 General Examinations*

1 At Annual Surveys for Machinery, a general examination of all the machinery in the engine room and the following inspections **(1)** to **(5)** are to be carried out:

((1) to (5) are omitted.)

2 At Annual Surveys for electric propulsion ships, it is to be ascertained as far as practical for electric propulsion systems that forced cooling apparatuses (including filters), supports and coverings of cables, capacitor elements of propulsion semiconductor converters for propulsion, windings of generating plants and motors for propulsion , slip rings, commutators and brushes, etc. are in good condition.

Chapter 5 SPECIAL SURVEYS

5.3 Special Surveys for Machinery

Paragraph 5.3.1 has been amended as follows.

5.3.1 General Examinations

At Special Surveys for Machinery, in addition to the general examinations and inspections specified in **3.3.1**, the verification runs specified in **1.1.8-1** and **-3**, and the surveys specified in **Table 2.5.6** are to be carried out.

Table 2.5.6 has been amended as follows.

Table 2.5.6 Additional Requirements at Special Surveys for Machinery

Items	Examinations
1 Diesel engines (main propulsion machinery and auxiliary machinery for propulsion, manoeuvring and personnel safety)	(a) The essential part of the crankcase and cylinder jacket, the foundation bolts, the chock liners and the tie rod bolts are to be generally examined. (b) The doors of the crankcase and the explosion relief devices of the crankcase and scavenge space are to be generally examined. (c) The anti-vibration dampers, detuners, balancers, and compensators are to be generally examined. (d) The crankshaft alignment is to be checked and if necessary, adjusted.
2 Electrical installations	(a) The switchboards, distribution boards, cables, etc. are, as far as practicable, to be generally examined. (b) Insulation resistance of the generators and switchboards, the motors and the cables; the main circuits of control gears for electric propulsion motors and semiconductor converters for propulsion of electric propulsion ships are to be tested to ensure that they are placed in good order, and to be adjusted if it is found not to comply with the requirements **2.17.1**, **Part 8**. However, where a proper record of measurement is maintained and deemed appropriate by the Surveyor, consideration may be given to accepting recent readings.

EFFECTIVE DATE AND APPLICATION (Amendment 1-5)

1. The effective date of the amendments is 14 December 2019.

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

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS

GUIDANCE

2019 AMENDMENT NO.1

Notice No.31 14 June 2019

Resolved by Technical Committee on 30 January 2019

Notice No.31 14 June 2019
AMENDMENT TO THE GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS

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

Amendment 1-1

Part 2 CLASS SURVEYS

Chapter 1 GENERAL

1.1 Surveys

1.1.3 Intervals of Class Maintenance Surveys

Sub-paragraphs -3 to -7 have been amended as follows.

3 ~~The timing (s~~Survey due date~~s)~~ of Ordinary Surveys of the propeller shafts Kind 1 and stern tube shafts Kind 1 specified in **1.1.3-1(6)(a)i), Part 2 of the Rules** may be extended ~~subject to the carrying out of Occasional Surveys~~ in accordance with the following **(1)** to **(43)** after carrying out an Occasional Survey, except for propeller shafts of ships affixed with the notation "*PSCM*" or "*PSCM・A*" subject also to Note 1 of **Table 2.8.1.3-1**~~:~~.

(1) ~~For~~ The following **(a)** and **(b)** apply in the case of oil lubricated ~~bearings~~ or freshwater lubricated shafts~~, the following **(a)** to **(c)** are to apply:~~ subject to the following **-4(1)**.

(a) Extension of 1 *year*

The survey due date may be extended for up to 1 *year* in cases where~~, after the execution of~~ a survey ~~consisting of~~ is carried out in accordance with the following **i)** to **v~~iii~~)**~~,~~ ~~examined parts are proven to be in good condition~~ and the shaft condition is confirmed to be satisfactory. ~~In this case, only one more "one-year extension" may be granted.~~

i) Examinations are to be carried out in accordance with the following **1)** to **3)**:
   1) Review of the previous weardown and/or clearance (between the bush and the shaft) recordings is to be carried out.
   2) The examinations specified in **8.1.2(2), Part 2 of the Rules** are to be carried out.
   3) Confirmation from the Chief Engineer that the shafting arrangement is in good working condition is to be obtained.

