AMENDMENTS FOR OTHER GUIDANCE

(Guidance for Approval of Manufacturing Process and Type Approval, Etc.)

- For development verification -

2023.09.

Development Verification

1. It was confirmed that the development output meets the development input requirements.
2. It has been confirmed that the amendment can be applied without conflict with related regulations.
3. It is expected that there will be no problems in complying with the intended use of the amendment by surveyors and customers (ship owners, shipyards, manufacturers, etc.).

KOREAN REGISTER

Machinery Rule Development Team

- Main Amendments -

(1) Enter into force on 1 July 2024 (the date of application for certification of products)

◉ To reflect IACS UR W31(Rev.3 Mar 2023)
◉ To reflect Request for Establishment/Revision of Classification Technical Rules

Present	Amendment	reason
CHAPTER 1 <Omitted> **CHAPTER 2 APPROVAL OF MANUFACTURING PROCESS** **Section 1 ~ Section 2-4** <Omitted> **Section 2-5 YP47 Steel Plates** **241. ~ 242. <Omitted>** **243. Approval tests** **1. <Omitted>** **2. Approval range** Except for **203. 4.** (1) and (2), approval range is to be in accordance with **Sec 2-1**. *(2021)* (2) <New> **3. <Omitted>** **4. Weldability test** (1) Y-shape weld crack test (Hydrogen crack test) (A) The test method is to be in accordance with recognized national standards such as JIS Z 3158-2016 or CB/T 4364-2013. *(2019) (2021)* (B) <Omitted> (2) <Omitted>	**CHAPTER 1** <Same as the present Guidance> **CHAPTER 2 APPROVAL OF MANUFACTURING PROCESS** **Section 1** <Same as the present Guidance> **SSection 2-5 YP47 Steel Plates** **241. ~ 242. <Same as the present Guidance>** **243. Approval tests** **1. <Same as the present Guidance>** **2. Approval test and acceptance criteria** (1) Except for **203. 4.** (1) and (2), approval range is to be in accordance with **Sec 2-1**. *(2021)* (2) The products for testing are to represent the maximum thickness for approval. If the target chemical composition changes with the thickness, the maximum thickness for each specified chemical composition specification shall be tested. *(2024)* **3. <Same as the present Guidance>** **4. Weldability test** (1) Y-shape weld crack test (Hydrogen crack test) (A) The test method is to be in accordance with recognized national standards such as **ISO 17642-2:2005**. *(2019) (2021) (2024)* (B) <Same as the present Guidance> (2) <Same as the present Guidance>	- To reflect IACS UR W31(Rev.3 Mar 2023)

Present	Amendment	reason
Section 2-6 ~ Section 2-7 <Omitted>	**Section 2-6 ~ Section 2-7** <Same as the present Guidance>	
Section 2-8 Brittle crack arrest steels *(2021)*	**Section 2-8 Brittle crack arrest steels *(2021)***	
271. ~ 272. <Omitted>	**271. ~ 272. <Same as the present Guidance>**	
273. Approval tests	**273. Approval tests**	- To reflect IACS UR W31(Rev.3 Mar 2023)
1. Extent of the approval tests (1) If the manufacturing process and mechanism to ensure the brittle crack arrest properties for the steels intended for approval are same, **203.** of **Sec 2-1** is to be followed for the extent of the approval tests.	**1. Extent of the approval tests** (1) If the manufacturing process and mechanism to ensure the brittle crack arrest properties for the steels intended for approval are same, **203.** of **Sec 2-1** is to be followed for the extent of the approval tests. For YP47 steels with brittle crack arrest properties, **203. 4.** (1) and (2) are not applied.	
(2) <New>	(2) The products for testing are to represent the maximum thickness for approval. If the target chemical composition changes with the thickness, the maximum thickness for each specified chemical composition specification shall be tested. *(2024)*	
(2) The number of test samples and test specimens may be increased when deemed necessary by the Society, based on the in-house test reports of the brittle crack arrest properties of the steels intended for approval specified in **272.** (2) (B).	(3) The number of test samples and test specimens may be increased when deemed necessary by the Society, based on the in-house test reports of the brittle crack arrest properties of the steels intended for approval specified in **272.** (2) (B).	
2. **Type of tests** (1) Brittle crack arrest tests are to be carried out in accordance with **3.** in addition to the approval tests specified in **Sec 2-1** and/or **Sec 2-5**.	2. **Type of tests** (1) Brittle crack arrest tests are to be carried out in accordance with **3.** in addition to the approval tests specified in **Sec 2-1** and/or **Sec 2-5**.	
(2) In the case of applying for addition of the specified brittle crack arrest properties for YP36, YP40 and YP47 steels of which, manufacturing process has been approved by the Society (i.e. The aim analyses, method of manufacture ~~and condition of supply~~ are similar and the steelmaking process, deoxidation and fine grain practice, casting method and condition of supply are the same), brittle crack arrest tests, chemical analyses, tensile test and Charpy V-notch impact test are to be carried out in accordance with this **Section** and **Sec 2-1**.	(2) In the case of applying for addition of the specified brittle crack arrest properties for YP36, YP40 and YP47 steels of which, manufacturing process has been approved by the Society (i.e. The aim analyses and method of manufacture are similar and the steelmaking process, deoxidation and fine grain practice, casting method and condition of supply are the same), brittle crack arrest tests, chemical analyses, tensile test and Charpy V-notch impact test are to be carried out in accordance with this **Section** and **Sec 2-1**. *(2024)*	

