Amendments for Rules for the Classification of Steel Ships

(Part 5 Machinery Installation)

- Main Amendments -

(1) Effective date : 1 Jan. 2020 (Date of which contracts for construction are signed)

◉ The word "up to an angle of inclination of 45 degree" has been deleted regarding switching operation or operational changes in the inclined condition.

◉ Lignum vitae in sea water lubricated bearings has been deleted.

◉ Newly added content of IACS UR P2.13 has been reflected.

◉ MSC.1/Circ.1567 has been reflected.(Criteria for pipes passing through collision bulkheads are classified as cargo ships and passenger ships, and the use of butterfly valves is permitted only for cargo ships.)

(2) Effective date : 1 Jan. 2020(Date of application for approval)

◉ Amendments of IACS UR P2.7.4(Rev.9) has been reflected.(examples and adaptations of mechanical joints in common compression formats are added).

◉ The amendments in IACS UR M72 regarding engine components have been reflected.

(3) Effective date : 1 Jul. 2020 (Date of which contracts for construction are signed)

◉ The opening of the damper in the funnels of boilers has been amended to make it easier to understand.

◉ The requirements for dynamic balancing test have been newly introduced.

◉ The requirement for manhole direction of boilers and pressure vessels has been deleted.

◉ Hydrostatic test for hydraulic motor has been amended.

(4) Effective date : 1 Jul. 2020 (Date of which contracts for construction are signed or application for certification)

◉ The requirements in IACS UR M80 regarding AC Generating sets have been reflected.

◉ The requirements for electronic speed governors have been newly introduced.

◉ The amendments in IACS UR A3 regarding the design and tests for windlass have been reflected.

Present	Amendment	Reason
CHAPTER 1 GENERAL **Section 1 General** **101. Application** **1.** The requirements of this Part apply to the machinery installations intended for the ships which have no special limitations for their service area and purpose. For machinery installations intended for the ships having any limitations for their service area or intended for the small ships, the requirements in this Part may be modified. Special consideration is to be given to the ships with any limitations for their purpose. **【See Guidance】** **2.** The machinery installations which do not comply with the requirements of this Part may be accepted, provided that they are considered acceptable by the Society. **【See Guidance】** **3. ~ 8. <omitted>** **102. Definitions** **1. ~ 2. <omitted>** **3. Propeller shaft Kind 1 or Stern tube shaft Kind 1** is the shaft which is provided with type approved measures against corrosion by sea water, or the shaft which is made of approved corrosion resistance material. The propeller shaft or stern tube shaft other than specified above is Kind 2. *(2019)*	**CHAPTER 1 GENERAL** **Section 1 General** **101. Application** **1.** The requirements of this Part apply to the machinery installations intended for the ships which have no special limitations for their service area and purpose. For machinery installations intended for the ships having any limitations for their service area or intended for the small ships, the requirements in this Part may be modified. Special consideration is to be given to the ships with any limitations for their purpose. **【See Guidance】** **2.** The equivalence of alternative and novel features which deviate from or are not directly applicable to the Rules is to be in accordance with **Pt 1, Ch 1 of Rules**. **3. ~ 8. <same as the present>** **102. Definitions** **1. ~ 2. <same as the present>** **3. Propeller shaft Kind 1 or Stern tube shaft Kind 1** is the shaft which is provided with approved measures(sleeves or type approved corrosion resisting) against corrosion by sea water, or the shaft which is made of approved corrosion resistance material. The propeller shaft or stern tube shaft other than specified above is Kind 2. *(2020)*	<Pt 5 Rules> (Amendment) - clarify the meaning of alternative and novel features. - Metal sleeves do not require type approval but require individual drawing approval.

Present	Amendment	Reason
4. ~ 25. <omitted> **26. KR Certificate (KRC)** is a document issued by the Society stating below. (1) Conformity with the requirements of the Rules (2) The tests and inspections have been carried out on the certified product itself, or on samples taken from the certified product itself. (3) The inspection and tests were performed in the presence of the Surveyor or in accordance with quality assurance system. **27. Work's Certificate (W)** is a document signed by the manufacturer stating below. (1) Conformity with the requirements (2) The tests and inspections have been carried out on the certified product itself, or on samples taken from the raw material, used for the product to be certified. (3) The tests were witnessed and signed by a qualified representative of the applicable department of the manufacturer. **28. Test Report (TR)** is a document signed by the manufacturer stating below. (1) Conformity with the requirements (2) The tests and inspections have been carried out on samples from the current production. (hereafter, omitted)	**4. ~ 25. <same as the present>** **26. KR Certificate (KRC)** is a document issued by the Society stating below. (1) Conformity with the requirements of the Rules (2) The tests and inspections have been carried out on the finished certified component itself; or on samples taken from earlier stages in the production of the component, when applicable. *(2020)* (3) The inspection and tests were performed in the presence of the Surveyor or in accordance with quality assurance system. **27. Work's Certificate (W)** is a document signed by the manufacturer stating below. (1) Conformity with the requirements (2) The tests and inspections have been carried out on the finished certified component itself; or on samples taken from earlier stages in the production of the component, when applicable. *(2020)* (3) The tests were witnessed and signed by a qualified representative of the applicable department of the manufacturer. **28. Test Report (TR)** is a document signed by the manufacturer stating below. (1) Conformity with the requirements (2) The tests and inspections have been carried out on samples from the current production batch. (hereafter, same as the present Rules)	<Pt 5 Rules> (Amendment) - Reflect IACS UR M72 (Rev.2 Jan 2019) <application date: the date of application for certification on or after 1 January 2020> - M72 1.2, amend the definition of KR Certificate - M72 1.3, amend the definition of Work's Certificate - M72 1.4

Present	Amendment	Reason
103. Construction, materials and installation **1. <omitted>** **Table 5.1.2 Angle of inclination** Type of machinery installations: Angle of inclination (deg)(2) — Athwart-ships: Static / Dynamic; Fore-and-aft: 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) Up to an angle of inclination of 45° no undesired switching operation or operational changes may 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 $500/L$ degrees. (L : Length of the ship as defined in **Part 3, Ch 1, 102.** of the Rules, m) (hereafter, omitted)	**103. Construction, materials and installation** **1. <same as the present>** **Table 5.1.2 Angle of inclination** Type of machinery installations: Angle of inclination (deg)(2) — Athwart-ships: Static / Dynamic; Fore-and-aft: 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) ~~Up to an angle of inclination of 45°~~ 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 $500/L$ degrees. (L : Length of the ship as defined in **Part 3, Ch 1, 102.** of the Rules, m) (hereafter, same as the present Rules)	<Pt 5 Rules> (Amendment) - Reflect IACS UR M46 (Rev.2 Dec 2018) <application date: the date of contract for construction on or after 1 January 2020> - Conflict with the requirement of static and dynamic 22.5 ° in inclination test in Ch 3, Sec 23, Table 3.23.1 of Guidance for Approval of Manufacturing Process and Type Approval etc. which reflects UR E10 (Rev.6). - Conflict with that there is no error operation at 30 ° inclination of circuit-breaker and electromagnetic contactor.

Present	Amendment	Reason
CHAPTER 2 MAIN AND AUXILIARY ENGINES **Section 2 Internal Combustion Engines** **201. ~ 202. <omitted>** **203. Safety devices** **1. Governors** (1) ~ (2) <omitted> (3) <new>	**CHAPTER 2 MAIN AND AUXILIARY ENGINES** **Section 2 Internal Combustion Engines** **201. ~ 202. <same as the present>** **203. Safety devices** **1. Governors** (1) ~ (2) <same as the present> (3) When electronic speed governors fitted to main internal combustion engines and form part of a remote control system, they are to comply with **Pt 9, Ch 3, 305. 2** (3) and with the following conditions. *(2020)* (A) If lack of power to the governor control and actuator systems may cause major and sudden changes in the preset speed or direction of thrust of the propeller, an automatically available back up power supply is to be provided. (B) Local control of the engines is always to be possible. For this purpose, means are to be provided at the local control position to disconnect the remote control signal. If this will also disconnect the speed governing functions required by (1), an additional separate speed governor is to be provided for such local mode of control. (C) Electronic speed governors and their actuators are to obtain the type approval according to **Ch 3, Sec 23** of the **Guidance for Approval of Manufacturing Process and Type Approval, Etc.**.	<Pt 5 Rules> (Amendment) - Reflect IACS UR M3 (Rev.6 Nov 2018) <application date: the date of application for certification or the date of contract for construction on or after 1 July 2020> - Reflect electronic speed governors in accordance with UR M3 3.1.3.

Present	Amendment	Reason
2. ~ 5. <omitted> **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 approved 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. (hereafter, omitted)	**2. ~ 5. <same as the present>** **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 ~~approved~~ 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. (hereafter, same as the present Rules)	<Pt 5 Rules> (Amendment) - Reflect Request for Establishment/ Revision of Classification Technical Rules 'MAM4300-1128-2019' <application date: the date of contract for construction on or after 1 July 2020> - Fire extinguishers in the scavenge spaces are usually satisfied by connecting steam lines, thus reflect that the separate approval is not needed.

Present	Amendment	Reason
204. ~ 210. <omitted> **211. Tests and Inspections** **1. Test of engine components** (1) <omitted> (2) The manufacturer is not exempted from responsibility for any relevant tests and inspections of those parts for which documentation is not explicitly requested by the Society. Manufacturing works is to be equipped in such a way that all materials and components can be consistently produced to the required standard. This includes production and assembly lines, machining units, special tools and devices, assembly and testing rigs as well as all lifting and transportation devices. *(2017)* (hereafter, omitted)	**204. ~ 210. <same as the present>** **211. Tests and Inspections** **1. Test of engine components** (1) <same as the present> (2) The manufacturer is not exempted from responsibility for any relevant tests and inspections of those parts for which documentation is not explicitly requested by the Society. The manufacturing process and equipment is to be set up and maintained in such a way that all materials and components can be consistently produced to the required standard. This includes production and assembly lines, machining units, special tools and devices, assembly and testing rigs as well as all lifting and transportation devices. *(2020)* (hereafter, same as the present Rules)	<Pt 5 Rules> - reflect M72 1.7 <Table 5.2.4> - Cylinder blocks: The applicability of the testing requirements was amended to align with the requirements for engine blocks. - Piston rod, Cross head: It is potentially confusing that the current requirement appears to mandate two stages of CD. - The requirements for mechanical and chemical testing for “high pressure fuel injection pump body” were introduced. - The note is newly introduced which the manufacturer approval in material tests for high pressure fuel oil system and servo oil system and, dimensional inspection for bearings can be omitted. - Added note to allow cooler to comply with KS or international standards if it is a Class 3 pressure vessels.

<Present>

Table 5.2.4 Test and inspection of engine components *(2017)*

Component		Material properties(1)	Non-destructive examination(2)	Hydraulic testing(3)	Dimensional inspection, including surface condition	Visual inspection (surveyor)	Applicable to engines(6)	Component certificate
Welded bedplate		W(C+M)	W(UT+CD)			fit-up + post-welding	All	KRC
Bearing transverse girders GS		W(C+M)	W(UT+CD)			X	All	KRC
Welded frame box		W(C+M)	W(UT+CD)			fit-up + post-welding	All	KRC
Cylinder block GJL				W(5)			CH	
Cylinder block GJS				W(5)			CH	
Welded cylinder frames		W(C+M)	W(UT+CD)			fit-up + post-welding	CH	KRC
Engine block GJL				W(5)			>400 kW/cyl.	
Engine block GJS		W(M)		W(5)			>400 kW/cyl.	
Cylinder liner		W(C+M)		W(5)			D>300 mm	
Cylinder head GJL				W			D>300 mm	
Cylinder head GJS				W			D>300 mm	
Cylinder head GS		W(C+M)	W(UT+CD)	W		X	D>300 mm	KRC
Forged cylinder head		W(C+M)	W(UT+CD)	W		X	D>300 mm	KRC
Piston crown GS		W(C+M)	W(UT+CD)			X	D>400 mm	KRC
Forged piston crown		W(C+M)	W(UT+CD)			X	D>400 mm	KRC
Crankshaft: made in one piece		KRC(C+M)	W(UT+CD)		W	Random, of fillets and oil bores	All	KRC
Semi-built crankshaft	Crank throw	KRC(C+M)	W(UT+CD)		W	Random, of fillets and shrink fittings	All	KRC
	Forged main journal and journals with flange	KRC(C+M)	W(UT+CD)		W	Random, of shrink fittings	All	
Exhaust gas valve cage				W			CH	
Piston rod, if applicable		KRC(C+M)	W(UT+CD) CD again after final machining (grinding)			Random	D>400 mm	KRC

<Present>

Table 5.2.4 Test and inspection of engine components (continued)

Component	Material properties(1)	Non-destructive examination(2)	Hydraulic testing(3)	Dimensional inspection, including surface condition	Visual inspection (surveyor)	Applicable to engines	Component certificate
Cross head	KRC(C+M)	W(UT+CD) CD again after final machining (grinding and polishing)			Random	CH	KRC
Connecting rod with cap	KRC(C+M)	W(UT+CD)		W	Random, of all surfaces, in particular those shot peened	All	KRC
Coupling bolts for crankshaft	KRC(C+M)	W(UT+CD)		W	Random, of interference fit	All	KRC
Bolts and studs for main bearings	W(C+M)	W(UT+CD)				D>300 mm	
Bolts and studs for cylinder heads	W(C+M)	W(UT+CD)				D>300 mm	
Bolts and studs for connecting rods	W(C+M)	W(UT+CD)		TR of thread making		D>300 mm	
Tie rod	W(C+M)	W(UT+CD)		TR of thread making	Random	CH	KRC
High pressure fuel injection pump body			W			D>300 mm	
			TR			D≤300 mm	
High pressure fuel injection valves (only for those not autofretted(7))			W			D>300 mm	
			TR			D≤300 mm	
High pressure fuel injection pipes including common fuel rail	W(C+M)		W for those that are not autofretted(7)			D>300 mm	
			TR for those that are not autofretted(7)			D≤300 mm	
High pressure common servo oil system	W(C+M)		W			D>300 mm	
			TR			D≤300 mm	
Cooler, both sides(4)	W(C+M)		W			D>300 mm	

<Present>

Table 5.2.4 Test and inspection of engine components (continued)

Component	Material properties(1)	Non-destructive examination(2)	Hydraulic testing(3)	Dimensional inspection, including surface condition	Visual inspection (surveyor)	Applicable to engines(6)	Component certificate
Accumulator of common rail fuel or servo oil system	W(C+M)		W			All engines with accumulators with a capacity of >0.5 *l*	
Piping, pumps, actuators, etc. for hydraulic drive of valves, if applicable	W(C+M)		W			>800 kW/cyl.	
Engine driven pumps (oil, water, fuel, bilge)			W			>800 kW/cyl.	
Bearings for main, crosshead, and crankpin	TR(C)	TR (UT for full contact between basic material and bearing metal)		W		>800 kW/cyl.	