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

iii) Verification that the propeller is free of damages which may cause the propeller to be out of balance is to be carried out.

iv) Verification of the effectiveness of the inboard seal and outboard seals is to be carried out.

v) The examinations specified in items 12 and 13 of **Table 2.8.1, Part 2 of the Rules** are to be carried out.

~~i) Verification of no reported repairs by grinding or welding of shaft and/or propeller;~~

~~ii) Confirmation from the chief engineer that the shafting arrangement is in good working condition;~~

~~iii) Visual inspection of all accessible parts of the shafting system;~~

~~iv) Review of the previous recordings of the weardown and/or clearance between the shaft and the bearing;~~

~~v) Verification of maintenance records of the stern tube sealing devices;~~

~~vi) Verification that main engines have not been operated within the barred speed range for torsional vibration;~~

~~vii) Verification that the propeller is free of damages which may cause the propeller to be out of balance; and~~

~~viii) Carrying out the examinations specified in items 12 and 13 in **Table 2.8.1**, **Part 2 of the Rules**.~~

(b) Extension of 3 *months*

The survey due date may be extended for up to 3 *months* in cases where~~, after the execution of~~ a survey ~~consisting of~~ is carried out in accordance with the following ~~**i) and ii)**~~ **i)** to **iv)**~~, examined parts are proven to be in good condition~~ and the shaft condition is confirmed to be satisfactory.

~~i) The verifications and examinations, etc. specified in the preceding **(a)i)** to **iv)** as well as **vi)** and **viii)**; and~~

i) Examinations are to be carried out in accordance with the following **1)** to **3)**:

1) Review of the previous weardown and/or clearance (between the bush and the shaft) recordings is to be carried out.

2) The examinations specified in **8.1.2(2), Part 2 of the Rules** are to be carried out.

3) Confirmation from the Chief Engineer that the shafting arrangement is in good working condition is to be obtained.

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

iii) Verification of the effectiveness of the inboard seal is to be carried out.

iv) The examinations specified in items 12 and 13 of **Table 2.8.1, Part B of the Rules** are to be carried out.

~~(c) The surveys specified in the preceding **(a)** and **(b)** may be carried out sequentially; the survey due date, however, may be extended for only 1 *year*.~~

~~(2) For freshwater lubricated bearings, the following **(a)** to **(d)** are to apply:~~

~~(a) The survey due date may be extended for up to 1 *year* in cases where, after the execution of a survey consisting of the following **i)** to **v)**, examined parts are proven to be in good condition. In this case, only one more "one-year extension" may be granted.~~

~~i) The review specified in the preceding **(1)(a)iv)**;~~

~~ii) Review of service records, regularly recorded data showing in-service conditions of the shaft(s), which may include water flow, water temperature, salinity, pH, make-up water and water pressure;~~

~~iii) Review of test records of freshwater sample tests carried out in accordance with the following **1)** to **5)** to verify that the test results comply with the criteria for parameters determined by the ship's management based upon the reference standards shown in **(d)** below and by taking into account its experience and knowledge. After the review, freshwater sample tests are to be carried out in accordance with the following **2)** to **5)** in the presence of a surveyor.~~

~~1) Freshwater sample tests are to be carried out at regular intervals, in principle, not exceeding six months.~~

~~2) Freshwater sample tests are to include, as parameter, chlorides and sodium~~

~~content, pH value, and presence of bearing particles or other particles (only for laboratory analysis, not required for tests carried out in presence of the surveyor).~~

~~3) Sampling is to be carried out in accordance with the following:~~

~~• Samples are 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.~~

~~• Samples are to be taken from the same pre-determined suitable position (before the filters, if any are fitted) in the system.~~

~~• Samples are to be collected under the direct supervision of the Chief Engineer, except when taking in the presence of a Surveyor.~~

~~4) Analysis results are to be retained on board and made available to the surveyor.~~

~~5) The extent of make-up water in the system is to be checked.~~

~~iv) The verifications and examinations, etc. specified in the preceding **(1)(a)i) to iii), vii)** as well as **viii)**; and~~

~~v) Verification of the effectiveness of the inboard seal and outboard seals~~

~~(b) The survey due date may be extended for up to 3 *month* in cases where, after the execution of a survey consisting of the following **i)** and **ii)**, examined parts are proven to be in good condition.~~

