Amendments to the Rules for Classification of Steel Ships

Pt. 5 Machinery Installations

2025. 9.

Machinery Rule Development Team

- Main Amendments -

(1) Ships contracted for construction on or after 2026/01/01

- ◉ Reflecting IACS UR M46 (Rev.4) adding reference requirements for inclination.
- ◉ Reflecting IACS UR M52 (Rev.3) to the requirements Aftmost propeller shaft bearing and Stern tube bearing/sealing device

(2) Ships contracted for construction or application for testing/certification is carried out on or after 2026/01/01

- ◉ Reflecting IACS UR M25 (Rev.5) about astern power for main propulsion
- ◉ Reflecting IACS UR M10 (Rev.5) to the requirements for construction/installation of crankcase.

Present

CHAPTER 1 GENERAL

Section 1 General

103. Construction, materials and installation

1. Inclinations and ship accelerations and motions

(1) **Inclincation** The construction, installation, lubricating system and cooling system of machinery are to be such that they cause no hindrance to their proper operations under the condition as given in Table 5.1.2. This Society may consider deviations from these angles of inclination, taking into consideration the type, size and service conditions of the ship.

Table 5.1.2 Angle of inclination

Type of machinery installations	Angle of inclination (deg)[2]			
	Athwart-ships		Fore-and-aft	
	Static	Dynamic	Static	Dynamic
Main and auxiliary machinery	15	22.5	5[4]	7.5
Safety equipment (emergency power installations, emergency fire pumps and their devices) Switch gear[1] (electrical and electronic appliances and remote control systems)	22.5[3]	22.5[3]	10	10

NOTES:

(1) No undesired switching operation or operational changes are to occur.

(2) Athwartships and fore-and-aft inclinations may occur simultaneously.

(3) In ships for the carriage of liquefied gases and of chemicals the emergency power supply must also remain operable with the ship flooded to a final athwartships inclination up to a maximum of 30 degrees.

(4) Where the length of the ship exceeds 100 m, the fore-and-aft static angle of inclination may be taken as 500/ degrees. (: Length of the ship as defined in **Part 3, Ch 1, 102.** of the Rules, m)

〈omitted〉

Amendment

CHAPTER 1 GENERAL

Section 1 General

103. Construction, materials and installation

1. Inclinations and ship accelerations and motions

(1) **Inclincation** The construction, installation, lubricating system and cooling system of machinery are to be such that they cause no hindrance to their proper operations under the condition as given in Table 5.1.2. This Society may consider deviations from these angles of inclination, taking into consideration the type, size and service conditions of the ship.

Table 5.1.2 Angle of inclination

Type of machinery installations	Angle of inclination (deg)[2]			
	Athwart-ships		Fore-and-aft	
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Main and auxiliary machinery	15	22.5	5[4]	7.5
Safety equipment (emergency power installations, emergency fire pumps and their devices) Switch gear[1] (electrical and electronic appliances and remote control systems)	22.5[3]	22.5[3]	10	10

NOTES:

(1) No undesired switching operation or operational changes are to occur.

(2) Athwartships and fore-and-aft inclinations may occur simultaneously.

(3) In ships for the carriage of liquefied gases and of chemicals the emergency power supply must also remain operable with the ship flooded to a final athwartships inclination up to a maximum of 30 degrees. (See Pt 7, Ch 5, 207. 2 (2), or Pt 7, Ch 6, 209. 3 (2) of the Rules)

(4) Where the length of the ship exceeds 100 m, the fore-and-aft static angle of inclination may be taken as 500/ degrees. (: Length of the ship as defined in **Part 3, Ch 1, 102.** of the Rules, m)

〈omitted〉

Present	Amendment
# CHAPTER 1 GENERAL ## Section 1 General **103. Construction, materials and installation** *(Omitted)* **5. Astern power for main propulsion** (1) In order to maintain sufficient maneuverability and secure control of the ship in all normal circumstances, the main propulsion machinery is to be capable of reversing the direction of thrust so as to bring the ship to rest from the maximum service speed. The main propulsion machinery is to be capable of maintaining in free route astern at least 70 % of the ahead revolutions corresponding to the maximum continuous ahead power. (2) For the main propulsion systems with reversing gears, controllable pitch propellers or electric propeller drive, running astern should not lead to the overload of propulsion machinery. *〈To be continued on next page〉*	# CHAPTER 1 GENERAL ## Section 1 General **103. Construction, materials and installation** *(Omitted)* **5. Astern power for main propulsion** (1) ~~In order to maintain sufficient maneuverability and secure control of the ship in all normal circumstances, the main propulsion machinery is to be capable of reversing the direction of thrust so as to bring the ship to rest from the maximum service speed. The main propulsion machinery is to be capable of maintaining in free route astern at least 70 % of the ahead revolutions corresponding to the maximum continuous ahead power.~~ The minimum astern power required by SOLAS II-1 / 28.1 to secure proper control of the ship in all normal circumstances is to be determined by the ship designer and is not to exceed the maximum permissible astern power (MPAP) for which the propulsion plant is designed. Astern trials are to be conducted in accordance with the provisions of ISO 19019:2005, section 5.4: Astern trials. (2) ~~For the main propulsion systems with reversing gears, controllable pitch propellers or electric propeller drive, running astern should not lead to the overload of propulsion machinery.~~ Where steam turbines are used for main propulsion, the astern trial is to demonstrate that they are to be capable of ~~maintaining~~ operating at their maximum permissible astern power (MPAP) ~~in free route astern at least 70% of the ahead revolutions corresponding to the maximum continuous ahead power~~ for a period of at least 15 minutes. The astern trial is to be limited to 30 minutes or in accordance with manufacturer's recommendation to avoid overheating of the turbine due to the effects of "windage" and friction. *〈To be continued on next page〉*

Present	Amendment
103. Construction, materials and installation	**103. Construction, materials and installation**
(Omitted)	*(Omitted)*
5. Astern power for main propulsion	**5. Astern power for main propulsion**
(3) Where steam turbines are used for main propulsion, they are to be capable of maintaining in free route astern at least 70 % of the ahead revolutions corresponding to the maximum continuous ahead power for a period of at least 15 minutes. The astern trial is to be limited to 30 minutes or in accordance with manufacturer's recommendation to avoid overheating of the turbine due to the effects of "windage" and friction.	(3) ~~Where steam turbines are used for main propulsion, they are to be capable of maintaining in free route astern at least 70 % of the ahead revolutions corresponding to the maximum continuous ahead power for a period of at least 15 minutes. The astern trial is to be limited to 30 minutes or in accordance with manufacturer's recommendation to avoid overheating of the turbine due to the effects of "windage" and friction.~~ ~~For the~~ Main propulsion systems with reversing gears, controllable pitch propellers or electric propeller drive are to be designed for the maximum permissible astern power, ~~running astern~~ which should not lead to the overload of propulsion machinery. (A) The designed maximum astern power, as referred to in **SOLAS II-1/3.15**, defining the maximum astern speed for the design of the main steering gear and rudder stock as per **SOLAS II-1/29.3.4** and **Rule Pt 4, Ch 1, 101**, shall not to be taken less than the MPAP.
(4) Main propulsion systems are to undergo tests to demonstrate the astern response characteristics. The tests are to be carried out at least over the manoeuvring range of the propulsion system and from all control positions. A test plan is to be provided by the yard and accepted by the surveyor. If specific operational characteristics have been defined by the manufacturer these shall be included in the test plan.	(4) ~~Main propulsion systems are to undergo tests to demonstrate the astern response characteristics.~~ The astern tests are to be carried out ~~at least over the manoeuvring range of the propulsion system and~~ from ~~all~~ control positions. A test plan is to be provided by the yard and accepted by the surveyor. If specific operational characteristics have been defined by the manufacturer these shall be included in the test plan.
(5) The reversing characteristics of the propulsion plant, including the blade pitch control system of controllable pitch propellers, are to be demonstrated and recorded during trials.	~~(5) The reversing characteristics of the propulsion plant, including the blade pitch control system of controllable pitch propellers, are to be demonstrated and recorded during trials.~~

Present	Amendment
# CHAPTER 2 MAIN AND AUXILIARY ENGINES ## Section 2 Reciprocating Internal Combustion Engines **202. Construction and installation** **1. - 5. 〈Omitted〉** **6. Lubricating oil arrangements** (1) Where the crankcases are of closed type, they are to be arranged so that the contained oil may be drained at any time. Lubricating oil drain pipes from the engine sump to the drain tank are to be submerged at their outlet ends. (2) Lubricating oil pipe lines are to be provided with a pressure gauge or other appropriate means at a suitable position to indicate that the proper circulation is maintained. (3) Lubricating devices for rotor shafts of exhaust gas turbochargers are to be designed so that the lubricating oil may not be drawn into the charging air.	# CHAPTER 2 MAIN AND AUXILIARY ENGINES ## Section 2 Reciprocating Internal Combustion Engines **202. Construction and installation** **1. - 5. 〈Omitted〉** **6. Lubricating oil arrangements** (1) Where the crankcases are of closed type, they are to be arranged so that the contained oil may be drained at any time. Lubricating oil drain pipes from the engine sump to the drain tank are to be continuously submerged at their outlet ends. (2) Lubricating oil pipe lines are to be provided with a pressure gauge or other appropriate means at a suitable position to indicate that the proper circulation is maintained. (3) Lubricating devices for rotor shafts of exhaust gas turbochargers are to be designed so that the lubricating oil may not be drawn into the charging air.

Present	Amendment
203. Safety devices	**203. Safety devices**
1. – 4. 〈Omitted〉	**1. – 4. 〈Omitted〉**
5. Ventilation of crankcase	**5. Ventilation of crankcase 【See Guidance】**
(1) Ventilation of crankcase, and any arrangement which could produce a flow of external air within the crankcase, is in principle not permitted except for dual fuel engines where crankcase ventilation is to be provided to prevent the accumulation of leaked gas.	(1) Ventilation of crankcase, and any arrangement which could produce a flow of external air ~~within~~ into the crankcase, is in principle not permitted except for ~~dual fuel~~ engines fueled with gas or low-flashpoint fuel, ~~where crankcase ventilation is to be provided to prevent the accumulation of leaked gas.~~ where it may be necessary to maintain the gas concentration in the crankcase below LEL provided.
(2) Crankcase ventilation pipes, where provided, are to be as small as practicable to minimize the in rush of air after a crankcase explosion.	(2) Crankcase ventilation pipes, where provided, are to be as small as practicable to minimize the in rush of air after a crankcase explosion.
(3) If a forced extraction of the oil mist atmosphere from the crankcase is provided (for mist detection purposes for instance), the vacuum in the crankcase is not to exceed 25 mm of water head.	(3) ~~If a forced extraction of the oil mist atmosphere from the crankcase is provided (for mist detection purposes for instance), the vacuum in the crankcase is not to exceed 25 mm of water head.~~ When forced extraction of crankcase atmosphere is provided, the crankcase pressure level is not to influence the reliable function of measurement and safety devices (such as oil mist detection) in the crankcase.
(4) To avoid interconnection between crankcases and the possible spread of fire following an explosion, crankcase ventilation pipes and oil drain pipes for each engine are to be independent of any other engine.	(4) To avoid interconnection between crankcases and the possible spread of fire following an explosion, crankcase ventilation pipes and oil drain pipes for each engine are to be independent of any other engine.
〈Newly added〉	**6.** For engines fuelled with gas or low-flashpoint fuel a detailed evaluation regarding the safety of crankcase is to be carried out justifying that: 1) either the gas concentration in the crankcase remains below the LEL without specific measures, or 2) the risk of a crankcase explosion is reduced through specific measures (see, for example, **5.** or **13.**).

Present	Amendment
	〈Following requirement number revised by newly inserting 203. 6.〉
6. Protective devices for scavenge manifolds (1) For crosshead type engines, scavenge spaces in open connection to the cylinders are to be connected to an fire extinguishing system, which is to be entirely separate from the fire extinguishing system of the engine room. (2) Scavenge spaces in open connection to the cylinders are to be provided with explosion relief valves for preventing an overpressure in the event of explosion and minimizing the possibility of injury to personnel.	**~~6.~~7. Protective devices for scavenge manifolds** (1) For crosshead type engines, scavenge spaces in open connection to the cylinders are to be connected to an fire extinguishing system, which is to be entirely separate from the fire extinguishing system of the engine room. (2) Scavenge spaces in open connection to the cylinders are to be provided with explosion relief valves for preventing an overpressure in the event of explosion and minimizing the possibility of injury to personnel.
7. Protection of starting air pipes The starting air mains are to be protected against the explosion arising from improper functioning of starting valves by the following arrangements: (1) An isolating non-return valve or equivalent thereto is to be provided at the starting air supply connection to each engine. (2) In direct reversing engines having a main starting manifold, a bursting disc or flame arrester is to be fitted at the starting valve on each cylinder; in non-reversing engines having a main starting manifold, at least one such device is to be fitted at the supply inlet to the starting air manifold on each engine. However, the above mentioned device may be omitted for engines having bore not exceeding 230 mm.	**~~7.~~8. Protection of starting air pipes** The starting air mains are to be protected against the explosion arising from improper functioning of starting valves by the following arrangements: (1) An isolating non-return valve or equivalent thereto is to be provided at the starting air supply connection to each engine. (2) In direct reversing engines having a main starting manifold, a bursting disc or flame arrester is to be fitted at the starting valve on each cylinder; in non-reversing engines having a main starting manifold, at least one such device is to be fitted at the supply inlet to the starting air manifold on each engine. However, the above mentioned device may be omitted for engines having bore not exceeding 230 mm.
8. Alarms of lubricating oil system Lubricating system to be used for main and auxiliary engines above 37 kW is to be provided with alarm devices which give visual and audible alarm in the event of failure of lubricating oil pressure supply or appreciable reduction in pressure of the lubricating oil supply.	**~~8.~~9. Alarms of lubricating oil system** Lubricating system to be used for main and auxiliary engines above 37 kW is to be provided with alarm devices which give visual and audible alarm in the event of failure of lubricating oil pressure supply or appreciable reduction in pressure of the lubricating oil supply.
9. Protection of high pressure fuel pipe All external high pressure fuel delivery lines between the high pressure fuel pumps and fuel injectors are to comply with the requirements specified in **Pt 8, Ch 2, 102. 5** (2).	**~~9.~~10. Protection of high pressure fuel pipe** All external high pressure fuel delivery lines between the high pressure fuel pumps and fuel injectors are to comply with the requirements specified in **Pt 8, Ch 2, 102. 5** (2).

Present	Amendment
10. Oil mist detection arrangements of crankcase (1) Following engines are to be provided with oil mist detection arrangements(or engine bearing temperature monitors or equivalent devices) obtained type approval. **【See Guidance】** *〈Omitted〉* *〈Newly added〉* **11. Alarms of exhaust gas turbocharger** For all turbochargers of Categories B and C, indications and alarms as listed in the **Table 5.2.2** are required. Indications may be provided at either local or remote locations	~~10.~~11. **Oil mist detection arrangements of crankcase** (1) Following engines are to be provided with oil mist detection arrangements(or engine bearing temperature monitors or equivalent devices) obtained type approval. **【See Guidance】** *〈Omitted〉* 12. Plans of showing details and arrangements of oil mist detection and alarm arrangements are to be submitted for approval in accordance with **Table 5.1.4** (item 26). **【See Guidance】** 13. Where it is proposed to use the introduction of inert gas into the crankcase to minimise a potential crankcase explosion, details of the arrangements are to be submitted to the classification society for consideration. **【See Guidance】** ~~11.~~14. **Alarms of exhaust gas turbocharger** For all turbochargers of Categories B and C, indications and alarms as listed in the **Table 5.2.2** are required. Indications may be provided at either local or remote locations

Present	Amendment
# CHAPTER 2 MAIN AND AUXILIARY ENGINES ## Section 2 Reciprocating Internal Combustion Engines **204. Crankshafts** **1. Application** The following requirements are to be applied to the crankshafts of reciprocating internal combustion engines. **2. Required diameter** The required diameter of crankpins or journals is not to be less than that given by the following formula: *〈omitted〉* **205. Dimensions of crank arms** **1. Solid shaft** For solid shafts, the thickness and breadth of crank arms are to comply with the following formula or the conditions shown in **Fig 5.2.1** in connection with the diameters of crankpin and journal. However, the thickness of crank arms is not to be less than 0.36 times the diameter of crankshaft. When the actual diameter of crankshaft is larger than the minimum required diameter of crankshaft, the left side of the following formula may be multiplied by 강값 강 . **【See Guidance】** *〈omitted〉*	# CHAPTER 2 MAIN AND AUXILIARY ENGINES ## Section 2 Reciprocating Internal Combustion Engines **204. Crankshafts** **1. Application** The following requirements are to be applied to the crankshafts of reciprocating internal combustion engines. **2. Required diameter** The required diameter of crankpins ~~or~~ and journals is not to be less than that given by the following formula: *〈omitted〉* **205. Dimensions of crank arms** **1. Solid shaft** For solid shafts, the thickness and breadth of crank arms are to comply with the following formula or the conditions shown in **Fig 5.2.1** in connection with the diameters of crankpin and journal. However, the thickness of crank arms is not to be less than 0.36 times the diameter of ~~crankshaft~~ crankpins and journals. When the actual diameter of crankshaft is larger than the minimum required diameter of crankshaft, the left side of the following formula may be multiplied by 강값 강 . **【See Guidance】** *〈omitted〉*

Present	Amendment
# CHAPTER 3 PROPULSION SHAFTING AND POWER TRANSMISSION SYSTEMS ## Section 2 Shaftings **206. Stern tube bearing and sealing device** **1.** The length of stern bearing in the stern tube or of strut bearing supporting the weight of propeller is to comply with the following requirements. (1) The bearings are to be type approved by the Society in their materials, construction and lubricating arrangements when rubber or synthetic materials are used. (2) For sea water lubricated bearings, the length of the bearing is to be not less than 4 times the required diameter of the shaft in way of the bearing. However when rubber or synthetic materials are used, where the material has been proven satisfaction of society through testing and operating experience, consideration may be given to an increased bearing pressure or a lessened bearing length. In this case, the length of the bearing is to be not less than 2 times the required diameter of the shaft in way of the bearing. *(2020)* (3) For oil lubricated bearings of white metal or synthetic materials, the length of the bearing is to be not less than 2 times the required diameter of the shaft in way of the bearing. The length of the bearing may be less provided the nominal bearing pressure is not more than 0.8 MPa as determined by static bearing reaction calculation taking into account shaft and propeller weight which is deemed to be exerted solely on the aft bearing divided by the projected area of the shaft. For oil lubricated bearings of synthetic materials, the length of the bearing may be less provided the nominal bearing pressure is not more than 0.6 MPa as determined by static bearing reaction calculation taking into account shaft and propeller weight which is deemed to be exerted solely on the aft bearing divided by the projected area of the shaft. However, the minimum length is to be not less than 1.5 times the actual diameter. **【See Guidance】** *〈Continuing on the next page〉*	# CHAPTER 3 PROPULSION SHAFTING AND POWER TRANSMISSION SYSTEMS ## Section 2 Shaftings **206. ~~Stern tube bearing and sealing device~~ Aftmost propeller shaft bearing, Stern tube bearing and sealing device** **1.** The length of stern bearing in the stern tube or of strut bearing supporting the weight of propeller is to comply with the following requirements. (1) The bearings are to be type approved by the Society in their materials, construction and lubricating arrangements when rubber or synthetic materials are used. ~~(2) For sea water lubricated bearings, the length of the bearing is to be not less than 4 times the required diameter of the shaft in way of the bearing. However when rubber or synthetic materials are used, where the material has been proven satisfaction of society through testing and operating experience, consideration may be given to an increased bearing pressure or a lessened bearing length. In this case, the length of the bearing is to be not less than 2 times the required diameter of the shaft in way of the bearing. *(2020)*~~ ~~(3) For oil lubricated bearings of white metal or synthetic materials, the length of the bearing is to be not less than 2 times the required diameter of the shaft in way of the bearing. The length of the bearing may be less provided the nominal bearing pressure is not more than 0.8 MPa as determined by static bearing reaction calculation taking into account shaft and propeller weight which is deemed to be exerted solely on the aft bearing divided by the projected area of the shaft. For oil lubricated bearings of synthetic materials, the length of the bearing may be less provided the nominal bearing pressure is not more than 0.6 MPa as determined by static bearing reaction calculation taking into account shaft and propeller weight which is deemed to be exerted solely on the aft bearing divided by the projected area of the shaft. However, the minimum length is to be not less than 1.5 times the actual diameter.~~ **【See Guidance】** *〈Continuing on the next page〉*

Present	Amendment
(4) The oil lubricated stern tube is always to be filled with oil and the lubricating oil is to be cooled by submerging the stern tube in the water of the after peak tank or by other suitable means. Means for ascertaining the temperature of the oil in the stern tube are also to be provided. Where a gravity tank supplying lubricating oil to the stern tube bearing is fitted, it is to be located above the load water line and provided with a low level alarm device. Adequate means are to be provided to supply ample amount of sea water for lubrication and cooling in the sea water lubricated stern tube.	~~(4) The oil lubricated stern tube is always to be filled with oil and the lubricating oil is to be cooled by submerging the stern tube in the water of the after peak tank or by other suitable means. Means for ascertaining the temperature of the oil in the stern tube are also to be provided. Where a gravity tank supplying lubricating oil to the stern tube bearing is fitted, it is to be located above the load water line and provided with a low level alarm device. Adequate means are to be provided to supply ample amount of sea water for lubrication and cooling in the sea water lubricated stern tube.~~ (2) For oil lubricated bearings of white metal, (A) The length of the bearing is to be not less than 2 times the required diameter of the shaft in way of the bearing. (B) The length of the bearing may be less provided the nominal bearing pressure is not more than 0.8 MPa as determined by static bearing reaction calculation taking into account shaft and propeller weight which is deemed to be exerted solely on the aft bearing divided by the projected area of the shaft. **【See Guidance】** (3) For oil lubricated bearings of synthetic materials, (A) The length of the bearing is to be not less than 2 times the required diameter of the shaft in way of the bearing. (B) The length of the bearing may be less provided the nominal bearing pressure is not more than 0.6 MPa as determined by static bearing reaction calculation taking into account shaft and propeller weight which is deemed to be exerted solely on the aft bearing divided by the projected area of the shaft. However, the minimum length is to be not less than 1.5 times the actual diameter. **【See Guidance】** (C) Where the material has proven satisfactory testing and operating experience, consideration may be given to an increased bearing pressure subject to the approval by the Society. (4) For sea water lubricated bearings, (A) The length of the bearing is to be not less than 4 times the required diameter of the shaft in way of the bearing. (B) However when synthetic materials are used, where the material has been proven satisfaction of the Society through testing and operating experience, consideration may be given to an increased bearing pressure or a lessened bearing length. In this case, the length of the bearing is to be not less than 2 times the required diameter of the shaft in way of the bearing.
〈Continuing on the next page〉	

Present	Amendment
(5) For grease lubricated bearings, the length of a grease lubricated bearing is to be not less than 4.0 times the required diameter of the shaft in way of the bearing. *(2021)* **2.** The sealing devices other than gland packing type sea water sealing device are to be type approved by the Society in their materials, construction and arrangement. **【See Guidance】** *〈Newly added〉*	(5) For grease lubricated bearings, the length of a grease lubricated bearing is to be not less than 4.0 times the required diameter of the shaft in way of the bearing. *(2021)* **2.** The sealing devices other than gland packing type sea water sealing device are to be type approved by the Society in their materials, construction and arrangement. **【See Guidance】** **3. Stern tube** (1) For oil lubricated stern tube, follow the below requirements; (A) The oil lubricated stern tube is always to be filled with oil. (B) The lubricating oil is to be cooled by submerging the stern tube in the water of the after peak tank or by other suitable means. Means for ascertaining the temperature of the oil in the stern tube are also to be provided. (C) Where a gravity tank supplying lubricating oil to the stern tube bearing is fitted, it is to be located above the load water line and provided with a low level alarm device. However, if the gravity tank is designed for a stern tube system where its static pressure is lower than the water pressure and does not cause any issues, it may be installed below the summer load waterline. (D) Means for ascertaining the temperature of the lubricating oil in the stern tube are to be provided. (2) For sea water lubricated stern tube, adequate means are to be provided to supply ample amount of sea water for lubrication and cooling.

Amendments to Guidance Relating to the Rules for the Classification of Steel Ships

Pt. 5 Machinery Installations

2025. 9.

Machinery Rule Development Team

- Main Amendments -

(1) Ships contracted for construction on or after 2026/01/01

- ◉ Reflecting IACS UR M52 (Rev.3) to the requirements Aftmost propeller shaft bearing and Stern tube bearing/sealing device
- ◉ Reflecting IACS UI SC306(New) to the requirements for the valve piercing collision bulkhead.

(2) Ships contracted for construction or application for testing/certification is carried out on or after 2026/01/01

- ◉ Updating reference clauses by reflecting IACS UR M10(Rev.5) in Pt 1 & Pt 5 Annex 5-7
- ◉ Reflecting IACS UR M10 (Rev.5) to the requirements for construction/installation of crankcase.
- ◉ Reflecting IACS UR P4 (Rev.4) to Annex 5-6.