NOTES:
C : Chemical composition
M : Mechanical properties
CD : Crack detection by Magnetic particle test or liquid penetrant test
UT : Ultrasonic testing
CH : Crosshead engines
GJL : Grey iron casting
GJS : Spheroidal graphite iron casting
GS : Steel casting
D : Cylinder bore diameter
KRC : KR Certificate
W : Work's certificate (refer to **Ch 1, 301. 2**)
TR : Test report
X : Visual examination of accessible surfaces by the Surveyor

(1) Material properties include chemical composition and mechanical properties, and also surface treatment such as surface hardening (hardness, depth and extent), peening and rolling (extent and applied force).
(2) Non-destructive examination means e.g. ultrasonic testing, crack detection by magnetic particle tests or liquid penetrant tests.
(3) Hydraulic testing is applied on the water/oil side of the component. Items are to be tested by hydraulic pressure at the pressure equal to 1.5 times the maximum working pressure. High pressure parts of the fuel injection system are to be tested by hydraulic pressure at the pressure equal to 1.5 maximum working pressure or maximum working pressure plus 300 bar, whichever is the less. Where design or testing features may require modification of these test requirements, special consideration may be given.
(4) Charge air coolers need only be tested on the water side.
(5) Hydraulic testing is also required for those parts filled with cooling water and having the function of containing the water which is in contact with the cylinder or cylinder liner.
(6) For the small auxiliary engines at discretion of the Society, **Ch 2, 101. 1** is to be applied.
(7) Manufacturers using autofretted method are to obtain the manufacturer approval by the Society. *(2018)*

<New>

Table 5.2.4 Test and inspection of engine components *(2017)*

Component	Material properties(1)	Non-destructive examination(2)	Hydraulic testing(3)	Dimensional inspection, including surface condition	Visual inspection (surveyor)	Applicable to engines(6)	Component certificate
Welded bedplate	W(C+M)	W(UT+CD)			fit-up + post-welding	All	KRC
Bearing transverse girders GS	W(C+M)	W(UT+CD)			X	All	KRC
Welded frame box	W(C+M)	W(UT+CD)			fit-up + post-welding	All	KRC
Cylinder block GJL			W(5)			>400 kW/cyl.	
Cylinder block GJS			W(5)			>400 kW/cyl.	
Welded cylinder frames	W(C+M)	W(UT+CD)			fit-up + post-welding	CH	KRC
Engine block GJL			W(5)			>400 kW/cyl.	
Engine block GJS	W(M)		W(5)			>400 kW/cyl.	
Cylinder liner	W(C+M)		W(5)			D>300 mm	
Cylinder head GJL			W			D>300 mm	
Cylinder head GJS			W			D>300 mm	
Cylinder head GS	W(C+M)	W(UT+CD)	W		X	D>300 mm	KRC
Forged cylinder head	W(C+M)	W(UT+CD)	W		X	D>300 mm	KRC
Piston crown GS	W(C+M)	W(UT+CD)			X	D>400 mm	KRC
Forged piston crown	W(C+M)	W(UT+CD)			X	D>400 mm	KRC
Crankshaft: made in one piece	KRC(C+M)	W(UT+CD)		W	Random, of fillets and oil bores	All	KRC
Semi-built crankshaft (Crank throw, forged main journal and journals with flange)	KRC(C+M)	W(UT+CD)		W	Random, of fillets and shrink fittings	All	KRC
Exhaust gas valve cage			W			CH	
Piston rod, ~~if applicable~~	KRC(C+M)	W(UT+CD) ~~CD again after final machining (grinding)~~			Random	D>400 mm CH	KRC

*** Reason**

- Cylinder blocks: The applicability of the testing requirements was amended to align with the requirements for engine blocks.
- Piston rod, Cross head: It is potentially confusing that the current requirement appears to mandate two stages of CD.

<New>

Table 5.2.4 Test and inspection of engine components (continued)

Component	Material properties[1]	Non-destructive examination[2]	Hydraulic testing[3]	Dimensional inspection, including surface condition	Visual inspection (surveyor)	Applicable to engines	Component certificate
Cross head	KRC(C+M)	W(UT+CD) ~~CD again after final machining (grinding and polishing)~~			Random	CH	KRC
Connecting rod with cap	KRC(C+M)	W(UT+CD)		W	Random, of all surfaces, in particular those shot peened	All	KRC
Coupling bolts for crankshaft	KRC(C+M)	W(UT+CD)		W	Random, of interference fit	All	KRC
Bolts and studs for main bearings	W(C+M)	W(UT+CD)				D>300 mm	
Bolts and studs for cylinder heads	W(C+M)	W(UT+CD)				D>300 mm	
Bolts and studs for connecting rods	W(C+M)	W(UT+CD)		TR of thread making		D>300 mm	
Tie rod	W(C+M)	W(UT+CD)		TR of thread making	Random	CH	KRC
High pressure fuel injection pump body	W(C+M)[8]		W			D>300 mm	
	W(C+M)[8]		TR			D≤300 mm	
High pressure fuel injection valves (only for those not autofretted[7])			W			D>300 mm	
			TR			D≤300 mm	
High pressure fuel injection pipes including common fuel rail	W(C+M)[8]		W for those that are not autofretted[7]			D>300 mm	
	W(C+M)[8]		TR for those that are not autofretted[7]			D≤300 mm	
High pressure common servo oil system	W(C+M)[8]		W			D>300 mm	
	W(C+M)[8]		TR			D≤300 mm	
Cooler, both sides[4]	W(C+M)[9]		W			D>300 mm	

*** Reason**

- The requirements for mechanical and chemical testing for “high pressure fuel injection pump body” were introduced.

<New>

Table 5.2.4 Test and inspection of engine components (continued)

Component	Material properties(1)	Non-destructive examination(2)	Hydraulic testing(3)	Dimensional inspection, including surface condition	Visual inspection (surveyor)	Applicable to engines(6)	Component certificate
Accumulator ~~of common rail fuel or servo oil system~~	W(C+M)(8)		W			All engines with accumulators with a capacity of >0.5 *l*	
Piping, pumps, actuators, etc. for hydraulic drive of valves, if applicable	W(C+M)(8)		W			>800 kW/cyl.	
Engine driven pumps (oil, water, fuel, bilge) other than high pressure fuel injection pump body and pump for hydraulic drive of valve above			W			>800 kW/cyl.	
Bearings for main, crosshead, and crankpin	TR(C)	TR (UT for full contact between base material and bearing metal)		W(8)		>800 kW/cyl.	

NOTES:

C : Chemical composition
M : Mechanical properties
CD : Crack detection by Magnetic particle test or liquid penetrant test
UT : Ultrasonic testing
CH : Crosshead engines
GJL : Grey iron casting
GJS : Spheroidal graphite iron casting
GS : Steel casting
D : Cylinder bore diameter
KRC : KR Certificate
W : Work's certificate (refer to **Ch 1, 301. 2**)
TR : Test report
X : Visual examination of accessible surfaces by the Surveyor

(1) Material properties include chemical composition and mechanical properties, and also surface treatment such as surface hardening (hardness, depth and extent), peening and rolling (extent and applied force).
(2) Non-destructive examination means e.g. ultrasonic testing, crack detection by magnetic particle tests or liquid penetrant tests.
(3) Hydraulic testing is applied on the water/oil side of the component. Items are to be tested by hydraulic pressure at the pressure equal to 1.5 times the maximum working pressure. High pressure parts of the fuel injection system are to be tested by hydraulic pressure at the pressure equal to 1.5 maximum working pressure or maximum working pressure plus 300 bar, whichever is the less. Where design or testing features may require modification of these test requirements, special consideration may be given.
(4) Charge air coolers need only be tested on the water side.
(5) Hydraulic testing is also required for those parts filled with cooling water and having the function of containing the water which is in contact with the cylinder or cylinder liner.
(6) For the small auxiliary engines at discretion of the Society, **Ch 2, 101. 1** is to be applied.
(7) Manufacturers using autofretted method are to obtain the manufacturer approval by the Society. *(2018)*
(8) The manufacturer approval in accordance with **Ch 1, 301. 2** may be omitted. *(2020)*
(9) The application of classification for pressure vessels given in **Ch 5, 303. 1** is to be complied with. *(2020)*

Present	Amendment	Reason
212. <new>	**212. AC generator sets *(2020)*** **1. General** (1) This provides requirements for AC Generating sets (i.e. Reciprocating Internal Combustion engines, alternators and couplings) in addition to the following requirements. (A) Reciprocating Internal Combustion engines are to comply with the requirements in **Ch 2, 211.** and **Annex 5-3** of the Guidance. (B) The Reciprocating Internal Combustion engine speed governor and overspeed protective device are to comply with the requirements of **Ch 2, 203. 1** and **Pt 6, Ch 1, 302.** (C) Alternators are to comply with the requirements in **Pt 6, Ch 1, 309.** (2) The requirements are applicable to AC generating sets driven by reciprocating internal combustion engines irrespective of their types (i.e. diesel engine, dual fuel engine, gas-fuel engine), except for those sets consisting of a propulsion engine which also drives PTO (power take off) generators. **2. The requirements for generating sets** (1) The generating set shall show torsional vibration levels which are compatible with the allowable limits for the alternator, shafts, coupling and damper. (2) The coupling selection for the generating set shall take into account the stresses and torques imposed on it by the torsional vibration of the system. The submission and approval of torsional vibration calculations are to be in accordance with **Ch 4**.	<Pt 5 Rules> (Amendment) - Reflect IACS UR M80 (New May 2019) <application date: the date of application for certification of the generator set or the date of contract for construction on or after 1 July 2020> - Reflect M80.1 - Reflect M80.2

Present	Amendment	Reason
		<Pt 5 Rules>
	(3) The rated power shall be appropriate for the actual use of the generator set. (4) The entity responsible of assembling the generating set shall install a rating plate marked with at least the following information. (A) the generating set manufacturer's name or mark; (B) the set serial number; (C) the set date of manufacture; (D) the rated power (both in kW and kVA) with one of the prefixes COP, PRP (or, only for emergency Generating sets, LTP) as defined in ISO 8528-1; (E) the rated power factor; (F) the set rated frequency (Hz); (G) the set rated voltage (V); (H) the set rated current (A); (I) the mass (kg).	
(hereafter, omitted)	(hereafter, same as the present Rules)	

Present

CHAPTER 3 PROPULSION SHAFTING AND POWER TRANSMISSION SYSTEMS

Section 2 Shaftings

201. ~ 203. <omitted>

204. Propeller shaft and stern tube shaft

1. <omitted>

Table 5.3.2 Value of K_2

Portion[1]	Propeller fitting method[2]	K_2[4]
1. The portion between the forward face of the propeller hub (or shaft flange) and the forward edge of the aftermost shaft bearing, or 2.5 d_p (4.0 d_p in water-lubricated), whichever is the greater.	Keyed	1.26
	Keyless fitting by shrink fit	1.22
	Flange[3]	1.22
2. Excluding the portion given in **1** above, the portion in the direction toward the bow up to the fore end of the forward stern tube seal.		1.15

NOTES:
(1) ~ (3) <omitted>
(4) K_2 is applied to the shafts to which type approved measures against corrosion by sea water are taken. The diameters of Kind 1 shaft made of approved corrosion-resistant materials and Kind 2 shaft are taken are to be dealt with as considered appropriate by the Society. **【See Guidance】**

Amendment

CHAPTER 3 PROPULSION SHAFTING AND POWER TRANSMISSION SYSTEMS

Section 2 Shaftings

201. ~ 203. <same as the present>

204. Propeller shaft and stern tube shaft

1. <same as the present>

Table 5.3.2 Value of K_2

Portion[1]	Propeller fitting method[2]	K_2[4]
1. The portion between the forward face of the propeller hub (or shaft flange) and the forward edge of the aftermost shaft bearing, or 2.5 d_p (4.0 d_p in water-lubricated), whichever is the greater.	Keyed	1.26
	Keyless fitting by shrink fit	1.22
	Flange[3]	1.22
2. Excluding the portion given in **1** above, the portion in the direction toward the bow up to the fore end of the forward stern tube seal.		1.15

NOTES:
(1) ~ (3) <same as the present>
(4) K_2 is applied to the shafts to which approved measures(sleeves or type approved corrosion resisting) against corrosion by sea water are taken. The diameters of Kind 1 shaft made of approved corrosion-resistant materials and Kind 2 shaft are taken are to be dealt with as considered appropriate by the Society. *(2020)* **【See Guidance】**

Reason

<Pt 5 Rules>

(Amendment)

- Metal sleeves do not require type approval but require individual drawing approval.