~~i) The verifications and examinations, etc. specified in the preceding **(a)i)** to **iv)**; and~~

~~ii) Verification of the effectiveness of the inboard seal.~~

~~(c) The surveys specified in the preceding **(a)** and **(b)** may be carried out sequentially; the survey due date, however, may only be extended for a maximum of 1 *year*.~~

~~(d) The reference standards for the criteria of the parameters specified in **(a)iii)** above are as follows:~~

~~i) Chloride and sodium content (upper limits)~~

~~1) Chloride content: 60 *ppm*~~

~~2) Sodium content: 70 *ppm*~~

~~ii) PH value~~

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

~~iii) Bearing particles and other particles~~

~~1) Metallic content (upper limits)~~

~~Iron (Fe): 25 *ppm*~~

~~Chromium (Cr): 5 *ppm*~~

~~Nickel (Ni): 5 *ppm*~~

~~Copper (Cu): 40 *ppm*~~

~~Silicon (Si): 30 *ppm*~~

~~2) Bearing particles (non-metallic content)~~

~~No polymer resins are to be found by micro-filter and/or microscopic testing.~~

(~~3~~2) ~~For~~ The following **(a)** and **(b)** apply in the case of water lubricated ~~bearings~~ shafts, ~~the following **(a)** to **(c)** are to apply:~~ subject to the following **-4(2)**.

(a) Extension of 1 *year*

The survey due date may be extended for up to 1 *year* in cases where~~, after the execution of~~ a survey ~~consisting of~~ is carried out in accordance with the following **i)** to ~~**viii)**~~**vi)**, ~~examined parts are proven to be in good condition~~ and the shaft condition is confirmed to be satisfactory.

~~i) Review of the previous recording of clearances between the shaft and its bearings;~~

i~~i~~) ~~Confirmation from the chief engineer that the shafting arrangement is in good~~

~~working condition after the execution of a survey consisting of~~ Examinations are to be carried out in accordance with the following ~~**1) and 2)**~~ **1)** to **4)**:

1) Review of the previous clearance (between the bush and the shaft) recordings is to be carried out.

~~1~~2) ~~Review of~~ ~~s~~Service records~~, regularly recorded data showing in-service conditions of the shaft(s); and~~ are to be reviewed.

~~2~~3) Verification of no reported repairs by grinding or welding of shafts and/or propellers is to be carried out.

4) Confirmation from the Chief Engineer that the shafting arrangement is in good working condition is to be obtained.

ii~~i~~) A ~~V~~visual inspection of all accessible parts of the shafting system~~;~~ is to be carried out.

iii~~v~~) Verification that the propeller is free of damages which may cause the propeller to be out of balance~~;~~ is to be carried out.

iv) Checking and recording the clearances ~~of bearing between the shaft and its bearings;~~ between the bush and the shaft are to be carried out.

v~~i~~) Verification of the effectiveness of the inboard seal~~;~~ is to be carried out.

vii) ~~Examination of the lubrication water piping in the case of shafts with seawater lubricated stern tube bearings or stern tube bearings utilising outboard fresh water; and;~~ The examinations specified in items 11 of **Table 2.8.1, Part 2 of the Rules** are to be carried out.

~~viii) Verification that the main engines have not been operated within the barred speed range for torsional vibration;~~

(b) Extension of 3 *months*

The survey due date may be extended for up to 3 *month* in cases where~~, after the execution of the verfications and examinations, etc. specified in the preceding **(a)i) to iv)** as well as **vi) to viii)**, examined parts are proven to be in good condition~~ a survey is carried out in accordance with the following **i)** to **v)** and the shaft condition is confirmed to be satisfactory.

i) Examinations are to be carried out in accordance with the following **1)** to **4)**:

1) Review of the previous clearance (between the bush and the shaft) recordings is to be carried out.

2) Service records are to be reviewed.

3) Verification of no reported repairs by grinding or welding of shafts and/or propellers is to be carried out.

4) Confirmation from the Chief Engineer that the shafting arrangement is in good working condition is to be obtained.

ii) A visual inspection of all accessible parts of the shafting system~~;~~ is to be carried out.

iii) Verification that the propeller is free of damages which may cause the propeller to be out of balance is to be carried out.

iv) Verification of the effectiveness of the inboard seal is to be carried out.

v) The examinations specified in items 11 of **Table 2.8.1, Part 2 of the Rules** are to be carried out.