Present	Amendment	reason
3. Approval tests and acceptance criteria (1) Test specimens and testing procedure of brittle crack arrest tests (A) The test specimens of the brittle crack arrest tests are to be taken with their longitudinal axis parallel to the final rolling direction of the test plates. (B) The loading direction of brittle crack tests is to be parallel to the final rolling direction of the test plates. (C) The thickness of the test specimens of the brittle crack arrest tests is to be the full thickness of the test plates. (D) The test specimens and repeat test specimens are to be taken from the same steel plate. (E) The thickness of the test specimen is to be the maximum thickness of the steel plate requested for approval. (F) In the case where the brittle crack arrest properties are evaluated by K_{ca}, the brittle crack arrest test method is to be in accordance with **Pt 2, Ch 1, 203. 1.** of the Guidance. In the case where the brittle crack arrest properties are evaluated by CAT, the test method is to be in accordance with **Pt 2, Ch 1, 203. 4.** of the Guidance. (2) ~ (3) <Omitted> **4. <Omitted>** **5. Renewal of approval** (1) <Omitted> (2) Chemical composition, mechanical properties, brittle crack arrest properties (e.g. brittle crack arrest test results or small-scale ~~alternative~~ test results) and nominal thickness are to be described in the form of histogram or statistics. **Section 2-9 ~ Section 3 <Omitted>**	**3. Approval tests and acceptance criteria** (1) Test specimens and testing procedure of brittle crack arrest tests (A) The test specimens of the brittle crack arrest tests are to be taken with their longitudinal axis parallel to the final rolling direction of the test plates. (B) The loading direction of brittle crack tests is to be parallel to the final rolling direction of the test plates. (C) The thickness of the test specimens of the brittle crack arrest tests is to be the full thickness of the test plates. (D) The test specimens and repeat test specimens are to be taken from the same steel plate. Where the brittle crack arrest properties are evaluated by K_{ca}, and the brittle crack arrest test result fails to meet the requirement, further brittle crack arrest tests may be carried out. In this case, the judgment of acceptance is to be made on the arrest toughness value K_{ca} of all test specimens (results of the initial test, failed tests and additional tests shall be included in the testing report.). *(2024)* (E) The thickness of the test specimen is to be the maximum thickness of the steel plate requested for approval. (F) In the case where the brittle crack arrest properties are evaluated by K_{ca}, the brittle crack arrest test method is to be in accordance with **Pt 2, Ch 1, 203. 1.** of the Guidance. In the case where the brittle crack arrest properties are evaluated by CAT, the test method is to be in accordance with **Pt 2, Ch 1, 203. 4.** of the Guidance. (2) ~ (3) <Same as the present Guidance> **4. <Same as the present Guidance>** **5. Renewal of approval** (1) <Same as the present Guidance> (2) Chemical composition, mechanical properties, brittle crack arrest properties (e.g. brittle crack arrest test results or small-scale test results) and nominal thickness are to be described in the form of histogram or statistics. *(2024)* **Section 2-9 ~ Section 3 <Same as the present Guidance>**	- To reflect IACS UR W31(Rev.3 Mar 2023)

Present

Section 4-1 Castings *(2018)*

401. ~ 402. <Omitted>

403. Approval tests

1. Test samples and specimen *(2021)*

(1) Test samples are to be representative of material types and casting methods for which approval is requested. The typical type of material and casting method are to be in accordance with Table 2.4.1.