Present	Amendment
# Pt. 1 Classification and Surveys ## CHAPTER 2 PERIODICAL AND OTHER SURVEYS *(2023)* ### Section 5-1 Special Survey (Machinery, Electrical Installations and Additional Installations) **502. Requirements of survey** **1.** In application to **502. 1** (1) (a) of the Rules, where total running hours for an internal combustion engine is confirmed and found in satisfactory by the Surveyor, the survey may be extended until next overhauling hours recommended by the manufacturer since the previous overhauling survey. However, the interval is not to exceed 5 years from the date of the previous overhauling survey. And the survey item of essential valves and valve arrangements are to be included the isolating non-return valve for starting air mains against explosion as specified in **Pt 5, Ch 2, 203.** 9 of the Rules. **【See Rule】** 〈Omitted〉	# Pt. 1 Classification and Surveys ## CHAPTER 2 PERIODICAL AND OTHER SURVEYS *(2023)* ### Section 5-1 Special Survey (Machinery, Electrical Installations and Additional Installations) **502. Requirements of survey** **1.** In application to **502. 1** (1) (a) of the Rules, where total running hours for an internal combustion engine is confirmed and found in satisfactory by the Surveyor, the survey may be extended until next overhauling hours recommended by the manufacturer since the previous overhauling survey. However, the interval is not to exceed 5 years from the date of the previous overhauling survey. And the survey item of essential valves and valve arrangements are to be included the isolating non-return valve for starting air mains against explosion as specified in **Pt 5, Ch 2, 203.** ~~9~~ 8 of the Rules. **【See Rule】** 〈Omitted〉

Present	Amendment
# Pt. 5 Machinery Installations # CHAPTER 2 MAIN AND AUXILIARY ENGINES ## Section 1 General **101. Application** **1.** In application to **101. 1** of the Rules, the small auxiliary engines may apply to the following; *(2017)* **【See Rule】** (1) For auxiliary engines having output of less than 100 kW driving generators (including emergency generator) or essential auxiliaries. (A) The submission of plans and documents may be omitted. However, plans or documents to confirm that the engines are comply with requirements in **Ch 1, 103. 1** and **Ch 2, 203. 9** of the Rules, are to be submitted to attending Surveyor. (B) Materials used in the main components may comply with *Korean Industrial Standards or equivalent.* (C) For tests except visual inspections of engine assembly and shop tests, if manufacturers carry out internal tests and submit test reports, the presence of the Surveyor may be omitted. (2) The requirements for the plans and documents, materials, tests of auxiliary engines driving cargo handling machinery are in accordance with **Pt 9, Ch 2** of the Rules. **2. Welding** In application to **101. 5** of the Rules, the general requirements for principal component with welded construction are to be comply with **Ch 5, Sec 4** of the Rules. **【See Rule】** **3. Electronically controlled reciprocating internal combustion engines** In application to **101. 7** of the Rules, the additional requirements specified otherwise by the Society are to be in accordance with **Annex 5-8**. **【See Rule】** 〈Omitted〉	# Pt. 5 Machinery Installations # CHAPTER 2 MAIN AND AUXILIARY ENGINES ## Section 1 General **101. Application** **1.** In application to **101. 1** of the Rules, the small auxiliary engines may apply to the following; *(2017)* **【See Rule】** (1) For auxiliary engines having output of less than 100 kW driving generators (including emergency generator) or essential auxiliaries. (A) The submission of plans and documents may be omitted. However, plans or documents to confirm that the engines are comply with requirements in **Ch 1, 103. 1** and **Ch 2, 203. ~~9~~ 10** of the Rules, are to be submitted to attending Surveyor. (B) Materials used in the main components may comply with *Korean Industrial Standards or equivalent.* (C) For tests except visual inspections of engine assembly and shop tests, if manufacturers carry out internal tests and submit test reports, the presence of the Surveyor may be omitted. (2) The requirements for the plans and documents, materials, tests of auxiliary engines driving cargo handling machinery are in accordance with **Pt 9, Ch 2** of the Rules. **2. Welding** In application to **101. 5** of the Rules, the general requirements for principal component with welded construction are to be comply with **Ch 5, Sec 4** of the Rules. **【See Rule】** **3. Electronically controlled reciprocating internal combustion engines** In application to **101. 7** of the Rules, the additional requirements specified otherwise by the Society are to be in accordance with **Annex 5-8**. **【See Rule】** 〈Omitted〉

Present	Amendment
Section 2 Reciprocating Internal Combustion Engines	**Section 2 Reciprocating Internal Combustion Engines**
203. Safety devices	**203. Safety devices**
1. In application to **203. 2** of the Rules, other acceptable means may be considered as follows. *(2021)* **【See Rule】** (1) Methods to prevent over pressure by tension of cylinder head bolts (2) Devices that activate the alarm and automatically stop or slow down the engine when cylinder overpressure occurs by installing cylinder pressure sensors capable of continuously monitoring (3) Other devices deemed appropriate by the Society	**1.** In application to **203. 2** of the Rules, other acceptable means may be considered as follows. *(2021)* **【See Rule】** (1) Methods to prevent over pressure by tension of cylinder head bolts (2) Devices that activate the alarm and automatically stop or slow down the engine when cylinder overpressure occurs by installing cylinder pressure sensors capable of continuously monitoring (3) Other devices deemed appropriate by the Society
2. In application to **203. 4** of the Rules, manual and name plate for relief valves of crankcase are to be in accordance with the following. **【See Rule】** *〈Omitted〉* *〈Newly added〉*	**2.** In application to **203. 4** of the Rules, manual and name plate for relief valves of crankcase are to be in accordance with the following. **【See Rule】**
	3. In application to **203. 5** (1) of the Rules, ventilation systems for the crankcase of engines fueled with gas or low-flashpoint fuel are to be arranged in accordance with the following. **【See Rule】** (1) It is demonstrated that the risk connected with a crankcase explosion is not increased by the ventilation system. (2) The operation of the ventilation system is monitored. (3) The automatic safety actions to be activated or the risk mitigation measures to be implemented in case of detection of a ventilation failure are specified by the engine manufacturer and justified in the safety concept of the engine.
	4. In application to **203. 5** (1) of the Rules, LEL means the Lower Explosive Limit, as defined in the paragraph 3.6.12 of **IEC 60079-10-1:2021**. The lowest applicable LEL of all possible gas or low flashpoint fuels, fuel vapours or mixture is to be considered. **【See Rule】**
〈Continuing on the next page〉	*〈Continuing on the next page〉*

Present	Amendment
3. In application to **203. 10** (1) of the Rules, bearing temperature monitors or equivalent devices are to be in accordance with the following. **【See Rule】** (1) Bearing temperature monitors of low speed reciprocating internal combustion engines are to be capable of monitoring temperature(or oil outlet temp.) of main bearing, crank bearing and crosshead bearing. (2) Bearing temperature monitors of medium and high speed reciprocating internal combustion engines are to be capable of monitoring temperature(or oil outlet temp.) of main bearing and crank bearing. (3) An equivalent device could be interpreted as measures applied to high speed engines where specific design features to preclude the risk of crankcase explosions are incorporated. *〈Newly added〉*	3. ~~3.~~ 5. In application to **203. ~~10~~11** (1) of the Rules, engine bearing temperature monitors or equivalent devices are to be in accordance with the following. **【See Rule】** ~~(1) Bearing temperature monitors of low speed reciprocating internal combustion engines are to be capable of monitoring temperature(or oil outlet temp.) of main bearing, crank bearing and crosshead bearing.~~ ~~(2) Bearing temperature monitors of medium and high speed reciprocating internal combustion engines are to be capable of monitoring temperature(or oil outlet temp.) of main bearing and crank bearing.~~ ~~(3) An equivalent device could be interpreted as measures applied to high speed engines where specific design features to preclude the risk of crankcase explosions are incorporated.~~ (1) For crosshead engines, "engine bearing" of the term includes at least journal and connecting rod bearings and the crosshead bearings. (2) For trunk piston engines, "engine bearing temperature monitors" may be accepted as an alternative to the oil mist detector only when the temperature of all bearings, including the piston pin bearings, are monitored. (3) "equivalent devices" includes measures applied to engines where specific design features to preclude the risk of crankcase explosion are incorporated, subject to appropriate by the Society. (4) The example of acceptable "temperature moniotrs or equivalent devices" are as the followings; (A) A temperature monitoring system of the bearing concerned (B) A bearing oil oulet temperature monitoring system (C) A splash oil temperature monitoring system (D) Measures applied to engines where specific design features to preclude the risk of crankcase explosions are incorporated, subject to appropriate by the Society.
4. In application to **203. 10** (1) of the Rules, where an overriding for automatic shutoff arrangements is installed, the documents on the consequences are to be submitted to this Society for approval. *〈Continuing on the next page〉*	4. ~~4.~~ 6. In application to **203. ~~10~~11** (1) of the Rules, where an overriding for automatic shutoff arrangements is installed, the documents on the consequences are to be submitted to this Society for approval. **【See Rule】** *〈Continuing on the next page〉*

Present	Amendment
5. In application to **203. 10** (2) of the Rules, the engine designer's and oil mist manufacturer's instructions are to be included the following particulars. **【See Rule】** (1) Schematic layout of engine oil mist detection and alarm system showing location of engine crankcase sample points and piping or cable arrangements together with pipe dimensions to detector. (2) Evidence of study to justify the selected location of sample points and sample extraction rate (if applicable) in consideration of the crankcase arrangements and geometry and the predicted crankcase atmosphere where oil mist can accumulate. (3) The manufacturer's maintenance and test manual.(A copy of the manual is to be provided on board ship.) (4) Information relating to type or in-service testing of the engine with engine protection system test arrangements having approved types of oil mist detection equipment.	5.~~6.~~7. In application to **203. ~~10~~11** (2) of the Rules, the engine designer's and oil mist manufacturer's instructions are to be included the following particulars. **【See Rule】** (1) Schematic layout of engine oil mist detection and alarm system showing location of engine crankcase sample points and piping or cable arrangements together with pipe dimensions to detector. (2) Evidence of study to justify the selected location of sample points and sample extraction rate (if applicable) in consideration of the crankcase arrangements and geometry and the predicted crankcase atmosphere where oil mist can accumulate. (3) The manufacturer's maintenance and test manual.(A copy of the manual is to be provided on board ship.) (4) Information relating to type or in-service testing of the engine with engine protection system test arrangements having approved types of oil mist detection equipment.
6. In application to **203. 10** (8) of the Rules, the details are to be submitted for consideration are to be in accordance with the following. **【See Rule】** (1) Engine particulars (type, power, speed, stroke, bore and crankcase volume, etc.) (2) Details of arrangements prevent the build up of potentially explosive conditions within the crankcase, e.g., bearing temperature monitoring, oil splash temperature, crankcase pressure monitoring, recirculation arrangements. (3) Evidence to demonstrate that the arrangements are effective in preventing the build up of potentially explosive conditions together with details of in-service experience. (4) Operating instructions and the maintenance and test instructions.	~~6.~~8. In application to **203. ~~10~~11** (8) of the Rules, the details are to be submitted for consideration are to be in accordance with the following. **【See Rule】** (1) Engine particulars (type, power, speed, stroke, bore and crankcase volume, etc.) (2) Details of arrangements prevent the build up of potentially explosive conditions within the crankcase, e.g., bearing temperature monitoring, oil splash temperature, crankcase pressure monitoring, recirculation arrangements. (3) Evidence to demonstrate that the arrangements are effective in preventing the build up of potentially explosive conditions together with details of in-service experience. (4) Operating instructions and the maintenance and test instructions.
〈Newly added〉	9. In application to 203. 12 of the Rules, arrangements and details of oil mist detection and alarm systems including evidence of studies justifying the selected location of sample points and the sample extraction rate(if applicable) from the crankcase and spaces in **203. 4** (8) of the Rules, supported by a confirmation from the manufacturer are to be submitted to the Society for reference. **【See Rule】**
〈Continuing on the next page〉	*〈Continuing on the next page〉*

Present	Amendment
〈Newly added〉	(1) As an alternative to the evidence of studies, an oil mist inlet test may be performed on a running engine. Test conditions such as setup, records or engine loads are to be agreed upon between engine designer, oil mist detector (OMD) manufacturer and respective class society. The test engine is to be chosen to demonstrate OMD arrangement suitability to cover a specified range of engine types and configurations. To allow a repeatable and comparable test, an oil mist generator. **10.** In application to **203. 13** of the Rules, where it is proposed to use the introduce inert gas into the crankcase to minimise a potential crankcase explosion, the details of arrangements are to be follow the **Annex 8-5** of the guidance. **【See Rule】**

Present

Annex 5-7 Reciprocating Internal Combustion Engines Fuelled by Natural Gas*(2025)*

Table 3 Monitoring and safety system functions for DF or GF engines

Monitored parameters [H=High L=Low O=Abnormal status]		Alarm	Automatic activation of the double block-and-bleed valves	Automatic switching over to oil fuel mode	Engine shutdown
Abnormal pressures in the gas fuel supply line	O	●	●	●	●
Gas fuel supply systems - malfunction	O	●	●	●	●
〈Omitted〉					

NOTES: [● = apply]
(1) - (5) 〈omitted〉
(6) Where required by **Ch 2, 203. 10** of the Rules
(7) Automatic safety actions to be activated as specified by the engine manufacturer.
(8) Only for trunk piston engines. This pressure sensor cannot replace or substitute a gas detector.
(9) Only for trunk piston engines. Slow down applies to crosshead engines.

Amendment

Annex 5-7 Reciprocating Internal Combustion Engines Fuelled by Natural Gas*(2025)*

Table 3 Monitoring and safety system functions for DF or GF engines

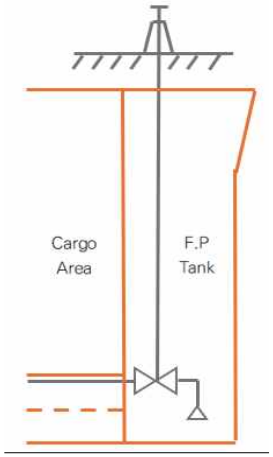
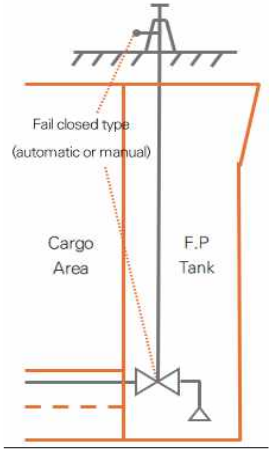
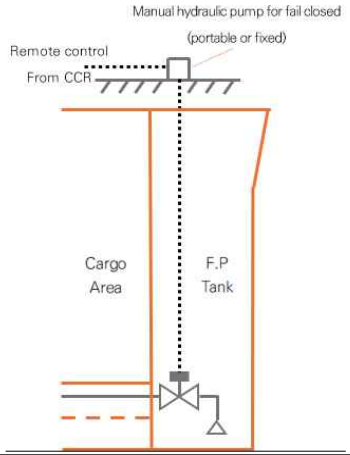
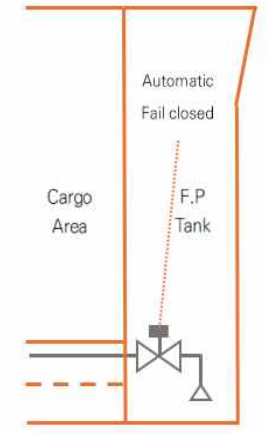
Monitored parameters [H=High L=Low O=Abnormal status]		Alarm	Automatic activation of the double block-and-bleed valves	Automatic switching over to oil fuel mode	Engine shutdown
Abnormal pressures in the gas fuel supply line	O	●	●	●	●
Gas fuel supply systems - malfunction	O	●	●	●	●
〈Omitted〉					

NOTES: [● = apply]
(1) - (5) 〈omitted〉
(6) Where required by **Ch 2, 203. ~~10~~ 11** of the Rules
(7) Automatic safety actions to be activated as specified by the engine manufacturer.
(8) Only for trunk piston engines. This pressure sensor cannot replace or substitute a gas detector.
(9) Only for trunk piston engines. Slow down applies to crosshead engines.

Present	Amendment
# CHAPTER 3 PROPULSION SHAFTING AND POWER TRANSMISSION SYSTEMS ## Section 2 Shaftings **206. Stern tube bearing and sealing device** **1.** In application to **206. 1.** (3) of the Rules, where the length of oil lubricated bearings is less than 2 times the required calculation diameter of the propeller shaft in way of the bearing, the following are to be satisfied with. **【See Rule】** (1) Improvement in condition of bearing loads The relative contact condition between propeller shaft and its bearing in the longitudinal direction is to be improved by employing the slope alignment (including the slope boring) and uniform distribution of bearing loads are to be ensured. For approval of the above, an slop alignment calculation sheet (bending moment, bending stress bearing pressure, bearing load, amount of deflection, angle of inclination, etc.) satisfying the following, and installation instruction is to be submitted. (A) The design of slop alignment is based on the static external force.(the review for shaft alignment variation due to dynamic external force such as bending moment, bending stress and other variation factors is above and beyond the requirements). (B) An absolute static bending moment value acting on any section of propeller shaft shall not exceed the absolute static moment value acting on the aft end of the stern tube bearing. 〈Omitted〉	# CHAPTER 3 PROPULSION SHAFTING AND POWER TRANSMISSION SYSTEMS ## Section 2 Shaftings **206. ~~Stern tube bearing and sealing device~~ Aftmost propeller shaft bearing, Stern tube bearing and sealing device** **1.** In application to **206. 1.** (2) and (3) of the Rules, where the length of oil lubricated bearings is less than 2 times the required calculation diameter of the propeller shaft in way of the bearing, the following are to be satisfied with. **【See Rule】** (1) Improvement in condition of bearing loads (A) Shaft alignment calculations and shaft alignment procedures are to be submitted for review, and the tests and inspections shall be satisfied, according to **Annex 5-12.** (B) If necessary, th relative the relative contact condition between propeller shaft and its bearing in the longitudinal direction is to be improved by employing the slope alignment (including the slope boring) and distribution of loads are to be ensured on bearings. ~~The relative contact condition between propeller shaft and its bearing in the longitudinal direction is to be improved by employing the slope alignment (including the slope boring) and uniform distribution of bearing loads are to be ensured. For approval of the above, an slop alignment calculation sheet (bending moment, bending stress bearing pressure, bearing load, amount of deflection, angle of inclination, etc.) satisfying the following, and installation instruction is to be submitted.~~ ~~(A) The design of slop alignment is based on the static external force.(the review for shaft alignment variation due to dynamic external force such as bending moment, bending stress and other variation factors is above and beyond the requirements).~~ ~~(B) An absolute static bending moment value acting on any section of propeller shaft shall not exceed the absolute static moment value acting on the aft end of the stern tube bearing.~~ 〈Omitted〉

Present	Amendment
# CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT ## Section 1 General **107. General requirements for piping arrangement** **1. -6. 〈Omitted〉** **7. Watertight Bulkhead 【See Rule】** (1) In application to **107. 8** of the Rules, suction pipes of the stern tank are to be fitted with stop valves at the fore side of the bulkhead. (2) In application to **107. 8.** (2) of the Rules, ships of less than 500 gross tonnage and engaged in under coastal services may be also loosened as follows. (A) The number of the pipe passing through the collision bulkhead may be not applied. (B) If it is not possible to install a screw down valve, a butterfly valve may be fitted. In this cases, a butterfly valve is to be of type with positive holding arrangements, or equivalents, that will prevent movement of the valve position due to vibration or flow of fluids. (3) *〈Omitted〉*	# CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT ## Section 1 General **107. General requirements for piping arrangement** **1. -6. 〈Omitted〉** **7. Watertight Bulkhead 【See Rule】** (1) In application to **107. 8** of the Rules, suction pipes of the stern tank are to be fitted with stop valves at the fore side of the bulkhead. ~~(2) In application to **107. 8.** (2) of the Rules, ships of less than 500 gross tonnage and engaged in under coastal services may be also loosened as follows.~~ ~~(A) The number of the pipe passing through the collision bulkhead may be not applied.~~ (2) In application to **107. 8** (2) of the Rules, it may be in accordance with the followings; (A) The valve fitted on the pipe piercing ship's collision bulkhead below the bulkhead deck of passenger ships and the freeboard deck of cargo ships may be either a deck standing manual type or a mechanically powered type with a fail-close arrangement. The valve of the fail-close arrangement shall be of an automatic fail-close type, or shall have an additional manual-closing function activate from a position above the bulkhead deck of passenger ships and the freeboard deck of cargo ships. Examples are provided as the below. (B) For ships of less than 500 gross tonnage and engaged in under coastal services, **107. 8** (2) of the Rules shall not be applied. (C) ~~(B) If it is not possible to install a screw down valve, a butterfly valve may be fitted. In this cases, a butterfly valve~~ In case a butterfly valve is installed, it is to be of type with positive holding arrangements, or equivalents, that will prevent movement of the valve position due to vibration or flow of fluids. (3) *〈Omitted〉*

Amendment

Type of arrangement	Example of valve installation	Type of arrangement	Example of valve installation
Case 1	Unacceptable	Case 2	Acceptable
- Manual deck stand controlled from the freeboard deck or bulkhead deck - When fail, the valve remains at its current position		- Manual deck stand controlled from the freeboard deck or bulkhead deck - Fail-close type valve (automatic close, or manual close from the freeboard deck or bulkhead deck) - Example of manual close Manual close shall be capable of being closed by a manual hydraulic pump activated from a position above the bulkhead deck/freeboard deck	
Case 3	Acceptable	Case 4	Acceptable
- Actuated mechanically and controlled remotely from cargo control room, etc. - Manual fail-close from abvoe the freeboard deck or bulkhead deck - Example of manual close Manual close shall be capable of being closed by a manual hydraulic pump activated from a position above the bulkhead deck/freeboard deck		- Actuated mechanically and controlled remotely from cargo control room, etc. - Automatic fail-close	

Present	Amendment
Annex 5-6 Plastic Piping System *(2023)*	**Annex 5-6 Plastic Piping System *(2023)***
6. Installation (1) - (6) *〈Omitted〉* (7) Penetration of divisions (A) Where plastic pipes pass through "A" or "B" class divisions, arrangements are to be made to ensure that the fire endurance is not impaired. These arrangements are to be tested in accordance with fire test procedures for "A" and "B" bulkheads specified in **Ch 3, 2604. 2** of the **"Guidance for Approval of Manufacturing Process and Type Approval, etc.".** (B) When plastic pipes pass through watertight bulkheads or decks, the watertight integrity of the bulkhead or deck is to be maintained. For pipes not able to satisfy the requirements in **4**.(1).(E), a metallic shut-off valve operable from above the freeboard deck should be fitted at the bulkhead or deck. (C) If the bulkhead or deck is also a fire division and destruction by fire of plastic pipes may cause the inflow of liquid from tanks, a metallic shut-off valve operable from above the freeboard deck is to be fitted at the bulkhead or deck. *〈Newly added〉* *〈Omitted〉*	**6. Installation** (1) - (6) *〈Omitted〉* (7) Penetration of divisions (A) Where plastic pipes pass through "A" or "B" class divisions, arrangements are to be made to ensure that the fire endurance is not impaired. These arrangements are to be tested in accordance with fire test procedures for "A" and "B" bulkheads specified in **Ch 3, 2604. 2** of the **"Guidance for Approval of Manufacturing Process and Type Approval, etc.".** (B) When plastic pipes pass through watertight bulkheads or decks, the watertight integrity of the bulkhead or deck is to be maintained. For pipes not able to satisfy the requirements in **4**.(1).(E), a metallic shut-off valve operable from above the freeboard deck should be fitted at the bulkhead or deck. (C) If the bulkhead or deck is also a fire division and destruction by fire of plastic pipes may cause the inflow of liquid from tanks, a metallic shut-off valve operable from above the freeboard deck is to be fitted at the bulkhead or deck. (D) For passenger ships, the penetrations used for the passage of plastic piping systems through a watertight bulkheads or decks shall be of a type approval in accordance with **Ch 3, Sec 41** of the **Guidance for Approval of Manufacturing Process and Type Approval, etc.** This requirement shall not apply to cable penetrations in watertight bulkheads and decks. *〈Omitted〉*

Amendments to the Rules for Classification of Steel Ships

Pt. 6 Electrical Equipment and Control Systems

2025. 9.

Machinery Rule Development Team

- Main Amendments -

(1) Ships contracted for construction on or after 2026/01/01

◉ IACS UI SC305(New Dec. 2024): Single essential propulsion components and their reliability

Present	Amendment
# CHAPTER 1 ELECTRICAL EQUIPMENT	# CHAPTER 1 ELECTRICAL EQUIPMENT
## Section 1 - 15 〈same as the present Rules〉	## Section 1 - 15 〈same as the present Rules〉
## Section 16 Electric Propulsion Unit	## Section 16 Electric Propulsion Unit
1601. - 1602. 〈same as the present Rules〉	1601. - 1602. 〈same as the present Rules〉
1603. Rotating machines *(2025)*	1603. Rotating machines *(2025)*
1. - 7. 〈same as the present Rules〉	1. - 7. 〈same as the present Rules〉
8. 〈newly added〉	8. Single essential propulsion components and their reliability (UI SC305) *(2026)* In accordance with SOLAS Regulation II-1/26.2, single essential propulsion components and their reliability shall comply with the following requirements. (1) The possibility of failures in electric machines shall be considered. Sufficient propulsion capacity shall be maintained or restored within due time for the following failure modes of electric machines, as a minimum: (A) winding insulation failures; and (B) excitation failures. (2) Single electric propulsion motors (both single and dual winding with a single rotor) for main propulsion shall not be considered to provide the reliability required for a single essential propulsion component. A separate propulsion unit sufficient to give the ship a navigable speed should be required for such arrangements. (3) Propulsion arrangements with two independent rotors on a single shaft shall be considered to provide the required reliability, provided it is possible to de-excite or de-flux each of the rotors individually and to supply independently the stators.
1604. - 1608. 〈same as the present Rules〉	1604. - 1608. 〈same as the present Rules〉
## Section 17 - 18 〈same as the present Rules〉	## Section 17 - 18 〈same as the present Rules〉

Amendments to Guidance Relating to the Rules for the Classification of Steel Ships

Pt. 6 Electrical Equipment and Control Systems

2025. 9.

Machinery Rule Development Team

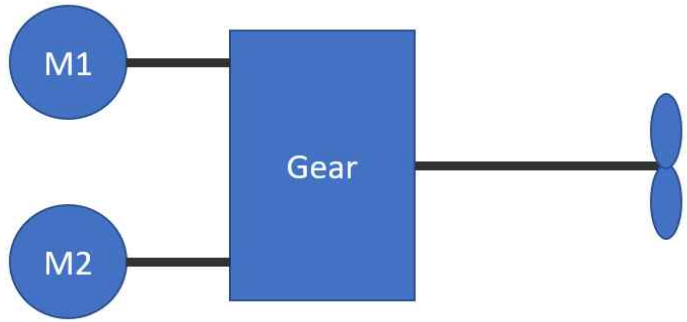
- Main Amendments -

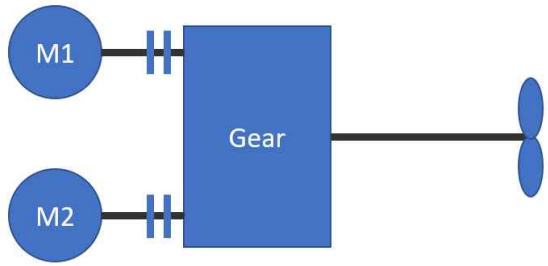
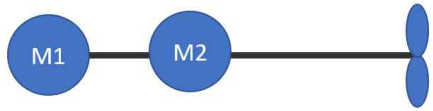
(1) Ships contracted for construction on or after 2026/01/01

◉ IACS UI SC11(Rev.2 Nov. 2024): Precautions against shock, fire and other hazards of electrical origin
◉ IACS UI SC305(New Dec. 2024): Single essential propulsion components and their reliability
◉ IACS UR E15(Rev.5 Jan. 2025): Electrical service required to be operable under fire conditions and fire resistant cables

Present	Amendment
CHAPTER 1 ELECTRICAL EQUIPMENT	**CHAPTER 1 ELECTRICAL EQUIPMENT**
Section 1 - 4 〈same as the present Rules〉	**Section 1 - 4 〈same as the present Rules〉**
Section 5 Cables *(2025)*	**Section 5 Cables *(2025)***
501. - 503. 〈same as the present Rules〉	**501. - 503. 〈same as the present Rules〉**
504. Installation of cables 【See Rule】	**504. Installation of cables 【See Rule】**
1. Precaution against fire protection	1. Precaution against fire protection
(1) - (2) 〈same as the present Rules〉	(1) - (2) 〈same as the present Rules〉
(3) In application to **504. 3** (3) of the Rules, the followings are to be complied with.	**(3) In application to 504. 3 (3) of the Rules, the followings are to be complied with.**
(A) 〈same as the present Rules〉	(A) 〈same as the present Rules〉
(B) In application to **504. 3** (3) of the Rules, the followings are to be complied with.	(B) ~~In application to **504. 3** (3) of the Rules, the followings are to be complied with.~~ Compliance with the requirements for cables and cable installation used for the purpose of (A) may be achieved by either of the following measures: *(2026)*
(a) Cables being of a fire resistant type complying with IEC 60331-1:2018 for cables of greater than 20 mm overall diameter, otherwise IEC 60331-21:1999+AMD1:2009 or IEC 60331-2:2018 for cables with an overall diameter not exceeding 20 mm, are installed and run continuous to keep the fire integrity within the high fire risk area. (see **Fig 6.1.7** of the Guidance) *(2022)*	(a) Cables being of a fire resistant type complying with IEC 60331-1:2018 for cables of greater than 20 mm overall diameter, ~~otherwise IEC 60331-21:1999+AMD1:2009 or~~ and IEC 60331-2:2018 for cables with an overall diameter not exceeding 20 mm, are installed and run continuous to keep the fire integrity within the high fire risk area. (see **Fig 6.1.7** of the Guidance) *(2022)*
(b) 〈same as the present Rules〉	(b) 〈same as the present Rules〉
Systems that are self monitoring, fail safe or duplicated with cable runs as widely separated as is practicable may be exempted.	~~Systems that are self monitoring, fail safe or duplicated with cable runs as widely separated as is practicable may be exempted.~~
	(c) Systems that are self monitoring, fail safe or duplicated with cable runs as widely separated as is practicable may be exempted.

Present	Amendment
(C) 〈same as the present Rules〉	**(C) 〈same as the present Rules〉**
(D) The definition for "high fire risk areas" is the following:	(D) The definition ~~for~~ of "high fire risk areas" is, at a minimuum, to be considered as follows: ~~the following:~~
(a) Machinery spaces as defined by **Pt 8, Ch 1, 103. 30** of the Rules, except spaces having little or no fire risk as defined by **Pt 8, Ch 7, 102. 3** (2) (B) ⑩ of the Rules.	(a) Machinery spaces as defined by **Pt 8, Ch 1, 103. 30** of the Rules, except spaces having little or no fire risk as defined by **Pt 8, Ch 7, 102. 3** (2) (B) ⑩ of the Rules. (Including the interpretations for tables 9.3, 9.4, 9.5, 9.6, 9.7 and 9.8 given in MSC/Circ.1120 as amended by MSC.1/Circ.1436 and MSC.1/Circ.1510)
(b) Spaces containing fuel treatment equipment and other highly flammable substances	(b) Spaces containing fuel treatment equipment and other highly flammable substances
(c) Galley and Pantries containing cooking appliances	(c) Galley and Pantries containing cooking appliances
(d) Laundry containing drying equipment	(d) Laundry containing drying equipment
(e) Spaces as defined by **Pt 8, Ch 7, 102. 3** (2) (B) ⑧, ⑫, ⑭ of the Rules for ships carrying more than 36 passengers	(e) ~~Spaces as defined by **Pt 8, Ch 7, 102. 3** (2) (B) ⑧, ⑫, ⑭ of the Rules for ships carrying more than 36 passengers~~ Cargo spaces except cargo tanks for liquids with flashpoint above 60°C and except cargo spaces exempted in accordance with SOLAS regulations II-2/10.7.1.2 or II- 2/10.7.1.4; and
	(f) Vehicle, ro-ro and special category spaces.
〈newly added〉	(E) In application to **504. 3** (2) of the Rules, the following spaces are to be as a minimum considered as "other high fire risk areas":
	(a) Cargo spaces except cargo tanks for liquids with flashpoint above 60°C and except cargo spaces exempted in accordance with SOLAS regulations II-2/10.7.1.2 or II- 2/10.7.1.4;
	(b) Vehicle, ro-ro and special category spaces;
	(c) Spaces containing flammable liquids; and
	(d) Pantries containing cooking appliances.
(E) - (F) 〈same as the present Rules〉	~~(E) - (F)~~ (F) - (G) 〈same as the present Rules〉
(4) 〈same as the present Rules〉	(4) 〈same as the present Rules〉
2. - 5. 〈same as the present Rules〉	**2. - 5. 〈same as the present Rules〉**
506. - 511. 〈same as the present Rules〉	**506. - 511. 〈same as the present Rules〉**

Present	Amendment
Section 6 - 15 〈same as the present Rules〉 **Section 16 Electric Propulsion Unit** **1603. 〈newly added〉**	**Section 6 - 15 〈same as the present Rules〉** **Section 16 Electric Propulsion Unit** **1603. Rotating Machines *(2026)*** **1.** In application to **1603. 8** of the Rules, examples of acceptable arrangements for roatating machines are illustrated in **Figures 6.1.8 to 6.1.10**.  **Fig 6.1.8 Asynchronous machines or machines that can be de-excited**

Present	Amendment
	 Fig 6.1.9 Permanent magnet machines with clutches  Fig 6.1.10 Asynchronous machines or machines that can be de-excited
1604. 〈same as the present Rules〉	1604. 〈same as the present Rules〉
Section 17 - 18 〈same as the present Rules〉	Section 17 - 18 〈same as the present Rules〉

Amendments to Guidance Relating to the Rules for the Classification of Steel Ships

Pt. 7 Ships of Special Service

2025. 9.