~~(c) The surveys specified in the preceding **(a)** and **(b)** may be carried out sequentially; the survey due date, however, may only be extended for a maximum of 1 *year*.~~

(~~4~~3) Occasional Surveys specified in **(1)** and **(2)** above are, in principle, to be carried out within 1 *month* of the survey due date, and the extension specified in **(1)** and **(2)** above counts from the survey due date. If the Occasional Survey is carried out more than 1 *month* prior to the survey due date, then the period of extension counts from the date on which the Occasional Survey

was completed.

~~**4** The "periodical analysis for lubricating oil" referred to in **1.1.3-1(6)(b), Part 2 of the Rules** is to be carried out regularly at intervals not exceeding 1 year and the items to be analyzed in each analysis are to include water content, chloride content, shaft metal content, bearing metal particle content, and oil oxidation degree.~~

4 The following **(1)** and **(2)** apply in the case of an extension of the survey due date specified in **(1)** and **(2)** of **-3** above.

(1) The following **(a)** and **(b)** apply in the case of an extension of the survey due date specified in **-3(1)** above until an Ordinary Survey specified in **8.1.1, Part 2 of the Rules** or a Partial Survey specified in **8.1.2, Part 2 of the Rules** is completed.

(a) No more than two consecutive "1 *year*" extensions can be granted. No further extension of another type (that in accordance with **-3(1)(b)** above) can be granted.

(b) No more than one "3 *months*" extension can be granted. In the event an additional extension is requested, an Occasional Survey in accordance with **-3(1)(a)** above is to be carried out, and the survey due date, prior to the previous extension, is to be extended for up to 1 *year*.

(2) The following **(a)** and **(b)** apply in the case of an extension of the survey due date specified in **-3(2)** above until an Ordinary Survey specified in **8.1.1, Part 2 of the Rules** is completed.

(a) No more than one "1 *year*" extension can be granted. No further extension of another type (that in accordance with **-3(2)(b)** above) can be granted.

(b) No more than one "3 *months*" extension can be granted. In the event an additional extension is requested, an Occasional Survey in accordance with **-3(2)(a)** above is to be carried out, and the survey due date, prior to the previous extension, is to be extended for up to 1 *year*.

5 ~~The~~ Upon postponement of the Ordinary Surveys of propeller shafts Kind 1 other than those of ships affixed with the notation "*PSCM*" or "*PSCM ･A*" and stern tube shafts Kind 1 facilitated by the Occasional Survey specified in **-3** above or the Partial Survey specified in **1.1.3-1(6)(b), Part 2 of the Rules**, the interval of of the Ordinary Surveys ~~are~~ is not to exceed the following limits:

(1) 7 *years* for shafts Kind 1*A*

(2) ~~12~~14 *years* for shafts Kind 1*B* and shafts Kind 1*W*

~~(3) 8 *years* for shafts Kind 1*W*~~

6 In applying the requirements specified in **1.1.3-1, Part 2 of the Rules**, the ship's owner/operator is to submit the statement of "the ship's operating period in salt water" to the Society.

7 ~~With respect to~~ Due dates of the "non-destructive examination (*NDE*)" specified in **1.1.3-1(6)~~(g)~~(a)iii), Part 2 of the Rules**~~, the survey due date~~ may be extended for up to 3 *months* in cases where~~, after the execution of an Occasional Survey consisting of the following (1) to (7), examined parts are proven to be in good condition~~ a survey specified in **i)** to **v)** of **-3(2)(b)** above is carried out and the shaft condition is confirmed to be satisfactory. In such cases, further extension of the due date according to **(a)** or **(b)** of **-3(2)** above is not allowed, until the non-destructive examination (*NDE*) is completed. The provisions of **-3(3)** above apply to the calculation of the extension of the due date.