Present	Amendment	Reason
2. <omitted> **3. Sleeves** (1) ~ (3) <omitted> (4) Security of sleeves (A) Sleeves are to be shrunk or forced on the shaft by pressure and they are not to be secured by pins or bolts. (B) Sleeves are to be made in a single piece. if made of two or more lengths, the jointing of the separate pieces is to be done by an type approved method of the Society. *(2019)* (hereafter, omitted)	**2. <same as the present>** **3. Sleeves** (1) ~ (3) <same as the present> (4) Security of sleeves (A) Sleeves are to be shrunk or forced on the shaft by pressure and they are not to be secured by pins or bolts. (B) Sleeves are to be made in a single piece. if made of two or more lengths, the jointing of the separate pieces is to be done by an ~~type~~ approved method of the Society. *(2020)* (hereafter, same as the present Rules)	<Pt 5 Rules> (Amendment) - When sleeves are installed with split parts, the method of construction is to be separately approved by plan approval.

Present	Amendment	Reason
205. <omitted>	**205. <same as the present>**	<Pt 5 Rules> (Amendment) - Reflect IACS UR M52 (Rev.1 Jan 2019) <application date: the date of contract for construction on or after 1 January 2020>
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 of lignum vitae, rubber or synthetic materials, 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.	**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 ~~of lignum vitae, rubber or synthetic materials~~, 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.	- the requirement is from 1986 and that water lubricated bearings of lignum vitae are no longer installed in current designs.
(hereafter, omitted)	(hereafter, same as the present Rules)	

Present	Amendment	Reason
CHAPTER 3 PROPULSION SHAFTING AND POWER TRANSMISSION SYSTEMS **Section 3 Propellers** **301.~ 306. <omitted>** **307. Tests and inspections** **1. Balancing tests** Propellers are to be subjected to static balancing tests. **【See Guidance】** **2. Contact tests** Where the propeller is force-fitted to the taper of the propeller shaft cone, the contact marking between the mating surfaces is to be verified by contact facing-up test or other suitable means. **3. Confirmation of the pull-up length** Where a propeller is force-fitted to the propeller shaft without the use of a key, the pull-up length is to be confirmed and recorded. (hereafter, omitted)	**CHAPTER 3 PROPULSION SHAFTING AND POWER TRANSMISSION SYSTEMS** **Section 3 Propellers** **301.~ 306. <same as the present>** **307. Tests and inspections** **1. Balancing tests** Propellers are to be subjected to static balancing tests. Dynamic balancing tests are necessary for propellers running above 500 rpm. *(2020)* **【See Guidance】** **2. Contact tests** Where the propeller is force-fitted to the taper of the propeller shaft cone, the contact marking between the mating surfaces is to be verified by contact facing-up test or other suitable means. **3. Confirmation of the pull-up length** Where a propeller is force-fitted to the propeller shaft without the use of a key, the pull-up length is to be confirmed and recorded. (hereafter, same as the present Rules)	<Pt 5 Rules> (Amendment) - Reflect IACS UR W24 5.2 <application date: the date of contract for construction on or after 1 July 2020> - UR W24 5.2 for propellers dynamic balancing tests are reflected.

Present	Amendment	Reason
CHAPTER 5 BOILER AND PRESSURE VESSELS **Section 1 Boilers** **101. ~ 113. <omitted>** **114. Manholes, mud holes and peep holes [See Guidance]** **1.** Manholes or mud holes are to be provided for boilers in a location where they do not come in the way on inspecting and cleaning of each portion of the boiler. The clear opening of manholes is to be not less than 300 mm by 400 mm. A mudhole opening in a boiler shell is not to be less than 60 mm by 90mm. Where, due to size or interior arrangement of a boiler, it is impractical to provide a manhole or other suitable opening for direct access, there are to be two or more suitable openings through which the interior can be inspected. **2.** The manhole cover of internal type is to be provided with a spigot which has a clearance of not more than 1.5mm all round. **3.** The minor axis of the oval opening to be provided on the shell plate is to be parallel to the longitudinal direction of the drum, except for the case where specially approved by the Society. **4. ~ 5.** <omitted> (hereafter, omitted)	**CHAPTER 5 BOILER AND PRESSURE VESSELS** **Section 1 Boilers** **101. ~ 113. <same as the present>** **114. Manholes, mud holes and peep holes [See Guidance]** **1.** Manholes or mud holes are to be provided for boilers in a location where they do not come in the way on inspecting and cleaning of each portion of the boiler. The clear opening of manholes is to be not less than 300 mm by 400 mm. A mudhole opening in a boiler shell is not to be less than 60 mm by 90mm. Where, due to size or interior arrangement of a boiler, it is impractical to provide a manhole or other suitable opening for direct access, there are to be two or more suitable openings through which the interior can be inspected. **2.** The manhole cover of internal type is to be provided with a spigot which has a clearance of not more than 1.5mm all round. **3.** ~~The minor axis of the oval opening to be provided on the shell plate is to be parallel to the longitudinal direction of the drum, except for the case where specially approved by the Society.~~ **3. ~ 4.** <same as the present> (hereafter, same as the present Rules)	<Pt 5 Rules> (Amendment) - Reflect Request for Establishment/ Revision of Classification Technical Rules 'MAM6200-2528-2018' <application date: the date of contract for construction on or after 1 July 2020> - Delete the requirement of manhole direction since reinforcement of openings are sufficiently strengthen according to 115.

Present	Amendment	Reason
CHAPTER 5 BOILER AND PRESSURE VESSELS **Section 1 Boilers** **115. ~ 133. <omitted>** **134. Boiler installation** **1. ~ 3. <omitted>** **4. Dampers** In case dampers are installed in the funnels or uptakes of boilers, their openings are not to be reduced to more than 2/3 of the flue area when closed. They are to be capable of locking in any open position and the degree of the opening is to be clearly indicated. (hereafter, omitted)	**CHAPTER 5 BOILER AND PRESSURE VESSELS** **Section 1 Boilers** **115. ~ 133. <same as the present>** **134. Boiler installation** **1. ~ 3. <same as the present>** **4. Dampers** In case dampers are installed in the funnels or uptakes of boilers, the opening of the damper is to be more than 1/3 of the flue area when closed. They are to be capable of locking in any open position and the degree of the opening is to be clearly indicated. However, when the automatic control damper is installed, the application of above provisions may not apply if the damper is a fail-open type. *(2020)* (hereafter, same as the present Rules)	<Pt 5 Rules> (Amendment) - Reflect Request for Establishment/ Revision of Classification Technical Rules 'ENP4800-2275-2019' <application date: the date of contract for construction on or after 1 July 2020> - Clarify the meaning clearly - Reflecting the internal opinion of the environment & piping team, it is specified that the provisions for opening of the damper may not be applied when the automatic control damper is installed and fail-open type.

Present	Amendment	Reason
CHAPTER 5 BOILER AND PRESSURE VESSELS **Section 3 Pressure Vessels** **301. ~ 309. <omitted>** **310. Flat end plates or cover plates without stay or other supports** The required thickness of flat end plates or cover plates without stay or other supports is to be in accordance with **110.** **【See Guidance】** **311. Flat plates or tube plates with stay or other supports** The required thickness of flat plates or tube plates with stay or other supports is to be in accordance with **111.** (hereafter, omitted)	**CHAPTER 5 BOILER AND PRESSURE VESSELS** **Section 3 Pressure Vessels** **301. ~ 309. <same as the present>** **310. Flat end plates or cover plates without stay or other supports** The required thickness of flat end plates or cover plates without stay or other supports is to be in accordance with **110.** **【See Guidance】** **311. Flat plates or tube plates ~~with stay or other supports~~** **1.** The required thickness of flat plates or tube plates with stay or other supports is to be in accordance with **111.** **2.** The thickness of tube plates for heat exchangers without tube stays is to be as deemed appropriate by the Society. *(2020)* **【See Guidance】** (hereafter, same as the present Rules)	<Pt 5 Rules> (Amendment) - Reflect Request for Establishment/ Revision of Classification Technical Rules 'MAM4300-1128-2019' <application date: the date of contract for construction on or after 1 July 2020> - The requirements for the thickness of tube plates for heat exchangers without tube stays in Guidance 310. 1 move to 311. and modify the title to "Flat plates or tube plates".

Present

319. Tests and inspections

1. Hydraulic tests

Pressure vessels and their fittings attached directly to a pressure vessel are to be subjected to hydraulic test according to **Table 5.5.17** after construction in the presence of the Surveyor. **【See Guidance】**

Table 5.5.17 Hydraulic Test Pressure

Item	Test pressure
Class 1 and Class 2 pressure vessels(1)	1.5 times the design pressure
Heat exchangers and other special vessels not applicable to the above	To be determined in each case
Fittings attached directly to Class 1 and Class 2 pressure vessels	2 times the design pressure of the pressure vessel
NOTE : (1) Class 3 pressure vessels considered necessary by the Society are to be subjected to hydraulic test.	

(hereafter, omitted)

Amendment

319. Tests and inspections

1. Hydraulic tests

Pressure vessels and their fittings attached directly to a pressure vessel are to be subjected to hydraulic test according to **Table 5.5.17** after construction in the presence of the Surveyor. **【See Guidance】**

Table 5.5.17 Hydraulic Test Pressure

Item	Test pressure
Class 1 and Class 2 pressure vessels(1)	1.5 times the design pressure
Heat exchangers and other special vessels not applicable to the above	To be determined in each case
Fittings directly affected by pressure of Class 1 and Class 2 pressure vessels	2 times the design pressure of the pressure vessel
NOTE : (1) Class 3 pressure vessels considered necessary by the Society are to be subjected to hydraulic test.	

(hereafter, same as the present Rules)

Reason

<Pt 5 Rules>

(Amendment)

- Reflect Request for Establishment/ Revision of Classification Technical Rules 'MAM4300-1128-2019' <application date: the date of contract for construction on or after 1 July 2020>

- Clarify that even if an intermediate piece is inserted between the pressure vessel and the valve a hydraulic test is to be carried out.

Present	Remark
# CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT ## Section 1 General <omitted> **104. Type of connections** <omitted>	(amendment) - IACS UR P2.7.4(Rev.9)

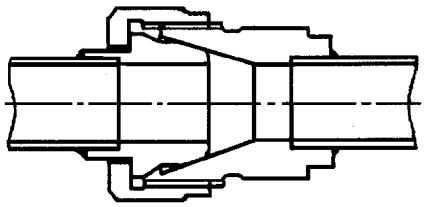
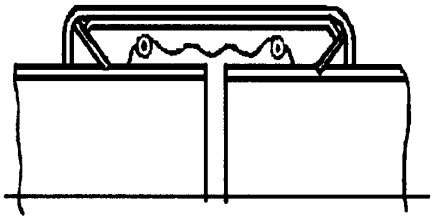
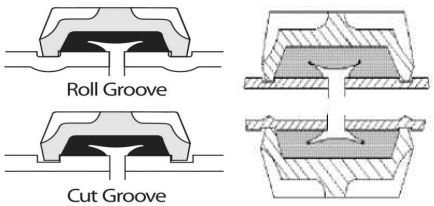
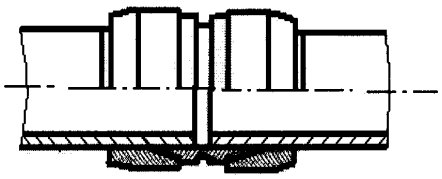
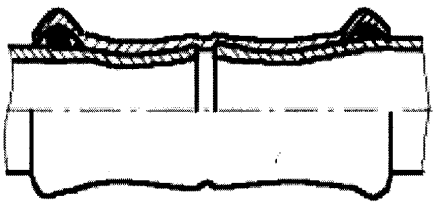
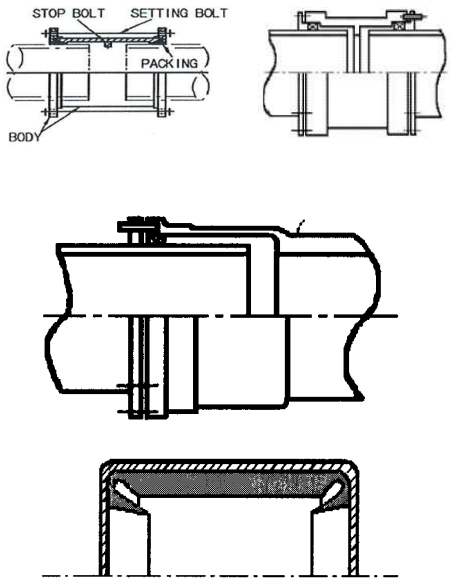
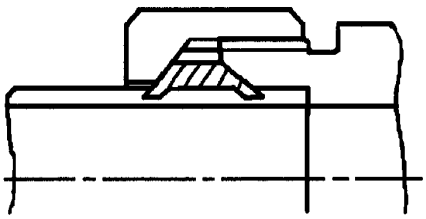
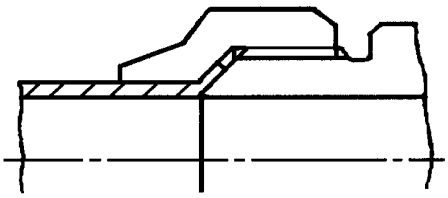
Type of mechanical joints	Examples of mechanical joints	Type of mechanical joints	Examples of mechanical joints
Pipe union		Slip-on joints	
Welded and brazed types		Grip type	
Compression couplings		Machine grooved type	
Swage type			
Press type		Slip type	
Bite type			
Flared type			

Fig 5.6.2 Examples of Mechanical Joints

Present	Remark
<omitted> **Table 5.6.10 Application of Mechanical Joints**	(amendment) - IACS UR P2.7.4(Rev.9)