Machinery Rule Development Team

- Main Amendments -

(1) Ships contracted for construction on or after 2026/01/01

◉ MSC.1/Circ.1683 : UI for gas free arrangement reflected in Pt.7 Ch.1 & Ch.6

PART 7 Ships of Special Service

CHAPTER 1 1 Oil Tankers

Section 10 Piping Systems and Venting Systems for Oil Tankers

1001. General 【See Rule】

1. In case where double bottom used as other than cargo oil tank is provided below cargo oil tank, the requirements specified in **Sec 10** of the Rules and additionally the requirements specified in the following are to be complied with ;

(1) The air pipes and sounding pipes provided in double bottom may pass through cargo oil tanks. In this case, all pipe joints in the cargo oil tanks are to be of welded joints with a sufficient thickness according to the requirements of **Table 7.1.8.** Further, consideration is to be given to the piping arrangement for expansion and contraction of the pipes.

(2) Valve operating rods are not to pass through any part subjected to liquid head at all time, such as the inner bottom plate of the cargo tank.

(3) Pipes conveying liquid and bilge suction pipes for tank or void space at the forward position of the ship are to comply with the following requirements:

(A) Pipes for tank or void space adjacent to the forward end of cargo oil tank may be led to the aft pump room. Fuel oil transfer pipes may be led to the pump provided in the engine room.

(B) Pipes for forepeak tank or void space not adjacent to cargo oil tank may be led to the pump provided in the engine room or the pump to provided in the aft pump room. Where this tank used ballast tank, ballast pipe may be led to the pipes for ballast tank adjacent to the cargo oil tank

(C) Where ballast pipes are arranged without passing through cargo oil tanks, piping for fore peak ballast tanks not located adjacent to cargo oil tanks may be led to the pipe lines for ballast tanks located adjacent to cargo oil.(As for bilge pipes, the requirements of **1003. 1.** (3) of the Rules are to apply) To the contrary, however, ballast pipes for ballast tanks located adjacent to cargo oil tanks are not to be led to the pumps which are installed in the engine room for the use of the ballast tanks not located adjacent to cargo oil tanks.

Table 7.1.8 The sounding pipes and air pipes passing through cargo oil tanks

Nominal diameter(mm)	Thickness of pipe	Reference(1)
$A < 100$	8.7	Sch. 160
$100 \leq A < 200$	11.1	Sch. 120
$200 \leq A < 250$	12.7	Sch. 80
$250 \leq A$	15.1	Sch. 80

Note:
(1) Standard specified in *KSD* 3562 and *KSD* 3570

2. All cargo piping (including cargo tank venting piping, relief valve discharge piping, cargo tank purging and gas-freeing piping/ducts), except those serving for inerting gas supply and for bow or stern loading and unloading arrangement, should be arranged within the cargo areas, as defined in **Pt 8 Ch 1 103. 6** of the **Rules for the Classification of Steel Ships**.

Amendment

PART 7 Ships of Special Service

CHAPTER 1 Oil Tankers

Section 10 Piping Systems and Venting Systems for Oil Tankers

1002. Cargo oil pumps and cargo oil piping systems, pipings in cargo oil tank, etc.

〈Omitted〉

3. In application to **1002. 4** of the Rules, Piping systems to be connected to cargo oil piping are to be dealt with under the following requirements; **【See Rule】**

(1) Pumps and pipes in any piping system connected to cargo oil pipes are to be dealt with as those in the cargo oil piping system. However, for piping systems specified in **1002. 2** (4), **9** (6), **1003. 1** (2), **2** (2), Guidance **Pt 8. Appendix 8-5. 2** (10) (g) and item (2) below, this requirement may be dispensed with. The piping systems connected to cargo oil piping mean those connected to cargo oil pipes having openings thereto. Hence, for example, hydraulic oil pipes for the control of cargo oil piping system are not regarded as the piping system connected to the cargo oil piping.

(2) In case where the cargo oil piping system is connected to;

(A) Tank vent pipes : The requirements in Guidance **Pt 8. Appendix 8-5 2** (10)(g) & (h) are to be complied with. Ventilating fans except inert gas blowers, are to be installed within the ~~dangerous spaces.~~cargo area. ~~Where the ventilators are located in a enclosded non-hazardous area, it is to comply with the following requirements.~~ However, gas-freeing air-supply fan(s)/blower(s) and related air-supply piping/ducts may be located in the forecastle area, outside of the cargo area, subject to the requirements in **Pt 8 Ch 2 406. 3** of the Guidance. *(2025)*

~~a) The air supply piping from the ventilator is to have automatically actuated shut-off valve and non-return valve in series.~~

~~b) The valves of a) above are to be located at the bulkhead where the air supply piping leaves the non-hazardous area, with at least the non-return valve on the outside.~~

~~c) Shut-off valve is to be opened after the ventilator has started, and automatically closed after the ventilator has stopped. Procedures for the operation of ventilators and valves are to be posted near the place of operation.~~

~~d) The intake of the ventilator is to be derived from a safe place (eg open deck) outside the ventilated space.~~

~~e) Ventilators is to be of non-sparking type.~~

〈Continued〉

Amendment

PART 7 Ships of Special Service

CHAPTER 6 Ships Carrying Dangerous Chemicals in Bulk

Section 3 Ship Arrangements

301. Cargo segregation 【See Rule】

〈Omitted〉

3. Cargo piping

Cargo piping is not to pass through the spaces specified in **301. 3** of the Rules and, in addition, spaces such as fuel oil tanks, fresh water tanks and control stations.

4. In applying **301. 2**, **301. 4** and **305. 3** of the Rules, all cargo piping (including cargo tank venting piping, relief valve discharge piping, cargo tank purging and gas-freeing piping/ducts), except those serving for inerting gas supply and for bow or stern loading and unloading arrangement, should be arranged within the cargo areas, as defined in **Pt 8 Ch 1 103. 6** of the Rules and in **Pt 7 Ch 6 106. 6** of the **Rules for the Classification of Steel Ships**. However, gas-freeing air-supply fan(s)/blower(s) and related air-supply piping/ducts may be located in the forecastle area, outside of the cargo area, subject to the requirements in **Pt 8 Ch 2 406. 3** of the Guidance. *(2025)*

〈Omitted〉

Section 8 Cargo Tank Venting and Gas-freeing Arrangements

806. Cargo tank gas-freeing 【See Rule】

1. The method and instruction of cargo tank gas-freeing are to be described on the Cargo Operation Manual in detail. Where gas-freeing air-supply fan(s)/blower(s) and related air-supply piping/ducts are located in the forecastle area, outside of the cargo area, in accordance with the requirements in **Pt 8 Ch 2 406. 3** of the Guidance, procedures complying with **Pt 8 Ch 2 406. 3** (7) are to be included in the manual. *(2025)*

2. Openings for gas-freeing are to be arranged at places as far as at least the distance specified in **803.** or **1512.** of the Rules from all openings or air intakes of accommodation or service spaces.

Amendments to Guidance Relating to the Rules for the Classification of Steel Ships

Pt. 8 Fire Protection and Fire Extinction

2025. 9.

Machinery Rule Development Team

- Main Amendments -

(1) Ships contracted for construction on or after 2026/01/01

◉ MSC.1/Circ.1683 : UI for gas free arrangement reflected in Pt.8
◉ Reflecting MSC.1/Circ.1684 and IACS UI SC140(Rev.4) to Ch 9 Sec 5.

Amendment

PART 8 Fire Protection and Fire Extinction

CHAPTER 2 PROBABILITY OF IGNITION

Section 4 Cargo Areas of Tankers

406. Inerting, purging and gas freeing

1. In applying **406. 2** of the Rules, "the Guidance as provided separated" means **21** of **Annex 8-6.** special requirements of the Guidance. **【See Rule】**

2. In applying **406. 3** of the Rules, the outlets mentioned in (1) (2) (3) are to be located in compliance with **403. 4** (1) (C) of the Rules as far as the horizontal distance is concerned. **【See Rule】**

3. In applying **406. 1** of the Rules, all cargo piping (including cargo tank venting piping, relief valve discharge piping, cargo tank purging and gas-freeing piping/ducts), except those serving for inerting gas supply and for bow or stern loading and unloading arrangement, should be arranged within the cargo areas, as defined in **103. 6** of the Rules and in **Pt 7 Ch 6 106. 6** of the **Rules for the Classification of Steel Ships**. However, gas-freeing air-supply fan(s)/blower(s) and related air-supply piping/ducts may be located in the forecastle area, outside of the cargo area, subject to the followings. *(2025)* **【See Rule】**

   (1) The air-supply piping/ducts should not be permanently connected to cargo piping or cargo tank venting piping/ducts and additionally the following conditions should also be met.

      (a) the connection should be made with detachable connections (e.g. spool pieces, detachable ducts/hoses, etc.) and two shut-off valves fitted as specified in (b) below. Such detachable connections should be located within the cargo area.

      (b) a non-return valve should be provided within the cargo area at the cargo side (i.e. between the said detachable connection and cargo tank(s)). A shut-off valve should be fitted at the fan/blower side (i.e. between the said detachable connection and the fan(s)/blower(s)), and another shut-off valve should be fitted at the cargo side (i.e. between the said detachable connection and cargo tank(s)). The shut-off valve at the cargo side may or may not be located after the non-return valve and therefore, a single non-return valve with a positive means of closure can be located between the said detachable connection and cargo tank(s) in lieu of the combination of the said non-return valve and shut-off valve at the cargo side.

      (c) the shut-off valve at the fan/blower side should open after the air-supply fan(s)/blower(s) is/are started. This should be triggered/activated by the fan discharge pressure.

      (d) the shut-off valve at the fan/blower side should automatically close when the air-supply fan(s)/blower(s) is/are stopped or in the event of loss of gas freeing air pressure.

      (e) when the air-supply duct is arranged penetrating through the bulkhead facing the cargo area, the shut-off valve at the fan/blower side should be fitted directly on the bulkhead. This shut-off valve may or may not be located inside the fan/blower room. Alternatively, the shut-off valve at the fan/blower side may be fitted on the open deck apart from the bulkhead. In all cases, electrical parts (if any) of this shut-off valve should, if fitted in a hazardous area, be of certified safe type (Refer to IEC 60092-502-1999) for use in the concerned hazardous area (Zone 1 or Zone 2).

〈Continued〉

Amendment

(2) the part of the air-supply piping/duct from air intakes of the fan(s)/blower(s) till the shut-off valve at the fan/blower side, except the part necessary to extend into a hazardous area (depending on the location of this shut-off valve), should be arranged in a non-hazardous area. The air intakes for the gas-freeing fans/blowers should be located on the open deck and in a non-hazardous area.

(3) when not being used in gas-freeing operation, the said detachable connection should be dismantled, with all the openings closed with blank flanges; and a warning plate should be provided in the vicinity of each opening, stating "This opening is to be closed with a blank flange when not in gas-freeing operation".

(4) the air-supply fan(s)/blower(s), as well as the associated piping/ducts, should not be used for any other purpose.

(5) the air-supply fan(s)/blower(s) should be of the non-sparking type in accordance with **Pt 8 Ch 3 104.** of the **Rules for the Classification of Steel Ships**.

(6) electrical motor(s) driving the air-supply fan(s)/blower(s) should be of the explosionproof type when fitted in the duct or located- in the cargo area.

(7) suitable and clear operational procedures should be provided stating, inter alia:

(a) the flexible hose, detachable duct or spool piece can only be connected and fixed to the piping/duct just or within 10 minutes before the gas-freeing operation.

(b) the shut-off valves can only be opened after the air-supply fan(s)/blower(s) are put into operation and this action should be interlocked with the fan discharge pressure.

〈Continued〉

Present	Amendment
# CHAPTER 9 STRUCTURAL INTEGRITY	# CHAPTER 9 STRUCTURAL INTEGRITY
## Section 5 Protection of Cargo Tank Structure Against Pressure or Vacuum In Tankers	## Section 5 Protection of Cargo Tank Structure Against Pressure or Vacuum In Tankers
503. Safety measures in cargo tanks	**503. Safety measures in cargo tanks**
1. In applying **503. 2** of the Rules, a P/V breaker fitted on the IG main may be utilized as the required as the required secondary means of venting. Where the cargo is homogenous or for multiple cargoes where the vapours are compatible and do not require isolation. The height requirements of **Ch 2, 403. 4** & **502.** of the Rules and the requirements for devices to prevent the passage of flame of **Ch 2, 403. 3** are not applicable to the P/V breaker provided the settings are above those of the venting arrangements required by **501.** of the Rules. Where the venting arrangements are of the free flow type and the masthead isolation valve is closed for the unloading condition, the IG systems will serve as the primary underpressure protection with the P/V breaker serving as the secondary means. **【See Rule】**	1. ~~In applying **503. 2** of the Rules, a P/V breaker fitted on the IG main may be utilized as the required as the required secondary means of venting. Where the cargo is homogenous or for multiple cargoes where the vapours are compatible and do not require isolation. The height requirements of **Ch 2, 403. 4** & **502.** of the Rules and the requirements for devices to prevent the passage of flame of **Ch 2, 403. 3** are not applicable to the P/V breaker provided the settings are above those of the venting arrangements required by **501.** of the Rules. Where the venting arrangements are of the free flow type and the masthead isolation valve is closed for the unloading condition, the IG systems will serve as the primary underpressure protection with the P/V breaker serving as the secondary means. **【See Rule】**~~
2. Inadvertent closure or mechanical failure of the isolation valves required by **Ch 2, 403. 2** (2) of the Rules & **Annex 8-5, 2** (10) (B) need not be considered in established the secondary means where the cargo is homogenous or for multiple cargoes where the vapours are compatible and do not require isolation since the valves are operated under control of the responsible ships officer and a clear visual indication of the operational status of the valves, and the possibility of mechanical failure of the valves is remote to their simplicity.	2. ~~Inadvertent closure or mechanical failure of the isolation valves required by **Ch 2, 403. 2** (2) of the Rules & **Annex 8-5, 2** (10) (B) need not be considered in established the secondary means where the cargo is homogenous or for multiple cargoes where the vapours are compatible and do not require isolation since the valves are operated under control of the responsible ships officer and a clear visual indication of the operational status of the valves, and the possibility of mechanical failure of the valves is remote to their simplicity.~~
3. For ships that apply pressure sensors in each tank as an alternative secondary means of venting as per **503. 2** of the Rules, the setting of the over-pressure alarm is to be above the pressure setting of the P/V-valve and the setting of the under-pressure alarm is to be below the vacuum setting of the P/V-valve. The alarm settings are to be within the design pressures of the cargo tanks. The settings are to be fixed and not arranged for blocking or adjustment in operation. An exception is permitted for ships that carry different types of cargo and use P/V valves with different settings, one setting for each type of cargo. The settings may be adjusted to account for the different types of cargo.	1. ~~3.~~ For ships that apply pressure sensors in each tank as an alternative secondary means of venting as per **503. 2** of the Rules, the setting of the over-pressure alarm is to be above the pressure setting of the P/V-valve and the setting of the under-pressure alarm is to be below the vacuum setting of the P/V-valve. The alarm settings are to be within the design pressures of the cargo tanks. The settings are to be fixed and not arranged for blocking or adjustment in operation. An exception is permitted for ships that carry different types of cargo and use P/V valves with different settings, one setting for each type of cargo. The settings may be adjusted to account for the different types of cargo.**【See Rule】**

Amendments to KR Technical Rules

Rules for Ships Using Low-flashpoint Fuels

2025. 9.

Machinery Rule Development Team

- Main Amendments -

(1) Ships contracted for construction on or after 2026/01/01

◉ Reflecting Resolution.MSC.551(108) regarding IGF Code

Present	Amendment
CHAPTER 3 GENERAL REQUIREMENTS	**CHAPTER 3 GENERAL REQUIREMENTS**
Section 2 Risk Assessment	**Section 2 Risk Assessment**
201. Risk assessment	**201. Risk assessment**
2. For ships using natural gas as fuel, the risk assessment required by 1 need only be conducted where explicitly required by the followings:	2. For ships using natural gas as fuel, the risk assessment required by 1 need only be conducted where explicitly required by the followings:
(1) 1001. 5 and 1201. 3 of Ch 5	(1) 1001. 5 and 1201. 3 of Ch 5
(2) 401. 1 and 415. 4 (7) (B) of Ch 6	(2) 401. 1 and 415. 4 (7) (B) of Ch 6
(3) 301. 1 of Ch 8,	(3) 301. 1 of Ch 8, 402. of Ch 8,
(4) 401. 1 and 701. of Ch 13	(4) 401. 1 and 701. of Ch 13
(5) 801. 1 (10) of Ch 15	(5) 801. 1 (10) of Ch 15
(6) 104. 4 and 106. 8 of Annex 2	(6) 104. 4 and 106. 8 of Annex 2
CHAPTER 7 MATERIAL AND GENERAL PIPE DESIGN	**CHAPTER 7 MATERIAL AND GENERAL PIPE DESIGN**
Section 3 Pipe Design	**Section 3 Pipe Design**
302. Wall thickness	**302. Wall thickness**
1. The minimum wall thickness is to be calculated as follows:	1. The minimum wall thickness is to be calculated as follows:
$t = \frac{t_0 + b + c}{1 - \frac{a}{100}}$ (mm)	$t = \frac{t_0 + b + c}{1 - \frac{\lvert a \rvert}{100}}$ (mm)
[same]	[same]
a = negative manufacturing tolerance for thickness (%).	a = negative manufacturing tolerance for thickness (%). negative manufacturing tolerance for thickness (%), i.e. where a is the manufacturing tolerance of -5%, |a| is equal to 5 and shall be entered into the formula as 1- (5/100).

Present	Amendment
CHAPTER 8 BUNKERING	**CHAPTER 8 BUNKERING**
Section 4 Manifold	**Section 4 Manifold**
401. Manifold The bunkering manifold is to be designed to withstand the external loads during bunkering. The connections at the bunkering station are to be of dry-disconnect type equipped with additional safety dry break-away coupling/self-sealing quick release. The couplings are to be of a standard type.	**401. Manifold** The bunkering manifold shall be designed to withstand the external loads during bunkering. The connections at the bunkering station shall be arranged in order to achieve a dry-disconnect operation in one of the followings ways **1.** A dry-disconnect / connect coupling in accordance with a standard at least equivalent to those acceptable to the Organization **2.** A manual connect coupler or hydraulic connect coupler, used to connect the bunker system to the receiving vessel bunkering manifold presentation flange **3.** A bolted flange to flange assembly.
402. (New)	**402.** When intended to use either of the connections specified in paragraphs **Ch 8, 401. 2** and **401. 3** these shall be combined with operating procedures that ensure a dry-disconnect is achieved. The arrangement shall be subject to special consideration informed by a bunkering arrangement risk assessment conducted at the design stage and considering dynamic loads at the bunkering manifold connection to a recognized standard acceptable to the Administration, the safe operation of the ship and other hazards that may be relevant to the ship during bunkering operation. The fuel handling manual required by Ch.18 201.3 shall include documentation that the bunkering arrangement risk assessment was conducted, and that special consideration was granted under this requirement.
403. (New)	**403** An emergency release coupler (ERC) / Emergency Release System (ERS) or equivalent means shall be provided, unless installed on the bunkering supply side of the bunkering line, and the said means shall be in accordance with a standard equivalent to those acceptable to the Organization it shall enable a quick physical disconnection Ądry break-awayĄ of the bunker system in an emergency event."

Present	Amendment
# CHAPTER 9 FUEL SUPPLY TO CONSUMERS ## Section 3 Redundancy of Fuel Supply **301. Redundancy of fuel supply** 1. For single fuel installations the fuel supply system is to be arranged with full redundancy and segregation all the way from the fuel tanks to the consumer, so that a leakage in one system does not lead to an unacceptable loss of power.	# CHAPTER 9 FUEL SUPPLY TO CONSUMERS ## Section 3 Redundancy of Fuel Supply **301. Redundancy of fuel supply** **1.** For single fuel installations the fuel supply system shall be arranged with redundancy and segregation, so that a leakage in one system, or failure of one of the fuel supply essential auxiliaries, does not lead to an unacceptable loss of power. In the event of a leakage or failure, and in accordance with SOLAS regulation II-1/26.3, the Administration, having regard to overall safety considerations, may accept a partial reduction in propulsion capability from normal operation.
## Section 4 Safety Functions of Gas Supply System **401. Safety functions of gas supply system** 7. In cases where the master gas fuel valve is automatically shutdown, the complete gas supply branch downstream of the double block and bleed valve are to be automatically ventilated assuming reverse flow from the engine to the pipe. 8. There is to be one manually operated shutdown valve in the gas supply line to each engine upstream of the double block and bleed valves to assure safe isolation during maintenance on the engine.	## Section 4 Safety Functions of Gas Supply System **401. Safety functions of gas supply system** **7.** In cases where the master gas fuel valve is automatically shut down when the safety system as required in **Ch 15, 201. 2** is activated, the complete gas supply pipe between this master gas fuel valve and the double block and bleed valves and between the double block and bleed valves and the consumer shall be automatically vented. **8.** There shall be one manually operated shutdown valve in the gas supply line to each gas consumer upstream of the double block and bleed valves to assure safe isolation during maintenance on the gas consumer.

Present	Amendment
Section 6 Fuel Supply to Consumers in Gas-safe Machinery Spaces	**Section 6 Fuel Supply to Consumers in Gas-safe Machinery Spaces**
601. Fuel supply to consumers in gas-safe machinery spaces	**601. Fuel supply to consumers in gas-safe machinery spaces**
1. Fuel piping in gas-safe machinery spaces are to be completely enclosed by a double pipe or duct fulfilling one of the following conditions: 【See Guidance】 (1) the gas piping is to be a double wall piping system with the gas fuel contained in the inner pipe. The space between the concentric pipes is to be pressurized with inert gas at a pressure greater than the gas fuel pressure. Suitable alarms are to be provided to indicate a loss of inert gas pressure between the pipes. When the inner pipe contains high pressure gas, the system is to be so arranged that the pipe between the master gas valve and the engine is automatically purged with inert gas when the master gas valve is closed; or *(2) Same* *(3) Same*	1. Gas fuel piping in gas-safe machinery spaces are to be completely enclosed by a double pipe or duct fulfilling one of the following conditions: 【See Guidance】 (1) the gas fuel piping is to be a double wall piping system with the gas fuel contained in the inner pipe. The space between the concentric pipes shall be pressurized with inert gas at a pressure greater than the gas fuel pressure. Suitable alarms are to be provided to indicate a loss of inert gas pressure between the pipes; or *(2) Same* *(3) Same*
Section 8 Design of Ventilated Duct, Outer Pipe Against Inner Pipe Gas Leakage	**Section 8 Design of Ventilated Duct, Outer Pipe Against Inner Pipe Gas Leakage**
801. The design pressure of the outer pipe or duct The design pressure of the outer pipe or duct of fuel systems is not to be less than the maximum working pressure of the inner pipe. Alternatively for fuel piping systems with a working pressure greater than 1.0 MPa, the design pressure of the outer pipe or duct is not to be less than the maximum built-up pressure arising in the annular space considering the local instantaneous peak pressure in way of any rupture and the ventilation arrangements.	**801. The design pressure of the outer pipe or duct** The design pressure of the outer pipe or duct of fuel systems shall not be less than the maximum working pressure of the inner pipe. Alternatively, the design pressure of the outer pipe or duct may be calculated in accordance with **802.**

Present	Amendment
802. High-pressure fuel piping the design pressure of the ducting 1. For high-pressure fuel piping the design pressure of the ducting is to be taken as the higher of the following:	**802. The alternative design pressure of outer pipe or duct** 1. Alternatively to **801.**, the design pressure of the outer pipe or duct is to be taken as the higher of the following
804. Testing and Dimension of Ducts For low pressure fuel piping the duct is to be dimensioned for a design pressure not less than the maximum working pressure of the fuel pipes. The duct is to be pressure tested to show that it can withstand the expected maximum pressure at fuel pipe rupture.	**804. Testing ~~and Dimension~~ of Ducts** The duct is to be pressure tested to show that it can withstand the expected maximum pressure at fuel pipe rupture
CHAPTER 11 FIRE SAFETY **Section 6 Dry Chemical Powder Fire-extinguishing System**	**CHAPTER 11 FIRE SAFETY** **Section 6 Dry Chemical Powder Fire-extinguishing System**
601. Dry chemical powder fire-extinguishing system 2. In addition to any other portable fire extinguishers that may be required elsewhere in IMO instruments, one portable dry powder extinguisher of at least 5 kg capacity is to be located near the bunkering station.	**601. Dry chemical powder fire-extinguishing system** 2. In addition to any other portable fire extinguishers that may be required elsewhere in IMO instruments, one portable dry powder extinguisher of at least 5 kg capacity shall be located near the bunkering station and in the fuel preparation room.
CHAPTER 12 EXPLOSION PREVENTION **Section 5 Hazardous Area Zones**	**CHAPTER 12 EXPLOSION PREVENTION** **Section 5 Hazardous Area Zones**
501. Zone "0" Zone "0" includes, but is not limited to: 1. The interiors of fuel tanks 2. Pipes and equipment containing fuel 3. Any pipe work of pressure-relief or other venting systems for fuel tanks *4. (New)*	**501. Zone "0"** Zone "0" includes, but is not limited to: 1. The interiors of fuel tanks 2. Pipes and equipment containing fuel 3. Any pipe work of pressure-relief or other venting systems for fuel tanks 4. Interbarrier spaces as defined by **Ch 1, 102. 15 (2)**

Present	Amendment
502. Zone "1" This zone includes, but is not limited to: 1. tank connection spaces, fuel storage hold spaces(Fuel storage hold spaces for type C tanks are normally not considered as zone "1") and interbarrier spaces;	**502. Zone "1"** This zone includes, but is not limited to: 1. tank connection spaces, fuel storage hold spaces(Fuel storage hold spaces for type C tanks are normally not considered as zone "1") ~~and interbarrier spaces;~~
CHAPTER 15 CONTROL, MONITORING AND SAFETY SYSTEMS **Section 4 Bunkering and Liquefied Gas Fuel Tank Monitoring**	**CHAPTER 15 CONTROL, MONITORING AND SAFETY SYSTEMS** **Section 4 Bunkering and Liquefied Gas Fuel Tank Monitoring**
401. Level indicators for liquefied gas fuel tanks 3. Liquefied gas fuel tank liquid level gauges may be of the following types: (1) indirect devices, which determine the amount of fuel by means such as weighing or in-line flow metering; or (2) closed devices, which do not penetrate the liquefied gas fuel tank, such as devices using radio-isotopes or ultrasonic devices; *(3) (new)*	**401. Level indicators for liquefied gas fuel tanks** **3.** Liquefied gas fuel tank liquid level gauges may be of the following types: (1) indirect devices which determine the amount of fuel by means such as weighing or in-line flow metering; or (2) closed devices which do not penetrate the liquefied gas fuel tank, such as devices using radio-isotopes or ultrasonic devices; (3) closed devices which penetrate the liquefied gas fuel tank but which form part of a closed system and keep the gas fuel from being released. Such devices shall be considered as tank connections. If the closed gauging device is not mounted directly onto the tank, it shall be provided with a shut-off valve located as close as possible to the tank
CHAPTER 18 OPERATION **Section 4 Regulations for Bunkering Operations**	**CHAPTER 18 OPERATION** **Section 4 Regulations for Bunkering Operations**
401. Responsibilities 1. Before any bunkering operation commences, the master of the receiving ship or his representative and the representative of the bunkering source (Persons In Charge, PIC) shall: (1) agree in writing the transfer procedure, including cooling down and if necessary, gassing up; the maximum transfer rate at all stages and volume to be transferred;	**401. Responsibilities** 1. Before any bunkering operation commences, the master of the receiving ship or his representative and the representative of the bunkering source (Persons In Charge, PIC) shall: (1) agree in writing the transfer procedure, including cooling down and if necessary, gassing up; the maximum transfer rate at all stages; minimum and maximum limiting transfer pressure and temperature; bunkering line PRVs settings; and volume to be transferred

Amendments to KR Technical Rules

Guidance for Prevention Systems of Pollution from Ships

2025. 9.

Machinery Rule Development Team

- Main Amendments -

(1) Ships contracted for construction on or after 2026/01/01

◉ Incorporation of IACS UR M86 (Nov. 2024) Revision of monitoring and safety requirements related to EGCS (Exhaust Gas Cleaning System)
◉ Amendment to para. 205. 3. (2), Sec. 2 of Ch. 2 to align the Korean and English texts.
◉ Amendment to correct reference clauses for para. 303, Sec. 3 of Ch. 3 and para. 104, Sec. 1 of Ch. 7.