~~(1) Review of the previous recording of clearance between the shaft and its bearings;~~

~~(2) Confirmation from the chief engineer that the shafting arrangement is in good working condition after the execution of the review and verification specified in the following (a) and (b):~~

~~(a) Review of service records, regularly recorded data showing in-service conditions of the shaft(s); and~~

~~(b) Verification of no reported repairs by grinding or welding of shaft and/or propeller.~~

~~(3) Visual inspection of all accessible parts of the shafting system;~~
~~(4) Verification that the propeller is free of damages which may cause the propeller to be out of balance;~~
~~(5) Verification of the effectiveness of the inboard seal;~~
~~(6) Examination of the lubrication water piping in the case of shafts with seawater lubricated stern tube bearings or stern tube bearings utilising outboard fresh water; and~~
~~(7) Verification that the main engines have not been operated within the barred speed range for torsional vibration.~~

Chapter 3 ANNUAL SURVEYS

3.3 Annual Surveys for Machinery

3.3.1 General Examinations

Sub-paragraph -2 has been amended as follows.

2 The ~~phrases "lubricating oil analysis" and "freshwater sample tests"~~ "reference standards deemed appropriate by the Society" referred to specified in **3.3.1(~~5~~4), Part 2 of the Rules** refer to ~~the "lubricating oil analysis" and "freshwater sample tests" specified in **2.2.1-2(2)** and **2.3.1-2(2)** of **Annex B1.1.3-7 "Alternative Propeller Shaft Survey Methods", Part B of the Guidance for the Survey and Construction of Steel Ships**, respectively.~~ the following **(1)** and **(2)**:
(1) those specified in **8.1.2-1** for oil lubricated shafts; and
(2) those specified in **8.1.2-2** for freshwater lubricated shafts.

Chapter 6 DOCKING SURVEYS

6.1 Docking Surveys

Paragraph 6.1.3 has been amended as follows.

6.1.3 Other Surveys

The ~~phrases "lubricating oil analysis" and "freshwater sample tests" specified~~ "reference standards deemed appropriate by the Society" referred to in **6.1.3-2, Part 2 of the Rules** refer to ~~the "lubricating oil analysis" and "freshwater sample tests" specified in **2.2.1-2(2)** and **2.3.1-2(2)** of **Annex B1.1.3-7 "Alternative Propeller Shaft Survey Methods", Part B of the Guidance for the Survey and Construction of Steel Ships**, respectively.~~ the following **(1)** and **(2)**:
(1) those specified in **8.1.2-1** for oil lubricated shafts; and
(2) those specified in **8.1.2-2** for freshwater lubricated shafts.

Chapter 8 PROPELLER SHAFT AND STERN TUBE SHAFT SURVEYS

Section 8.1 has been amended as follows.

8.1 Propeller Shaft and Stern Tube Shaft Surveys

8.1.1 Ordinary Surveys

When the clearance and/or wear down at the aft end of the stern tube or the shaft bracket bearing exceed the value given below, the bearing is to be replaced or repaired.

(1) Clearance ~~for~~ in the case of water lubricated bearings~~:~~

Propeller shaft diameter, *d* (*mm*): Clearance (*mm*)

$d \leq$ 230: 6.0

230 $< d \leq$ 305: 8.0

305 $< d$: 9.5

(2) Wear~~-~~down ~~for~~ in the case of oil lubricated bearings~~:~~

~~As a rule,~~ To be standardized as 0.3 *mm*, but 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.

(3) Weardown ~~for~~ in the case of freshwater lubricated bearings~~:~~

Weardown value used as reference for repairs specified by the manufacturer.

8.1.2 Partial Surveys

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

(1) Metal particles (upper limits)

(a) Iron (Fe): 50 *ppm*

(b) Tin (Sn): 20 *ppm*

(c) Lead (Pb): 20 *ppm*

(d) Sodium (Na): 80 *ppm*

(2) IR Oxidation and separated water (upper limits)

(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 **8.1.2(2)(b)ii), Part 2 of the Rules** means the reference standards specified in the following **(1)** and **(2)**:

(1) Chloride content and sodium content (upper limits)

(a) Chloride: 60 *ppm*

(b) Sodium (Na): 70 *ppm*

(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) 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) Bearing particles (non-metallic content)

No polymer resins are to be found by micro-filter and/or microscopic testing.

8.1.3 Preventive Maintenance System

1 The wording "appropriate stern tube sealing devices as approved by the Society" specified in **8.1.3, Part 2 of the Rules**, means stern tube sealing devices capable of being repaired and replaced without withdrawing the shaft.