Systems		Kind of connections		
		Pipe Unions	Compression Couplings	Slip-on joints
Flammable fluids (Flash point ≤ 60 °C)				
1	Cargo oil lines(4)	○	○	○
2	Crude oil washing lines(4)	○	○	○
3	Vent lines(3)	○	○	○
4	Water seal effluent lines	○	○	○
5	Scrubber effluent lines	○	○	○
6	Main lines(2)(4)	○	○	○
7	Distributions lines(4)	○	○	○
Flammable fluids (Flash point 〉 60 °C)				
8	Cargo oil lines(4)	○	○	○
9	Fuel oil lines(3)(2)	○	○	○
10	Lubricating oil lines(2)(3)	○	○	○
11	Hydraulic oil(2)(3)	○	○	○
12	Thermal oil(2)(3)	○	○	○
Sea water				
13	Bilge lines(1)	○	○	○
14	Water filled fire extinguishing systems, e.g. sprinkler systems(3)	○	○	○
15	Non water filled fire extinguishing systems, e.g. foam, drencher systems(3)	○	○	○
16	Fire main (not permanently filled)(3)	○	○	○
17	Ballast system(1)	○	○	○
18	Cooling water system(1)	○	○	○
19	Tank cleaning services	○	○	○
20	Non-essential systems	○	○	○

Present	Remark

Table 5.6.10 Application of Mechanical Joints (continued)

Systems		Kind of connections		
		Pipe Unions	Compression Couplings[6]	Slip-on joints
Fresh water				
21	Cooling water system[(1)]	○	○	○
22	Condensate return[(1)]	○	○	○
23	Non-essential system	○	○	○
Sanitary/Drains/Scuppers				
24	Deck drains (internal)[(6)]	○	○	○[4]
25	Sanitary drains	○	○	○
26	Scuppers and discharge (overboard)	○	○	-
Sounding/Vent				
27	Water tanks/Dry spaces	○	○	○
28	Oil tanks (f.p. 〉 60 °C)[(2)(3)]	○	○	○
Miscellaneous				
29	Starting/Control air[1]	○	○	-
30	Service air (non-essential)	○	○	○
31	Brine	○	○	○
32	CO_2 system[1]	○	○	-
33	Steam	○	○	○[(5)]

Abbreviations ○ : Application is allowed, - : Application is not allowed

NOTES - Fire resistance capability

If mechanical joints include any components which readily deteriorate in case of fire, they are to be of an approved fire resistant type under consideration of the following footnotes:

1) Inside machinery spaces of category A - only approved fire resistant types.
2) Not inside machinery spaces of category A or accommodation spaces. May be accepted in other machinery spaces
   provided the joints are located in easily visible and accessible positions.
3) Approved fire resistant types except in cases where such mechanical joints are installed on exposed open decks, as
   defined in SOLAS II-2/Reg. 9.2.3.3.2.2(10) and not used for fuel oil lines.
4) Only in pump rooms and open decks - only approved fire resistant types.

NOTES - General

5) Slip type slip-on joints as shown in Fig 5.6.2. May be used for pipes on deck with a design pressure of 10 bar or less.
6) Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.

(amendment)
- IACS UR P2.7.4(Rev.9)

Present	Remark
Table 5.6.11 Application of mechanical joints depending upon the class of piping	(amendment) - IACS UR P2.7.4(Rev.9)

Type of joints	Classes of piping systems		
	Class Ⅰ	Class Ⅱ	Class Ⅲ
Pipe Unions			
Welded and brazed type	○(OD≤60.3 mm)	○(OD≤60.3 mm)	○
Compression Couplings			
Swage type	○	○	○
Bite type	○(OD≤60.3 mm)	○(OD≤60.3 mm)	○
Flared type	○(OD≤60.3 mm)	○(OD≤60.3 mm)	○
Press type	-	-	○
Slip-on joints			
Machine grooved type	○	○	○
Grip type	-	○	○
Slip type	-	○	○
Abbreviations ○ : Application is allowed - : Application is not allowed			

<omitted>

Amendment	Remark

CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT

(amendment)
- IACS UR P2.7.4(Rev.9)

Section 1 General

<same as present>

104. Type of connections

<same as present>

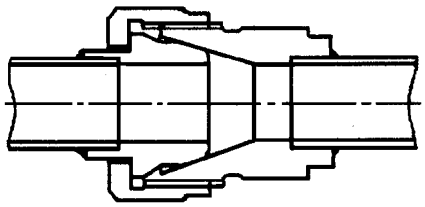
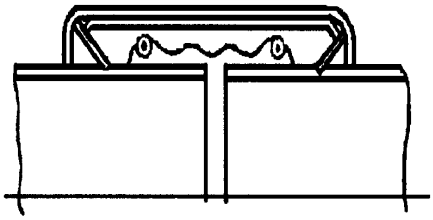
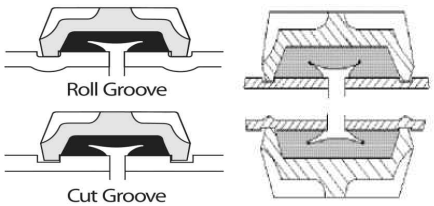
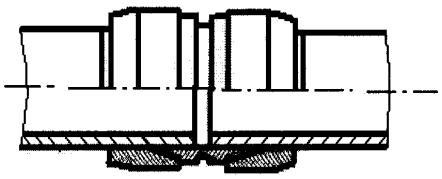
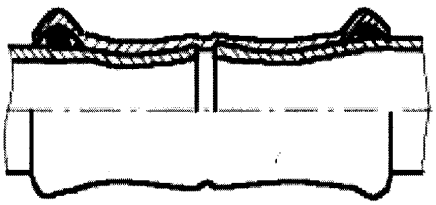
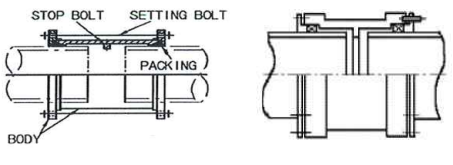
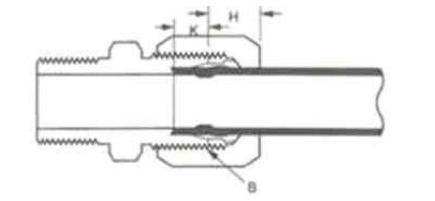
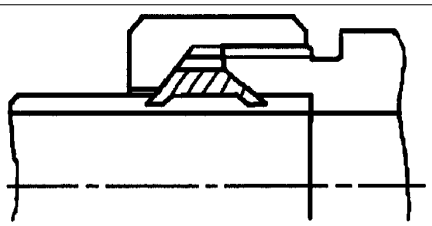
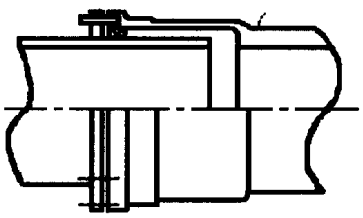
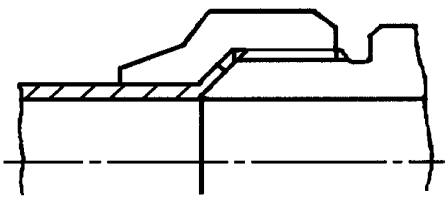
Type of mechanical joints	Examples of mechanical joints	Type of mechanical joints	Examples of mechanical joints
Pipe union		Slip-on joints	
Welded and brazed types		Grip type	
Compression couplings		Machine grooved type	
Swage type			
Press type		Slip type	
Typical compression type			
Bite type			
Flared type			

Fig 5.6.2 Examples of Mechanical Joints

Amendment	Remark
<same as present> **Table 5.6.10 Application of Mechanical Joints**	(amendment) - IACS UR P2.7.4(Rev.9)

Systems		Kind of connections		
		Pipe Unions	Compression Couplings	Slip-on joints
Flammable fluids (Flash point ≤ 60 °C)				
1	Cargo oil lines(4)	○	○	○
2	Crude oil washing lines(4)	○	○	○
3	Vent lines(3)	○	○	○
Inert Gas				
4	Water seal effluent lines	○	○	○
5	Scrubber effluent lines	○	○	○
6	Main lines(2)(4)	○	○	○
7	Distributions lines(4)	○	○	○
Flammable fluids (Flash point 〉 60 °C)				
8	Cargo oil lines(4)	○	○	○
9	Fuel oil lines(3)(2)	○	○	○
10	Lubricating oil lines(2)(3)	○	○	○
11	Hydraulic oil(2)(3)	○	○	○
12	Thermal oil(2)(3)	○	○	○
Sea water				
13	Bilge lines(1)	○	○	○
14	Water filled fire extinguishing systems, e.g. sprinkler systems(3)	○	○	○
15	Non water filled fire extinguishing systems, e.g. foam, drencher systems(3)	○	○	○
16	Fire main (not permanently filled)(3)	○	○	○
17	Ballast system(1)	○	○	○
18	Cooling water system(1)	○	○	○
19	Tank cleaning services	○	○	○
20	Non-essential systems	○	○	○

Amendment	Remark

Table 5.6.10 Application of Mechanical Joints (continued)

Systems		Kind of connections		
		Pipe Unions	Compression Couplings[6]	Slip-on joints
Fresh water				
21	Cooling water system[1]	○	○	○
22	Condensate return[1]	○	○	○
23	Non-essential system	○	○	○
Sanitary/Drains/Scuppers				
24	Deck drains (internal)[6]	○	○	○[4]
25	Sanitary drains	○	○	○
26	Scuppers and discharge (overboard)	○	○	-
Sounding/Vent				
27	Water tanks/Dry spaces	○	○	○
28	Oil tanks (f.p. 〉 60 °C)[2][3]	○	○	○
Miscellaneous				
29	Starting/Control air[1]	○	○	-
30	Service air (non-essential)	○	○	○
31	Brine	○	○	○
32	CO_2 system[1]	○	○	-
33	Steam	○	○	○[5]

Abbreviations ○ : Application is allowed, - : Application is not allowed

NOTES - Fire resistance capability

If mechanical joints include any components which readily deteriorate in case of fire, the following footnotes are to be observed:

1) Inside machinery spaces of category A - approved fire resistant types.
2) Slip on joints are not accepted Not inside machinery spaces of category A or accommodation spaces. May be accepted in other machinery spaces provided the joints are located in easily visible and accessible positions. provided the joints are located in easily visible and accessible positions.
3) Approved fire resistant types except in cases where such mechanical joints are installed on open decks, as defined in SOLAS II-2/Reg. 9.2.3.3.2.2(10) and not used for fuel oil lines.
4) In pump rooms and open decks - approved fire resistant types.

NOTES - General

5) Slip type slip-on joints as shown in Fig 5.6.2. May be used for pipes on deck with a design pressure of 10 bar or less.
6) Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.

(amendment)
- IACS UR P2.7.4(Rev.9)

Amendment	Remark
Table 5.6.11 Application of mechanical joints depending upon the class of piping	(amendment) - IACS UR P2.7.4(Rev.9)

Type of joints	Classes of piping systems		
	Class Ⅰ	Class Ⅱ	Class Ⅲ
Pipe Unions			
Welded and brazed type	○(OD≤60.3 mm)	○(OD≤60.3 mm)	○
Compression Couplings			
Swage type	○	○	○
Bite type	○(OD≤60.3 mm)	○(OD≤60.3 mm)	○
Typical compression type	○(OD≤60.3 mm)	○(OD≤60.3 mm)	○
Flared type	○(OD≤60.3 mm)	○(OD≤60.3 mm)	○
Press type	-	-	○
Slip-on joints			
Machine grooved type	○	○	○
Grip type	-	○	○
Slip type	-	○	○
Abbreviations ○ : Application is allowed - : Application is not allowed			

<same as presents>

Present	Amendment	Remark
<omitted>	<same as present>	
107. General requirements for piping arrangement	**107. General requirements for piping arrangement**	
<omitted>	<same as present>	
2. Protection of pipes and fittings	**2. Protection of pipes and fittings**	
<omitted>	<same as present>	(amendment)
(4) <Added>	(4) Seawater pipes located in cargo holds and in other spaces where pipes may be subject to impacts (e.g. fish holds, chain lockers), are to be protected from mechanical damage. *(2020)*	- IACS UR P2.13

Present	Amendment	Remark
<omitted>	<same as present>	
107. General requirements for piping arrangement	**107. General requirements for piping arrangement**	(amendment) - Reflects MSC.1/ Circ.1567.
<omitted>	<same as present>	
8. Watertight bulkheads **[See Guidance]** (1) Valves or cocks such as drain valves, which do not constitute a part of any pipe line are not to be fitted on the collision bulkhead. (2) Except as provided in para. (3), the collision bulkhead may be pierced below the bulkhead deck by not more than one(1) pipe for dealing with fluid in the forepeak tank in principle and the pipe is to be fitted with a screw-down valve capable of being operated from above the bulkhead deck, the valve chest being secured inside the forepeak to the collision bulkhead. The valve, however, may be fitted on the after side of the collision bulkhead provide that the valves are readily accessible under all service conditions and the space in which they are located is not a cargo space.	**8. Watertight bulkheads** **[See Guidance]** (1) Valves or cocks such as drain valves, which do not constitute a part of any pipe line are not to be fitted on the collision bulkhead. (2) Except as provided in para. (3), the collision bulkhead may be pierced below the bulkhead deck of passenger ships and the freeboard deck of cargo ships by not more than one pipe for dealing with fluid in the forepeak tank, provided that the pipe is fitted with a screw-down valve capable of being operated from above the bulkhead deck of passenger ships and the freeboard deck of cargo ships, the valve being located inside the forepeak at the collision bulkhead. The valve, however, may be the fitted on the after side of the collision bulkhead provided that the valve is readily accessible under all service conditions and the space in which it is located is not a cargo space. Alternatively, for cargo ships, the pipe may be fitted with a butterfly valve suitably supported by a seat or flanges and capable of being operated from above the freeboard deck. All valves shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable. *(2020)*	
<omitted>	<same as present>	

Present	Amendment	Remark
Section 14 Tests and Inspections **1401. Tests of auxiliary machinery** **1. Hydrostatic Tests** (1) The pressure receiving portions of the essential auxiliary are to be tested to a hydrostatic pressure of 1.5 times the design pressure after having been machine-finished, except where otherwise specified. The test pressure, however, is not to be less than 0.2 MPa. **【See Guidance】** <omitted>	**Section 14 Tests and Inspections** **1401. Tests of auxiliary machinery** **1. Hydrostatic Tests** (1) The pressure receiving portions of the essential auxiliary are to be tested to a hydrostatic pressure of 1.5 times the design pressure after having been machine-finished. The test pressure, however, is not to be less than 0.2 MPa. <same as present>	(amendment) - Deleted the relevant Rules as deleted Guidance 1401.1