Present	Amendment
# CHAPTER 2 Nitrogen oxide Emission Abatement Systems ## Section 2 Selective Catalytic Reduction(SCR) system **205. Handling urea solution as reductant agent** **3. Piping system and venting system of urea solution storage tank** (1) The reductant piping and venting systems are to be independent of other ship service piping and/or systems. Reductant piping systems are not to be located in accommodation, service spaces, or control stations. The vent pipes of the storage tank are to terminate in a safe location on the weather deck and the tank venting system is to be arranged to prevent entrance of water into the urea tank. (2) Reductant tanks are to be of steel or other equivalent material with a melting point above 925℃. Pipes/piping systems are to be of steel or other equivalent material with melting point above 925℃, except downstream of the tank valve, provided this valve is metal seated and arranged as fail-to-closed or with quick closing from a safe position outside the space in the event of fire; in such case, type approved plastic piping may be accepted even if it has not passed a fire endurance test. Reductant tanks and pipes/piping systems are to be made with a material compatible with reductant or coated with appropriate anti-corrosion coating. (2020) (3) Material requirement "to be of steel or other equivalent material" in (2) with a melting point	# CHAPTER 2 Nitrogen oxide Emission Abatement Systems ## Section 2 Selective Catalytic Reduction(SCR) system **205. Handling urea solution as reductant agent** **3. Piping system and venting system of urea solution storage tank** (1) The reductant piping and venting systems are to be independent of other ship service piping and/or systems. Reductant piping systems are not to be located in accommodation, service spaces, or control stations. The vent pipes of the storage tank are to terminate in a safe location on the weather deck and the tank venting system is to be arranged to prevent entrance of water into the urea tank. (2) Reductant tanks and pipes/piping systems are to be of steel or other equivalent material with a melting point above 925℃. ~~Pipes/piping systems are to be of steel or other equivalent material with melting point above 925℃, except downstream of the tank valve, provided this valve.~~If the tank valve is metal seated and arranged as fail-to-closed or with quick closing from a safe position outside the space in the event of fire.~~; in such case, type approved plastic piping may be accepted~~ this requirement does not apply to the downstream of the tank valve. In such cases, type-approved plastic piping located downstream of the tank valve may be exceptionally accepted even if it has not passed a fire endurance test. Reductant tanks and pipes/piping systems are to be made with a material compatible with reductant or coated with appropriate anti-corrosion coating. (2026) (3) Material requirement "to be of steel or other equivalent material" in (2) with a melting point

Present	Amendment
CHAPTER 3 Sulphur oxide Emission Abatement Systems	**CHAPTER 3 Sulphur oxide Emission Abatement Systems**
Section 2 Exhaust Gas Cleaning(EGC) system	**Section 2 Exhaust Gas Cleaning(EGC) system**
(...)	(...)
205. EGC System Configuration	**205. EGC System Configuration**
(...)	(...)
3. Redundancy (Applicable when only the "CEmS-EGC(R)" class notation)	**3. Redundancy (Applicable when only the "CEmS-EGC(R)" class notation)**
(1) Redundancy of equipment is to be provided for those rotating and reciprocating components that form part of the EGC essential supplementary systems, such as pumps, fans, blowers, etc.	(1) Redundancy of equipment is to be provided for those rotating and reciprocating components that form part of the EGC essential supplementary systems, such as pumps, fans, blowers, etc.
(...)	(...)
(6) If the Society considers that the redundancy of the pump and blower (including the exhaust fan) required above is acceptable to the Society, the provision of spare parts made up of rotating parts, including motors and bearings may be permitted.	(6) If the Society considers that the redundancy of the pump and blower (including the exhaust fan) required above is acceptable to the Society, the provision of spare parts made up of rotating parts, including motors and bearings may be permitted.
4. Exhaust gas by-pass/dry operation	**4. Exhaust gas by-pass/dry operation**
EGC units that incorporate a wet washwater scrubbing process are to be capable of being operated without the washwater system in operation or are to be installed with an exhaust bypass arrangement or changeover system to enable continued operation of the fuel oil combustion machinery in the event the exhaust emission abatement system is not in operation, either through operational selection or equipment failure. As applicable, evidence of material suitability is to be submitted for dry running of SOx scrubbers. Such a device may not be required if the flow of unrestricted exhaust gas is ensured and there is no risk of a failure that results in the stop of the oil burning machinery.	EGC units that incorporate a wet washwater scrubbing process are to be capable of being operated without the washwater system in operation or are to be installed with an exhaust bypass arrangement or changeover system to enable continued operation of the fuel oil combustion machinery in the event the exhaust emission abatement system is not in operation, either through operational selection or equipment failure. As applicable, evidence of material suitability is to be submitted for dry running of SOx scrubbers. Such a device may not be required if the EGCS is designed for dry operation, the flow of unrestricted exhaust gas is ensured, and there is no risk of a failure that results in the stop of the oil burning machinery.

Present	Amendment
207. EGC System Piping **1. Exhaust Gas Piping Systems** (1) Exhaust Gas Piping/Scrubber Materials (...) (2) Exhaust Gas Piping Valves (A) Valves used in the EGC system are to comply with the relevant requirements specified in Pt 5, Ch 6 of the Rules for the Classification of Steel Ships. The valves are to be constructed of corrosion resistant materials and the valves located at the front of the SOx scrubber may be the same material as the valve of the the oil burning machinery. (B) Isolation and bypass valves used in EGC system exhaust piping systems are to prevent the passage of exhaust gases to other fuel oil combustion machinery or machinery spaces. Where bypass arrangements for the SOx scrubber unit are provided, the isolation and bypass valves are to be arranged in an interlocked, fail safe manner, such that free flow of exhaust gases to the atmosphere at all times is possible, either through the scrubber unit or through the bypass. Bypass valves are to be provided with a local position indicator. (C) Valves are to be installed in accessible locations, clear of or protected from obstructions, moving equipment, and hot surfaces, in order to permit regular inspection and periodic servicing.	**207. EGC System Piping** **1. Exhaust Gas Piping Systems** (1) Exhaust Gas Piping/Scrubber Materials (...) (2) Exhaust Gas Piping Valves (A) Valves/dampers used in the EGC system are to comply with the relevant requirements specified in Pt 5, Ch 6 of the Rules for the Classification of Steel Ships. The valves are to be constructed of corrosion resistant materials and the valves located at the front of the SOx scrubber may be the same material as the valve of the the oil burning machinery. (B) Isolation and bypass valves/dampers used in EGC system exhaust piping systems are to prevent the passage of exhaust gases to other fuel oil combustion machinery or machinery spaces. Where bypass arrangements for the SOx scrubber unit are provided, the isolation valves/dampers and bypass valves/dampers are to be arranged in an interlocked, fail safe manner, such that free flow of exhaust gases to the atmosphere at all times is possible, either through the scrubber unit or through the bypass. Bypass valves are to be provided with a local position indicator. (C) In installations with individually controlled bypass and uptake dampers, an interlock is required to prevent both dampers from being closed at the same time. The interlock can comprise a pressure sensor upstream of the dampers, interfaced to the EGCS safety system, opening the bypass damper in case of high back pressure. (~~C~~D) Valves are to be installed in accessible locations, clear of or protected from obstructions, moving equipment, and hot surfaces, in order to permit regular inspection and periodic servicing.

Present	Amendment
208. System Design **1. General** (1) The EGC control system is to be integrated with, or in direct communication with, the engine control system. (2) The system is to be designed such that a single fault of a component will not lead to a potentially dangerous situation for human safety and the vessel. Data describing the identification of hazards associated with the design and operation of the exhaust gas cleaning system and the means of safeguard or control is to be submitted.	**208. System Design** **1. General** (1) The EGC control system is to be integrated with, or in direct communication with, the engine control system. (2) The system is to be designed such that a single fault of a component will not lead to a potentially dangerous situation for human safety and the vessel. ~~Data describing the identification of hazards associated with the design and operation of the exhaust gas cleaning system and the means of safeguard or control is to be submitted.~~ An FMEA, or equivalent, demonstrating the safety system design basis is to be submitted to the Society, when the control system is connected to an integrated control system of a vessel. (3) For vessels with unmanned propulsion machinery space, the alarm and monitoring systems of the EGCS can be integrated in the vessel's centralized monitoring systems.

Present	Amendment
3. Safety Shutdown System (1) An independent shutdown system is to be provided. The automatic safety shutdown system is to be based on the following: (A) Means are to be provided to indicate the parameters causing shutdown. (B) Upon activation of the safety shutdown system, alarms are to be given at the normal control position and at the local control position. (C) In the event where shutdown by the safety shutdown system is activated, the restart should not occur automatically, unless after the system is reset manually. (2) Monitoring and safety shutdowns are to be in accordance with **Table 3.2.3** of this Section.	**3. Safety Shutdown System** (1) An independent shutdown system is to be provided to ensure that failures or malfunctions in the control and alarm systems do not impair the operation of the safety system.. The automatic safety shutdown system is to be based on the following: ~~(A) Means are to be provided to indicate the parameters causing shutdown.~~ ~~(B) Upon activation of the safety shutdown system, alarms are to be given at the normal control position and at the local control position.~~ (A) Upon activation of the safety shutdown system, visual and audible alarms are to be indicated at both the local and remote control positions. Visual alarms are to include a means of indicating the parameters causing shutdown. (B) In addition to the automatic shutdown system, manual emergency shutdown arrangements are to be provided at both the local and remote the control positions. (C) In the event where shutdown by the safety shutdown system is activated, the restart should not occur automatically, unless after the system is manually reset ~~manually.~~ (2) Monitoring and safety shutdowns are to be in accordance with **Table 3.2.3** of this Section, and the safety shutdown is to be automatically activated under the conditions specified therein.

Present

Table 3.2.3 Monitoring and Safety System Functions for EGC Systems *(2020)*

Parameters	Display	Alarm activated	Automatic Shutdown
EGC exhaust fan/blower motors	Run	Stop	
EGC exhaust bypass, isolation, mixing valves, where provided	Position		
Exhaust gas temperature after EGC unit(except if dry running can be used)	●	H	
Differential pressure across EGC scrubber unit or EGC circuit or pressure before EGC unit(except if dry running can be used)	●	H	HH
EGC washwater pumps, alkali system pumps or dry system supply device	Run	Stop	
EGC washwater and alkali system supply pressure	●	L	
EGC washwater system supply temperature(Closed/Hybrid type)	●	H	
EGC alkali system supply temperature	●	L/H	
Water level in EGC scrubber	●	H	HH
Alkali storage tank temperature		L/H	
Alkali storage tank level	●	L/H	
Alkali system drip tray level		H	
EGC residue tank level	●	H	
Power supply fail of control, alarm, monitoring or safety device		Fail	

Amendment

Table 3.2.3 Monitoring and Safety System Functions for EGC Systems *(2020)*

	Group 1		Group 2
Parameters	Display	Alarm activated	Automatic Shutdown and EGC bypass(1)
EGC exhaust fan/blower motors(3)	Run	Stop	
EGC exhaust bypass, isolation, mixing valves, where provided	Position(4)		
Exhaust gas temperature after EGC unit(except if dry running can be used)	●	H	●(HH)
Differential pressure across EGC scrubber unit or EGC circuit or pressure before EGC unit(2)(except if dry running can be used)	●	H	HH
EGC washwater pumps, Chemical treatment fluid (Alkali) system pumps or dry system supply device	Run	Stop	
EGC washwater and chemical treatment fluid (Alkali) system supply pressure	●	L	
EGC washwater system supply temperature(Closed/Hybrid type)	●	H	
EGC Chemical treatment fluid (Alkali) system supply temperature	●	L/H	
Water level in EGC scrubber	●	H	HH
Chemical treatment fluid (Alkali) storage tank temperature		L/H(5)	
Chemical treatment fluid (Alkali) storage tank level	●	L/H(5)	
~~Alkali system drip tray level~~ Chemical treatment fluid leakage detection in system drip tray or drain / residue tank		H(6)	
~~EGC residue tank level~~	●	~~H~~	
Power supply fail of control, alarm, monitoring or safety device		Fail	

Gr.1 Common sensor for indication and alarm, Gr.2 Sensor for shut down and bypass

Notes
(1) Automatic stopping of all EGCS pumps. Automatic bypass of the EGC unit is required when the EGC unit is not suitable for operation in the dry condition.
(2) As applicable in accordance with the specific EGC system design and installation.
(3) If applied.
(4) See 207.1.(2) of Sec 2.
(5) 207.1.(2) 6 of Sec 3.
(6) If necessary, 207.3(4) of Sec 3.

Present	Amendment
# CHAPTER 7 Onboard Carbon Capture and Storage system ## Section 1 General **104. Plans and Documents** (...) **2. Plans and Documents for approval** (1) General arrangement of OCCS system (2) Specification of OCCS system (3) Analysis for compatibility with fuel consumers (incl. **404. 3** (2))	# CHAPTER 7 Onboard Carbon Capture and Storage system ## Section 1 General **104. Plans and Documents** (...) **2. Plans and Documents for approval** (1) General arrangement of OCCS system (2) Specification of OCCS system (3) Analysis for compatibility with fuel consumers (incl. 304 ~~**404. 3** (2)~~)

Amendments to KR Technical Rules

Guidance for Approval of Manufacturing Process and Type Approval, etc.

2025. 9.

Machinery Rule Development Team

- Main Amendments -

(1) Application date for type approval certification on or after 2026/01/01

◉ Updating reference clauses reflecting IACS UR M10(Rev.5)
◉ IACS UR E10(Rev.10 Aug. 2024): Test specification for type approval
◉ Deleted reference clauses and requriements related to the type approval of propeller shaft aftmost bearing
◉ Reflecting IACS UR M85(New) to Ch 3 Sec 42 about Type approval of propeller shaft aftmost bearing

Present	Amendment
# CHAPTER 3 TYPE APPROVAL ## Section 10 Crankcase Oil Mist Detection and Alarm Equipment **1003. Design requirements** Oil mist detection arrangements are to be designed and fitted in accordance with the following requirements. (1) The oil mist detection arrangements are to be installed in accordance with the engine designer's and oil mist manufacturer's instructions and recommendations. Items and contents to be included in the instructions and recommendations are to comply with the requirements in **Pt 5, Ch 2, 203.** 10 of the Guidance relating to the Rules. (2) Alarms and shutdowns for the oil mist detection arrangements and the system arrangements are to be in accordance with the requirements in **Pt 9, Ch 3, Sec 3.** (3) Where sequential oil mist detection arrangements are provided the sampling frequency and time is to be as short as reasonably practicable. (4) The oil mist detection arrangements are to provide an indication that any lenses fitted in the equipment and used in determination of the oil mist level have been partially obscured to a degree that will affect the reliability of the information and alarm indication. (5) The oil mist detection arrangements are to provide a alarm indication in the event of a foreseeable functional failure in the equipment and installation arrangements. (6) Where oil mist detection equipment includes the use of programmable electronic systems, the arrangements are to be in accordance with the requirements in **Pt 9, Ch 3, 302.** (7) Oil mist detection arrangements are to be capable of being tested on the test bed and onboard under engine at standstill and engine running at normal operating conditions.	# CHAPTER 3 TYPE APPROVAL ## Section 10 Crankcase Oil Mist Detection and Alarm Equipment **1003. Design requirements** Oil mist detection arrangements are to be designed and fitted in accordance with the following requirements. (1) The oil mist detection arrangements are to be installed in accordance with the engine designer's and oil mist manufacturer's instructions and recommendations. Items and contents to be included in the instructions and recommendations are to comply with the requirements in **Pt 5, Ch 2, 203.** ~~10~~ 7 of the Guidance relating to the Rules. (2) Alarms and shutdowns for the oil mist detection arrangements and the system arrangements are to be in accordance with the requirements in **Pt 9, Ch 3, Sec 3.** (3) Where sequential oil mist detection arrangements are provided the sampling frequency and time is to be as short as reasonably practicable. (4) The oil mist detection arrangements are to provide an indication that any lenses fitted in the equipment and used in determination of the oil mist level have been partially obscured to a degree that will affect the reliability of the information and alarm indication. (5) The oil mist detection arrangements are to provide a alarm indication in the event of a foreseeable functional failure in the equipment and installation arrangements. (6) Where oil mist detection equipment includes the use of programmable electronic systems, the arrangements are to be in accordance with the requirements in **Pt 9, Ch 3, 302.** (7) Oil mist detection arrangements are to be capable of being tested on the test bed and onboard under engine at standstill and engine running at normal operating conditions.

Present	Amendment
# CHAPTER 3 TYPE APPROVAL	# CHAPTER 3 TYPE APPROVAL
## Section 1 - 22 〈same as the present Rules〉	## Section 1 - 22 〈same as the present Rules〉
## Section 23 Automatic and Remote Control Systems	## Section 23 Automatic and Remote Control Systems
2301. - 2303. 〈same as the present Rules〉	**2301. - 2303. 〈same as the present Rules〉**
2304. Type test **1. Hardware** (1) 〈same as the present Rules〉 (2) **Test methods and criteria** (A) After the drawings and documents submitted in accordance with the requirements in **2302.** have been examined, tests are to be carried out in accordance with the testing condition and method of **Table 3.23.1** in the presence of the Society's surveyor, and they are to be proven to satisfy the criteria of Table 3.23.1. (B) - (D) 〈same as the present Rules〉 **2. - 3. 〈same as the present Rules〉**	**2304. Type test** **1. Hardware** (1) 〈same as the present Rules〉 (2) **Test methods and criteria** (A) After the drawings and documents submitted in accordance with the requirements in **2302.** have been examined, tests are to be carried out in accordance with the testing condition and method of **Table 3.23.1** in the presence of the Society's surveyor, and they are to be proven to satisfy the criteria of Table 3.23.1. Table 3.23.1 〈See the next page〉 (B) - (D) 〈same as the present Rules〉 **2. - 3. 〈same as the present Rules〉**
## Section 23 - 41 〈same as the present Rules〉	## Section 23 - 41 〈same as the present Rules〉

〈Present〉

Table 3.23.1 Environmental Test Items, Testing Conditions and Methods, and Criteria *(2025)*

<table>
<tr><th>No.</th><th>Test item</th><th>Testing condition and method</th><th>Criteria</th></tr>
<tr><td>1-8</td><td colspan="3">〈same as the present Rules〉</td></tr>
<tr><td>9</td><td>Inclination test</td><td>· The equipment is at an operating condition and check the operation of the equipment with 22.5° static inclination.
· The equipment is at an operating condition and check the operation of the equipment with rolling of 22.5° at period of about 10 seconds for not less than 15 min.
· The test is carried out in three axis directions.
· These inclination tests are normally not required for equipment with no moving parts.

· Detailed test methods are referred to IEC 60092-504:2016.</td><td>〈same as the present Rules〉</td></tr>
<tr><td>10</td><td>Insulation resistance test</td><td>· Measure the insulation resistance between current carrying parts and between current parts and earth when measured with the following application voltage.

<table><tr><th>Rated voltage : Un(V)</th><th>Test voltage(D.C. voltage)(V)</th></tr><tr><td>Un ≤ 65</td><td>2 × Un, min. 24</td></tr><tr><td>Un > 65</td><td>500</td></tr></table>
· The insulation resistance measurement shall be carried out before and after a series of environmental tests: the damp heat test, cold test, salt mist test, and high voltage test.
· For the equipment containing circuits in which the application of the test voltage is not desirable, the test voltage is applied after removing the circuits.</td><td></td></tr>
<tr><td>11</td><td>High voltage test</td><td>· Apply the following test voltage, alternating of a frequency of 50Hz or 60Hz, between current carrying parts and between current-carrying parts connected and earth for 1 minute.

〈same as the present Rules〉</td><td></td></tr>
<tr><td>12-16</td><td colspan="3">〈same as the present Rules〉</td></tr>
<tr><td>17</td><td>Conducted radio frequency immunity test</td><td>〈same as the present Rules〉
· Detailed test methods are referred to Test level 2 of IEC 61000-4-6:2013.</td><td>〈same as the present Rules〉</td></tr>
<tr><td>18</td><td colspan="3">〈same as the present Rules〉</td></tr>
<tr><td>19</td><td>Surge immunity test</td><td>〈same as the present Rules〉
· Detailed test methods are referred to Test level 2 of IEC 61000-4-5:2017.</td><td>〈same as the present Rules〉</td></tr>
<tr><td>20</td><td>Radiated emission test</td><td>〈same as the present Rules〉
· Detailed test methods are referred to CISPR 16-2-3:2016 and IEC 60945:2002(for 156 ~ 165 MHz).</td><td>〈same as the present Rules〉</td></tr>
<tr><td>21</td><td>Conducted emission test</td><td>〈same as the present Rules〉
· Detailed test methods are referred to CISPR 16-2-1:2017.</td><td>〈same as the present Rules〉</td></tr>
<tr><td>22-23</td><td colspan="3">〈same as the present Rules〉</td></tr>
</table>

〈Amendments〉

Table 3.23.1 Environmental Test Items, Testing Conditions and Methods, and Criteria *(2026)*

<table>
<tr><th>No.</th><th>Test item</th><th>Testing condition and method</th><th>Criteria</th></tr>
<tr><td>1-8</td><td colspan="3">〈same as the present Rules〉</td></tr>
<tr><td>9</td><td>Inclination test</td><td>~~· The equipment is at an operating condition and check the operation of the equipment with 22.5° static inclination.~~
~~· The equipment is at an operating condition and check the operation of the equipment with rolling of 22.5° at period of about 10 seconds for not less than 15 min.~~
~~· The test is carried out in three axis directions.~~
~~· These inclination tests are normally not required for equipment with no moving parts.~~

-Static test
a) inclined to the vertical at an angle of at least 22.5°
b) inclined to at least 22.5° on the other side of the vertical and in the same plane as in (a), c) inclined to the vertical at an angle of at least 22.5° in plane at right angles to that used in (a),
d) inclined to at least 22.5° on the other side of the vertical and in the same plane as in (c).
Note: The period of testing in each position should be sufficient to fully evaluate the behaviour of the equipment.

-Dynamic test
· Using the directions defined in a) to d) above, the equipment is to be rolled to an angle of 22.5° each side of the vertical with a period of 10 seconds.
· The test in each direction is to be carried out for not less than 15 minutes.
· On ships for the carriage of liquified gases and chemicals, the emergency power supply is to remain operational with the ship flooded up to a maximum final athwart ship inclination of 30° (see Pt 7, Ch 5, 207. 2 (2) and Ch 6, 209. 3. (2) of the Rules)
Note: These inclination tests are normally not required for equipment with no moving parts.

· Detailed test methods are referred to IEC 60092-504:2016.</td><td>〈same as the present Rules〉</td></tr>
<tr><td>10</td><td>Insulation resistance test</td><td>· Measure the insulation resistance ~~between current carrying parts and~~ between ~~current~~conductive parts and earth, and, where appropriate, between phases, using an insulation tester with the following test voltage ~~when measured with the following application voltage.~~

<table><tr><th>Rated voltage : Un(V)</th><th>Test voltage(D.C. voltage)(V)</th></tr><tr><td>Un ≤ 65</td><td>2 × Un, min. 24</td></tr><tr><td>Un > 65</td><td>500</td></tr></table>
· The insulation resistance measurement shall be carried out before and after a series of environmental tests: the damp heat test, cold test, salt mist test, and high voltage test.
· ~~For the equipment containing circuits in which the application of the test voltage is not desirable, the test voltage is applied after removing the circuits.~~ Certain components e.g. for EMC protection may be required to be disconnected for this test.</td><td></td></tr>
</table>

11	High voltage test	· Apply the following test voltage~~, alternating of a frequency of 50Hz or 60Hz, between current carrying parts and between current-carrying parts connected and earth for 1 minute.~~ at a frequency of 50Hz or 60Hz for 1 minute between conductive parts and earth, and between separate circuits. 〈same as the present Rules〉	
12-16	〈same as the present Rules〉		
17	Conducted radio frequency immunity test	〈same as the present Rules〉 · Detailed test methods are referred to Test level 2 of IEC 61000-4-6:~~2013~~ 2023.	〈same as the present Rules〉
18	〈same as the present Rules〉		
19	Surge immunity test	〈same as the present Rules〉 · Detailed test methods are referred to Test level 2 of IEC 61000-4-5:2014+AMD1:2017.	〈same as the present Rules〉
20	Radiated emission test	〈same as the present Rules〉 · Detailed test methods are referred to CISPR 16-2-3:2016+AMD1:2019+AMD2:2023 and IEC 60945:2002(for 156 ~ 165 MHz).	〈same as the present Rules〉
21	Conducted emission test	〈same as the present Rules〉 · Detailed test methods are referred to CISPR 16-2-1:2014+AMD1:2017.	〈same as the present Rules〉
22-23	〈same as the present Rules〉		

Present	Amendment
Section 15 Machinery and Equipment for Ships	**Section 15 Machinery and Equipment for Ships**
1501. Application	**1501. Application**
1. The requirements of this Section apply to tests and inspection for the approval of the machinery and equipment listed below for which approval of the Society is to be obtained in advance before being fitted in ships. *(2018)* (1) Kind 1 propeller shafts with corrosion resisting (**Pt 5, Ch 1, 102. 3** of the Rules) (2) Resin Chock (**Pt 5, Ch 2, 202. 1** (3), **Pt 5, Ch 3, 103. 1** and **Pt 5, Ch 7, 106.** of the Rules) (3) Resilient mountings for reciprocating internal combustion engine (Pt 5, Ch 2, 202. 1 (3) of the Rules). In addition, this guidance may apply for type approval of the resilient mountings for gear transmissions, generators, steam turbines, gas turbines and auxiliary machinery at the request of the manufacturers. *(2020)* (4) Stern tube bearings (**Pt 5, Ch 3, 206. 1** of the Rules) (5) Stern tube sealing devices (**Pt 5, Ch 3, 206. 2** of the Rules) (6) Flexible couplings (**Pt 5, Ch 3, 406. 2** of the Rules) (7) Pipes of special materials **(Pt 5, Ch 6, 102. 5. (1)** of the Rules except for plastic pipes) (8) Cargo pipings, pumps and cargo hoses of ships carrying liquefied gases in bulk (**Pt 7, Ch 5, 513.** of the Rules) (9) Fuel pipings and pumps for ships using low-flashpoint fuels (**Ch 16, 701.** and **703.** of Rules for Ships using Low-flashpoint Fuels) (10) Expansion bellows for fuel cell fuel system (**Ch 2, 701. 4** of the **Guidance for Fuel Cell Systems on board ships**) (11) Others as deemed necessary by the Society	**1.** The requirements of this Section apply to tests and inspection for the approval of the machinery and equipment listed below for which approval of the Society is to be obtained in advance before being fitted in ships. *(2018)* (1) Kind 1 propeller shafts with corrosion resisting (**Pt 5, Ch 1, 102. 3** of the Rules) (2) Resin Chock (**Pt 5, Ch 2, 202. 1** (3), **Pt 5, Ch 3, 103. 1** and **Pt 5, Ch 7, 106.** of the Rules) (3) Resilient mountings for reciprocating internal combustion engine (Pt 5, Ch 2, 202. 1 (3) of the Rules). In addition, this guidance may apply for type approval of the resilient mountings for gear transmissions, generators, steam turbines, gas turbines and auxiliary machinery at the request of the manufacturers. *(2020)* ~~(4) Stern tube bearings (Pt 5, Ch 3, 206. 1 of the Rules)~~ (4) Stern tube sealing devices (**Pt 5, Ch 3, 206. 2** of the Rules) (5) Flexible couplings (**Pt 5, Ch 3, 406. 2** of the Rules) (6) Pipes of special materials **(Pt 5, Ch 6, 102. 5. (1)** of the Rules except for plastic pipes) (7) Cargo pipings, pumps and cargo hoses of ships carrying liquefied gases in bulk (**Pt 7, Ch 5, 513.** of the Rules) (8) Fuel pipings and pumps for ships using low-flashpoint fuels (**Ch 16, 701.** and **703.** of Rules for Ships using Low-flashpoint Fuels) (9) Expansion bellows for fuel cell fuel system (**Ch 2, 701. 4** of the **Guidance for Fuel Cell Systems on board ships**) (10) Others as deemed necessary by the Society
〈Omitted〉	*〈Omitted〉*

Present

1503. Type tests

1. General

The tests specified in the relevant provisions of the Rules and their Guidance relating to the machinery and equipment, and additionally, the detailed tests peculiar to the machinery and equipment as prescribed in **Par 2** are to be carried out.

2. Details of Tests

In the type test program, the test items specified in Table 3.15.1 as applicable to the machinery and equipment concerned and additionally those deemed necessary by the Society are to be included.

Table 3.15.1 Type test item of machinery and equipment of ship (continued)

Kinds	Type test item
Stern tube bearings	(A) Confirmation tests for the characteristics of materials (a) In the case of vulcanized rubber, the following tests specified in **KS M 6518** (ⅰ) Tensile test (ⅱ) Hardness test (ⅲ) Tension set test (ⅳ) Adhesion test (ⅴ) Test for adhesion to metals (except those not to be adhered to metals) (ⅵ) Tear test (ⅶ) Compression set test (ⅷ) Dipping test (in the case of a water-lubricated system, tests are to be carried out using sea water) (ⅸ) Aging test (b) In the case of materials other than those specified above in (a), tests according to pertient national standards or other equivalent standards concerning the contents of (a) according to the materials. (B) Abrasion test (C) Running test (In this case, confirm that the bearing pressures during the tests are to be verified are not less than 0.8 MPa for an oil-lubricated system, and are not less than 0.2 ㎏/㎟ for a water-lubricated system respectively.) (D) "Type test program" submitted according to **102. 3** (1) (A) is to include the following items: (a) Drawing of the test rig (b) Drawing of the product (specified the materials, dimensions, etc.) (c) Condition of tests (lubrication system, shaft speed, bearing load, hydraulic pressure, test time, etc.)

〈Omitted〉

Amendment

1503. Type tests

1. General

The tests specified in the relevant provisions of the Rules and their Guidance relating to the machinery and equipment, and additionally, the detailed tests peculiar to the machinery and equipment as prescribed in **Par 2** are to be carried out.