2 The preventive maintenance system specified in **8.1.3, Part 2 of the Rules**, is to be approved in accordance with the procedures specified in **Table 2.8.1.3-1**.

~~**3 The wording "where deemed appropriate by the Society" in 8.1.3, Part 2 of the Rules means those cases where it is difficult to sufficiently draw out the propeller from the propeller shaft for those ships in which the distance between the propeller and the rudder plate is short and where no sign of slippage between the shaft and propeller has been confirmed. However, even in such cases, the propeller is to be drawn out from its shaft as far as possible and the condition of the propeller boss bore is to be checked by the Surveyor.**~~

~~**4**~~**3** The wording "properly monitored" in **8.1.3(1), Part 2 of the Rules**, as it pertains to "bearing temperature", is to be achieved by either of the following monitoring and recording devices provided for measuring the temperature of the metal at the aft end bottoms of stern tubes:

(1) Two or more temperature sensors embedded into the metal

(2) An embedded temperature sensor which can be replaced from inside the ship and a spare temperature sensor.
In such cases, replacement by the spare sensor is to be demonstrated according to the procedures submitted beforehand.

~~**5**~~**4** The wording "properly monitored" in **8.1.3(2), Part 2 of the Rules**, as it pertains to "bearing temperature", is to be achieved by at least one device provided for measuring the temperature of the metal at the aft end bottoms of stern tubes.

8.1.4 Propeller Shaft and Stern Tube Shaft Surveys of Ships Affixed with Notation "*APSS • O*" or "*APSS • W*"

The wording "specified separately by the Society" ~~specified~~ in **8.1.4, Part 2 of the Rules** means that the surveys are to be carried out in accordance with **Annex B1.1.3-7 "Alternative Propeller Shaft and Stern Tube Shaft Survey Methods", Part B of the Guidance for the Survey and Construction of Steel Ships**. In applying said **Annex**, the references are to be replaced in accordance with the following **(1)** to **(4)**:

(1) ~~t~~The references to "**7.3.1-1, Part D of the Rules for the Survey and Construction of Steel Ships**" ~~specified~~ made in note 4 of **Table 2.1** and note 2 of **Table~~s~~ ~~2.1 and~~ 2.2** of the **Annex** ~~is~~ are to be replaced by ~~the~~ references to "**5.3.1-1, Part 7 of the Rules for the Survey and Construction of Inland Waterway Ships**"~~, as well as~~.

(2) ~~t~~The references to ~~"Table B8.1.3-1, Part B of the Guidance"~~ "**B8.1.2-1, Part B of the Guidance**" and "**Table B8.1, Part B of the Rules**" ~~specified~~ made in **2.1.3-1(1)(b)** ~~and 2.2.1-2(2)~~ of the **Annex** ~~and "Table B8.1, Part B of the Rules"~~ are to be replaced respectively by ~~the~~ references to "**Table 2.8.1.3-1, Part 2 of the Guidance**" and "**Table 2.8.1, Part 2 of the Rules**".

(3) The reference to "**Table B8.1.2-1, Part B of the Rules**" made in **2.2.1-2(2)(b)** of the **Annex** is to be replaced by a reference to "**8.1.2-1, Part 2 of the Guidance**".

(4) The reference to "**Table B8.1.2-2, Part B of the Rules**" made in **2.3.1-2(2)(b)** of the **Annex** is to be replaced by a reference to "**8.1.2-2, Part 2 of the Guidance**".