Table 2.4.1 The type of material and casting method *(2022)*

Kinds	Representative grade or Standards	Casting method
Carbon steel(1)	*RSC* 410 ~ *RSC* 600 Pt 2, Ch 1, 501. of the Rules	- Sand casting - Die casting - Precision casting - Centrifugal casting - Others
Low alloy steel	*RSC* 440*A* ~ *RSC* 550*A* Pt 2, Ch 1, 501. of the Rules	
<Omitted>		
Notes : (1) Where carbon steel for low temperature service has passed the tests, the tests for carbon steel may be omitted. *(2021)* (2) Where 25Cr duplex stainless steel has passed the tests, the tests for 22Cr duplex stainless steel may be omitted. (3) Where Spheroidal or nodular graphite iron has passed the tests, the tests for grey iron may be omitted.		

(2) ~ (5) <Omitted>

404. ~ 406. <Omitted>

Section 4-2 ~ Section 14 <Omitted>

Amendment

Section 4-1 Castings *(2018)*

401. ~ 402. <Same as the present Guidance>

403. Approval tests

1. Test samples and specimen *(2021)*

(1) Test samples are to be representative of material types and casting methods for which approval is requested. The typical type of material and casting method are to be in accordance with Table 2.4.1.

Table 2.4.1 The type of material and casting method *(2022) (2024)*

Kinds	Representative grade or Standards	Casting method
Carbon steel(1)	*RSC* 400*H* ~ *RSC* 600*H*, *RSC* 400*M* ~ *RSC* 600*M* Pt 2, Ch 1, 501. of the Rules	- Sand casting - Die casting - Precision casting - Centrifugal casting - Others
Alloy steel	*RSC* 550*HA* ~ *RSC* 700*HA*, *RSC* 550*MA* ~ *RSC* 700*MA* Pt 2, Ch 1, 501. of the Rules	
<Same as the present Guidance>		
Notes : (1) Where carbon steel for low temperature service has passed the tests, the tests for carbon steel may be omitted. *(2021)* (2) Where 25Cr duplex stainless steel has passed the tests, the tests for 22Cr duplex stainless steel may be omitted. (3) Where Spheroidal or nodular graphite iron has passed the tests, the tests for grey iron may be omitted.		

(2) ~ (5) <Same as the present Guidance>

404. ~ 406. <Same as the present Guidance>

Section 4-2 ~ Section 14 <Same as the present Guidance>

reason

- The revised material grade in Part 2 of the Rules is reflected.

Present	Amendment	reason
CHAPTER 3 TYPE APPROVAL **Section 1 <Omitted>** **Section 2 Welding Materials** **201. ~ 202. <Omitted>** **204. Periodical inspection** **1. General** The manufacturer of welding materials is to be subjected to the periodical inspection in the presence of Surveyor at each manufacturing plant within three months before or after the expiry of the validity. However, the manufacturer with a large number of welding materials may be subject to periodical inspection by reduction the effective date of the validity, subject to the approval of the Society. *(2019)* **2. ~ 5. <Omitted>** **205. ~ 206. <Omitted>** <hereafter, omitted>	**CHAPTER 3 TYPE APPROVAL** **Section 1 <Same as the present Guidance>** **Section 2 Welding Materials** **201. ~ 202. <Same as the present Guidance>** **204. Periodical inspection** **1. General** The manufacturer of welding materials is annually to be subjected to the periodical inspection in the presence of Surveyor at each manufacturing plant within three months before or after the expiry of the validity. However, the manufacturer with a large number of welding materials may be subject to periodical inspection by reduction the effective date of the validity, subject to the approval of the Society. *(2019) (2024)* **2. ~ 5. <Same as the present Guidance>** **205. ~ 206. <Same as the present Guidance>** <hereafter, same as the present Guidance>	- To match the Korean ver. <Korean ver. > **204. 정기검사** **1. 일반** 용접용재료의 제조자는 매년 승인유효 월일 전후 3개월 이내에 우리 선급 검사원 입회하에 다음 2항 및 3항에 정하는 요령으로 각 제조공장마다 정기검사를 받아야 한다. 다만, 다수의 용접용재료를 보유한 제조자는 우리 선급의 승인을 받아 승인유효 월일을 경감하여 매년 정기검사를 받을 수 있다. *(2019)*

Amendments of the Rules

(External Development Review-External Opinion Inquiry)

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

2024.02.