Present	Amendment	Reason
CHAPTER 8 WINDLASSES AND MOORING WINCHES **Section 1 General** **101. <omitted>** **102. Materials** **1.** Materials used in the major parts of windlasses and mooring winches are to be of steel forgings, steel castings or equivalent thereto which meet Korean Industrial standards or equivalent. **【See Guidance】** *(2017)* **2.** However, materials of shafts and gears of windlasses which transmit a power not less than 100 kW are to comply with requirements in **Pt 2, Ch 1** of Rules. *(2017)* **103. <New>**	**CHAPTER 8 WINDLASSES AND MOORING WINCHES** **Section 1 General** **101. <same as the present>** **102. Materials** **1.** Materials used in the major parts of windlasses and mooring winches are to be of steel forgings, steel castings or equivalent thereto which meet Korean Industrial standards or equivalent. **【See Guidance】** *(2017)* **2.** However, materials of shafts and gears of windlasses which transmit a power not less than 100 kW are to comply with requirements in **Pt 2, Ch 1** of Rules. *(2017)* **103. Welding *(2020)*** **1. Welded fabrication of Windlasses** Weld joint designs are to be shown in the construction plans and are to be approved in association with the approval of the windlass design. Welding procedures and welders are to be qualified in accordance with the requirements of **Pt 2, Ch 2, Sec 4** and **Sec 5**. Welding consumables are to be approved by the Society in the case their type and grade fall within the scope of **Pt 2, Ch 2, Sec 6**; when their type and grade fall outside the scope of **Pt 2, Ch 2, Sec 6**, the welding consumables are to comply with the applicable requirements of the Society, if any, or to national or international standards. The degree of non-destructive examination of welds and post-weld heat treatment, if any, are to be specified and submitted for consideration.	<Pt 5 Rules> (Amendment) - Reflect IACS UR A3 (Rev.1 Jun 2019) <application date: the date of application of certification of windlass on or after 1 July 2020; or the date of contract for construction on or after 1 July 2020> - A3 2.2 Welded Fabrication is newly introduced.

Present	Amendment	Reason
Section 2 Windlasses	**Section 2 Windlasses**	<Pt 5 Rules>
201. <omitted>	**201. <same as the present>**	
202. Standards of Compliance *(2018)*	**202. Standards of Compliance *(2018)***	(Amendment)
1. The design, construction and testing of windlasses are to conform to an acceptable standard or code of practice. To be considered acceptable, the standard or code of practice is to specify criteria for stresses, performance and testing. The following are examples of standards recognized. (1) SNAME T&R Bulletin 3-15 Guide to the Design and Testing of Anchor Windlasses for Merchant Ships (2) ISO 7825 Deck machinery general requirements (3) ISO 4568 Shipbuilding - Sea-going vessels - Windlasses and anchor capstans (4) JIS F6714 Windlasses (5) BS MA35 Specifications for Ship Deck Machinery Windlass	**1.** The design, construction and testing of windlasses are to conform to an acceptable standard or code of practice. To be considered acceptable, the standard or code of practice is to specify criteria for stresses, performance and testing. The following are examples of standards recognized. (1) SNAME T&R Bulletin 3-15 Guide to the Design and Testing of Anchor Windlasses for Merchant Ships (2) ISO 7825 Deck machinery general requirements (3) ISO 4568 Shipbuilding - Sea-going vessels - Windlasses and anchor capstans (4) JIS F6714 Windlasses ~~(5) BS MA35 Specifications for Ship Deck Machinery Windlass~~	- Delete BS MA35 in standard of compliance
203. ~ 204. <omitted>	**203. ~ 204. <same as the present>**	
205. Shop tests *(2018)*	**205. Shop tests *(2018)***	
1. <omitted>	**1. <same as the present>**	
2. Windlass shall be permanently marked with the following information. (1) Nominal size of chain (e.g. 100/3/45 means chain dia./grade/breaking load) (2) Maximum anchorage depth (m)	**2.** Windlass shall be permanently marked with the following information. (1) Nominal size of the windlass (e.g. 100/3/45 is the size designation of a windlass for 100 mm diameter chain cable of Grade 3, with a holding load of 45 % of the breaking test load of the chain cable) *(2020)* (2) Maximum anchorage depth (m)	- To align with ISO 4568.
(hereafter, omitted)	(hereafter, same as the present Rules)	

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

(Part 5 Machinery Installation)

- Main Amendments -

(1) Effective date : 1 Jan. 2020(Date of application for approval) & 1 July 2021(Date of which the contract for construction is signed)

◉ Amendments of IACS UR P4(Rev.5) has been reflected.

(2) Effective date : 1 Jul. 2020 (Date of which the contract for construction is signed)

◉ The thickness of the bow or side thruster propeller blades operated in an environment with low fatigue load due to their low frequency of use has been revised to accept the detailed calculation submitted by the manufacturer.

◉ The acceptance criteria for propeller dynamic balance test has been newly added.

◉ The requirement for manhole direction of boilers and pressure vessels has been deleted.

◉ The test specimen of the impact test was incorrectly referred to as the tensile test specimen, so the impact test specimen was corrected to the full size test specimen.

◉ It has been added requirements for the application of standard pipes to bilge suction pipes.

◉ Hydrostatic test for hydraulic motor has been amended.

◉ The requirements of motor ratings for steering gear have been newly added.

◉ Annex 5-7 Control and Safety System for Dual Fuel Diesel Engines has been deleted reflecting the deletion of the IACS UR M59 (Del June 2019).

(3) Effective date : 1 Jul. 2020 (Date of the application for certificate)

◉ The redundancy requirements for Electronically-Controlled Diesel Engines in case of multi propulsion have been newly added.

Present	Amendment	Reason
CHAPTER 1 GENERAL **Section 1 General** **101. Application** **1.** In application to **101. 1** of the Rules, where redundant propulsion systems and steering systems are installed, the requirements in **Annex 5-10** may be applied additionally. **【See Rule】** **2.** In application to **101. 2** of the Rules, the term "considered acceptable by the Society" means that permits to use the machinery installation which are deemed to be equivalent in accordance with **Pt 1, Ch 1, 104.** of the Guidance, in case that determined the application of any specific requirements of this Rules unreasonable or unnecessary. **【See Rule】** (hereafter, omitted)	**CHAPTER 1 GENERAL** **Section 1 General** **101. Application** **1.** In application to **101. 1** of the Rules, where redundant propulsion systems and steering systems are installed, the requirements in **Annex 5-10** may be applied additionally. **【See Rule】** ~~**2.** In application to **101. 2** of the Rules, the term "considered acceptable by the Society" means that permits to use the machinery installation which are deemed to be equivalent in accordance with **Pt 1, Ch 1, 104.** of the Guidance, in case that determined the application of any specific requirements of this Rules unreasonable or unnecessary. **【See Rule】**~~ (hereafter, same as the present Rules)	<Pt 5 Guidances> (Amendment) - deleted duo to reference for alternative and novel features is already mentioned.

Present	Amendment	Reason
CHAPTER 3 PROPULSION SHAFTING AND POWER TRANSMISSION SYSTEMS **Section 1 General** **102. Other propulsion and maneuvering machinery** **【See Rule】** In application to **102.** of the Rules, water-jet propulsion systems and azimuth or rotatable thrusters may be complied with the following; **1. <omitted>** **2.** Bow or side thrusters and their control units (hereinafter called "**thrusters**") are to comply with the followings. *(2019)* (1) <omitted> (2) Materials The materials used in the principal component, in principle, are to be complied with the requirements of **Pt 2, Ch 1** of the Rules. However, the Society may accept to be used of the materials which comply with *Korean Industrial Standard* or standard considered as equivalent thereto. (3) Shop tests (A) ~ (D) <omitted> (4) On board tests The performance test and the safety device test for thruster are to be carried out. (hereafter, omitted)	**CHAPTER 3 PROPULSION SHAFTING AND POWER TRANSMISSION SYSTEMS** **Section 1 General** **102. Other propulsion and maneuvering machinery** **【See Rule】** In application to **102.** of the Rules, it may be complied with the following; **1. <same as the present>** **2.** Bow or side thrusters and their control units (hereinafter called "**thrusters**") are to comply with the followings. *(2019)* (1) <same as the present> (2) Materials The materials used in the principal component, in principle, are to be complied with the requirements of **Pt 2, Ch 1** of the Rules. However, the Society may accept to be used of the materials which comply with *Korean Industrial Standard* or standard considered as equivalent thereto. (3) Design *(2020)* The construction and strength of propeller blades is to comply with the requirements in **Ch 3, 303.** of the Rules. However, where the manufacturer submits a detailed calculation and deemed as appropriate by the Society, it may be complied with. (4) Shop tests (A) ~ (D) <same as the present> (5) On board tests The performance test and the safety device test for thruster are to be carried out. (hereafter, same as the present Rules)	<Pt 5 Guidance> (Amendment) - Reflect 'MAM4300-176-2019' request for revision of Guidance <application date: the date of contract for construction on or after 1 July 2020> - revise in line with Korean version. - The thickness of the bow or side thruster propeller blades operated in an environment with low fatigue load due to their low frequency of use has been revised to accept the detailed calculation submitted by the manufacturer.

Present	Amendment	Reason
CHAPTER 3 PROPULSION SHAFTING AND POWER TRANSMISSION SYSTEMS **Section 2 Shafting** **206. Stern tube bearing and sealing devices** **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) Alignment calculation only dealing with the static external force may be accepted (the review for shaft alignment variation due to dynamic force such as variation of bending moment, bending stress and etc. is not accepted). (B) At any position on the propeller shaft static bending moment (absolute value) is not to exceed the value at the aft end of the stern tube bearing.	**CHAPTER 3 PROPULSION SHAFTING AND POWER TRANSMISSION SYSTEMS** **Section 2 Shafting** **206. Stern tube bearing and sealing devices** **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.	<Pt 5 Guidance> (Amendment) <application date: the date of contract for construction on or after 1 July 2020> - Corrected the English to make it easier to understand.

Present	Amendment	Reason
(2) Improvement in lubricating oil and condition of lubricating For improving the lubricating condition of stern tube bearing, the following measures are to be taken; (A) The lubricating oil inlet is to be provided at the aft end of the bearing for ensuring the forced circulation of the lubricating oil. (B) To be use lubricating oil with superior resistance against burning out bearing and characteristic being easy to emulsify (being difficult to separate). However, additaments for lubricating oil are to be considered the fitness with sealing materials for stern tube sealing device such as rubber. (C) Damage found of bearings at early stage For finding of bearings burned out at early stage and preventing of extension of the damage, at least one(1) temperature sensor in bearing shell and high temperature alarm (Set point 60 °c or below) are to be provided. (D) Low level alarm is to be provided in the lubricating oil tank. (hereafter, omitted)	(2) Improvement in lubricating oil and condition of lubricating For improving the lubricating condition of stern tube bearing, the following measures are to be taken; (A) The lubricating oil inlet is to be provided at the aft end of the bearing and the slow forced circulation of lubricating oil is to be provided. (B) The lubricating oil of which characteristic is superior against burn-out resistance of bearing and easy to be emulsified(being difficult to be separated) is to be selected. And the compatibility of additives for lubricating oil with sealing materials for stern tube oil sealing device such as rubber is to be also reviewed. (C) Early detection of bearing damage For early detection of bearing burn-out and preventing its spread, the temperature measuring device fitted inside of bearing shell is to be provided at one or more locations including the maximum load point of stern tube bearing and high temperature alarm set 60℃ or below is to be fitted. (D) Low level alarm is to be provided in the lubricating oil tank. (hereafter, same as the present Rules)	- Corrected the English to make it easier to understand.

Present	Amendment	Reason
CHAPTER 3 PROPULSION SHAFTING AND POWER TRANSMISSION SYSTEMS **Section 3 Propellers** **307. Tests and inspections** **1. <omitted>** **2. <new>** (hereafter, omitted)	**CHAPTER 3 PROPULSION SHAFTING AND POWER TRANSMISSION SYSTEMS** **Section 3 Propellers** **307. Tests and inspections** **1. <same as the present>** **2. Dynamic balancing test for propellers** The residual unbalance the dynamic balancing test for propellers is not to exceed the value of the permissible residual unbalance $U_{per.}$ in the following equation according to (KS B) ISO 1940-1. *(2020)* **【See Rule】** $$U_{per} = 1000 \times \frac{(e_{per} \cdot \Omega) \cdot m}{\Omega} \quad (\mathrm{g \cdot mm})$$ $(e_{per} \cdot \Omega)$: the numerical value of the balance (mm/s) unless otherwise specified 40 to be used. m : the rotor mass (kg) Ω : the angular velocity of the service speed. (rad/s) (hereafter, same as the present Rules)	<Pt 5 Guidance> (Amendment) - Reflect IACS UR W24 5.2 <application date: the date of contract for construction on or after 1 July 2020> - Acceptance criteria of dynamic balancing test for propellers are newly introduced.