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

Item	Procedures
	(1. to 4. are omitted.)
5. After Approval	(-1 to -3 are omitted.) -4 The ship is, no later than the survey due date specified in **1.1.3-1(6)(a)i), Part 2 of the Rules**[1, 2], to be subject to ~~the applicable survey items specified in **Table 2.8.1**~~ a Partial Survey in accordance with **(a)** to **(i)** of **8.1.2(1)**, **Part 2 of the Rules**[3, 4] after the examinations specified in the following (1) to (4) are carried out and the shaft condition is to be confirmed satisfactory ~~(excluding survey items 1, 3, 4, 5, 7 and 8 for parts covered by the preventive maintenance system) as well as checking and recording the measurements of bearing weardown of the propeller shaft or the stern tube shaft at the after bearing of the stern tube, visual inspection of all accessible parts of the shafting system, seal liner found to be or placed in a satisfactory condition and verification of the satisfactory condition of inboard and outboard seals at the propeller shaft surveys in accordance with **1.1.3-1(6)(a), Part 2 of the Rules**~~. However, for propeller shafts ~~with keyless propeller attachments or having coupling flanges at the aft end~~ with keyless connections, the maximum interval of two consecutive surveys according to the requirements applied to Partial Surveys, including survey items 2~~,~~ and 9 ~~and 10~~ specified in **Table 2.8.1, Part 2 of the Rules** ~~may be extended‡ until the earlier date of the following **(1) or (2)**~~ or Ordinary Surveys (specified in **8.1.1, Part 2 of the Rules**) is not to exceed 18 *years*[5, 6]. ~~In cases where survey items 2, 9 and 10 specified in **Table 2.8.1, Part 2 of the Rules** are carried out, verification of the satisfactory re-installation of the propeller including verification of the satisfactory condition of inboard and outboard seals is to be carried out.~~ In all cases where the results of the examinations specified in the following (1) to (4) or the Partial Survey are not satisfactory, an Ordinary Survey specified in **8.1.1, Part 2 of the Rules** is to be carried out. ~~(1) The date when the propeller shaft is withdrawn for an examination due to some reason such as an abnormality being found by the analysis of monitoring parameters~~ ~~(2) The date 18 *years* after the propeller shaft survey (including survey items 2, 9 and 10 in **Table 2.8.1, Part 2 of the Rules**) was completed except in the case when one extension for no more than three months is granted‡~~ (1) Review of service records, including those specified in (2) and (3) of 4.-3, is to be carried out. (2) Review of test records of the lubricating oil analysis is to be carried out to confirm that the reference standards specified in 4.-3 are complied with. (3) An oil sample examination is to be carried out. (4) Verification of no reported repairs by grinding or welding of shafts and/or propellers is to be carried out.
6. Cancellation of Approval	Where the following **-1** to **-3** is applicable, the Society may cancel the ship's approval to adopt the preventive maintenance system for ~~the~~ propeller shafts. In ~~this~~ such cases, the Society is to notifi~~es~~y the ship's management of the cancellation, and the ship is to undergo the propeller shaft survey immediately in accordance with the requirements of **8.1.1, Part 2 of the Rules**. -1 Where any improper conduct is found regarding entries in the records such as those for oil analysis results. -2 Where it is regarded by the Society that proper maintenance is not carried out according to the approved manual. -3 Where the shipowner or ship management company has changed, or cancellation of the approval to adopt the preventive maintenance system has been requested by the ship's management.

(Notes)

1 In cases where the survey due date is to be extended, the provisions of **-3(1)** and **-4(1)** of **1.1.3** apply, replacing "examinations specified in **8.1.2(2), Part B of the Rules**" with "examinations specified in (1) to (4) of 5.-4 in **Table 2.8.1.3-1**". The provisions of **1.1.3-3(3)** apply to the calculation of the extension of the due date.

2 For required surveys completed within 3 *months* before the survey due date, the next period will start from the survey due date.

3 The Ordinary Survey specified in **8.1.1, Part 2 of the Rules** may be carried out upon request of the shipowner.

~~(1)~~4 ~~The carrying out of~~ In the case of keyless connections, it is recommended that either the Partial Survey, including survey items 2~~,~~ and 9 ~~and 10~~ specified in **Table 2.8.1**, **Part 2 of the Rules** ~~is recommended~~ or the Ordinary Survey specified in **8.1.1, Part 2 of the Rules** be carried out in cases where ~~the next survey due date will be earlier than~~ the date 18 *years* after the date of completion of the previous Partial ~~s~~Survey, ~~which included the~~ including survey items 2~~,~~ and 9 ~~and 10~~ specified in **Table 2.8.1**, **Part 2 of the Rules** or the previous Ordinary Survey is earlier than the next survey due date.

~~(2)~~5 In cases where the due date of the Partial Survey, including survey items 2 and 9 specified in **Table 2.8.1**, **Part 2 of the Rules**, or an Ordinary Survey is to be extended, the provisions of **1.1.3-3(1)(b)** apply, replacing "examinations specified in **8.1.2(2), Part 2 of the Rules**" with "examinations specified in (1) to (4) of 5.-4 in **Table 2.8.1.3-1**". In such cases, ~~N~~no further extension of the due date can be granted until such a Partial Survey or Ordinary Survey is completed. The provisions of **1.1.3-3(3)** apply to the calculation of the extension of the due date.