2. Details of Tests

In the type test program, the test items specified in Table 3.15.1 as applicable to the machinery and equipment concerned and additionally those deemed necessary by the Society are to be included.

Table 3.15.1 Type test item of machinery and equipment of ship (continued)

Kinds	Type test item
~~Stern tube bearings~~	~~(A) Confirmation tests for the characteristics of materials~~ ~~(a) In the case of vulcanized rubber, the following tests specified in **KS M 6518**~~ ~~(ⅰ) Tensile test~~ ~~(ⅱ) Hardness test~~ ~~(ⅲ) Tension set test~~ ~~(ⅳ) Adhesion test~~ ~~(ⅴ) Test for adhesion to metals (except those not to be adhered to metals)~~ ~~(ⅵ) Tear test~~ ~~(ⅶ) Compression set test~~ ~~(ⅷ) Dipping test (in the case of a water-lubricated system, tests are to be carried out using sea water)~~ ~~(ⅸ) Aging test~~ ~~(b) In the case of materials other than those specified above in (a), tests according to pertient national standards or other equivalent standards concerning the contents of (a) according to the materials.~~ ~~(B) Abrasion test~~ ~~(C) Running test (In this case, confirm that the bearing pressures during the tests are to be verified are not less than 0.8 MPa for an oil-lubricated system, and are not less than 0.2 ㎏/㎟ for a water-lubricated system respectively.)~~ ~~(D) "Type test program" submitted according to **102. 3** (1) (A) is to include the following items:~~ ~~(a) Drawing of the test rig~~ ~~(b) Drawing of the product (specified the materials, dimensions, etc.)~~ ~~(c) Condition of tests (lubrication system, shaft speed, bearing load, hydraulic pressure, test time, etc.)~~

〈Omitted〉

Present	Amendment
〈Newly Added〉	

Section 42 Synthetic materials for aftmost propeller shaft bearings

4201. General

1. The requirement of this Section applies to the synthetic materials for aftmost propeller shaft bearings in accordance with **Pt 5, Ch 3 206. 1** (1) of the Rules.

2. The qualification for design and application of aftmost propeller shaft bearings are to be provided and guaranteed by the manufacturer.

3. Testing and inspection are to be carried out in accordance with ths requirement of this Section.

4202. Date to be sumitted

The following reference data are to be submitted to the Society in addition to those specified in **102.**

(1) Product name
(2) Name and address of the manufacturer, including details for all relevant production places.
(3) Reference of applicable Rules and Standards which the product are to comply with.
(4) Details of products information
  (A) Material type
  (B) Lubrication type
  (C) Isotropic or anisotropic behaviour
  (D) Elastomeric or non-elastomeric type
(5) Limitations of the product
(6) Product specification, technical data sheet, and installation maunal including:
  (A) Maximum nominal surface pressure
  (B) Product dimensions
    (a) Minimum and maximum dimensions
    (b) Other, if relevant
  (C) Commonly acceptable mating material(type of shaft material, roughness, hardness, etc.)
  (D) Running clearance
  (E) Maximum operating temperature
(7) Safety data sheet
(8) Description of production processes.
(9) Description of quality assurance system or copy of **ISO 9001** certificate.
(10) In-service experience, if available.
(11) List of tests and measuring equipment including calibration certificate.

4203. Type tests

1. Test program

(1) Test program is to include following items;
  (A) Description of products to be approved
  (B) Description of the selected test samples
  (C) Content of tests (test items, test standard, test conditions, acceptance criteria, etc.)
  (D) Description of the wear testing stands and the test conditions
(2) The extent of the test program is to test the material properties of **3.** In particular a reduction or complete suppression of the approval tests may be accepted by the Society taking into account:
  (A) Documentation of approval tests performed
  (B) The proven track record

〈Continuing on the next page〉

Present	Amendment
〈Newly Added〉	**2. Wear test** (1) Unless otherwise specified in this section, the requirements for the wear test is refer to **ASTM G77-17** or other national or international equivalent standards, with the following data: (A) Material of the shaft used in the test and its properties are to be specified and shall be equivalent to typical mating material e.g. alloyed steel or stainless steel or copper alloy. (B) Diameter of shaft: the shaft diameter depends on the bearing size. The running clearance shall be considered in the abrasion test. (C) Motion of shaft: continuous rotation. (D) Circumferential velocity shall be 6 m/s for oil or water lubrication and should be 3 m/s for grease lubrication. (D) Lubrication: sea water or substitute ocean water (23℃±2℃), or mineral oil (80℃± 2℃), or grease (80℃±2℃) according to the applicable lubrication type. (E) Surface roughness of test shaft: R_a shall not exceed 0.5 μm for stainless steel and R_a shall not exceed 0.8μm for copper alloy. (F) Interface pressure : maximum nominal surface pressure±10% (G) Duration of test: until the coefficient of friction and wear rate remains constant at least 192h. Wear of bushings shall be measured continuously or regularly. If regularly, wear to be measured by disassembling every 48 hours until a constant wear rate has been achieved (minimum of four points of measurements). (2) Parameters to be recorded (A) Dimensions of test specimen (B) Wear in relation to time (C) Coefficient of friction in relation to time (D) Temperature of test specimen during test cycle (E) Deviation of load from the maximum nominal surface pressure **3. Characteristics of materials (Material properties)** (1) The properties of non-elastomeric materials for aftmost propeller shaft bearings are to comply with the requirements of **Table 3.42.1.** The properties of elastomeric materials for aftmost propeller shaft bearings are to comply with the requirements of **Table 3.42.2.**

Table 3.42.1 Type testing for non-elastomeric materials for aftmost propeller shaft bearings

Test items	Test standard[1)]	Number of specimens for each sample[2)]	Test conditions	Acceptance criteria
Compressive strength (MPa)	ISO 604:2002, ASTM D695-2015	5[3)]		- Min. 85 MPa in the case of isotropic materials. - Min. 85 MPa for specimens parallel to sheet plane in the case of anisotropic materials. Min. 100 MPa for specimens normal to sheet plane in the case of anisotropic materials.
Compressive modulus (MPa)	ISO 604:2002, ASTM D695-2015	5		- Min. 850 MPa in the case of isotropic materials. - Min. 850 MPa for specimens parallel to sheet plane in the case of anisotropic materials. Min. 1000 MPa for specimens normal to sheet plane in the case of anisotropic materials.

〈Continuing on the next page〉

Present	Amendment
〈Newly Added〉	**Table 3.42.1 Type testing for non-elastomeric materials for aftmost propeller shaft bearings**

Test items	Test standard [1)]	Number of specimens for each sample[2)]	Test conditions	Acceptance criteria
Water swelling [volume, %], only required for water lubrication	ISO 175: 2010	3	- Exposure period: 4 weeks - Test liquid: Substitute ocean water ASTM D1141-98(2021) - Test Temperature : (a) 20℃±2℃ (b) 60℃±2℃ or advised maximum working temperature by manufacturer, whichever is higher. - Test specimen size : 50 x 50 x t mm (t is min. 4 mm or the min. thickness of the bushing product) - Testing immediately after extraction (wet condition).	Volumetric swelling≤3%
Oil swelling (for oil lubricated system) [volume, %], only required for oil lubrication	ISO 175: 2010	3	- Exposure period: 4 weeks - Test liquid: oil No.3 (ISO 1817:2022) - Test Temperature: 20℃±2℃. - Test specimen size: 50x50xt mm (t is min. 4 mm or the min. thickness of the bushing product.) - Testing immediately after extraction (wet condition).	Volumetric swelling≤3%
Compressive strength and modulus change when immersed in water, only required for water lubrication	ISO 604: 2002; ASTM D695-2015	5[3)]	- Exposure period: 4 weeks - Test liquid: Substitute ocean water (ASTM D1141) - Test Temperature: 20℃±2℃	Min. 80% retention of minimum specified compressive strength and modulus before water immersion

〈Continuing on the next page〉

Present	Amendment
〈Newly Added〉	

Table 3.42.1 Type testing for non-elastomeric materials for aftmost propeller shaft bearings

Test items	Test standard [1)]	Number of specimens for each sample[2)]	Test conditions	Acceptance criteria
Temperature resistance	ISO 604: 2002; ASTM D695-2015	5[3)]	Compressive strength and compressive modulus at maximum temperature (60 ℃±2 ℃ or advised maximum working temperature by manufacturer, whichever is higher).	Min. 80% retention of minimum specified compressive strength and modulus at 20 ℃±2 ℃
Wear test	Refer to **4203. 2**	1		

(Note)
(1) Other testing standards may also be accepted, provided that they are suitable for testing of the synthetic material selected for application in aftmost propeller shaft bearings.
(2) The number of specimens is to be prepared for each sample.
(3) Test at least five specimens for each sample in the case of isotropic materials. Test at least ten specimens, five normal to and five parallel to sheet plane, for each sample in the case of anisotropic materials.

Table 3.42.2 Type testing for elastomeric materials for aftmost propeller shaft bearings

Test items	Test standard[1)]	Number of specimens for each sample[2)]	Test conditions	Accceptance criteria
Tensile strength (MPa)	ISO 37:2017, Method A, of ASTM D412-16(2021), ASTM D638-22	3		- Min.10 MPa for rubber bearing - Min.30 MPa for other elastomeric earing
Elongation (%)	ISO 37:2017, Method A, of ASTM D412-16(2021), ASTM D638-22	3		- Min. 150 % for rubber bearing - Min. 60 % for other elastomeric bearing
Hardness	ISO 48-4:2018; ASTM D2240-15(2021)	3		

〈Continuing on the next page〉

Present	Amendment
〈Newly Added〉	**Table 3.42.2 Type testing for elastomeric materials for aftmost propeller shaft bearings**

Test items	Test standard[1)]	Number of specimens for each sample[2)]	Test conditions	Acceptance criteria
Water swelling [volume, %], only required for water lubrication	ISO 1817:2022	3	- Exposure period: 4 weeks - Test liquid: Substitute ocean water (ASTM D1141) - Test Temperature : (a) 20 ℃±2 ℃ (b) 60 ℃±2 ℃ or advised maximum working temperature by manufacturer, whichever is higher. - Test specimen size : 50 x 50 x t mm (t is min. 4 mm or the min. thickness of the bushing product) - Testing immediately after extraction (wet condition).	Volumetric swelling≤3%
Oil swelling (%) (for oil lubricated system) , only required for oil lubrication	ISO 1817:2022	3	- Exposure period: 4 weeks - Test liquid: oil No.3 (ISO 1817) - Test Temperature: 20 ℃±2 ℃. - Test specimen size: 50 x 50 x t mm (t is min. 4 mm or the min. thickness of the bushing product.) - Testing immediately after extraction (wet condition).	Volumetric swelling≤3%
Tensile strength and elongation change when immersed in water, only required for water lubrication	ISO 37:2017, Method A, of ASTM D412-16(2021), ASTM D638-22	3	- Exposure period: 4 weeks - Test liquid: Substitute ocean water (ASTM D1141) - Test Temperature: 20 ℃±2 ℃	Min. 80% retention of minimum specified tensile strength and elongation before water immersion

〈Continuing on the next page〉

Present	Amendment
〈Newly Added〉	**Table 3.42.2 Type testing for elastomeric materials for aftmost propeller shaft bearings**

Test items	Test standard[1)]	Number of specimens for each sample[2)]	Test conditions	Acceptance criteria
Temperature resistance	ISO 37:2017; ISO 7743:2017; Method A of ASTM D412-16(2021); ASTM D638-22	3	Tensile strength and elongation at maximum temperature (60 ℃±2 ℃ or advised maximum working temperature by manufacturer, whichever is higher).	Min. 80 % retention of minimum specified tensile strength and elongation at 20 ℃±2 ℃
Adhesion to metals(MPa) (except those not to be adhered to metals)	ISO 813:2019; ISO 1827:2022	3		
Change of properties due to aging(%)	ISO 37:2017; ISO 7743:2017; Method A of ASTM D412-16(2021); ASTM D638-22	3	After oven aging for tension and elongation tests. Test specimens shall be subjected to circulating air at maximum temperature (60 ℃±2 ℃ or advised maximum working temperature by manufacturer, whichever is higher) for 96 hours. Tension and elongation tests shall be performed not less than 20 hours and not more than 48 hours after removal from the aging environment.	Min. 75 % retention of Tensile strength and elongation before aging
Wear test	Refer to **4203. 2**	1		

(Note)
(1) Other testing standards may also be accepted, provided that they are suitable for testing of the synthetic material selected for application in aftmost propeller shaft bearings.
(2) The number of specimens is to be prepared for each sample.

4. Test product

(1) At least three representative diameter products of each kind of product shall be selected for type approval testing, except for the wear test where one representative product may be selected
(2) Each kind of product means:
(A) Same chemical composition range
(B) Same reinforcement, only applicable to composite materials
(C) Same production process

〈Continuing on the next page〉

Present	Amendment
〈Newly Added〉	(3) The test products used for type approval testing are to be selected from the manufacturer's production line or stock by a Surveyor of the Society as one of the following: (A) Fininshed certified component itself: or (B) On samples taken from earlier stages in the production of the component, when applicable. **5. Test laboratories** (1) The selected test facility shall have accreditation according to ISO/IEC 17025 for carrying out and recording of the material property tests required by this section. The test facility and the testing arrangements are to be to the satisfaction of the Classification Society. If the test laboratory does not have the relevant accreditation, then specified testing will need to be witnessed by a Surveyor of the Society. **4204. Type approval certificate** **1.** Type Approval Certificate based on the test reports and manufacturer's technical documentation e.g., installation/ engineering manuals is to be issued by the Society. **2.** The Type Approval Certificate shall contain the general information as defined by the Society Rules. As minimum, the following information is specifically applicable to products relevant to this document and shall be included on the relevant Type Approval Certificate: (1) Product description and properties in accordance with **4203. 3.** (2) Maximum nominal surface pressure (3) Maximum operating temperature

Amendments to KR Technical Rules

Guidance for Cyber Resilience of Ships and Systems

2025. 9.

Machinery Rule Development Team

- Main Amendments -

(1) Ships contracted for construction on or after 2025/10/01

◉ Newly added + notation and revised the notation names
◉ Revised requirements

Present	Amendment
# CHAPTER 1 GENERAL ## Section 1 General **101. - 103. 〈same as the present Rules〉**	# CHAPTER 1 GENERAL ## Section 1 General **101. - 103. 〈same as the present Rules〉**
104. Class notations *(2025)* Ships complying with the Guidance will be assigned with an additional following notation **1. 〈same as the present Rules〉** **2. Cyber Resilience+**: Ships having Cyber Resilience and implementing essential cyber security management system(CSMS) based on cyber risk management process in accordance with the requirements in **Ch 2, Sec 1** through **Sec 5** of this Guidance. **3. 〈same as the present Rules〉** **4. 〈newly added〉**	**104. Class notations *(2026)*** Ships complying with the Guidance will be assigned with an additional following notation **1. 〈same as the present Rules〉** **2. Cyber Resilience+(CSMS)**: Ships having Cyber Resilience and implementing essential cyber security management system(CSMS) based on cyber risk management process in accordance with the requirements in **Ch 2, Sec 1** through **Sec 5** of this Guidance. **3. 〈same as the present Rules〉** **4.** IT systems additionally requested by the applicant may be included within the scope of applicable systems in accordance with **103. 2**, and the class notation "**+**" may be additionally assigned to such ships (e.g., Cyber Resilience (CSMS)+). However, unless explicitly specified in this guidance for the additionally included IT systems, the requirements of **Ch 2** and **Ch 3** shall not be applied to such systems.
## Section 2 - 3 〈same as the present Rules〉	## Section 2 - 3 〈same as the present Rules〉

Present	Amendment
CHAPTER 2 CYBER RESILIENCE OF SHIPS	**CHAPTER 2 CYBER RESILIENCE OF SHIPS**
Section 1 General	**Section 1 General**
101. 〈same as the present Rules〉	**101. 〈same as the present Rules〉**
102. Application	**102. Application**
1. – 3. 〈same as the present Rules〉	**1. – 3. 〈same as the present Rules〉**
4. The requirements of **Sec 4** of this Chapter additionally apply to ships having Class Notation of Cyber Resilience+. *(2025)*	**4.** The requirements of **Sec 4 5** of this Chapter additionally apply to ships having Class Notation of Cyber Resilience~~+~~(CSMS). *(2026)*
	5. For ships assigned with the class notation of "**Cyber Resilience+**" or "**Cyber Resilience(CSMS)+**", the following requirements shall apply to the additionally included IT systems, as far as applicable: (1) 401.1 Vessel Asset Inventory (2) 402.1 Security Zones and Network Segmentation (3) 402.2 Network Protection Safeguards (4) 402.3 Antivirus, Antimalware, Antispam and Other Protections from Malicious Code (5) 402.4 Access Control (6) 402.7 Use of Mobile and Portable Devices
5. 〈newly added〉	

Present	Amendment
Section 2 Survey *(2025)*	**Section 2 Survey *(2025)***
201. 〈same as the present Rules〉	**201. 〈same as the present Rules〉**
202. Classification Survey	**202. Classification Survey**
1. During Design and Construction phase (1) - (4) 〈same as the present Rules〉 (5) 〈newly added〉	**1. During Design and Construction phase** (1) - (4) 〈same as the present Rules〉 (5) For ships assigned with the class notation "**Cyber Resilience(CSMS)**", the following documents shall be additionally submitted for approval: (A) Ship Cyber Risk Assessment Report (B) Ship Cyber Risk Management Plan and Corrective Action Results (if applicable) (C) Ship Cyber Incident Response and Recovery Manual
2. 〈same as the present Rules〉	**2. 〈same as the present Rules〉**
203. 〈same as the present Rules〉	**203. 〈same as the present Rules〉**
Section 3 - 4 〈same as the present Rules〉	**Section 3 - 4 〈same as the present Rules〉**

Present	Amendment
Section 5 Requirements for Ship Cyber Security Management System *(2025)* **1.1.1.**	**Section 5 Requirements for Ship Cyber Security Management System *(2025)*** **1.1.2.**
501. General	**501. General**
1. Application	**1. Application**
(1) The requirements in this Section specify additional requirements for implementing the essential Cyber Security Management System(CSMS) based on the cyber risk management process in the operational phase of the ship. In addition to the requirements of this Section, the relevant requirements for Maintenance Survey in **Ch 2, 203.** for ship cyber resilience shall be basically complied with.	(1) ~~The requirements in this Section specify additional requirements for implementing the essential Cyber Security Management System(CSMS) based on the cyber risk management process in the operational phase of the ship. In addition to the requirements of this Section, the relevant requirements for Maintenance Survey in **Ch 2, 203.** for ship cyber resilience shall be basically complied with.~~ The requirements of this section specify the requirements for Cyber Security Management System (CSMS) of ships assigned with the class notation "**Cyber Resilience(CSMS)**".
(2) The requirements in this Section support compliance with the regulation for cyber risk management of ships as per IMO Resolution MSC.428(98).	(2) ~~The requirements in this Section support compliance with the regulation for cyber risk management of ships as per IMO Resolution MSC.428(98).~~ Ships complying with the requirements of this section shall be deemed to satisfy the requirements for ship cyber risk management in accordance with IMO Resolution MSC.428(98).
(3) 〈newly added〉	(3) Ships complying with the requirements of this Section shall, as a baseline, also comply with the relevant requirements of **Ch 2, Sec 1** through **4**, regarding ship cyber resilience.

Present	Amendment
2. Limitation If any cyber security-related regulation required by International Conventions, flag state laws, or domestic laws of ports of call are not specified in this Guidance, they will not be included in the Surveys conducted by this Society, and the responsibility for the compliance with such regulations lies with the shipowner. (2) 〈newly added〉	**2. Limitation** (1) If any cyber security-related regulation required by International Conventions, flag state laws, or domestic laws of ports of call are not specified in this Guidance, they will not be included in the Surveys conducted by this Society, and the responsibility for the compliance with such regulations lies with the shipowner. (2) The requirements of this Section specify the minimum requirements for a cyber security management system based on the ship cyber risk management process during operation and do not imply the prevention of all cyber incidents.
3. Definition (1) Initial Survey: the first survey conducted upon the request of the shipowner for additional application of the requirements of this Section.	**3. Definition** (1) CSMS Initial Survey: the first survey conducted in accordance with the requirements of this Section after delivery of the ship. ~~upon the request of the shipowner for additional application of the requirements of this Section.~~ (Note) For ships assigned with the class notation "**Cyber Resilience(CSMS)**" during the construction, the CSMS initial survey shall be conducted at the time of the first annual survey.
502. Approval documents	**502. Approval documents**
1. Ship cyber security and resilience program The Ship cyber security and resilience program shall conform to the requirements in **504.1**.	**1. Ship cyber security and resilience program (hereinafter, CSMS Manual)** ~~The Ship cyber security and resilience program shall conform to t he requirements in **504.1**.~~ (1) Cyber security organization chart and job descriptions of security personnel (2) Cyber risk management policy (3) Cyber security education and training policy (4) Physical security policy (5) Outsider security policy (6) Internal audit procedures for ship cyber security

Present	Amendment
2. Documents or data for reference Shipowner shall submit the following for reference. (1) Ship cyber risk assessment report and risk management plan (2) Cyber security organization chart and job description of security personnel	~~**2. Documents or data for reference**~~ ~~Shipowner shall submit the following for reference.~~ ~~(1) Ship cyber risk assessment report and risk management plan~~ ~~(2) Cyber security organization chart and job description of security personnel~~
	2. Ship Cyber Risk Assessment Report (1) List of cyber threats (2) Cyber risk assessment results (3) Cyber risk management plan and corrective action results (if applicable)
3. Subsequent Annual Survey The survey shall be carried out in accordance with the requirements of **503. 1** (2).	~~**3. Subsequent Annual Survey**~~ ~~The survey shall be carried out in accordance with the requirements of **503. 1** (2).~~
	3. Cyber Incident Response and Recovery Plan (1) Organization chart and emergency contact network for cyber incident response (2) Cyber incident response and recovery procedures
	4. Data for reference (1) Cyber security training record (2) Software security-related patch update records (3) Internal audit plan or results for cyber security

Present	Amendment
503. Surveys	**503. Surveys**
1. Initial Survey	**1. CSMS Initial Survey**
(1) Approval of a document The shipowner shall submit the documents specified in **502.** and be approved by this Society before the initial survey according to this Section.	(1) Approval of a document The shipowner shall submit the documents specified in **502.** and be approved by this Society before the initial survey ~~according to this Section~~.
(2) Survey During the initial survey, the shipowner shall provide this Society with the following evidence demonstrating the appropriate implementation of the requirements in **504.** However, the evidence is not limited to these items.	(2) Survey ~~During the initial survey, the shipowner shall provide this Society with the following evidence demonstrating the appropriate implementation of the requirements in **504.** However, the evidence is not limited to these items.~~ During the CSMS initial survey, the shipowner shall present to the attending surveyor the following evidence or objective records, demonstrating compliance with the relevant requirements of **504.** of this Chapter, based on the approved CSMS Manual.
(A) Ship cyber risk assessment report and risk management result	(A) Ship cyber risk assessment report and ~~risk management result~~ implementation status of cyber risk management plan
(B) Cyber security training plan and result	(B) Cyber security training ~~plan and result~~ record
(C) Cyber security incident report (if any)	(C) ~~Cyber security incident report (if any)~~ Implementation status of physical security
(D) 〈newly added〉	(D) Status of outsider security management
(D) Internal audit result related to cyber security	(E) Internal audit result related to cyber security
(3) 〈newly added〉	(3) Issuance of CSMS Statement of Compliance (SoC) A CSMS Statement of Compliance shall be issued to a ship upon completion of the initial survey in accordance with the requirements of this Section.
2. - 3. 〈same as the present Rules〉	**2. - 3. 〈same as the present Rules〉**

Present	Amendment
504. Additional requirements **1. Cyber security policy** (1) Ship cyber security and resilience program The Ship cyber security and resilience program specified in **Ch 2, 203. 1** (2) shall additionally address the following policies: (A) Policy for cyber risk management (B) Roles and responsibilities for cyber security management (C) Policy for Crew Awareness and Training (D) Policy for internal audit regarding cyber security (2) The shipowner shall place, review and manage the Ship cyber security and resilience program onboard. (3) The shipowner shall designate and assign responsibility and authority to the personnel who have the competencies to operate and manage the program.	**504. Additional requirements** **1. Ship cyber security management policy** ~~(1) Ship cyber security and resilience program~~ ~~The Ship cyber security and resilience program specified in **Ch 2, 203. 1**~~ ~~(2) shall additionally address the following policies:~~ ~~(A) Policy for cyber risk management~~ ~~(B) Roles and responsibilities for cyber security management~~ ~~(C) Policy for Crew Awareness and Training~~ ~~(D) Policy for internal audit regarding cyber security~~ ~~(2) The shipowner shall place, review and manage the Ship cyber security and resilience program onboard.~~ ~~(3) The shipowner shall designate and assign responsibility and authority to the personnel who have the competencies to operate and manage the program.~~ (1) A CSMS manual, specifying the methods, procedures, and responsible personnel for the operation of the ship's CSMS shall be kept on board, regulary reviewed, and properly managed. (2) Personnel with the necessary competence to operate and manage the ship's CSMS shall be designated, with clear assignment of responsibilities and authority.

Present	Amendment
2. Cyber risk management (1) The shipowner shall establish a cyber risk management process, including identification, analysis, evaluation, and processing of cyber risks to CBS and networks in a ship. (2) Internal and external cyber threats that may adversely affect the operation of CBSs and networks on board ship shall be identified and listed. (3) The Cyber risk assessment for CBSs and networks on board ship shall be conducted periodically taking into account cyber threats and vulnerabilities. (4) Priorities for risk level shall be determined based on the results of the Cyber risk assessment, and improvement actions shall be taken if deemed necessary.	**2. Ship cyber risk management process** ~~(1) The shipowner shall establish a cyber risk management process, including identification, analysis, evaluation, and processing of cyber risks to CBS and networks in a ship.~~ ~~(2) Internal and external cyber threats that may adversely affect the operation of CBSs and networks on board ship shall be identified and listed.~~ ~~(3) The Cyber risk assessment for CBSs and networks on board ship shall be conducted periodically taking into account cyber threats and vulnerabilities.~~ ~~(4) Priorities for risk level shall be determined based on the results of the Cyber risk assessment, and improvement actions shall be taken if deemed necessary.~~ (1) A cyber risk management process, specifying the methods and procedures for identifying, analyzing, assessing, and addressing cyber risks related to onboard systems, equipment, and networks, shall be established and implemented. (2) Internal and external cyber threats that may negatively impact the operation of onboard systems, equipment, and networks shall be identified and documented. (3) A periodic cyber risk assessment shall be conducted, considering cyber threats and vulnerabilities affecting assets within the cyber security management scope. (4) Based on the results of cyber risk assessment, a risk management plan shall be established by prioritizing cyber risks, and appropriate mitigation measures shall be implemented.

Present	Amendment
4. Incident Response and Recovery (1) The shipowner shall define the roles and responsibilities of the organization or crews responsible for immediate response and recovery activities to system operation and security issues in a ship. (2) An emergency contact network shall be established and kept it up to date to enable prompt communication with internal and external personnel. (3) In the event of a cyber incident onboard ship, procedures shall be established and implemented to notify the appropriate competent authorities and report to the relevant person in charge.	~~**4. Incident Response and Recovery**~~ ~~(1) The shipowner shall define the roles and responsibilities of the organization or crews responsible for immediate response and recovery activities to system operation and security issues in a ship.~~ ~~(2) An emergency contact network shall be established and kept it up to date to enable prompt communication with internal and external personnel.~~ ~~(3) In the event of a cyber incident onboard ship, procedures shall be established and implemented to notify the appropriate competent authorities and report to the relevant person in charge.~~ **4. Physical Security** (1) Physical security policies shall be established and implemented to control unauthorized access to onboard systems, equipment, and facilities. (2) Physical access control measures shall be provided to ensure that only authorized personnel can access protected areas containing critical assets on board. (3) where access monitoring devices, such as CCTV, are installed for surveilience of protected areas, unauthorized access to the recording devices of such monitoring systems shall be controlled. (4) Upon installation of new systems on board, it shall be verified that at least the same level of physical security as existing systems is applied.

Present	Amendment
5. Cyber security internal audit (1) Cyber security internal audit procedure shall be established and conducted periodically.	~~**5. Cyber security internal audit**~~ ~~(1) Cyber security internal audit procedure shall be established and conducted periodically.~~ **5. Outsider Security** (1) In order to prevent security incidents caused by outsiders on board, a security policies shall be established and implemented to control the use of mobile devices, data, as well as maintenance activities, by outsiders. (2) Outsiders shall be restricted from accessing shipboard systems and equipment, except where access is permitted under the supervision of onboard personnel. (3) Where temporary system access rights must be granted to outsiders on board, an appropriate approval procedure by the responsible person shall be followed. (4) Outsiders shall use the systems in compliance with the shipboard security procedures, and when connecting outsider-owned equipment to the systems, a prior security inspection shall be conducted.
6. 〈newly added〉	**6. Cyber Incident Response and Recovery Plan** (1) A cyber incident response and recovery plan, including the types of incidents and corresponding response methods and procedures, shall be maintained on board and kept up to date. (2) An organization and designated personnel responsible for immediate response to and recovery from cyber incidents affecting shipboard systems shall be established, and their roles and responsibilities shall be defined. (3) An emergency contact network shall be established and kept up to date to enable prompt communication with internal and external stakeholders. (4) Procedures shall be established and implemented for reporting to the appropriate competent authority and notifying the responsible persons in the event of a cyber incident. ⚓

Amendments of the Rules for Classification of Steel Ships

Pt. 5 Machinery Installations

(For Development Verification and Validation)

2025. 8.