Present	Amendment	Reason
CHAPTER 5 BOILER AND PRESSURE VESSELS **Section 1 Boilers** **114. Manholes, mud holes and peep holes [See Rule]** **1.** In application to **114. 3** of the Rules, the term "where specially approved by the Society" means that the detailed strength calculation is submitted and approved by the Society. **2.** The required thickness of manhole covers is to be determined by the formula below. However, the thickness at the center is not to be made 14 mm or less. In case where a groove is provided at the periphery of a manhole cover, the thickness of such a part may be reduced to 2/3 of that of the central area. (hereafter, omitted)	**CHAPTER 5 BOILER AND PRESSURE VESSELS** **Section 1 Boilers** **114. Manholes, mud holes and peep holes [See Rule]** ~~**1.** In application to **114. 3** of the Rules, the term "where specially approved by the Society" means that the detailed strength calculation is submitted and approved by the Society.~~ **1.** The required thickness of manhole covers is to be determined by the formula below. However, the thickness at the center is not to be made 14 mm or less. In case where a groove is provided at the periphery of a manhole cover, the thickness of such a part may be reduced to 2/3 of that of the central area. (hereafter, same as the present Rules)	<Pt 5 Guidance> (Amendment) - Reflect Request for Establishment/ Revision of Classification Technical Rules 'MAM6200-2528-2018' <application date: the date of contract for construction on or after 1 July 2020> - Deleted due to deletion of the requirement for manhole direction in the Rules.

Present	Amendment	Reason
CHAPTER 5 BOILER AND PRESSURE VESSELS **Section 3 Pressure Vessels** **310. Flat end plates or tube plates without stay or other supports** 【See Rule】 **1.** The thickness of tube plates for heat exchangers without tube stays is to comply with the following requirements: (1) Except for floating head, the required thickness of flat tube plates without tube stays for the heat exchangers and the like is to be either of the values calculated by the following formula, whichever is the greater; (hereafter, omitted)	**CHAPTER 5 BOILER AND PRESSURE VESSELS** **Section 3 Pressure Vessels** **311. Flat end plates or tube plates ~~without stay or other supports~~** 【See Rule】 **1.** The thickness of tube plates for heat exchangers without tube stays is to comply with the following requirements: (1) Except for floating head, the required thickness of flat tube plates without tube stays for the heat exchangers and the like is to be either of the values calculated by the following formula, whichever is the greater; (hereafter, same as the present Rules)	<Pt 5 Guidance> (Amendment) - Reflect Request for Establishment/ Revision of Classification Technical Rules 'MAM4300-1128-2019' <application date: the date of contract for construction on or after 1 July 2020> - The requirements for the thickness of tube plates for heat exchangers without tube stays in Guidance 310. 1 move to 311. and modify the title to "Flat plates or tube plates".

Present	Amendment	Reason
CHAPTER 5 BOILERS AND PRESSURE VESSELS **Section 4 Welding for Boilers and Pressure Vessels** **403. Heat treatment** [See Rule] **1. Omission of stress relief** In application to **403. 3** (1) of the Rules, the required conditions for omitting stress relieving in case where the material having superior notch toughness is used, are to be as specified below: (1) The base metal is to be of steel plate with the specified impact value of 47.1 J or more by the use of test specimens *R* 4 at a temperature of 0 °C. (2) The plate thickness of the material is to be 40 mm or less. (3) Regardless above (1) and (2), in case of the pressure vessels specially designed or used for special condition, the necessity of stress relieving is to be determined at every time of test. (hereafter, omitted)	**CHAPTER 5 BOILERS AND PRESSURE VESSELS** **Section 4 Welding for Boilers and Pressure Vessels** **403. Heat treatment** [See Rule] **1. Omission of stress relief** In application to **403. 3** (1) of the Rules, the required conditions for omitting stress relieving in case where the material having superior notch toughness is used, are to be as specified below: (1) The base metal is to be of steel plate with the specified charpy V-notch impact value of 47 J or more by the use of full size test specimens given in **Pt 2, Ch 1, 202. Table 2.1.3** of the Guidance at a temperature of 0 °C, or (2) The plate thickness of the material is to be 40 mm or less. (3) Regardless above (1) and (2), in case of the pressure vessels specially designed or used for special condition, the necessity of stress relieving is to be determined at every time of test. (hereafter, same as the present Rules)	<Pt 5 Guidance> (Amendment) - Reflect 'MET4800- 295-2019' request for revision of Guidance <application date: the date of contract for construction on or after 1 July 2020> - change to more common value - R4 is the specimen for tensile test according to Pt 2.

Present	Amendment	Remark
CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT [Omitted] **Section 4 Bilge and Ballast System** [Omitted] **404. Size of bilge suction pipes [See Rule]** [Omitted] **2. Bilge suction branch pipes** In application to **404. 2** of the Rules, the bilge suction branch pipes are to be complied with the following. [Omitted] (4) [Newly added] (4) The term "it may be reduced to 40 mm, where considered acceptable by the Society" specified in **404. 2** of the Rules means those ships not engaged on international voyages and the internal diameter of the branch bilge suction pipes by the formula specified in **404. 2** of the Rules is to be 40 mm or less. [Omitted]	**CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT** [Same as present] **Section 4 Bilge and Ballast System** [Same as present] **404. Size of bilge suction pipes [See Rule]** [Same as present] **2. Bilge suction branch pipes** In application to **404. 2** of the Rules, the bilge suction branch pipes are to be complied with the following. [Same as present] (4) In application to **404. 2** of the Rules, the standard pipes of internal diameter nearest to the calculated diameter may be used and above **404.1.(3)** is to be applied. (5) The term "it may be reduced to 40 mm, where considered acceptable by the Society" specified in **404. 2** of the Rules means those ships not engaged on international voyages and the internal diameter of the branch bilge suction pipes by the formula specified in **404. 2** of the Rules is to be 40 mm or less. [Same as present]	(amendment) - As a request for revision of the environmental piping team, if the inside diameter calculation of the bilge suction pipe is less than the inside diameter of the standard pipe, the irrationality of using a standard pipe one step higher is identified and revised.

Present	Amendment	Remark
CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT [Omitted] **Section 12 Refrigerating Machinery** **1201. General [See Rule]** **1. Application** [Omitted] (9) Ammonia refrigerating machinery compartment [Omitted] (b) Access doors not leading to weather deck are to be of high tightly and self-closing type. [Omitted]	**CHAPTER 6 AUXILIARIES AND PIPING ARRANGEMENT** [Same as present] **Section 12 Refrigerating Machinery** **1201. General [See Rule]** **1. Application** [Same as present] (9) Ammonia refrigerating machinery compartment [Same as present] (b) Access doors not leading to weather deck are to be of highly tight and self-closing type. [Same as present] [Same as present]	(amendment) -

Present	Amendment	Remark
Section 14 Tests and Inspections **1401. Hydraulic tests of auxiliary machinery** **1.** Hydraulic test In application to **1401. 1** (1) of the Rules, "where otherwise specified" means those specified in other Chapters and **Table 5.6.6** of the Guidance. **【See Rule】** **Table 5.6.6** Item: Hydrulic motor — Hydrostatic test pressure: 1.5 times the design pressure of hydraulic pump **2.** Capacity tests In application to **1401. 2** (1) of the Rules, the capacity test may be omitted for the remainder of the design, except for the first example of a particular design series for the auxiliary machinery designed the same as first example. **【See Rule】** [omitted]	**Section 14 Tests and Inspections** **1401. Hydraulic tests of auxiliary machinery** **1.** Capacity tests In application to **1401. 2** (1) of the Rules, the capacity test may be omitted for the remainder of the design, except for the first example of a particular design series for the auxiliary machinery designed the same as first example. **【See Rule】** [same as present]	(amendment) - Deleted the quoted requirement as deletion of related Rule. 1401.1.

Table 5.6.6

Item	Hydrostatic test pressure
Hydrulic motor	1.5 times the design pressure of hydraulic pump

Present	Amendment	Reason
CHAPTER 7 STEERING GEARS **207. Electric installations for electric and electro-hydraulic steering gear** 【See Rule】 **1.** In case of manual auxiliary steering gears for a ship which SOLAS is not applicable to, the power supply circuit from the main switchboard to the steering gear may be one circuit. **2.** In case of steering gears complied with the following, the requirements of **207. 1, 5** (excluding short circuit protection) and **7** of the Rules may not be applied. (1) Ships with a gross tonnage less than 500 tons, or (2) Ships engaged in domestic coastal or smooth water service area **3.** For a ship fitted with multiple steering systems, the requirements in **207. 3** and **4** of the Rules are to be applied to each of the steering systems. *(2017)* **4.** In application to **207. 5** and **6** of the Rules, steering gear motor circuits which are limited to full load current via an electronic converter are exempt from the requirement to provide protection against excess current, including starting current, of not less than twice the full load current of the motor. In this case, the required overload alarm is to be set to a value not greater than the normal load of the electronic converter. (hereafter, omitted)	**CHAPTER 7 STEERING GEARS** **207. Electric installations for electric and electro-hydraulic steering gear** 【See Rule】 **1.** In case of manual auxiliary steering gears for a ship which SOLAS is not applicable to, the power supply circuit from the main switchboard to the steering gear may be one circuit. **2.** In case of steering gears complied with the following, the requirements of **207. 1, 5** (excluding short circuit protection) and **7** of the Rules may not be applied. (1) Ships with a gross tonnage less than 500 tons, or (2) Ships engaged in domestic coastal or smooth water service area **3.** For a ship fitted with multiple steering systems, the requirements in **207. 3** and **4** of the Rules are to be applied to each of the steering systems. *(2017)* **4.** In application to **207. 5** and **6** of the Rules, steering gear motor circuits which are limited to full load current via an electronic converter are exempt from the requirement to provide protection against excess current, including starting current, of not less than twice the full load current of the motor. In this case, the required overload alarm is to be set to a value not greater than the normal load of the electronic converter. **5.** Electric motors for electric steering gear power unit are to be at least of S3 40 % with intermittent periodic duty and electric motors for electro-hydraulic steering gear power unit are to be at least of S6 25 % with continuous operation periodic duty according to IEC 60034-1. *(2020)* (hereafter, same as the present)	<Pt 5 Guidance> (Amendment) - Add the requirements of motor ratings for steering gear <application date: the date of contract for construction on or after 1 July 2020>

Present	Amendment	Reason
CHAPTER 8 WINDLASSES AND MOORING WINCHES **Section 2 Windlasses** **206. On-board tests** [See Rule] *(2018)* **1.** <same as the present> (1) <omitted> (2) Single cable lifter windlasses Average speed is to be measured by anyone among the following after identifying the above (1) (A). (A) Where windlass is capable to lift simultaneously anchor chain cable of both sides by use of independent hydraulic pump unit of one side, the average speed is to be 0.15 m/s or over at the test mentioned in above (1) (A) making use of a hydraulic pump unit of one side. (B) Where windlass is incapable to lift simultaneously anchor chain cable of both sides by use of independent hydraulic pump unit of one side, the average speed of recovery of chain cables, when the maximum length of anchor chain cables are submerged but freely suspended at commencement of lifting is to be 0.15 m/s or over by comparing with the measurements for capability particulars and the estimated performance curve. In case of where the result is doubted by comparing with performance curve, it may be carried out retesting. (C) Single cable lifter windlasses driven by electric motor or steam are to be applied with appropriate modifications of the requirements of (B) above. (3) Couple windlasses Couple windlasses are to be applied with appropriate modifications of the requirements of above (1). In this case, 2 sets of prime mover may be used for lifting anchors of one side or both sides simultaneously.	**CHAPTER 8 WINDLASSES AND MOORING WINCHES** **Section 2 Windlasses** **206. On-board tests** [See Rule] *(2018)* **1.** <same as the present> (1) <same as the present> (2) Single cable lifter windlasses Average speed is to be measured by one of the following after confirming the (1) (A) above. (A) Where a hydraulic pump unit is used to lift simultaneously both sides of anchor chain cables, the average speed, when each 1 length of both sides anchor chains are lifted simultaneously, is to be 0.15 m/s or over at the test condition mentioned in (1) (A) above. (B) Where each hydraulic pump unit is used to lift relevant side of anchor chain cable, the average speed of recovery of chain cables, when the maximum length of anchor chain cables are released but freely suspended at commencement of lifting, is to be 0.15 m/s or over by comparing with the measurements for capability particulars and the estimated performance curve. In case where the result is suspected by comparing with performance curve, a retest may be requested. (C) For single cable lifter windlass driven by an electric motor or steam, appropriately modified requirements on the (B) above are to be applied. (3) Couple windlasses Requirements of above (1) apply, with appropriate modifications, to couple windlasses. In this case, 2 sets of prime mover may be used for lifting each side anchor or both sides anchors simultaneously.	<Pt 5 Rules> (Amendment) <application date: the date of contract for construction on or after 1 July 2020> - Corrected the English to make it easier to understand.