6 For the Partial Surveys specified in **8.1.2, Part 2 of the Rules** or the Ordinary Surveys specified in **8.1.1, Part 2 of the Rules** completed within 3 *months* before the due date, the next period will start from the due date.

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 14 June 2019.

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 1-2

Part 7 MACHINERY INSTALLATIONS

Chapter 2 DIESEL ENGINES

2.1 General

2.1.1 General

Sub-paragraph -4 has been added as follows.

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

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

1. The effective date of the amendments is 14 December 2019.

Amendment 1-3

Part 2 CLASS SURVEYS

Chapter 1 GENERAL

1.1 Surveys

1.1.2 Class Maintenance Surveys

Sub-paragraph -1(5) has been amended as follows.

1 Modifications and changes that are subject to Occasional Surveys referred to in **1.1.2-2(3), Part 2 of the Rules** are as specified in **(1)** through **(5)** below:
((1) to (4) are omitted.)
(5) Ships Using Low-flashpoint Fuels
(a) For ships that fall under the following ~~(a~~**i)** or ~~(b~~**ii)**, a survey is to be carried out to verify compliance with the requirements of **1.1.8, Part 1 of the Rules** before using low-flashpoint fuels or undertaking to use ~~below specified~~ different low-flashpoint fuels than specified~~.~~:
~~(a~~i) Ships which convert to using low-flashpoint fuels on or after 1 January 2017; or
~~(b~~ii) Ships which, on or after 1 January 2017, undertake to use low-flashpoint fuels different from those which ~~it was~~they were originally approved to use before 1 January 2017.
(b) For ships that fall under the following **i)** or **ii)**, a survey is to be carried out to verify compliance with the requirements of **GF11.3.1-1**, **GF11.3.1-2**, **GF12.5.2-2** and **GF15.10.1, Part GF of the Guidance for the Survey and Construction of Steel Ships**. before using low-flashpoint fuels or undertaking to use different low-flashpoint fuels than specified:
i) Ships which convert to using low-flashpoint fuels on or after 1 July 2019; or
ii) Ships which, on or after 1 July 2019, undertake to use low-flashpoint fuels different from those which they were originally approved to use before 1 July 2019.

EFFECTIVE DATE AND APPLICATION (Amendment 1-3)

1. The effective date of the amendments is 1 July 2019.

Amendment 1-4

Part 2 CLASS SURVEYS

Chapter 2 CLASSIFICATION SURVEYS

2.3 River Trials and Stability Experiments

2.3.1 River Trials

Sub-paragraph -1 has been amended as follows.

1 The Astern test required by **2.3.1-1(1), Part 2 of the Rules** is to be carried out in accordance with the following **(1)** ~~and~~ to **(~~2~~4)** below.

(1) While the ship is running ahead at maximum speed, 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. The elapsed time for the ship to stop after the full astern order, heading angle of the ship and stopping distance are to be measured. For ships that are unable to perform the test at maximum speed, the ship is to run ahead at not less than the speed of at least 90% of the ship speed corresponding to not less than 95% of the maximum continuous revolutions of the main engine. However, the measurements of the items regarding stopping ability may be dispensed with, provided that sufficient data is available from an astern test of a sister ship and subject to the special approval by the Society.

(2) 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. The ship is to be kept running astern until the astern speed (rotational speed in rpm) stabilizes and the performance is to be confirmed in accordance with **1.3.2, Part 7 of the Rules**.

(3) For low pressure gas-fuelled dual fuel engines, the confirmation specified in **(2)** is to be carried out for all operating modes (gas mode, diesel mode, etc.).

(4) To high pressure gas-fuelled dual fuel engines, the requirements for low pressure gas-fuelled dual fuel engines specified in **(3)** apply mutatis mutandis.

EFFECTIVE DATE AND APPLICATION (Amendment 1-4)

1. The effective date of the amendments is 1 July 2019.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to gas-fuelled engines for which the application for approval is submitted to the Society before the effective date.