Machinery Rule Development Team

- Main Amendments -

(1) Request for Establishment/Revision of Classification Technical Rules
〈ships contracted for construction on or after 2026/07/01〉

◉ Clarification about the requirement of manufacturing process approval for Class I and Class II pressure vessels in Ch 5 Sec 4 401.

◉ Reflecting IACS Rec 188(New) to Ch 6 Sec 9.

Present	Amendment	Reason
CHAPTER 5 BOILERS AND PRESSURE VESSELS **Section 4 Welding for Boilers and Pressure Vessels** **401. General** **1.** The manufacturers of welded boiler, Class 1 and Class 2 pressure vessels are to obtain the approval of manufacturing process and to submit to the Society for approval the detailed construction drawings and welding procedures as specified in **Ch 1, 208. 1** (7) (quality of materials, welding method, specification of welding materials, type of edge preparation, heat treatment, test methods are to be shown) before the commencement of the work. Unless specially specified otherwise, the following requirements are also to be applied to welded construction. **2. Welding procedure qualification test** The manufacturers are to submit the detailed data in connection with the welding work for examination of the Society and also conduct the welding procedure qualification tests specified by the Society if they plan to construct boilers or pressure vessels with welded structure for the first time, or if they adopt a new welding method, and if they change types of base metals, types of welding materials, or types of joints. But, for minor changes in the welding process, the test may be omitted if approved by the Surveyor. **【See Guidance】**	**CHAPTER 5 BOILERS AND PRESSURE VESSELS** **Section 4 Welding for Boilers and Pressure Vessels** **401. General** **1.** The manufacturers of welded boiler, Class 1 and Class 2 pressure vessels are to obtain the approval of manufacturing process and to submit to the Society for approval the detailed construction drawings and welding procedures as specified in **Ch 1, 208. 1** (7) (quality of materials, welding method, specification of welding materials, type of edge preparation, heat treatment, test methods are to be shown) before the commencement of the work. Unless specially specified otherwise, the following requirements are also to be applied to welded construction. **【See Guidance】** **2. Welding procedure qualification test** The manufacturers are to submit the detailed data in connection with the welding work for examination of the Society and also conduct the welding procedure qualification tests specified by the Society if they plan to construct boilers or pressure vessels with welded structure for the first time, or if they adopt a new welding method, and if they change types of base metals, types of welding materials, or types of joints. But, for minor changes in the welding process, the test may be omitted if approved by the Surveyor. **【See Guidance】**	- A reference phrase has been added following the revision of the Guidance

Present	Amendment	Reason
CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT **Section 9 Fuel Oil System** **901. General** **1.-7. 〈Omitted〉** **8. Fuel oil pumps** (1) Stop valves or cocks are to be fitted on both the suction and delivery sides of fuel oil pumps to overhaul these pumps. (2) All pumps which are capable of developing a pressure exceeding the design pressure of the system are to be provided with relief valves arranged discharge back to the suction side of the pump. However, pressure relief valves may not be fitted when the system is served only by centrifugal pumps, so designed that the pressure delivered can not exceed that for which the piping is designed. (3) The power supply to the fuel oil transfer pump, fuel oil burning pump, fuel valve cooling oil pump, other similar fuel oil pumps and fuel oil purifiers is to be capable of being stopped from a remote position which will always be accessible in the event of fire taking place in the compartment in which they are situated or its neighbourhood, as well as from the compartment itself. 〈Omitted〉	**CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT** **Section 9 Fuel Oil System** **901. General** **1.-7. 〈Omitted〉** **8. Fuel oil pumps** (1) Stop valves or cocks are to be fitted on both the suction and delivery sides of fuel oil pumps to overhaul these pumps. (2) All pumps which are capable of developing a pressure exceeding the design pressure of the system are to be provided with relief valves arranged discharge back to the suction side of the pump. However, pressure relief valves may not be fitted when the system is served only by centrifugal pumps, so designed that the pressure delivered can not exceed that for which the piping is designed. 【See Guidance】 (3) The power supply to the fuel oil transfer pump, fuel oil burning pump, fuel valve cooling oil pump, other similar fuel oil pumps and fuel oil purifiers is to be capable of being stopped from a remote position which will always be accessible in the event of fire taking place in the compartment in which they are situated or its neighbourhood, as well as from the compartment itself. 〈Omitted〉	- A reference phrase has been added following the revision of the Guidance

Guidance Relating to the Rules for the Classification of Steel Ships

Pt. 5 Machinery Installations

(For External opinion inquiry)

2025. 8.

Machinery Rule Development Team

- Main Amendments -

(1) Request for Establishment/Revision of Classification Technical Rules
〈ships contracted for construction or application for testing/certification is carried out on or after 2026/01/01〉

◉ Reflection of IACS UR M10(Rev.5) (a part of M10.19) about Oil mist detection arrangements

(2) Request for Establishment/Revision of Classification Technical Rules
〈ships contracted for construction on or after 2026/01/01〉

◉ Amendment for the valve piercing collision bulkhead.

◉ Reflecting IACS UR P4(Rev.4) to Annex 5-6.

(3) Request for Establishment/Revision of Classification Technical Rules
〈ships contracted for construction on or after 2026/07/01〉

◉ Clarification about the requirement of manufacturing process approval for Class I and Class II pressure vessels in Ch 5 Sec 4 401.

◉ Clarification about the requirement of carbon steel piping system(SPP) in Ch 6 Sec 1.

◉ Clarification about the requirement when aluminum piping is used on hulls made of aluminum.

◉ Reflecting IACS Rec 188(New) to Ch 6 Sec 9.

◉ Revised the footnote 1 of Table 1 in Annex 5-6

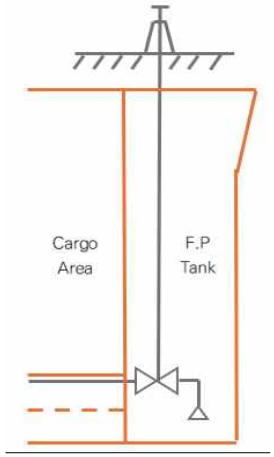
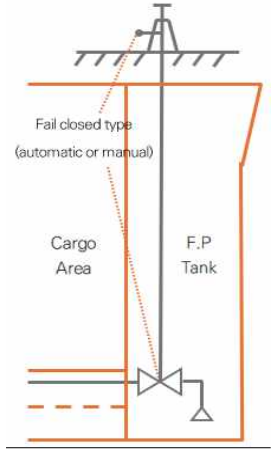
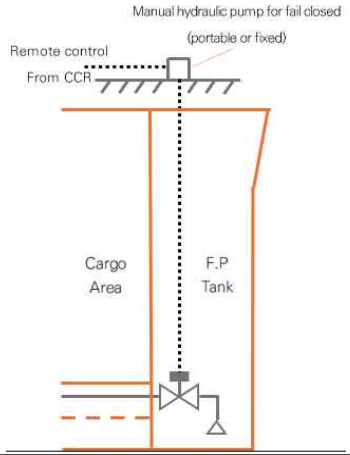
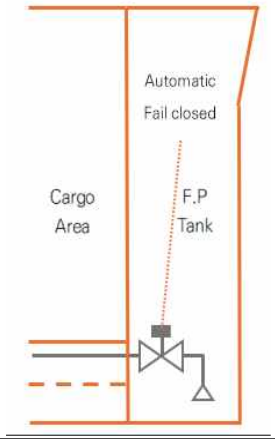
◉ Added the approval criteria for the valve operation in Annex 5-6.

◉ Revised the reference phrase in Annex 5-6 .

Present	Amendment	Reason
CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT **Section 1 General** **107. General requirements for piping arrangement** **1. -6.** *〈Omitted〉* **7. Watertight Bulkhead 【See Rule】** (1) In application to **107. 8** of the Rules, suction pipes of the stern tank are to be fitted with stop valves at the fore side of the bulkhead. (2) In application to **107. 8.** (2) of the Rules, ships of less than 500 gross tonnage and engaged in under coastal services may be also loosened as follows. (A) The number of the pipe passing through the collision bulkhead may be not applied. (B) If it is not possible to install a screw down valve, a butterfly valve may be fitted. In this cases, a butterfly valve is to be of type with positive holding arrangements, or equivalents, that will prevent movement of the valve position due to vibration or flow of fluids. (3) *〈Omitted〉*	**CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT** **Section 1 General** **107. General requirements for piping arrangement** **1. -6. 〈Omitted〉** **7. Watertight Bulkhead 【See Rule】** (1) In application to **107. 8** of the Rules, suction pipes of the stern tank are to be fitted with stop valves at the fore side of the bulkhead. (2) ~~In application to **107. 8.** (2) of the Rules, ships of less than 500 gross tonnage and engaged in under coastal services may be also loosened as follows.~~ ~~(A) The number of the pipe passing through the collision bulkhead may be not applied.~~ (2) In application to **107. 8** (2) of the Rules, it may be in accordance with the followings; (A) The valve fitted on the pipe piercing ship's collision bulkhead below the bulkhead deck of passenger ships and the freeboard deck of cargo ships may be either a deck standing manual type or a mechanically powered type with a fail-close arrangement. The valve of the fail-close arrangement shall be of an automatic fail-close type, or shall have an additional manual-closing function activate from a position above the bulkhead deck of passenger ships and the freeboard deck of cargo ships. Examples are provided in **Table 5.6.2** (B) For ships of less than 500 gross tonnage and engaged in under coastal services, **107. 8** (2) of the Rules shall not be applied. (C) ~~(B) If it is not possible to install a screw down valve, a butterfly valve may be fitted. In this cases, a butterfly valve~~ In case a butterfly valve is installed, it is to be of type with positive holding arrangements, or equivalents, that will prevent movement of the valve position due to vibration or flow of fluids. (3) *〈Omitted〉*	〈1 Jan. 2026 (Contracted date), Circular will be issued.〉 - IACS UI SC306

Amendment	Reason

Table 5.6.2 Examples of valve applications for piping piercing ship's collision bulkhead.

Type of arrangement	Example of valve installation	Type of arrangement	Example of valve installation
Case 1	Unacceptable	Case 2	Acceptable
- Manual deck stand controlled from the freeboard deck or bulkhead deck - When fail, the valve remains at its current position		- Manual deck stand controlled from the freeboard deck or bulkhead deck - Fail-close type valve (automatic close, or manual close from the freeboard deck or bulkhead deck) - Example of manual close Manual close shall be capable of being closed by a manual hydraulic pump activated from a position above the bulkhead deck/freeboard deck	
Case 3	Acceptable	Case 4	Acceptable
- Actuated mechanically and controlled remotely from cargo control room, etc. - Manual fail-close from above the freeboard deck or bulkhead deck - Example of manual close Manual close shall be capable of being closed by a manual hydraulic pump activated from a position above the bulkhead deck/freeboard deck		- Actuated mechanically and controlled remotely from cargo control room, etc. - Automatic fail-close	

- Examples are provided to clarify the intent.
- It is to be inserted after 107. 7 (2) (A).

Present	Amendment	Reason
# CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT ## Section 3 Sea inlet and Overboard Discharge **303. Scuppers and sanitary discharge** **1. Scuppers of exposed decks** In application to **303. 3** of the Rules, scuppers piping within superstructures are not to be connected to the scupper piping of exposed decks. **【See Rule】** **2. Non-return valves of scuppers and sanitary pipes** In application to **303. 4** of the Rules, discharge from spaces under the freeboard deck is to comply with the following. **【See Rule】** (1) Discharge from under the freeboard deck (A) Inboard open end of scuppers (a) Where discharge of bilge from the small compartments at fore and stern (steering gear room, boatswain's store, chain locker, etc.) is carried out by hand pumps or ejectors, "the vertical distance to the inboard opening end of scupper" means the vertical distance to the position located highest in the system of such discharge pipes. (b) Inboard open end of scupper pipes in case where timber load lines are marked, the vertical distance to the inboard open end is to be measured from the timber summer load line. (B) Overboard discharge pipes which are always closed during navigation. Requirements of **303. 4** of the Rules are to be applied to normally opened discharge pipes during a voyage, but, in case normally closed discharge pipes, except when discharging, during a voyage such as gravity discharge of top side tank, a screw down stop valve with opened/close indicator being operable from a position easily accessible on the freeboard deck may be used. (C) Overboard discharge pipes Discharge pipes passing through cargo hold are to be of steel pipe with SCH.160 or 16 mm of wall thickness and above, or are to be protected appropriately. (D) Acceptable arrangements of scupper and discharge are to comply with **Table 5.6.2**. *(2021)* **Table 5.6.2. Acceptable arrangements of scupper and discharge** *〈Omitted〉*	# CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT ## Section 3 Sea inlet and Overboard Discharge **303. Scuppers and sanitary discharge** **1. Scuppers of exposed decks** In application to **303. 3** of the Rules, scuppers piping within superstructures are not to be connected to the scupper piping of exposed decks. **【See Rule】** **2. Non-return valves of scuppers and sanitary pipes** In application to **303. 4** of the Rules, discharge from spaces under the freeboard deck is to comply with the following. **【See Rule】** (1) Discharge from under the freeboard deck (A) Inboard open end of scuppers (a) Where discharge of bilge from the small compartments at fore and stern (steering gear room, boatswain's store, chain locker, etc.) is carried out by hand pumps or ejectors, "the vertical distance to the inboard opening end of scupper" means the vertical distance to the position located highest in the system of such discharge pipes. (b) Inboard open end of scupper pipes in case where timber load lines are marked, the vertical distance to the inboard open end is to be measured from the timber summer load line. (B) Overboard discharge pipes which are always closed during navigation. Requirements of **303. 4** of the Rules are to be applied to normally opened discharge pipes during a voyage, but, in case normally closed discharge pipes, except when discharging, during a voyage such as gravity discharge of top side tank, a screw down stop valve with opened/close indicator being operable from a position easily accessible on the freeboard deck may be used. (C) Overboard discharge pipes Discharge pipes passing through cargo hold are to be of steel pipe with SCH.160 or 16 mm of wall thickness and above, or are to be protected appropriately. (D) Acceptable arrangements of scupper and discharge are to comply with **Table 5.6.2**: 5.6.3 *(2021)* **Table ~~5.6.2~~: 5.6.3 Acceptable arrangements of scupper and discharge** *〈Omitted〉*	

Present	Amendment	Reason
# CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT ## Section 4 Bilge and Ballast System **401. General** **1. Application** Bilge piping of ships having length less than 50 m is to comply with the following. However, requirements not specified in the following are to be in accordance with the Rules. **【See Rule】** (1) Number of bilge pumps Number of bilge pumps are to be in accordance with **Table** 5.6.3 of the Guidance. (2) Capacity of bilge pump The independent power bilge pump specified **Table** 5.6.3 of the Guidance, is to have capacity not less than that obtained from the formula in **405. 2** of the Rules. However, it may be added to the capacity of a independent power bilge pump given in (1) above. **(Omitted)** **Table** 5.6.3 **Number of Bilge Pumps (Table Omitted)**	# CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT ## Section 4 Bilge and Ballast System **401. General** **1. Application** Bilge piping of ships having length less than 50 m is to comply with the following. However, requirements not specified in the following are to be in accordance with the Rules. **【See Rule】** (1) Number of bilge pumps Number of bilge pumps are to be in accordance with **Table** ~~5.6.3~~ 5.6.4 of the Guidance. (2) Capacity of bilge pump The independent power bilge pump specified **Table** ~~5.6.3~~ 5.6.4 of the Guidance, is to have capacity not less than that obtained from the formula in **405. 2** of the Rules. However, it may be added to the capacity of a independent power bilge pump given in (1) above. **(Omitted)** **Table** ~~5.6.3~~ 5.6.4 **Number of Bilge Pumps (Table Omitted)**	

Present	Amendment	Reason
CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT **Section 11 Compressed Air System** **1102. Construction and safety devices 【See Rule】** **1.** In application to **1102. 1** (4) of the Rules, the strength of crankshaft of air compressor is to comply with the following (1) or (2). However, for other cases, special consideration may be given to the diameter of crank shafts, if the detailed data and calculations on the strength of crank shafts are submitted. (1) The required diameters 강갭 of journals and crank pins are not to be less than that given by the following formula. 강갭 • • 겂값 • 걍 • • • 각 • (mm) (Omitted) 걍 : Coefficient according to **Table 5.6.4** of the Guidance 정 : Number of cylinders 겂 : Material factor according to **Table 5.6.5** or **Table 5.6.6** of the Guidance 걍 : Specified minimum tensile strength (N mm) **Table 5.6.4 Values of 걍 (Table Omitted)** **Table 5.6.5 Values of 겂 for steel shaft (Table Omitted)** **Table 5.6.6 Values of 겂 for nodular cast iron shafts (Table Omitted)**	**CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT** **Section 11 Compressed Air System** **1102. Construction and safety devices 【See Rule】** **1.** In application to **1102. 1** (4) of the Rules, the strength of crankshaft of air compressor is to comply with the following (1) or (2). However, for other cases, special consideration may be given to the diameter of crank shafts, if the detailed data and calculations on the strength of crank shafts are submitted. (1) The required diameters 강갭 of journals and crank pins are not to be less than that given by the following formula. 강갭 • • 겂값 • 걍 • • • 각 • (mm) (Omitted) 걍 : Coefficient according to **Table ~~5.6.4~~ 5.6.5** of the Guidance 정 : Number of cylinders 겂 : Material factor according to **Table ~~5.6.5~~ 5.6.6** or **Table ~~5.6.6~~ 5.6.7** of the Guidance 걍 : Specified minimum tensile strength (N mm) **Table ~~5.6.4~~ 5.6.5 Values of 걍 (Table Omitted)** **Table ~~5.6.5~~ 5.6.6 Values of 겂 for steel shaft (Table Omitted)** **Table ~~5.6.6~~ 5.6.7 Values of 겂 for nodular cast iron shafts (Table Omitted)**	

Present	Amendment	Reason
(Continued as follows) (2) Crankshafts are to include a satisfactory safety factor against fatigue failures. Various calculation methods may be used. Following gives one method for evaluation of safety against fatigue in the arm fillets. The method applies for crankshafts made of forged and cast steel and nodular cast iron intended for one or multistage compressors with the cylinders arranged in line, V or W. (A) The stresses in the crankpin fillet is to fulfil the following criterion: $_{강} \leq$ ^{각} $_{강}$ = the bending stress amplitude in the fillet (N mm$^{'}$) $_{각}$ = the fatigue strength (N mm$^{'}$) = the minimum safety factor For the fatigue criteria mentioned below, the following minimum safety factor applies: = 1.4 This safety factor includes the influence of torsional stresses in the fillets, which for the sake of simplicity are neglected in this method. The fatigue strength is to be calculated as follows: $_{각}$ $^{'}$ $_{강량}$ = ultimate tensile strength of the material (N mm$^{'}$) $_{강량}$ = material factor according to **Table 5.6.7** of the Guidance (Omitted) **Table 5.6.7 material factor $_{강량}$ (Table Omitted)**	(Continued as follows) (2) Crankshafts are to include a satisfactory safety factor against fatigue failures. Various calculation methods may be used. Following gives one method for evaluation of safety against fatigue in the arm fillets. The method applies for crankshafts made of forged and cast steel and nodular cast iron intended for one or multistage compressors with the cylinders arranged in line, V or W. (A) The stresses in the crankpin fillet is to fulfil the following criterion: $_{강} \leq$ ^{각} $_{강}$ = the bending stress amplitude in the fillet (N mm$^{'}$) $_{각}$ = the fatigue strength (N mm$^{'}$) = the minimum safety factor For the fatigue criteria mentioned below, the following minimum safety factor applies: = 1.4 This safety factor includes the influence of torsional stresses in the fillets, which for the sake of simplicity are neglected in this method. The fatigue strength is to be calculated as follows: $_{각}$ $^{'}$ $_{강량}$ = ultimate tensile strength of the material (N mm$^{'}$) $_{강량}$ = material factor according to **Table ~~5.6.7~~ 5.6.8** of the Guidance (Omitted) **Table ~~5.6.7~~ 5.6.8 material factor $_{강량}$ (Table Omitted)**	

Present	Amendment	Reason
(Continued as follows) 쟌걼걓 (N mm′) = bending moment in the middle of the arm nearest the center of the bearing span 걓걍 ′걾갌강 = cylinder bore (mm), 걾 = design pressure (MPa). For multicylinder arrangements on one bearing span, use the maximum of the individual 걾′. = distance between the centers of two bearings (mm), (see **Fig 5.6.15** of the Guidance) 갌 = distance from the center of a bearing to the center of the arm nearest the center of the bearing span (mm), (see **Fig 5.6.15** of the Guidance) 강 갌 강 ≥ 갌 , (mm) 걓걍 = design factor according to **Table 5.6.8** of the Guidance **Table 5.6.8 Design factor 걓걍 (Table Omitted)**	(Continued as follows) 쟌걼걓 (N mm′) = bending moment in the middle of the arm nearest the center of the bearing span 걓걍 ′걾갌강 = cylinder bore (mm), 걾 = design pressure (MPa). For multicylinder arrangements on one bearing span, use the maximum of the individual 걾′. = distance between the centers of two bearings (mm), (see **Fig 5.6.15** of the Guidance) 갌 = distance from the center of a bearing to the center of the arm nearest the center of the bearing span (mm), (see **Fig 5.6.15** of the Guidance) 강 갌 강 ≥ 갌 , (mm) 걓걍 = design factor according to **Table ~~5.6.8~~ 5.6.9** of the Guidance **Table ~~5.6.8~~5.6.9 Design factor 걓걍 (Table Omitted)**	

Present	Amendment	Reason
Annex 5-6 Plastic Piping System *(2023)*	**Annex 5-6 Plastic Piping System *(2023)***	〈1 Jan. 2026 (Contracted date), Circular will be issued.〉
6. Installation (1) - (6) *〈Omitted〉* (7) Penetration of divisions (A) Where plastic pipes pass through "A" or "B" class divisions, arrangements are to be made to ensure that the fire endurance is not impaired. These arrangements are to be tested in accordance with fire test procedures for "A" and "B" bulkheads specified in **Ch 3, 2604. 2** of the **"Guidance for Approval of Manufacturing Process and Type Approval, etc.".** (B) When plastic pipes pass through watertight bulkheads or decks, the watertight integrity of the bulkhead or deck is to be maintained. For pipes not able to satisfy the requirements in **4**.(1).(E), a metallic shut-off valve operable from above the freeboard deck should be fitted at the bulkhead or deck. (C) If the bulkhead or deck is also a fire division and destruction by fire of plastic pipes may cause the inflow of liquid from tanks, a metallic shut-off valve operable from above the freeboard deck is to be fitted at the bulkhead or deck. *〈Newly added〉*	**6. Installation** (1) - (6) *〈Omitted〉* (7) Penetration of divisions (A) Where plastic pipes pass through "A" or "B" class divisions, arrangements are to be made to ensure that the fire endurance is not impaired. These arrangements are to be tested in accordance with fire test procedures for "A" and "B" bulkheads specified in **Ch 3, 2604. 2** of the **"Guidance for Approval of Manufacturing Process and Type Approval, etc.".** (B) When plastic pipes pass through watertight bulkheads or decks, the watertight integrity of the bulkhead or deck is to be maintained. For pipes not able to satisfy the requirements in **4**.(1).(E), a metallic shut-off valve operable from above the freeboard deck should be fitted at the bulkhead or deck. (C) If the bulkhead or deck is also a fire division and destruction by fire of plastic pipes may cause the inflow of liquid from tanks, a metallic shut-off valve operable from above the freeboard deck is to be fitted at the bulkhead or deck. (D) For passenger ships, the penetrations used for the passage of plastic piping systems through a watertight bulkheads or decks shall be of a type approval in accordance with **Ch 3, Sec 41** of the **Guidance for Approval of Manufacturing Process and Type Approval, etc.** This requirement shall not apply to cable penetrations in watertight bulkheads and decks.	- IACS UR P4(Rev.4)
〈Omitted〉	*〈Omitted〉*	

Present	Amendment	Reason
CHAPTER 5 BOILERS AND PRESSURE VESSELS **Section 4 Welding for Boilers and Pressure Vessels** **401. General** *〈Newly added〉*	**CHAPTER 5 BOILERS AND PRESSURE VESSELS** **Section 4 Welding for Boilers and Pressure Vessels** **401. General** 1. In application to **401. 1** of the Rules, where Class I and Class II pressure vessels do not have longitudinal welds, the requirement for the approval of manufacturing process may be waived at the discretion of the Society.	- Newly established requirement for manufacturing approval only when longitudinal welding is present. - Clarified that this applies exclusively to small pressure vessels (seamless pipes), and is therefore subject to our classification society's review.
1. **Welding procedure qualification tests** In application to **401. 2** of the Rules, the welding procedure qualification tests are to comply with **Pt 2, Ch 2, Sec 4** of the Guidance. **【See Rule】**	~~1.~~ 2. **Welding procedure qualification tests** In application to **401. 2** of the Rules, the welding procedure qualification tests are to comply with **Pt 2, Ch 2, Sec 4** of the Guidance. **【See Rule】**	
2. In application to **401. 3** (3) of the Rules, the requirements of base metals for welding are to be in accordance with the following. **【See Rule】** (1) Base metals used in the welding work are to be those suitable for welding. And the carbon content is not to exceed 0.23 for carbon steel and low alloy steel castings and forging, or 0.35 for other materials. When approved by the Society in consideration of the welding conditions, the carbon content may be increased to the value approved. (2) The upper limit of the carbon equivalent for high tensile steels as base material is to be as deemed appropriate by the Society.	~~2.~~ 3. In application to **401. 3** (3) of the Rules, the requirements of base metals for welding are to be in accordance with the following. **【See Rule】** (1) Base metals used in the welding work are to be those suitable for welding. And the carbon content is not to exceed 0.23 for carbon steel and low alloy steel castings and forging, or 0.35 for other materials. When approved by the Society in consideration of the welding conditions, the carbon content may be increased to the value approved. (2) The upper limit of the carbon equivalent for high tensile steels as base material is to be as deemed appropriate by the Society.	

Present	Amendment	Reason
CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT **Section 1 General** **102. Pipes** **1. Materials 【See Rule】** (1) The carbon steel pipes for ordinary piping marked as pipes produced at the manufacturing process approval factory of the Society may be used for Class II on the assumption that the requirement specified in **102. 2.** (4) of the Rules. *〈Newly added〉*	**CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT** **Section 1 General** **102. Pipes** **1. Materials 【See Rule】** (1) The carbon steel pipes for ordinary piping ~~marked as pipes~~ produced at the manufacturing process approval factory of the Society may be used for Class II on the assumption that the requirement specified in **102. 2.** (4) of the Rules. (2) In application to **102. 2.** (4) of the Rules, in case where the carbon steel pipes are an open-ended piping system, the limitation for design temperature in service may not be applied.	- The requirement was removed as it caused confusion, since Class II piping systems are originally subject to inspection by the surveyor. - Revised so that only open-ended pipes among Class III piping systems may be exempted from considering the design temperature limitation.

Present	Amendment	Reason
CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT **Section 1 General** **102. Pipes** **1. – 2.** *〈Omitted〉* **3. Use of special materials and flexible pipes** In application to **102. 5** of the Rules, the following are to apply. (1) In case where plastic pipes are used, plastic piping system are to comply with the requirements given in the **Annex 5-6.** *(2017)* (2) When aluminium alloy pipes are used, the following requirements are to be complied with; (A) Aluminium alloy pipes are, as a rule, to be in accordance with the requirements of the standards deemed appropriate by the Society, and are to be of seamless drawn pipes or seamless extruded pipes. (B) The pipes for the following are not to be of aluminium alloy; (a) As a rule, pipes with a design temperature exceeding 150 °C (b) Pipes specified in above **2.** (2) (B) through (L) *〈Newly Added〉* (C) The required wall thickness of aluminium alloy pipes subject to internal pressure are to be in accordance with the following; The wall thickness of pipes is to be determined by the formula in **102. 6** of the Rules. In this case, the allowable stress 각 is to be of the minimum value of the following values. However, when the design temperature is not in the creep region of the material, no consideration may be required for the value of 각ᵣ. *〈Omitted〉*	**CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT** **Section 1 General** **102. Pipes** **1. – 2.** 〈Omitted〉 **3. Use of special materials and flexible pipes** In application to **102. 5** of the Rules, the following are to apply. (1) In case where plastic pipes are used, plastic piping system are to comply with the requirements given in the **Annex 5-6.** *(2017)* (2) When aluminium alloy pipes are used, the following requirements are to be complied with; (A) Aluminium alloy pipes are, as a rule, to be in accordance with the requirements of the standards deemed appropriate by the Society, and are to be of seamless drawn pipes or seamless extruded pipes. (B) The pipes for the following are not to be of aluminium alloy; (a) As a rule, pipes with a design temperature exceeding 150 °C (b) Pipes specified in above **2.** (2) (B) through (L) (C) In the case of ships with hulls constructed of aluminum, this requirement is not to apply. In such cases, **Ch 5 Sec 2 201. 2** (1) of **Rules/Guidance for the Classifiaction of High Speed and Light Craft** is to apply. ~~(C)~~(D) The required wall thickness of aluminium alloy pipes subject to internal pressure are to be in accordance with the following; The wall thickness of pipes is to be determined by the formula in **102. 6** of the Rules. In this case, the allowable stress 각 is to be of the minimum value of the following values. However, when the design temperature is not in the creep region of the material, no consideration may be required for the value of 각ᵣ. *〈Omitted〉*	– Revised to allow reference to the High-Speed Craft guidelines only when aluminum piping is used on hulls made of aluminum.