Present	Amendment	Remark
Annex 5-6 Plastic Piping System <omitted>	**Annex 5-6 Plastic Piping System** <same as present>	(amendment) - IACS UR P4(Rev.5)
2. Definitions (1) Plastic(s) is both thermoplastic and thermosetting plastic materials with or without reinforcement, such as PVC and fibre reinforced plastics – FRP. <omitted>	**2. Definitions** (1) Plastic(s) is both thermoplastic and thermosetting plastic materials with or without reinforcement, such as PVC and fibre reinforced plastics – FRP. Plastic includes synthetic rubber and materials of similar thermo/mechanical properties. <same as present>	
4. General requirements The specification of piping is to be in accordance with a recognised national or international standard approved by the Society. In addition, the following requirements apply: (1) Strength <omitted> (E) External pressure External pressure is to be determined by the following. $P_{ext} \leq \frac{P_{col}}{3}$ P_{ext} : External pressure P_{col} : Pipe collapse pressure. In no case is the collapse pressure to be less than 0.3 MPa. The design external pressure is a sum of the vacuum inside the pipe and a head of liquid acting on the outside of the pipe. <omitted>	**4. General requirements** The specification of piping is to be in accordance with a recognised national or international standard approved by the Society. In addition, the following requirements apply: (1) Strength <same as present> (E) External pressure(for any installation which may be subject to vacuum conditions inside the pipe or a head of liquid acting on the outside of the pipe; and for any pipe installation required to remain operational in case of flooding damage, as per Regulation II-1/8-1 of SOLAS 1974 Convention, as amended, or for any pipes that would allow progressive flooding to other compartments through damaged piping or through open ended pipes in the compartments). External pressure is to be determined by the following. $Pn_{ext} \leq \frac{P_{col}}{3}$ P_{ext} : External pressure P_{col} : Pipe collapse pressure. In no case pipe is the collapse pressure to be less than 0.3 MPa. The maximum working external pressure is a sum of the vacuum inside the pipe and a head of liquid acting on the outside of the pipe. Notwithstanding the requirements of (D) or (E) above as applicable, the pipe or pipe layer minimum wall thickness is to follow recognized standards. In the absence of standards for pipes not subject to external pressure, the requirements of (E) above are to be met. The maximum permissible working pressure is to be specified with due regard for maximum possible working temperatures in accordance with Manufacturer's recommendations. <same as present>	

Present	Amendment	Remark
<omitted>	<same as present>	
(4) Temperature (A) The design temperature depending on the working pressure is to be in accordance with Manufacturer's recommendations, but in each case it is to be at least 20 ℃ lower than the minimum heat distortion temperature of the pipe material, determined according to *ISO 75* method A, or equivalent. (B) The minimum heat distortion temperature is to be not less than 80 ℃.	(4) Temperature (A) The design temperature depending on the working pressure is to be in accordance with Manufacturer's recommendations, but in each case it is to be at least 20 ℃ lower than the minimum heat distortion/deflection temperature of the pipe material, determined according to *ISO 75* method A, or equivalent. (B) The minimum heat distortion/deflection temperature is to be not less than 80 ℃.	(amendment) - IACS UR P4(Rev.5)
5. Requirements for pipes/piping systems depending on service and/or locations	**5. Requirements for pipes/piping systems depending on service and/or locations**	
(1) Fire endurance (A) Pipes and their associated fittings whose integrity is essential to the safety of ships are required to meet the minimum fire endurance requirements of Appendix 1 or 2, as applicable, of IMO Res A.753 (18). (B) Depending on the capability of a piping system to maintain its strength and integrity, there exist three different levels of fire endurance for piping systems. (a) Level 1(L1) : Piping having passed the fire endurance test specified in Appendix 1 of IMO Res. A. 753 (18) for a duration of a minimum of one hour without loss of integrity in the dry condition is considered to meet level 1 fire endurance standard. (b) Level 2(L2) : Piping having passed the fire endurance test specified in Appendix 1 of IMO Res. A 753 (18) for a duration of a minimum of 30 *minutes* in the dry condition is considered to meet level 2 fire endurance standard.	(1) Fire endurance (A) Pipes and their associated fittings whose integrity is essential to the safety of ships are required to meet the minimum fire endurance requirements of Appendix 1 or 2, as applicable, of IMO Res A.753 (18). (B) Depending on the capability of a piping system to maintain its strength and integrity, there exist three different levels of fire endurance for piping systems. (a) Level 1(L1) : Piping having passed the fire endurance test specified in Appendix 1 of IMO Res. A.753(18), as amended by IMO Res. MSC. 313(88) and IMO Res. MSC. 399(95) for a duration of a minimum of one hour without loss of integrity in the dry condition is considered to meet level 1 fire endurance standard (L1). Level 1W – Piping systems similar to Level 1 systems except these systems do not carry flammable fluid or any gas and a maximum 5% flow loss in the system after exposure is acceptable (L1W). (b) Level 2(L2) : Piping having passed the fire endurance test specified in Appendix 1 of IMO Res. A.753(18), as amended by IMO Res. MSC. 313(88) and IMO Res. MSC. 399(95) for a duration of a minimum of 30 minutes in the dry condition is considered to meet level 2 fire endurance standard (L2). Level 2W – Piping systems similar to Level 2 systems except a maximum 5% flow loss in the system after exposure is acceptable (L2W).	
<omitted>	<same as present>	

Present	Amendment	Remark
(D_<Newly added>	(D) For Safe Return to Port purposes (SOLAS II-2, Reg.21.4), plastic piping can be considered to remain operational after a fire casualty if the plastic pipes and fittings have been tested to L1 standard.	(amendment) - IACS UR P4(Rev.5)

Present	Remark

Table 1 Fire Endurance Requirements Matrix

Piping system	Location										
	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
Cargo (Flammable cargos, f.p ≤ 60 °C)											
1. Cargo lines	NA	NA	L1	NA	NA	O	NA	O[10]	O	NA	L1[2]
2. Crude oil washing lines	NA	NA	L1	NA	NA	O	NA	O[10]	O	NA	L1[2]
3. Vent lines	NA	NA	NA	NA	NA	O	NA	O[10]	O	NA	X
Inert gas											
4. Water seal effluent lines	NA	NA	O[1]	NA	NA	O[1]	O[1]	O[1]	O[1]	NA	O
5. Scrubber effluent lines	O[1]	O[1]	NA	NA	NA	NA	NA	O[1]	O[1]	NA	O
6. Main lines	O	O	L1	NA	NA	NA	NA	NA	O	NA	L1[6]
7. Distribution lines	NA	NA	L1	NA	NA	O	NA	NA	O	NA	L1[2]
Flammable liquids (f.p > 60 °C)											
8. Cargo lines	X	X	L1	X	X	NA[3]	O	O[10]	O	NA	L1
9. Fuel oil	X	X	L1	X	X	NA[3]	O	O	O	L1	L1
10. Lubricating oil	X	X	L1	X	X	NA	NA	NA	O	L1	L1
11. Hydraulic oil	X	X	L1	X	X	O	O	O	O	L1	L1
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
14. Foam system	L1	L1	L1	NA	NA	NA	NA	NA	O	L1	L1
15. Sprinkler system	L1	L1	L3	X	NA	NA	NA	O	O	L3	L3
16. Ballast	L3	L3	L3	L3	X	O[10]	O	O	O	L2	L2
17. Cooling water, essential services	L3	L3	NA	NA	NA	NA	NA	O	O	NA	L2
18. Tank cleaning services fixed machines	NA	NA	L3	NA	NA	O	NA	O	O	NA	L3[2]
19. Non-essential system	O	O	O	O	O	NA	O	O	O	O	O
Freshwater											
20. Cooling water essential services	L3	L3	NA	NA	NA	NA	O	O	O	L3	L3
21. Condensate return	L3	L3	L3	O	O	NA	NA	NA	O	O	O
22. Non-essential system	O	O	O	O	O	NA	O	O	O	O	O
Sanitary/Drain/Scuppers											
23. Deck drains (internal)	L1[4]	L1[4]	NA	L1[4]	O	NA	O	O	O	O	O
24. Sanitary drains (internal)	O	O	NA	O	O	NA	O	O	O	O	O

(amendment) - IACS UR P4(Rev.5)

Amendment	Remark

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
Cargo (Flammable cargos, f.p ≤ 60 °C)											
1. Cargo lines	NA	NA	L1	NA	NA	O	NA	O[10]	O	NA	L1[2]
2. Crude oil washing lines	NA	NA	L1	NA	NA	O	NA	O[10]	O	NA	L1[2]
3. Vent lines	NA	NA	NA	NA	NA	O	NA	O[10]	O	NA	X
Inert gas											
4. Water seal effluent lines	NA	NA	O[1]	NA	NA	O[1]	O[1]	O[1]	O[1]	NA	O
5. Scrubber effluent lines	O[1]	O[1]	NA	NA	NA	NA	NA	O[1]	O[1]	NA	O
6. Main lines	O	O	L1	NA	NA	NA	NA	NA	O	NA	L1[6]
7. Distribution lines	NA	NA	L1	NA	NA	O	NA	NA	O	NA	L1[2]
Flammable liquids (f.p > 60 °C)											
8. Cargo lines	X	X	L1	X	X	NA[3]	O	O[10]	O	NA	L1
9. Fuel oil	X	X	L1	X	X	NA[3]	O	O	O	L1	L1
10. Lubricating oil	X	X	L1	X	X	NA	NA	NA	O	L1	L1
11. Hydraulic oil	X	X	L1	X	X	O	O	O	O	L1	L1
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	NA	O	O	NA	L1
14. Foam system	L1W	L1W	L1W	NA	NA	NA	NA	NA	O	L1W	L1W
15. Sprinkler system	L1W	L1W	L3	X	NA	NA	NA	O	O	L3	L3
16. Ballast	L3	L3	L3	L3	X	O[10]	O	O	O	L2W	L2W
17. Cooling water, essential services	L3	L3	NA	NA	NA	NA	NA	O	O	NA	L2W
18. Tank cleaning services fixed machines	NA	NA	L3	NA	NA	O	NA	O	O	NA	L3[2]
19. Non-essential system	O	O	O	O	O	NA	O	O	O	O	O
Freshwater											
20. Cooling water essential services	L3	L3	NA	NA	NA	NA	O	O	O	L3	L3
21. Condensate return	L3	L3	L3	O	O	NA	NA	NA	O	O	O
22. Non-essential system	O	O	O	O	O	NA	O	O	O	O	O
Sanitary/Drain/Scuppers											
23. Deck drains (internal)	L1W[4]	L1W[4]	NA	L1W[4]	O	NA	O	O	O	O	O
24. Sanitary drains (internal)	O	O	NA	O	O	NA	O	O	O	O	O

(amendment) - IACS UR P4(Rev.5)

Present	Remark

Table 1 Fire Endurance Requirements Matrix (continued)

Piping system	Location										
	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
25. Scuppers and discharges (overboard)	O[1,8]	O[1,8]	O[1,8]	O[1,8]	O[1,8]	O	O	O	O	O[1,8]	O
Sounding/Air											
26. Watertanks/ dry spaces	O	O	O	O	O	O[10]	O	O	O	O	O
27. Oil tanks (f.p > 60 °C)	X	X	X	X	X	X[3]	O	O[10]	O	X	X
Miscellaneous											
28. Control air	L1[5]	L1[5]	L1[5]	L1[5]	L1[5]	NA	O	O	O	L1[5]	L1[5]
29. Service air (non-essential)	O	O	O	O	O	NA	O	O	O	O	O
30. Brine	O	O	NA	O	O	NA	NA	NA	O	O	O
31. Auxiliary low pressure steam (≤ 7 MPa)	L[2]	L[2]	O[9]	O[9]	O[9]	O	O	O	O	O[9]	O[9]
32.~34. <Newly added>											

Abbreviations :

L1 Fire endurance test (IMO Resolution A.753(18), Appendix 1) in dry conditions, 60 *min*.
L2 Fire endurance test (IMO Resolution A.753(18), Appendix 1) in dry conditions, 30 *min*.
L3 Fire endurance test (IMO Resolution A.753(18), Appendix 2) in wet conditions, 30 *min*.
0 No fire endurance test required
NA Not applicable
X Metallic materials having a melting point greater than 925 °C

Footnotes :

1. Where non-metallic piping is used, remotely controlled valves to be provided at ship's side (valve is to be controlled from outside space).
2. Remote closing valves to be provided at the cargo tanks.
3. When cargo tanks contain flammable liquids with f.p. > 60 °C, "O may replace "NA or "X".
4. For drains serving only the space concerned, "O may replace "L1"
5. When controlling functions are not required by statutory requirements or guidelines, "O may replace "L1"
6. For pipe between machinery space and deck water seal, "O may replace "L1"
7. For passenger vessels, "X is to replace "L1".

(amendment) - IACS UR P4(Rev.5)

Table 1 Fire Endurance Requirements Matrix (continued)

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
25. Scuppers and discharges (overboard)	O[1,8]	O[1,8]	O[1,8]	O[1,8]	O[1,8]	O	O	O	O	O[1,8]	O
Sounding/Air											
26. Watertanks/ dry spaces	O	O	O	O	O	O[10]	O	O	O	O	O
27. Oil tanks (f.p > 60 °C)	X	X	X	X	X	X[3]	O	O[10]	O	X	X
Miscellaneous											
28. Control air	L1[5]	L1[5]	L1[5]	L1[5]	L1[5]	NA	O	O	O	L1[5]	L1[5]
29. Service air (non-essential)	O	O	O	O	O	NA	O	O	O	O	O
30. Brine	O	O	NA	O	O	NA	NA	NA	O	O	O
31. Auxiliary low pressure steam (≤ 7 MPa)	L2W	L2W	O[9]	O[9]	O[9]	O	O	O	O	O[9]	O[9]
32. Central vacuum Cleaners	NA	NA	NA	O	NA	NA	NA	NA	O	O	O
33. Exhaust Gas Cleaning System	L3[1]	L3[1]	NA	NA	NA	NA	NA	NA	NA	L3[1,11] NA	NA
Effluent line											
34. Urea transfer/ Supply System (SCR installation)	L1[12]	L1[12]	NA	NA	NA	NA	NA	NA	O	L3[1,11] NA	NA

Abbreviations :

L1 Fire endurance test (IMO Resolution A.753(18), Appendix 1, as amended by IMO Res. MSC. 313(88) and IMO Res. MSC. 399(95)) in dry conditions, 60 *min*.

L1W Fire endurance test(**5**.(1))

L2 Fire endurance test (IMO Resolution A.753(18), Appendix 1, as amended by IMO Res. MSC. 313(88) and IMO Res. MSC. 399(95)) in dry conditions, 30 *min*.

L2W Fire endurance test(**5**.(1))

L3 Fire endurance test (IMO Resolution A.753(18), Appendix 2, as amended by IMO Res. MSC. 313(88) and IMO Res. MSC. 399(95)) in wet conditions, 30 *min*.

0 No fire endurance test required

NA Not applicable

X Metallic materials having a melting point greater than 925 °C

Footnotes :

1. Where non-metallic piping is used, remotely controlled valves to be provided at ship's side (valve is to be controlled from outside space).
2. Remote closing valves to be provided at the cargo tanks.
3. When cargo tanks contain flammable liquids with f.p. > 60 °C, "O may replace "NA or "X".
4. For drains serving only the space concerned, "O may replace "L1W"
5. When controlling functions are not required by statutory requirements or guidelines, "O may replace "L1"
6. For pipe between machinery space and deck water seal, "O may replace "L1"
7. For passenger vessels, "X is to replace "L1".