Present	Amendment	Reason
CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT **Section 9 Fuel Oil System** **901. General** **1.-4. 〈Omitted〉**	**CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT** **Section 9 Fuel Oil System** **901. General** **1.-4. 〈Omitted〉**	
	5. **Fuel oil pumps** In application to **901. 8** (2) of the Rules, If the vessel design requires isolation valves at the relief valve discharge line, these valves should be locked open, otherwise other arrangements should be set to prevent overpressurization. **【See Rule】**	- IACS Rec 188(New)
5. **Fuel oil transfer pumps** In application to **901. 9** of the Rules, the following may be accepted. **【See Rule】** (1) The fuel oil transfer pumps may be in accordance with the following. (A) For main engine with output 368 kW or above but less than 1,471 kW or ships having length less than 50 m, the main fuel oil transfer pump is to be a power pump. Stand-by pump may be acceptable by hand pump. (B) Where main engine output is 368 kW or less, hand pump may be acceptable. (C) In case of ships equipped with two or more engines, the main engine output means total output of the engines. (2) In case of ships engaged in smooth water service, 1 set of fuel oil transfer pump may be acceptable.	6.~~5.~~ **Fuel oil transfer pumps** In application to **901. 9** of the Rules, the following may be accepted. **【See Rule】** (1) The fuel oil transfer pumps may be in accordance with the following. (A) For main engine with output 368 kW or above but less than 1,471 kW or ships having length less than 50 m, the main fuel oil transfer pump is to be a power pump. Stand-by pump may be acceptable by hand pump. (B) Where main engine output is 368 kW or less, hand pump may be acceptable. (C) In case of ships equipped with two or more engines, the main engine output means total output of the engines. (2) In case of ships engaged in smooth water service, 1 set of fuel oil transfer pump may be acceptable.	
6. **Fuel oil piping** In application to **901. 10** of the Rules, for tanks used in common service with fuel oil tanks and ballast tanks, piping arrangement is to be made in such a way that either fuel oil or ballast water can be drawn individually under any circumstances. (refer to **Fig 5.6.11** of the Guidance) **【See Rule】**	7.~~6.~~ **Fuel oil piping** In application to **901. 10** of the Rules, for tanks used in common service with fuel oil tanks and ballast tanks, piping arrangement is to be made in such a way that either fuel oil or ballast water can be drawn individually under any circumstances. (refer to **Fig 5.6.11** of the Guidance) **【See Rule】**	
7. No fuel oil pipes are to be led through drinking water tanks, and no drinking water pipes are to be led through fuel oil tanks.	8.~~7.~~ No fuel oil pipes are to be led through drinking water tanks, and no drinking water pipes are to be led through fuel oil tanks.	
8. In application to **901. 14** of the Rules, the example of two fuel oil service tanks for each type of fuel oil used on board are as shown in **Fig 5.6.12** of the Guidance. This requirement applies only to ships subject to the requirements of the SOLAS. **【See Rule】**	9.~~8.~~ In application to **901. 14** of the Rules, the example of two fuel oil service tanks for each type of fuel oil used on board are as shown in **Fig 5.6.12** of the Guidance. This requirement applies only to ships subject to the requirements of the SOLAS. **【See Rule】**	

Present

Annex 5-6 Plastic Piping System *(2023)*

5. Requirements for pipes/piping systems depending on service and/or locations

(1) *〈Omitted〉*

Table 1 Fire Endurance Requirements Matrix

Piping system	Location[13]										
	A	B	C	D	E	F	G	H	I	J	K
	Machinery spaces of category A	Other machinery spaces & pump rooms	Cargo pump rooms	Ro/Ro cargo holds	Other dry cargo holds	Cargo tanks	Fuel oil tanks	Ballast water tanks	Cofferdams void spaces pipe tunnel & ducts	Accommodation service & control spaces	Open decks
〈Omitted〉											
Seawater[1]											
12. Bilge main & branches	L1[7]	L1[7]	L1	X	X	NA	O	O	O	NA	L1
13. Fire main water spray	L1	L1	L1	X	NA	NA	NA	O	O	NA	L1

Amendment

Annex 5-6 Plastic Piping System *(2023)*

5. Requirements for pipes/piping systems depending on service and/or locations

(1) *〈Omitted〉*

Table 1 Fire Endurance Requirements Matrix

Piping system	Location[13]										
	A	B	C	D	E	F	G	H	I	J	K
	Machinery spaces of category A	Other machinery spaces & pump rooms	Cargo pump rooms	Ro/Ro cargo holds	Other dry cargo holds	Cargo tanks	Fuel oil tanks	Ballast water tanks	Cofferdams void spaces pipe tunnel & ducts	Accommodation service & control spaces	Open decks
〈Omitted〉											
Seawater[1]											
12. Bilge main & branches	L1[7]	L1[7]	L1	X	X	NA	O	O	O	NA	L1
13. Fire main water spray	L1	L1	L1	X	NA	NA	NA	O	O	~~NA~~ X	L1

Reason

- Revised Footnote 1 of Table 1 in Appendix 5-6.

Present	Amendment	Reason
6. Installation (10) Shop tests (A) Plastic pipes except for piping systems specified in **3** (2) above are to be subjected to the following tests and measurements of dimension after the manufacturer. The number of test specimens, testing procedures, results, procedures of measurement of dimension and tolerance are to be complied with the manufacturer's approved by the Society. (a) Tensile test (b) Hydrostatic test of each pipe/fitting(A hydrostatic pressure is to be not less than 1.5 times the nominal pressure). Alternatively, where pipe/fittings are not employing hand lay up techniques and are manufactured in accordance with Korean Industrial Standards or equivalent by manufacturer who has an effective quality system accepted by this Society, the hydrostatic pressure test may be carried out in accordance with the standards. (c) Outside diameter and wall thickness measurements (d) Ascertainment of uniform quality and no harmful defect (f) Electric conductivity test(only for pipes required for electric conductivity by specified in **5** (4) above) (g) Depending upon the intended application, the Society may require the pressure testing of each pipe/fitting. (B) For tests and measurements specified in (A), in case where the manufacture has been assessed in accordance with **Pt 1, Annex 1-11** of the Guidance, testing items under the Surveyor's attendance may be omitted. In this case, the Society's surveyor may require submission of the test results. (11) Testing after installation on board (A) Piping systems for essential services are to be subjected to a test pressure not less than 1.5 times the design pressure or 0.4 MPa whichever is greater. Notwithstanding the requirement above, the requirement in **6.(11).(B)** of **Annex 5-6** may be applied to open ended pipes (drains, effluent, etc.). (B) Piping systems for non-essential services are to be checked for leakage under operational conditions. (C) For piping required to be electrically conductive, earthing is to be checked and random resistance testing is to be conducted.	**6. Installation** ~~(10) Shop tests~~ ~~(A) Plastic pipes except for piping systems specified in **3** (2) above are to be subjected to the following tests and measurements of dimension after the manufacturer. The number of test specimens, testing procedures, results, procedures of measurement of dimension and tolerance are to be complied with the manufacturer's approved by the Society.~~ ~~(a) Tensile test~~ ~~(b) Hydrostatic test of each pipe/fitting(A hydrostatic pressure is to be not less than 1.5 times the nominal pressure). Alternatively, where pipe/fittings are not employing hand lay up techniques and are manufactured in accordance with Korean Industrial Standards or equivalent by manufacturer who has an effective quality system accepted by this Society, the hydrostatic pressure test may be carried out in accordance with the standards.~~ ~~(c) Outside diameter and wall thickness measurements~~ ~~(d) Ascertainment of uniform quality and no harmful defect~~ ~~(f) Electric conductivity test(only for pipes required for electric conductivity by specified in **5** (4) above)~~ ~~(g) Depending upon the intended application, the Society may require the pressure testing of each pipe/fitting.~~ ~~(B) For tests and measurements specified in (A), in case where the manufacture has been assessed in accordance with **Pt 1, Annex 1-11** of the Guidance, **Ch 5** of the **"Guidance for Approval of Manufacturing Process and Type Approval, etc."**, testing items under the Surveyor's attendance may be omitted. In this case, the Society's surveyor may require submission of the test results.~~ (10)~~(11)~~ Testing after installation on board (A) Piping systems for essential services are to be subjected to a test pressure not less than 1.5 times the design pressure or 0.4 MPa whichever is greater. Notwithstanding the requirement above, the requirement in **6.(11).(B)** of **Annex 5-6** may be applied to open ended pipes (drains, effluent, etc.). (B) Piping systems for non-essential services are to be checked for leakage under operational conditions. (C) For piping required to be electrically conductive, earthing is to be checked and random resistance testing is to be conducted.	- Currently, plastic pipes are used for Class 3 piping only, and therefore, the manufacturing test are not enforced. Based on the opinion received from the Technical Department, this requirement has been deleted. - In the future, if plastic pipes are to be used for Class 1 or 2 piping, the necessity of introducing this requirement will be discussed.

Amendments of the Guidance Relating to the Rules for the Classification of Steel Ships

Pt. 5 Machinery Installations

(Pt. 1 Classification and Surveys / Annex 1-1 only)

(For Development Verification Validation)

2026. 02.

Machinery Rule Development Team

- Main Amendments -

(1) Ships contracted for construction for construction or the application for classification survey is carried out on or after 2026/07/01

- ◉ [Guidance Pt. 5, Ch. 1] Addition of essential auxiliaries related to electrically propelled ships
- ◉ [Guidance Pt. 5, Ch. 7] Incorporation of IACS UR M42 (Rev.7)
- ◉ [Guidance Pt. 5, Ch. 7] Amendment to the Rules regarding conditions for omission of the auxiliary steering gear
- ◉ [Guidance Pt. 5, Annex 5-4] Incorporation of IACS UR M56 (Rev.4 Corr.3)
- ◉ [Guidance Pt. 5, Annex 5-10] Addition of test requirements for ships assigned the RP class notation
- ◉ [Guidance Pt. 5, Annex 5-12] Establishment of requirements for In-Line Type Shaft Generator Systems

Present	Amendment	Reason
Guidance Relating to the Rules for the Classification of Steel Ships **Part 5 Machinery Installations** **CHAPTER 1 GENERAL** **Section 1 General**	**Guidance Relating to the Rules for the Classification of Steel Ships** **Part 5 Machinery Installations** **CHAPTER 1 GENERAL** **Section 1 General**	
102. Definitions	**102. Definitions**	
1. The essential auxiliaries given in **102. 5** of the Rules are as follows; **【See Rule】** (1) Auxiliary machinery essential for main propulsion (A) For ships equipped with an internal combustion engine as main engine *(Omitted)* (B) For ships equipped with a steam turbine as main engine *(Omitted)* (g) Other auxiliary machinery as deemed essential by the Society	**1.** The essential auxiliaries given in **102. 5** of the Rules are as follows; **【See Rule】** (1) Auxiliary machinery essential for main propulsion (A) For ships equipped with an internal combustion engine as main engine *(Omitted)* (B) For ships equipped with a steam turbine as main engine *(Omitted)* (g) Other auxiliary machinery as deemed essential by the Society	
(New)	(C) For ships with electric propulsion as the main propulsion system (a) For cooling Water System of the propulsion Motor (if installed) Cooling water pumps (b) For lubricating oil system of the propulsion motor (if installed) Lubricating oil pumps (c) For identification of essential auxiliaries for the prime mover of the electric propulsion system, see (A) (d) Other auxiliary machinery as deemed essential by the Society	Added: a list of essential auxiliaries for electric propulsion ships
(Omitted)	*(Omitted)*	

Present	Amendment	Reason
Guidance Relating to the Rules for the Classification of Steel Ships **Part 5 Machinery Installations** **CHAPTER 7 STEERING GEARS** **Section 2 Performance and Arrangement**	**Guidance Relating to the Rules for the Classification of Steel Ships** **Part 5 Machinery Installations** **CHAPTER 7 STEERING GEARS** **Section 2 Performance and Arrangement**	
104. Display of operating instructions 【See Rule】	**104. Display of operating instructions 【See Rule】**	
	1. In application to **104. 1** of the Rules, where applicable, following standard signboard should be fitted at a suitable place on steering control post on the bridge or incorporated into operating instruction on board: CAUTION IN SOME CIRCUMSTANCES WHEN 2 POWER UNITS ARE RUNNING SIMULTANEOUSLY THE RUDDER MAY NOT RESPOND TO HELM. IF THIS HAPPENS STOP EACH PUMP IN TURN UNTIL CONTROL IS REGAINED. The above signboard is related to steering gears provided with 2 power units (usually identical) intended for simultaneous operation, and normally provided with either their own control systems or two separate (partly or mutually) control systems which are/may be operated simultaneously.	UR M42.14
In application to **104. 2** of the Rules, the "appropriate instructions for emergency procedures" are to simply indicate emergency procedures corresponding to the design of steering gear (for example, to shut down the failed system indicated by the alarming system), and are to be fitted at a suitable place on steering control post on the navigation bridge where applicable.	**2.** In application to **104. 2** of the Rules, the "appropriate instructions for emergency procedures" are to simply indicate emergency procedures corresponding to the design of steering gear (for example, to shut down the failed system indicated by the alarming system), and are to be fitted at a suitable place on steering control post on the navigation bridge where applicable.	
(Omitted)	*(Omitted)*	

Present	Amendment	Reason
Guidance Relating to the Rules for the Classification of Steel Ships **Part 5 Machinery Installations** **CHAPTER 7 STEERING GEARS** **Section 2 Performance and Arrangement** **201. Number of steering gears 【See Rule】** **1.** In case where ships whose required upper stock diameter is not more than 120 mm according to **Pt 4, Ch 1** of the Rules and engaged in the service in smooth water area, or ships with a gross tonnage less than 50 tons, provide that spare parts liable to wear down such as packings, bearings are provided where the main steering gear is operated by power, the auxiliary steering gear required by **201.** of the Rules may be omitted. **2.** In case where the auxiliary steering gear as specified in **201. 1** of the Rules is of hydraulic type, the rudder actuator can serve in common with that for the main steering gear. Further, part of the hydraulic piping of the rudder actuator of the main steering gear may be used in common with that for the auxiliary steering gear. In this case, but the pipe length of the part of common use is to be as short as practicable. *(Omitted)*	**Guidance Relating to the Rules for the Classification of Steel Ships** **Part 5 Machinery Installations** **CHAPTER 7 STEERING GEARS** **Section 2 Performance and Arrangement** **201. Number of steering gears 【See Rule】** ~~**1.** In case where ships whose required upper stock diameter is not more than 120 mm according to **Pt 4, Ch 1** of the Rules and engaged in the service in smooth water area, or ships with a gross tonnage less than 50 tons, provide that spare parts liable to wear down such as packings, bearings are provided where the main steering gear is operated by power, the auxiliary steering gear required by **201.** of the Rules may be omitted.~~ **1.** In application of **201. 1** of the Rules, for ships other than passenger ships, the auxiliary steering gear may be omitted in any of the following cases: (1) Ships whose required upper stock diameter is not more than 120 mm according to **Pt 4, Ch 1** of the Rules, and engaged in the service in smooth water area or ships with a gross tonnage less than 50 gross tonnage (2) Ships in which the steering gear is power-operated, being ships engaged in service in smooth water area, or ships of less than 50 gross tonnage engaged in service in the domestic coastal area; provided, however, that spare parts liable to wear, such as packings and bearings, are provided on board. **2.** In case where the auxiliary steering gear as specified in **201. 1** of the Rules is of hydraulic type, the rudder actuator can serve in common with that for the main steering gear. Further, part of the hydraulic piping of the rudder actuator of the main steering gear may be used in common with that for the auxiliary steering gear. In this case, but the pipe length of the part of common use is to be as short as practicable. *(Omitted)*	

Present	Amendment	Reason
Guidance Relating to the Rules for the Classification of Steel Ships **Part 5 Machinery Installations** **Annex 5-4 Strength Calculation for Gears of Power Transmission Systems**	**Guidance Relating to the Rules for the Classification of Steel Ships** **Part 5 Machinery Installations** **Annex 5-4 Strength Calculation for Gears of Power Transmission Systems**	
6. Surface durability The criterion for surface durability is based on the Hertz pressure on the operating pitch point or at the inner point of single pair contact. The contact stress σ_H is to be equal to or less than the permissible contact stress σ_{HP}. *(Omitted)* (10) Hardness ratio factor, Z_W *(Omitted)* (c) For $HB > 470$, $Z_W = \left(\frac{3}{R_{zH}}\right)^{0.15}$ Where, HB : Brinell hardness of the tooth flanks of the softer gear of the pair R_{zH} : equivalent roughness (㎛) $R_{zH} = \frac{R_{z1} \cdot (10/\rho_{red})^{0.33} \cdot (R_{z1}/R_{z2})^{0.66}}{(v \cdot \nu_{40}/1500)^{0.33}}$ v_{40}: nominal kinematic viscosity of the oil at 40 ℃ (mm^2/s) ρ_{red}: relative radius of curvature (refer to (9), (C)) *(Omitted)*	**6. Surface durability** The criterion for surface durability is based on the Hertz pressure on the operating pitch point or at the inner point of single pair contact. The contact stress σ_H is to be equal to or less than the permissible contact stress σ_{HP}. *(Omitted)* (10) Hardness ratio factor, Z_W *(Omitted)* (c) For $HB > 470$, $Z_W = \left(\frac{3}{R_{zH}}\right)^{0.15}$ Where, HB : Brinell hardness of the tooth flanks of the softer gear of the pair R_{zH} : equivalent roughness (㎛) $R_{zH} = \frac{R_{z1} \cdot (10/\rho_{red})^{0.33} \cdot (R_{z1}/R_{z2})^{0.66}}{(v \cdot \nu_{40}/1500)^{0.33}}$ If $R_{zH} > 16$ then $R_{zH} = 16$ ㎛, $R_{zH} < 3$ then $R_{zH} = 3$ ㎛ v_{40}: nominal kinematic viscosity of the oil at 40 ℃ (mm^2/s) ρ_{red}: relative radius of curvature (refer to (9), (C)) *(Omitted)*	Adding upper and lower limit value of R_{zH} (UR M56 (Rev.4 Corr.3))

Present	Amendment	Reason
Guidance Relating to the Rules for the Classification of Steel Ships **Part 5 Machinery Installations** **Annex 5-10 Redundant Propulsion and Steering System**	**Guidance Relating to the Rules for the Classification of Steel Ships** **Part 5 Machinery Installations** **Annex 5-10 Redundant Propulsion and Steering System**	
2. Approval of plan and documents (1) In addition to the plans and data required by the rules, the following are to be submitted. The Society, where considered necessary, may require further plans and documents other than specified in this Annex. *(Omitted)* (B) Failure mode and effect analysis(FMEA) report (a) The integrity of the propulsion systems, steering systems and auxiliary service systems is to be verified by means of a FMEA or equivalent method and is to show that a single failure will not compromise the capability requirements specified of paragraph 3 (1). (b) FMEA for electric propulsion unit is to be carried out including related auxiliary equipment and control system and to be submitted. (c) FMEA is to analyze impact on the entire system for all possible failure modes and continuous failure. And FMEA is to detect these failures properly and to present an alternative. (d) The general procedure of FMEA is to be in accordance with the relevant standard. (C) The test procedure to verify the complete redundant propulsion and steering systems during the final sea trial. (D) For ships with RP1-S and RP2-S notation, a general arrangement detailing locations of all machinery and equipment(including the routing of all associated power, control and communication cables) necessary for the correct functioning of the propulsion and steering systems. *(Omitted)*	**2. ~~Approval~~Submission of plan and documents** (1) In addition to the plans and data required by the rules, the following are to be submitted. The Society, where considered necessary, may require further plans and documents other than specified in this Annex. *(Omitted)* (B) Failure mode and effect analysis(FMEA) report (a) The integrity of the propulsion systems, steering systems and auxiliary service systems is to be verified by means of a FMEA or equivalent method and is to show that a single failure will not compromise the capability requirements specified of paragraph 3 (1). (b) FMEA for electric propulsion unit is to be carried out including related auxiliary equipment and control system and to be submitted. (c) FMEA is to analyze impact on the entire system for all possible failure modes and continuous failure. And FMEA is to detect these failures properly and to present an alternative. (d) The general procedure of FMEA is to be in accordance with the relevant standard. (C) The test ~~procedure~~plan to verify the complete redundant propulsion and steering systems during the final sea trial. (a) The test plan is to include at least the verification method(s) for the worst-case scenario(s) referred to in the FMEA report. (D) For ships with RP1-S and RP2-S notation, a general arrangement detailing locations of all machinery and equipment(including the routing of all associated power, control and communication cables) necessary for the correct functioning of the propulsion and steering systems. *(Omitted)*	

Present	Amendment	Reason
Guidance Relating to the Rules for the Classification of Steel Ships **Part 5 Machinery Installations** **Annex 5-10 Redundant Propulsion and Steering System**	**Guidance Relating to the Rules for the Classification of Steel Ships** **Part 5 Machinery Installations** **Annex 5-10 Redundant Propulsion and Steering System**	
(Omitted)	*(Omitted)*	
5. System segregation (1) Where failure is deemed to include loss of a complete propulsion machinery space due to fire or flooding(ships with RP-S notation), redundant components and systems are to be separated by watertight bulkheads with an A-60 fire classification. (2) Two A-0 bulkheads separated by a space(cofferdam, tank etc.) which afford no substantial fire risk may be accepted as equivalent to A-60. (3) In cases where the watertight door may be provided between the segregated propulsion machinery spaces, the watertight door is also to comply with the requirements specified in **Pt 3, Ch 14, Sec 4** of the Rules. The indicators to show whether they are open or shut are to be provided at the navigation bridge and the centralized control station.	**5. System segregation** (1) Where failure is deemed to include loss of a complete propulsion machinery space due to fire or flooding(ships with RP-S notation), redundant components and systems are to be separated by watertight bulkheads with an A-60 fire classification. (2) Two A-0 bulkheads separated by a space(cofferdam, tank etc.) which afford no substantial fire risk may be accepted as equivalent to A-60. (3) In cases where the watertight door may be provided between the segregated propulsion machinery spaces, the watertight door is also to comply with the requirements specified in **Pt 3, Ch 14, Sec 4** of the Rules. The indicators to show whether they are open or shut are to be provided at the navigation bridge and the centralized control station.	
(New)	**6. Tests and Inspections** (1) After the propulsion and steering systems have been installed, it is to be verified, in accordance with the reviewed test plan, that the requirements of **3.** and **4.** are satisfied. (a) The tests are to be carried out, as far as practicable, under conditions as close as possible to actual operating conditions or by simulation, and proper operation is to be confirmed. (b) Where the test conditions are not specified in the test plan, they may be agreed between the shipyard and the Classification Society. (2) The Society may require, when deemed necessary, other tests and inspections may be required.	
(Omitted)	*(Omitted)*	

〈Amendments〉

Annex 5-12 Shaft Alignment *(2017)*

1. Application

(1) Shaft alignment calculations (if applicable, including stern tube boring details), shaft alignment procedures, and are to be submitted for review for any one of followings. *(2023)*
(A) Propulsion shafting of the actual propeller shaft diameter not less than 400 mm, in way of aftmost bearing (aft stern tube bearing or strut bearing)
(B) Propulsion shafting with reduction gears where the gear wheel is driven by two or more ahead pinions
(C) Propulsion shafting with no forward stern tube bearing
(D) In-line type shaft generator is installed in the propulsion shaft line
(2) The installation, testing, and inspection of an in-line type shaft generator are required to comply with **Annex 5-12-2**.

2. Shaft alignment calculations

The shaft alignment calculations are to include bearing reactions, shear forces and bending moments along the shafting and are to be performed for the maximum allowable alignment tolerances.

(1) The following drawings and data are to be submitted for the purpose of shaft alignment design and installation:
(A) Description of shafting system such as shaft diameter, shaft material, bearing length, bearing liner material, and bearing axial position, bearing clearance, propulsion system specifications
(B) Propeller dimensional data, weight and buoyancy effect, including propeller cap and energy saving devices
(C) For geared installations, gear forces and moments
(D) Crankshaft equivalent model including external forces acting on crankshaft
(E) Axial positions of the bearings points of support
(F) Definition of a reference line
(G) Bearing offsets from reference line
(H) Thermal displacement of the bearings between cold static and hot static machinery conditions
(I) Calculated bearing loads for all considered conditions
(J) Calculated shaftline deflection for all considered conditions
(K) Bending moment and shear force curves along the shaftline for static and dynamic conditions
(L) Misalignment angle between the shaft and the aft most bearing (aft stern tube bearing or aft most strut bearing) for all considered conditions or the alternative modelling techniques according to **3** (5) of **Annex 5-12-2**
(M) When in-line type shaft generator is installed, drawings and data for **3** of **Annex 5-12-2**

(2) Where the hull deflections are accounted for in the analysis. The vessel conditions to be considered in the analysis should account for the following.
(A) Drydock or after launching draft at cold static condition
(B) Ballast draft at hot static condition
(C) Full loaded draft at hot static condition
(3) Where the hull deflections are not accounted for in the analysis then the shaft alignment verification is to comply with **Par 5** (5) (D). Vessels where cargo/ballast load change is not significantly affecting the draft of the ship will be given special consideration. In no case are the calculated bearing reactions to exceed 80% of the maximum allowable manufacturer's limit.
(4) The shaft alignment calculations are to show the following. *(2019)*
(A) Bearing loads under all operating conditions are within the acceptable limits specified by the bearing manufacturer. In addition, the aft most bearing (aft stern tube bearing or strut bearing) is to comply with **Ch 3, 206. 1** of the Rules.
(B) Bearing reactions supporting the shaft are always positive. However, if additional measurements and analyses (such as whirling analysis) in accordance with **Par 5** (5) (E) are carried out and confirmed that unloading of the bearing has no adverse effect on vessel operation, bearing reactions can be zero (unloaded).
(C) Shear forces and bending moments on propulsion equipment are within the limits specified

by manufacturers.

(D) Shear forces and bending moments at the crankshaft flange are in accordance with the engine manufacturer's limits.

(E) The designed relative slope between the shaft and the aft most bearing (aft stern tube bearing or strut bearing) is to be positive (the forward end of the bearing is to be above, or on the same elevation as the aft end of the bearing), and not to exceed 0.3×10^{-3} rad.

(F) The shaft alignment calculations are to identify the following corresponding to the condition in which they will be measured.

(a) Gap and sag data, temporary support location, jack down location and force

(b) Jack up location, jack up correction factor

3. Stern tube bearing slope boring *(2019)*

(1) The slope boring angle calculation (single or double slope) is to be based on a static afloat condition with a hot engine and fully immersed propeller.

(2) If the calculated relative slope between the shaft and the aft most bearing is greater than 0.3×10^{-3} rad, the relative slope is to be reduced by means of slope boring or bearing inclination.

(3) On alignment sensitive installations (e.g. tankers, bulkers and twin screw vessels and shafting with no forward stern tube bearing) it is recommended to apply the double slope design on the aft stern tube bearings. *(2021)*

4. Shaft Alignment Procedure *(2019)*

The shaft alignment procedure is to be submitted for review and is to be based on the submitted shaft alignment calculations. As a minimum, the shaft alignment procedure is to include the following.

(1) Bore sighting : The bore sighting procedure is to be conducted in two stages (A), (B) and to be satisfied with (C), (D). Sufficient number of targets should be utilized during the sighting through to ensure accuracy in verification of bearing slopes. Target arrangement is to be included in the procedure submitted for review.

(A) Bore sighting before stern tube bearings fitting (not applicable for stern tube bearings installed by resin chocking), is to be conducted on the stern tube bore to verify the following. Whenever applicable, it is recommended that all corrections are done by machining the outside bush diameter, rather than correcting the stern tube bore.

(a) The stern tube bore dimensions : in order to define dimensions and tolerance for the aft and the forward stern tube bush outside diameters machining

(b) The stern tube bore misalignment, vertical and horizontal : in order to define angular corrections for stern tube bush outside diameter machining

(B) Bore sighting after the stern tube bearings are fitted, is to verify the following. In cases with no forward stern tube bearing, the intermediate shaft bearing should serve as a referent point to conduct sighting.

(a) The aft stern tube bush slope : The measurement is to be taken with reference to the forward stern tube bush.

(b) The horizontal misalignment between aft and the forward stern tube bearing.

(C) The horizontal misalignment of all bearings is to be minimized and is not to exceed the clearance of adjacent bearings.

(D) The slope boring angle is to be verified relative to the straight line connecting both stern tube bearings. Acceptable tolerance is up to $\pm 0.1 \times 10^{-3}$ rad, with the following restrictions.

(a) The measured slope boring angle is never to result in misalignment greater than 0.3×10^{-3} rad.

(b) In case of a propulsion installation with no forward stern tube bearing, the intermediate shaft bearing should be chocked and its offset not changed after the bore sighting is complete.

(2) Stern tube bearing fitting pressure : The stern tube bearing fitting pressure should be verified to comply with planned values.

(3) Gap and sag : The gap and sag procedure is to be verified against the respective analysis (e.g. based on dry dock or light ship draft condition). Acceptable tolerances are ±0.1 mm.

(4) Bearing load measurements : Identification of the bearings at which the measurements are to be taken, the jack up locations, the data to be recorded and the procedures to be followed should be reported in the submittal.

(5) Stern tube bearing run-in procedure : For alignment sensitive installation (e.g. tankers, bulkers

and twin screw vessels and shafting with no forward stern tube bearing), it is recommended to conduct a run-in procedure before the stern tube bearings are exposed to higher service speeds and rudder angles. *(2021)*

5. Tests and inspections

The shaft alignment for all vessels is to be carried out in the presence of a Surveyor. The alignment is to be verified in the afloat condition with superstructure in place and major welding work completed and is to be to the satisfaction of the attending Surveyor.

In addition, the vessels which are subjected to submission of shaft alignment calculations and procedures in **Par 1** are to comply with the following.

(1) The alignment verification is to be carried out in accordance with the procedures. The alignment calculated data is to be verified and recorded, in the presence of the Surveyor for the following. *(2019)*
  (A) Stern tube sighting and slope boring (as applicable) before shaft fitting
  (B) Stern tube bearing fitting pressure as required in **Par 4** (2)
  (C) Gap and sag
  (D) Bearing reaction

(2) Stern tube run-in procedure as required in **Par 4** (5) is recommended to be conducted, in the presence of the Surveyor.

(3) Stern tube sighting and slope boring (as applicable) before shaft fitting
  (A) Maximum allowable slope boring angle deviation is not to result in negative slope, and is never to exceed relative slope of 0.3×10^{-3} rad.
  (B) In case of a propulsion installation with no forward stern tube bearing, the intermediate shaft bearing is to be chocked and its offset not to be changed after the bore sighting is complete.
  (C) In cases where sighting through and bearing positioning are conducted in block stage of the vessel construction, the verification of the following procedures is required.
    (a) Slope boring angle (as applicable)
    (b) Bearing vertical offset positioning
    (c) Engine vertical offset positioning
    (d) Gap and sag procedure
  (D) Where a monitoring system is installed to verify the stern tube bearing misalignment, the waiver of above requirements (A), (B), (C) can be considered.

(4) Gap and sag verification
  (A) The gap and sag is to be measured at the drydock or after launching condition, unless agreed to otherwise by the Society.
  (B) With assistance of the temporary supports the gap and sag needs to be verified at all open flanges until gap and sag values are brought within acceptable tolerances of ±0.1 mm from the corresponding calculated values.

(5) Bearing load verification *(2023)*
  (A) The bearing load measurements are to be carried out at the drydock or lightship condition, unless agreed to otherwise by the Society.
  (B) Bearing reactions are required to be verified and recorded by such means as hydraulic jack and strain gauge method on all accessible shafting bearings as following.
    (a) Forward stern tube bearing
    (b) Intermediate shaft bearing
    (c) Minimum three aftmost main engine bearings (for directly coupled propulsion systems only)
    (d) Main-gear shaft bearing
  (C) The measured values for the bearings are to be within ±20 % of the calculated values, unless specifically approved otherwise.
  (D) In the case that the measured values are not within ±20 % of the calculated values, the shaft alignment calculations are to be revised so as to reflect compliance and re-submitted.
  (E) In the case that measurements in a particular service condition indicate that one of the bearings is unloaded, additional measurements and analyses, (such as whirling analysis) will be required to confirm unloading of the bearing has no adverse effect on vessel operation.
  (F) Additional bearing load measurements may be required, as determined necessary by the Society. ⚓

Annex 5-12-1 Enhanced Shaft Alignment *(2021)*

1. Application

(1) This annex addresses the enhanced requirements of design, procedure and verification for shaft alignment in addition to the requirements in **Annex 5-12**. The sensitive installations to the shaft alignment (e.g. tankers, bulkers and twin screw vessels and shafting with no forward stern tube bearings, etc.) are the main targets of application, but can be extended if requested.

(2) The requirements of this annex are optional, and ships satisfying the requirements of this annex may be assigned a notation specified in **2.** as additional special feature notations.

2. Class notations

Ships satisfying the requirements of this annex may be assigned the following notation as additional special feature notations.

(1) Where the enhanced requirements of design for shaft alignment in **3.** are satisfied, the notation of ESA1 may be assigned.

(2) Where the enhanced requirements of design, procedure and verification for shaft alignment in **3.** and **4.** are satisfied, the notation of ESA2 may be assigned.

3. The requirements for ships assigned ESA1 notation

In order to register as ships with the ESA1 notation, the following requirements of the enhanced design for shaft alignment are to be satisfied.

(1) Drawings and data to be submitted

In addition to the requirements of **Annex 5-12**, the following drawings and data are to be submitted for review, as a minimum:

~~(A) Description of shafting system such as shaft diameter, shaft material, bearing length, bearing liner material, and bearing axial position, bearing clearance, propulsion system specifications~~

(A) Stern tube lubricant specifications, (manufacturer, type and viscosity)

~~(C) Propeller dimensional data, weight and buoyancy effect, including propeller cap and energy saving devices~~

(B) Hydrodynamic propeller loads in running conditions including ship turning condition

~~(E) For geared installations, gear forces and moments~~

~~(F) External forces acting on crankshaft~~

~~(G) Axial positions of the bearings points of support~~

(C) Bearing Stiffness values for all bearings in the shaftline

~~(I) Definition of a reference line~~

~~(J) Bearing offsets from reference line~~

~~(K) Thermal displacement of the bearings between cold static and hot static machinery conditions~~

(D) Effect of predicted hull deflections over the range of the ship's operating drafts

~~(M) Calculated bearing loads for all considered conditions~~

~~(N) Calculated shaftline deflection for all considered conditions~~

~~(O) Bending moment and shear force curves along the shaftline for static and dynamic conditions~~

~~(P) Misalignment angle between the shaft and the aft most bearing (aft stern tube bearing or aft most strut bearing) for all considered conditions or the alternative modelling techniques according to (5)~~

(E) Whirling Vibrations calculations

(F) When in-line type shaft generator is installed, drawings and data for **3** of **Annex 5-12-2**

(2) Hydrodynamic propeller loads

(A) Transverse and vertical hydrodynamic propeller loads in the following ship conditions are to be used in the shaft alignment calculations.

(a) Straight ahead condition at MCR at ballast draft

(b) Straight ahead condition at MCR at full loaded draft

(c) Full rudder turn to port and starboard at MCR at ballast draft

(d) Full rudder turn to port and starboard at MCR at full loaded draft

A turning condition is hereby defined as the condition in which the vessel is performing a steady state full rudder turn to port or starboard, commencing from a straight course at a ballast or full loaded draft at MCR condition.

(B) Hydrodynamic propeller loads can be estimated by calculations (lifting surface method, boun-

dary panel method, CFD, etc.) or based on empirical/database formulae duly justified.

(C) Where hydrodynamic propeller loads as per (B) are not available, then empirical formulae for hydrodynamic propeller loads in **Table 1** are to be used for the dynamic condition calculations as shown in the following table.

Table 1 Empirical formulae for hydrodynamic propeller loads

	Straight ahead condition	Turning condition
For single screw vessel	- 5% of Q + 30% of Q	- 30% of Q
For twin screw vessel	+/- 20% of Q	- 40% of Q

NOTES:
Q : Torque at MCR
+ : Upward moment about the transverse axis
- : Downward moment about the transverse axis

(3) Hull deflections

(A) The hull deflections in the following ship conditions are to be used in the shaft alignment calculations. In addition, the hull deflections for the aft peak tank empty and full (or the maximum level in the ship loading manual) is to be evaluated.

(a) Dry dock or aft launching draft (lightship condition or close to lightship condition with minimum ballast)

(b) Ballast draft

(c) Full loaded draft

(B) Hull deflections can be estimated by finite element calculations or by measurements from similar vessels (same type, similar vessel size, similar double bottom height in the area of the engine room, similar stern tube and stern arrangement) or other recognized calculation methodologies.

(4) Shaft alignment calculations

(A) In order to determine the shaft alignment that satisfies the various operating conditions of the ship, the shaft alignment calculations in the following conditions are to be performed.

(a) Cold, static, dry dock or aft launching draft (lightship condition or close to lightship condition with minimum ballast) with propeller partially immersed

(b) Hot, static, ballast draft with propeller fully immersed

(c) Hot, ballast draft with propeller fully immersed in dynamic condition including hydrodynamic propeller loads according to (2)

(d) Hot, static, full loaded draft with propeller fully immersed

(e) Hot, full loaded draft with propeller fully immersed in dynamic condition including hydrodynamic propeller loads according to (2)

(5) Contact between the shaft and the aft most bearing (aft stern tube bearing or aft most strut bearing)

The misalignment angle between the shaft and the aft most bearing is not to exceed 0.3×10^{-3} rad under all ship conditions which the shaft alignment calculations are performed. When alternative recognized modelling techniques are used, such as 3D Finite Element Modelling with Fluid Structure Interaction between the bearing oil film and the rotating shaft, the relevant assumptions and practices are to be detailed in the submitted calculation report. If a 3D Finite Element Modelling with Fluid Structure Interaction between the bearing oil film and the rotating shaft is used, the misalignment angle criterion can be replaced by an oil film thickness criterion so that the oil film thickness to be not below 30 μm under all ship conditions which the shaft alignment calculations are performed; other criteria may be considered acceptable by the Society on a case by case basis.

(6) Whirling vibrations

(A) Calculations are to be submitted to ensure that whirling vibration frequencies are satisfactory throughout the speed range. The calculations are to take into account bearing and oil-film stiffness and gyroscopic effects. The calculations are to investigate the excitation frequencies

giving rise to all critical speeds within the speed range.
(B) The whirling critical speeds are not to be within the range of ±20% of MCR.

(7) STCM notation
Oil lubricated stern tube shaft that the approved condition monitoring scheme in accordance with **Pt 1, Ch 2, 701. 2** of the Guidance is applied, is to be installed and the notation of STCM is to be assigned.

4. The requirements for ships assigned ESA2 notation

In order to register as ships with the ESA2 notation, in addition to the requirements of ~~EAS1~~ ESA2 in **3**, the following requirements of the enhanced procedure and verification for shaft alignment are to be satisfied.

(1) Data to be submitted
(A) Shaft alignment procedure including final sighting and the followings
(a) Bearing locations (including temporary supports), bearing offsets in respect of the reference line and bearing loads.
(b) Bearing offset tolerances
(c) Jack up positions and correction factors
(d) Bearing load with tolerances
(e) Bearing reaction influence coefficients
(B) Bearing run-in procedure
(C) Shaft alignment verification procedure during sea trials

(2) Final sighting
(A) After the stern structure is in place and heavy equipment such as engines, boilers, generators, etc. are installed and major welding works are completed at the aft part of ships, final sighting is to be carried out in the presence of the Surveyor.
(B) The final sighting is to extend from the aft most bearing (aft stern tube bearing or aft most strut bearing), up to the engine or gearbox (if applicable) output flange, and is to be used to adjust the relative position of the engine and intermediate bearings in respect of the stern tube bearings.
(C) Sufficient number of targets are to be utilized during the sighting-through, to ensure satisfactory accuracy in verification of bearings offsets.
(D) The sighting procedure may be carried out by recognized methods, e.g. piano wire, optical sighting or laser sighting.
(E) The bearings and engine/gearbox offsets (vertical and horizontal) in respect of the reference line are to correspond to those in the calculation with a tolerance of ±0.1 mm.
(F) When final sighting is carried out, shaft alignment by gap and sag method is not required.

(3) Bearing run-in procedure
(A) Bearing run-in is to be carried out in the presence of the Surveyor. A bearing run-in procedure, to be agreed between the Surveyor and the yard, is to be conducted preferably with fully immersed propeller. If this is not possible due to shallow waters, then the lowest possible RPM for navigation and the lowest possible helm angles are to be used to avoid exposing the new bearings into high stresses and temperatures.
(B) Bearing run-in procedure is to be carried out as soon as possible prior to commencing full operational sea trials. The procedure gradually exposes the stern tube bearing to increased loads and assists with bedding the stern tube shaft in a controlled manner to the stern tube bearing to create proper contact with the bearing bottom surface. It also prepares the stern tube bearings to withstand various service loads without sustaining damage.
(C) During the bearing run-in, the aft stern tube bearing temperature is to be closely monitored. If bearing temperature rises at a rate faster than a previously agreed rate, such as 5℃/min, or exceeds expected temperature threshold then the rudder angle is to be immediately set to zero and the engine speed is to be immediately reduced to minimum, or shut down - until the bearing temperature lowers to an acceptable level and stabilizes accordingly. Temperatures exceeding the high temperature alarm settings and high temperatures increase rate to be reported to the Society. If previously agreed allowable limits, design criteria or alarm settings are exceeded, the shipyard may request to repeat the bearing run-in procedure. Repeating is subject to Society agreement; otherwise further investigation is to be carried out.
(D) Once a bearing run-in procedure is completed satisfactorily, the parts of the sea trials addressing the propulsion system and shaftline may commence.

(4) Shaft alignment verification during sea trials
  (A) The sea trial is to be carried out in the presence of the Surveyor with stern tube lubricant according to specification in the shaft alignment calculation report. The aft stern tube bearing temperature is to be recorded during verification.
  (B) The following movements are to be included in the sea trial program after the vessel stabilizes at a full ahead condition, at a zero-rudder angle (straight ahead) and ballast condition.
    (a) Perform one 360 ~~degree~~° turn to the port by swiftly changing the rudder angle from 0 to full rudder angle and a full ahead setting. At the completion of the turn, return the rudder angle to ~~zero~~0 ° (straight ahead).
    (b) Keep the rudder angle to ~~zero~~0 ° for 5 minutes at a full ahead setting.
    (c) Perform one 360 ~~degree~~° turn to the starboard by swiftly changing the rudder angle from 0 to full rudder angle and a full ahead setting. At the completion of the turn, return the rudder angle to ~~zero~~0 ° (straight ahead).
    (d) Keep the rudder angle to ~~zero~~0 ° for 5 minutes and at a full ahead setting.
  (C) If the recorded bearing temperature rate of rise does not exceed a previously agreed rate, such as 5℃/min, or the high temperature alarm settings then the sea trial bearing performance for shaft alignment is regarded as satisfactory. If previously agreed allowable limits, design criteria or alarm settings are exceeded then the whole test in (B) may be repeated subject to the Society's acceptance and considered passed if satisfactory results are demonstrated twice. The results of the test (maximum rate of temperature rise and maximum bearing temperature, as well as alarm set point) are to be included in the sea trial report. A root cause analysis is to be initiated to reveal the possible cause of the damage, if bearing is deemed to be damaged.
  (D) In order to verify the bearing loads in various ship conditions, the bearing loads in the following conditions are to be additionally measured in the presence of the Surveyor during sea trials.
    (a) Ballast draft with the aft peak tank full (or the maximum level in the ship loading manual) at hot static condition, and the measured bearing loads are not to be exceeded bearing manufacturer's limits.
    (b) Full loaded draft at hot static condition, and the measured bearing loads are not to be exceeded the bearing manufacturer's limits. However if full loaded draft condition is not foreseen during sea trials, then the jack up test values at ballast draft hot static condition are to be performed and the bearing load values to be not above 80% of the bearing manufacturer's limits. ⚓

Annex 5-12-2 Shaft Alignment of In-line type Shaft Generator *(2026)*

1. Application

(1) In addition to **Annex 5-12** and **Annex 5-12-1** (where applicable), this Annex deals with the installation, testing and inspection related to shaft alignment for ships fitted with in-line type shaft generators installed directly on the propulsion shafting without a separate gearing arrangement.

2. Class notations

(1) Ships satisfying the requirements of this annex may be assigned the additional special feature notation **ESA-iSG**.

(2) For ships assigned with the class notation **ESA1** or **ESA2**, the notation is to be designated as **ESA1-iSG** or **ESA2-iSG**, respectively.

3. Shaft alignment calculations

Where a shaft generator is installed, the shaft alignment calculation report is to include, in addition to Paragraph 2 of **Annex 5-12** and Paragraphs 3 and 4 of **Annex 5-12-1** (where applicable), at least the following information, which is to be submitted for reference:

(1) Sectional drawing of the shaft generator or an equivalent shaft model

(2) Electromagnetic forces (generated during rotation) of the shaft generator

(3) Recommended value and/or its allowable tolerance of the air-gap

(4) Recommended clearance and/or its allowable tolerance between the shaft generator casing (or oil seal) and the generator shaft

4. Whirling vibration

A whirling vibration calculation within the operable range of the main engine is to be submitted to confirm the following:

(1) Paragraph 3 (6) of **Annex 5-12-1** is to be complied with, irrespective of its application

(2) The displacement of the shaft generator is not to result in either an excessive reduction of the air-gap or contact with the casing.

5. Installation

(1) The shaft generator is to be installed in accordance with the installation conditions specified in the shaft alignment calculation report and the shaft alignment procedure, with particular attention to conditions such as propeller immersion, bearing support temperature, and other relevant parameters.

(2) The casing of the shaft generator is to be secured so as to prevent any abnormal movement resulting from rotor electromagnetic forces or other associated effects.

6. Onboard tests

In addition to the test and verification items specified in **Annex 5-12** and **Annex 5-12-1**, at least the following items are to be carried out in the presence of the Surveyor:

(1) Air-gap

(A) The air-gap between the stator and the rotor of an in-line type shaft generator is to be confirmed at not less than three circumferential positions.

(B) For permanent magnet type shaft generators, however, the air-gap is to be confirmed at not less than four positions.

(C) The measured air-gap values are to comply with the manufacturer's recommended value and/or allowable tolerances.

(2) The clearance between the shaft generator casing (or oil seal) and the shaft is to be within the manufacturer's recommended value and/or allowable tolerance.

(3) Prior to sea trial, the basic operational condition of the shaft generator is to be confirmed by means of ahead and astern rotation.

(4) It is to be confirmed that no abnormal noise or overheating occurs during sea trial.

(5) A visual inspection is to be carried out after the sea trial. However, additional inspections may be required if deemed necessary by the Surveyor

7. Survey

(1) Annual Survey

(A) Using the main engine turning gear or auxiliary driving device, low-speed rotation is to be carried out to confirm that there are no abnormal noises, vibrations, or friction. If necessary, the air-gap between the stator and the rotor, and the clearance between the shaft and the casing (or oil seal), are to be measured to ensure that the installation condition remains in an acceptable state.

(B) A visual inspection is to be conducted for the securing condition of the shaft generator, as well as its control and safety devices, to confirm that there is no damage, loosening, or abnormal condition.

(2) Intermediate Survey

(A) In addition to item (1), the most recent air-gap measurement records taken within the most recent six months are to be reviewed.

(3) Special Survey

(A) In addition to item (2), the air-gap between the stator and the rotor are to be measured and confirmed to be within the manufacturer's recommended clearance and/or allowable tolerance. ⚓

〈Amendments to the Guidance Relating to the Rules for the Classification of Steel Ships Pt.1 Annex 1-1〉

Additional Special Feature Notations	Relevant Requirements
URN(NXX), URN(QXX), URN(RXX), URN(SXX), URN(THR) *(2024)*	to ships comply with the additional requirements for the underwater radiated noise specified in **Ch 3** of the **Guidance for Radiated Noise from Ships**. URN : **U**nderwater **R**adiated **N**oise N : Normal mode, Q : Quiet mode, R : Research mode, S : Seismic survey mode, THR : THRuster mode, XX : Integer ship speed (knots) in still water corresponding to the propeller output at each mode
ARN(SM), ARN(S1), ARN(S2), ARN(BM), ARN(B1), ARN(B2) *(2024)*	to ships comply with the additional requirements for the external airborne noise specified in **Ch 4** of the **Guidance for Radiated Noise from Ship**. ARN : **A**irborne **R**adiated **N**oise SM : ARN for **S**ailing is **M**easured BM : ARN for **B**erthing is **M**easured
CS1, CS2, CS3, *(2020)*	to ships operating the maritime cyber security system specified in the **Guidance for Maritime Cyber Security System**
CS READY *(2019)*	to ships with the maritime cyber security system specified in the **Guidance for Maritime Cyber Security System**
AL1, AL2, AL3, AL4, AL5 *(2019)*	to ships with the autonomous systems specified in the **Guidance for Autonomous Ships**
CSAP *(2019)*	to ships comply with the additional requirements specified in **Pt. 7 Annex 7-11** Guidelines on providing safe working conditions for securing of containers on deck
FTS *(2019)*	to ships where fuel oil treatment system specified in **Pt 5, Ch 6, Annex 5-13** of the Guidance are provided onboard. (Fuel oil Treatment System)
ISPM(0), ISPM(1), ISPM(2), ISPM(3) *(2020)*	to ships operating the integrated software process specified in the **Guidance for Integrated software Process Management**
PID, MID *(2023)*	to ships comply with the requirements to prevent the spread of infectious disease in the event of an outbreak of an infectious disease on board in **Guidance for Ships designed to Prevent the spread of Infectious Disease** (PID : **P**revention of the spread of **I**nfectious **D**isease, MID: **M**itigation of the spread of **I**nfectious **D**isease)
RP1, RP2, RP1-S, RP2-S	to ships comply with the additional requirements for the redundant propulsion and steering systems specified in **Pt 5, Annex 5-10** of the Guidance. *(2019)*
ESA1, ESA2 *(2022)*	to ships which comply with the requirements of enhanced shaft alignment specified in **Pt 5, Annex 5-12-1 of the Guidance.** (Enhanced Shaft Alignment)
ESA-iSG ESA1-iSG, ESA2-iSG (2026)	to ships satisfying the requirements for in-line type Shaft Generator (iSG) specified in **Pt. 5, Annex 5-12-2 of the Guidance** and, where applicable, the enhanced shaft alignment requirements specified in **Pt. 5, Annex 5-12-1 of the Guidance**.
Methanol and/or Ethanol Ready D(A) *(2022)*	to ships for which the Concept Design is prepared in accordance with **Sec 18, Annex 5 of the Guidances Relating to the Rules for the Classification of Ships Using Low-flashpoint Fuels**. (Approval in principle) Methanol and Ethanol Ready D(A) : to ships suitable for methyl alcohol and ethyl alcohol fuel ready level Methanol Ready D(A) : to ships suitable for methyl alcohol fuel ready level Ethanol Ready D(A) : to ships suitable for ethyl alcohol fuel ready level

<table>
<tr><th>Additional Special Feature Notations</th><th>Relevant Requirements</th></tr>
<tr><td>Methanol and/or Ethanol Ready D (2022)</td><td>to ships for which the generic Design is prepared in accordance with Sec 18, Annex 5 of the Guidances Relating to the Rules for the Classification of Ships Using Low-flashpoint Fuels.
<table>
<tr><td>Methanol and Ethanol Ready D</td><td>to ships suitable for methyl alcohol and ethyl alcohol fuel ready level</td></tr>
<tr><td>Methanol Ready D</td><td>to ships suitable for methyl alcohol fuel ready level</td></tr>
<tr><td>Ethanol Ready D</td><td>to ships suitable for ethyl alcohol fuel ready level</td></tr>
</table></td></tr>
<tr><td>Methanol and/or Ethanol Ready I (SR, FT, TV, FS, BS, ME, AE, ME-C, AE-C) (2022)</td><td>to ships for which parts of the systems are installed with the detailed design in accordance with Sec 18, Annex 5 of the Guidances Relating to the Rules for the Classification of Ships Using Low-flashpoint Fuels.
(partial Installation)
<table>
<tr><td>Methanol and Ethanol Ready I</td><td>to ships suitable for methyl alcohol and ethyl alcohol fuel ready level</td></tr>
<tr><td>Methanol Ready I</td><td>to ships suitable for methyl alcohol fuel ready level</td></tr>
<tr><td>Ethanol Ready I</td><td>to ships suitable for ethyl alcohol fuel ready level</td></tr>
</table>
SR : hull Structure Reinforcement for fuel tank
FT : Fuel Tank
TV : fuel Tank Venting systems
FS : Fuel Supply systems
BS : fuel Bunkering Systems
ME : Methyl alcohol and/or Ethyl alcohol fired Main Engines
AE : Methyl alcohol and/or Ethyl alcohol fired Auxiliary Engines,

ME-C : Methyl alcohol and/or Ethyl alcohol fired Main Engine - Conversion
AE-C : Methyl alcohol and/or Ethyl alcohol fired Auxiliary Engines - Conversion</td></tr>
<tr><td>Reduced Freeboard (2023)</td><td>to ships comply with the requirement specified in Annex 1 of the Rules for the Classification of Dredgers</td></tr>
<tr><td>ETA (2025)</td><td>to ships where the Emergency Towing Arrangement specified in Pt 4, Ch 8, 205. of the Rules is applied.</td></tr>
<tr><td>LSN (2025)</td><td>to be assigned to ships where the program for lashing calculations is approved by the Society in accordance with the requirements in Ch 4, Sec 4 of the Guidance for Approval of Manufacturing Process and Type Approval, ETC
(Lashing Software for Nonstandardized cargo)</td></tr>
</table>

Amendments of the Rules for Classification of Steel Ships

Pt. 5 Machinery Installations

(For Development Verification and Validation)

2025. 9.

Machinery Rule Development Team

- Main Amendments -

(1) Request for Establishment/Revision of Classification Technical Rules
〈ships contracted for construction on or after 2026/07/01〉

◉ Reflecting IACS UR P1(Rev.6) to Ch 6 Sec 1. [MRD4800-191-2025]

Present	Amendment	Reason
# CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT ## Section 1 General ### 101. General **1. Application** 【See Guidance】 (1) The requirements in this Chapter apply to the materials, design, fabrication, tests and piping arrangement of auxiliaries and piping systems. (2) The requirements in this Chapter may be modified for ships having special limitation for their service and usage and for small ships. *〈Newly added〉*	# CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT ## Section 1 General ### 101. General **1. Application** 【See Guidance】 (1) The requirements in this Chapter apply to the materials, design, fabrication, tests and piping arrangement of auxiliaries and piping systems. (2) The requirements in this Chapter may be modified for ships having special limitation for their service and usage and for small ships. (3) Application is not allowed for the following piping systems, except for **102.6,** and the relevant requirements are to be complied with. (A) Chemical cargo piping systems of ships subject to **Pt 7, Ch 6** and shipboard hydrocarbon/chemical process piping system (B) Gas cargo/fuel and process piping systems of ships, subject to **Pt 7, Ch 5** and gas fuel piping systems of ships subject to **Rules for the Classification of Ships Using Low-flashpoint Fuels.** (C) Piping systems for other low flashpoint fuels defined in **SOLAS II-1/2.29.**	- IACS UR P1(Rev.6) P1.1 Scope

Present

102. Pipes

1. - 5. *〈Omitted〉*

6. Required wall thickness of pipes

Table 5.6.3 Minimum Wall Thickness for Steel Pipes for CO_2 fire extinguishing (mm)

Nominal diameter ( )	Fire extinguishing CO_2 pipes	
	From bottles to distribution station	From distribution station to nozzle
15	3.2	2.6
20	3.2	2.6
25	4.0	3.2
32	4.0	3.2
40	4.0	3.2
50	4.5	3.6
65	5.0	3.6
80	5.6	4.0
90	6.3	4.0
100	7.1	4.5
125	8.0	5.0
150	8.8	5.6

NOTES:

1. - 2. *〈Omitted〉*
3. The external diameters and thicknesses have been selected from ISO Recommendations *R*336 for smooth welded and seamless steel pipes. Diameter and thickness according to other national or international standards may be accepted.
4. For larger diameters specified in this table, the minimum wall thickness will be subject to special consideration by the Society.
5. The minimum thicknesses listed in this table are the nominal wall thickness. No allowance needs to be made for negative tolerance or for reduction in thickness due to bending.

Amendment

102. Pipes

1. - 5. *〈Omitted〉*

6. Required wall thickness of pipes

Table 5.6.3 Minimum Wall Thickness for Steel Pipes for CO_2 fire extinguishing (mm)

Nominal diameter ( )	Fire extinguishing CO_2 pipes	
	From bottles to distribution station	From distribution station to nozzle
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80	5.6	4.0
90	6.3	4.0
100	7.1	4.5
125	8.0	5.0
150	8.8	5.6

NOTES:

1. - 2. *〈Omitted〉*
3. The external diameters and thicknesses have been selected from ISO 4200:1991~~Recommendations *R*336~~ for smooth welded and seamless steel pipes. Diameter and thickness according to other national or international standards may be accepted.
4. For larger diameters specified in this table, the minimum wall thickness will be subject to special consideration by the Society.
5. The minimum thicknesses listed in this table are the nominal wall thickness. No allowance needs to be made for negative tolerance or for reduction in thickness due to bending.

Reason

- IACS UR P1(Rev.6) Table 5

Present	Amendment	Reason
7. Minimum calculated wall thickness of pipes (1) The minimum calculated wall thickness of straight pipes subject to internal pressure is to be determined by the following formula: 걶 걶 값 : mm 값 where: 걶 = Strength thickness specified in (3) (mm) 값 = Corrosion allowance specified in **Tables 5.6.6** and **5.6.7** (mm) 값 = Negative manufacturing tolerance ( )	**7. Minimum calculated wall thickness of pipes** (1) The minimum calculated wall thickness of straight pipes subject to internal pressure is to be determined by the following formula: 걶 걶 값 : mm 걷값걷 where: 걶 = Strength thickness specified in (3) (mm) 값 = Corrosion allowance specified in **Tables 5.6.6** and **5.6.7** (mm) 값 = Negative manufacturing tolerance ( ) (in the case of a positive tolerance, "a" is to be zero) For Example, if "값" is -5, the value of "값" shall be 5. and the formula shall be applied as 1-(5/100).	- IACS UR P1(Rev.6) P1.2.3