(amendment) - IACS UR P4(Rev.5)

Present	Remark
Table 1 Fire Endurance Requirements Matrix (continued)	

8. Scuppers serving open decks in positions 1 and 2, as defined in regulation 13 of the International Convention on Load Lines, 1966, are to be "X throughout unless fitted at the upper end with the means of closing capable of being operated from a position above the freeboard deck in order to prevent downflooding.
9. For essential services, such as fuel oil tank heating and ship's whistle, "X is to replace "O".
10. For tankers where compliance with paragraph 3 (f) of regulation 13F of Annex I of MARPOL 73/78 is required, "NA is to replace "O".
11.~13. <Newly added>

Location definitions

- A (Machinery spaces of category A) : Machinery spaces of category A as defined in SOLAS* regulation II-2/3.19.
- B (Other machinery spaces and pump rooms) : Spaces, other than category A machinery spaces and cargo pump rooms, containing propulsion machinery, boilers, steam and internal combustion engines, generators and major electrical machinery, pumps, oil filling stations, refrigerating, stabilizing, ventilation and air-conditioning machinery, and similar spaces, and trunks to such spaces.
- C (Cargo pump rooms) : Spaces containing cargo pumps and entrances and trunks to such spaces.
- D (Ro-ro cargo holds) : Ro-Ro cargo holds are Ro-Ro cargo spaces and special category spaces as defined in SOLAS* regulation II-2/3.14 and 3.18.
- E (Other dry cargo holds) : All spaces other than Ro-Ro cargo holds used for non-liquid cargo and trunks to such spaces.
- F (Cargo tanks) : All spaces used for liquid cargo and trunks to such spaces.
- G (Fuel oil tanks) : All spaces used for fuel oil (excluding cargo tanks) and trunks to such spaces.
- H (Ballast water tanks) : All spaces used for ballast water and trunks to such spaces.
- I (Cofferdams, voids, etc.) : Cofferdams and voids are those empty spaces between two bulkheads separating two adjacent compartments.
- J (Accommodation, service) : Accommodation spaces, service spaces and control stations as defined in SOLAS * regulation II-2/3.10, 3.12, 3.22.
- K (Open decks) : Open deck spaces as defined in SOLAS* regulation II-2/9.2.2.3.2.2.(5).

* SOLAS 74 as amended by the 1978 SOLAS Protocol and the 1981 and 1983 amendments (consolidated text).

(amendment) - IACS UR P4(Rev.5)

Amendment	Remark
Table 1 Fire Endurance Requirements Matrix (continued)	
8. Scuppers serving open decks in positions 1 and 2, as defined in regulation 13 of the International Convention on Load Lines, 1966, are to be "X throughout unless fitted at the upper end with the means of closing capable of being operated from a position above the freeboard deck in order to prevent downflooding. 9. For essential services, such as fuel oil tank heating and ship's whistle, "X is to replace "O". 10. For tankers where compliance with paragraph 3.6 of regulation 19 of Annex I of MARPOL 73/78 as amended is required, "NA is to replace "O". 11. L3 in service spaces, NA in accommodation and control spaces. 12. Type Approved plastic piping without fire endurance test(0) is acceptable 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. 13. For Passenger Ships subject to SOLAS II-2, Reg.21.4 (Safe return to Port), plastic pipes for services required to remain operative in the part of the ship not affected by the casualty thresholds, such as systems intended to support safe areas, are to be considered essential services. In accordance with MSC Circular MSC.1/Circ.1369, interpretation 12, for Safe Return to Port purposes, plastic piping can be considered to remain operational after a fire casualty if the plastic pipes and fittings have been tested to L1 standard. Location definitions - A (Machinery spaces of category A) : Machinery spaces of category A as defined in SOLAS* regulation II-2/3.31. - B (Other machinery spaces and pump rooms) : Spaces, other than category A machinery spaces and cargo pump rooms, containing propulsion machinery, boilers, fuel oil unit, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilizing, ventilation and air-conditioning machinery, and similar spaces, and trunks to such spaces. - C (Cargo pump rooms) : Spaces containing cargo pumps and entrances and trunks to such spaces. - D (Ro-ro cargo holds) : Ro-Ro cargo holds are Ro-Ro cargo spaces and special category spaces as defined in SOLAS* regulation II-2/3.41 and 3.46. - E (Other dry cargo holds) : All spaces other than Ro-Ro cargo holds used for non-liquid cargo and trunks to such spaces. - F (Cargo tanks) : All spaces used for liquid cargo and trunks to such spaces. - G (Fuel oil tanks) : All spaces used for fuel oil (excluding cargo tanks) and trunks to such spaces. - H (Ballast water tanks) : All spaces used for ballast water and trunks to such spaces. - I (Cofferdams, voids, etc.) : Cofferdams and voids are those empty spaces between two bulkheads separating two adjacent compartments. - J (Accommodation, service) : Accommodation spaces, service spaces and control stations as defined in SOLAS * regulation II-2/3.1, 3.45, 3.18 - K (Open decks) : Open deck spaces as defined in SOLAS* regulation II-2/9.2.2.3.2.(5). * SOLAS 1974 Convention, as amended.	(amendment) - IACS UR P4(Rev.5)

Present	Amendment	Remark
(2) Flame spread (A) All pipes, except those fitted on open decks and within tanks, cofferdams, pipe tunnels and ducts are to have low surface flame spread characteristics not exceeding average values specified in **Ch 3, 2604. 3** of the "**Guidance for Approval of Manufacturing Process and Type Approval, etc.**".	(2) Flame spread (A) All pipes, except those fitted on open decks and within tanks, cofferdams, pipe tunnels and ducts if separated from accommodation, permanent manned areas and escape ways by means of an A class bulkhead are to have low surface flame spread characteristics not exceeding average values specified in **Ch 3, 2604. 3** of the "**Guidance for Approval of Manufacturing Process and Type Approval, etc.**".	(amendment) - IACS UR P4(Rev.5)
<omitted>	<same as present>	
6. Installation	**6. Installation**	
(1) Supports (A) Selection and spacing of pipe supports in shipboard systems are to be determined as a function of allowable stresses and maximum deflection criteria. Support spacing is not to be greater than the pipe Manufacturer's recommended spacing. The selection and spacing of pipe supports are to take into account pipe dimensions, mechanical and physical properties of the pipe material, mass of pipe and contained fluid, external pressure, operating temperature, thermal expansion effects, loads due to external forces, thrust forces, water hammer, vibrations, maximum accelerations to which the system may be subjected. Combination of loads is to be considered.	(1) Supports (A) Selection and spacing of pipe supports in shipboard systems are to be determined as a function of allowable stresses and maximum deflection criteria. Support spacing is not to be greater than the pipe Manufacturer's recommended spacing. The selection and spacing of pipe supports are to take into account pipe dimensions, length of piping, mechanical and physical properties of the pipe material, mass of pipe and contained fluid, external pressure, operating temperature, thermal expansion effects, loads due to external forces, thrust forces, water hammer, vibrations, maximum accelerations to which the system may be subjected. Combination of loads is to be considered.	
<omitted>	<same as present>	
(7) Penetration of divisions	(7) Penetration of divisions	
<omitted>	<same as present>	
(B) When plastic pipes pass through watertight bulkheads or decks, the watertight integrity of the bulkhead or deck is to be maintained.	(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.	
<omitted>	<same as present>	

Present	Amendment	Reason
Annex 5-7 Control and Safety System for Dual Fuel Diesel Engines **1. Application** In addition to the requirements of **Pt 5, Ch 2, Sec 2** of the Rules and **Pt 7, Ch 5, Sec 5** and **Sec 16** of the Rules, as far as found applicable, the following requirements are to be applied to dual-fuel diesel engines utilizing high pressure Methane gas fuel injection (hereinafter referred to as **DFD engines**). **2. ~ 12. <omitted>**	**~~Annex 5-7 Control and Safety System for Dual Fuel Diesel Engines~~ <deleted>** **~~1. Application~~** ~~In addition to the requirements of **Pt 5, Ch 2, Sec 2** of the Rules and **Pt 7, Ch 5, Sec 5** and **Sec 16** of the Rules, as far as found applicable, the following requirements are to be applied to dual-fuel diesel engines utilizing high pressure Methane gas fuel injection (hereinafter referred to as **DFD engines**).~~ **~~2. ~ 12.~~ <deleted>**	<Pt 5 Guidance> (Amendment) - Reflect IACS UR M59 (Del June 2019) <application date: the date of contract for construction on or after 1 July 2020> - Delete Annex 5-7 Control and Safety System for Dual Fuel Diesel Engines
Annex 5-7-1 Internal Combustion Engines Supplied with Low Pressure Gas *(2019)* **1. ~ 8. <omitted>** (hereafter, omitted)	**Annex 5-7 Internal Combustion Engines Supplied with Low Pressure Gas *(2019)*** **1. ~ 8. <same as the present>** (hereafter, same as the present Rules)	- Annex 5-7-1 changes to Annex 5-7

Present	Amendment	Reason
Annex 5-8 The Additional Requirements on Electronically-Controlled Diesel Engines	**Annex 5-8 The Additional Requirements on Electronically-Controlled Diesel Engines**	<Pt 5 Guidance>
1. ~ 3. <omitted>	**1. ~ 3. <same as the present>**	(Amendment) - Reflect Request for Establishment/ Revision of Classification Technical Rules 'MAM4300-339-2019' <application date: the date of application for certificate on or after 1 July 2020>
4. Construction and Associated Installations (1) ~ (2) <omitted> (3) Accumulators and common accumulators (A) ~ (B) <omitted> (C) Common Accumulators are to be independently provided at least two in different uses, in principle. In case where the result of fatigue analysis upon the fluctuating stress is submitted and approved by the Society, a single arrangement may be acceptable.	**4. Construction and Associated Installations** (1) ~ (2) <same as the present> (3) Accumulators and common accumulators (A) ~ (B) <same as the present> (C) Common Accumulators are to be independently provided at least two in different uses, in principle. In case where the result of fatigue analysis upon the fluctuating stress is submitted and approved by the Society, a single arrangement may be acceptable. In addition, where navigable speed is obtained even if one of common accumulators is out of use, a ship having two or more main engines may install one common accumulator for each main engine. *(2020)*	- Add redundancy requirements for common accumulators in case of multi propulsion.
(4) Fuel Oil Piping System and Hydraulic Oil Piping System (A) Piping systems are to comply with the requirements in **Pt 5, Ch 6, Sec 1** of the Rules. (B) Fuel oil pressure pumps and hydraulic oil pressure pumps are to be independently provided at least two in different uses respectively. In this case, even though one of the pumps becomes inoperable, the remained pumps are capable of supplying a sufficient amount of oil at the maximum continuous output of the main propulsion machinery. These pumps are to be connected ready for use anytime.	(4) Fuel Oil Piping System and Hydraulic Oil Piping System (A) Piping systems are to comply with the requirements in **Pt 5, Ch 6, Sec 1** of the Rules. (B) Fuel oil pressure pumps and hydraulic oil pressure pumps are to be independently provided at least two in different uses respectively. In this case, even though one of the pumps becomes inoperable, the remained pumps are capable of supplying a sufficient amount of oil at the maximum continuous output of the main propulsion machinery. These pumps are to be connected ready for use anytime. However, where navigable speed is obtained even if one of fuel oil pressure pumps and/or hydraulic oil pressure pumps is out of use, a ship having two or more main engines may install one fuel oil pressure pumps and/or one hydraulic oil pressure pumps for each main engine. *(2020)*	- Add redundancy requirements for fuel oil pressure pumps and hydraulic oil pressure pumps in case of multi propulsion.
(C) <omitted>	(C) <same as the present>	

Present	Amendment	Reason
(D) The common piping arrangement from a fuel oil pressure pump or a hydraulic oil pressure pump to a common accumulator, from a common accumulator to an other common accumulator and from a common accumulator to the position where distributed to each cylinder is to be independently provided at least two in different uses, respectively. In case where the result of fatigue analysis upon the fluctuating stress is submitted and approved by the Society, a single arrangement may be acceptable.	(D) The common piping arrangement from a fuel oil pressure pump or a hydraulic oil pressure pump to a common accumulator, from a common accumulator to an other common accumulator and from a common accumulator to the position where distributed to each cylinder is to be independently provided at least two in different uses, respectively. In case where the result of fatigue analysis upon the fluctuating stress is submitted and approved by the Society, a single arrangement may be acceptable. <u>In addition, where navigable speed is obtained even if one of common pipings is out of use, a ship having two or more main engines may install one common pipings for each main engine.</u> *<u>(2020)</u>*	<Pt 5 Guidance> - Add redundancy requirements for common pipings in case of multi propulsion.
(E) ~ (G) <omitted>	(E) ~ (G) <same as the present>	
5. System Design (1) Electronic control system (A) <omitted> (B) Controllers for the system are to comply with the following. (a) At least two main controllers which are integrated to control every function, e.g. fuel injection, exhaust valve drive, cylinder lubrication and supercharge, are to be provided. (b) Notwithstanding the requirement in (a) above, a single main controller may be acceptable, in case where the normal operation of the main propulsion machinery is available by using a control system independent from the main controller.	**5. System Design** (1) Electronic control system (A) <same as the present> (B) Controllers for the system are to comply with the following. (a) At least two main controllers which are integrated to control every function, e.g. fuel injection, exhaust valve drive, cylinder lubrication and supercharge, are to be provided. (b) Notwithstanding the requirement in (a) above, a single main controller may be acceptable, in case where the normal operation of the main propulsion machinery is available by using a control system independent from the main controller.	
<u>(c) <new></u>	<u>(c) Notwithstanding the requirement in (a) above, where navigable speed is obtained even if one of main controllers is out of use, a ship having two or more main engines may install one main controller for each main engine.</u> *<u>(2020)</u>*	- Add redundancy requirements for main controllers in case of multi propulsion.
(hereinafter, omitted)	(hereinafter, same as the present)	