Hull Rule Development Team

Main Amendments

(1) Background of Amendment

1) The acceptance criteria for approval of manufacturing process for synthetic fibre ropes has been amended to comply with Part 4, Chapter 8 of the Rules.
   - The breaking load of vinylon and nylon ropes is recognized as 80~90% of the standard value in accordance with current Guidance, but the industrial standards contains the same provisions in the Guidance, resulting in a double deduction, so revision is necessary.
   (Nylon rope requires breaking load in wet condition in accordance with IACS Rec.10(Rev.5) and MSC.1/Circ.1619)

(2) Effective date (circular will be issued)

1) for which the building contract is placed on or after 1 January 2024; or
2) in the absence of a building contract, the keel of which is laid or which is at a similar stage of construction on or after 1 July 2024; or
3) the delivery of which is on or after 1 January 2027.

Present	Amendment	Note

CHAPTER 2 APPROVAL OF MANUFACTURING PROCESS

Section 1 ~ Section 11 〈omitted〉
Section 12 Synthetic Fibre Ropes

1201. ~ 1202. 〈omitted〉

1203. Approval tests

Table 2.12.1 Approval Test Items and Acceptance Criteria for synthetic fibre ropes

<table>
<tr><th>Test item</th><th>Test method</th><th>Acceptance criteria</th></tr>
<tr><td>Construction & Diameter</td><td>Construction and diameter of synthetic fibre ropes are to be measured in accordance with Pt 4, Ch 8, Sec 6 of the Rule.</td><td>To comply with the Pt 4, Ch 8, Sec 6 of the Rule.</td></tr>
<tr><td>Tensile tests in wet and dry conditions</td><td>(1) Tensile tests on three each test specimens are to, in principle, be carried out for each of the test conditions given in Table below and breaking strength and elongation are to be measured. For rope having diameter higher than 60mm, one additional tensile test specimen is to be taken from the rope of maximum diameter.
(2) The gauge length of the test specimen is to be 30 times or more of the rope diameter, however it needs not to exceed 1 meter.
<table>
<tr><th>Kind of rope / Diameter of test rope</th><th>Vinylon rope
polyester rope
nylon rope</th><th>Polyethylene rope
polypropylene rope</th></tr>
<tr><td rowspan="2">12 ~ 24 mm</td><td>Wet condition(1)</td><td>Wet condition(3)</td></tr>
<tr><td>Dry condition(2)</td><td>Dry condition(2)</td></tr>
<tr><td rowspan="2">40 ~ 60 mm</td><td>Wet condition(1)</td><td>Wet condition(3)</td></tr>
<tr><td>Dry condition(2)</td><td>Dry condition(2)</td></tr>
</table>
NOTES:
(1) The test specimen is to be soaked in water at normal temperature for a period of 30 minutes or more, then taken out and subjected to tensile test at room temperature.
(2) The test specimen in dry condition is to be subjected to tensile test at room temperature.
(3) The test specimen is to be soaked in warm water at temperature of 35 ± 2°C for a period of 30 minutes or more, then taken out and immediately subjected to tensile test at room temperature.</td><td>(1) Except on cases with vinylon and nylon in wet condition, respective breaking loads are to satisfy the requirements specified in Pt 4, Ch 8, Sec 6, of the Rules.
(2) The breaking loads of vinylon and nylon in wet conditions are to be 80 % or more and 90 % or more respectively of the values specified in above (1)
(3) Values with respect to elongation are to be for reference only.</td></tr>
</table>

〈see next page〉

Present	Amendment	Note

CHAPTER 2 APPROVAL OF MANUFACTURING PROCESS

Section 1 ~ Section 11 〈same as the present〉
Section 12 Synthetic Fibre Ropes

1201. ~ 1202. 〈same as the present〉

1203. Approval tests

Table 2.12.1 Approval Test Items and Acceptance Criteria for synthetic fibre ropes

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<tr><th>Test item</th><th>Test method</th><th>Acceptance criteria</th></tr>
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(2) The gauge length of the test specimen is to be 30 times or more of the rope diameter, however it needs not to exceed 1 meter.
<table>
<tr><th>Kind of rope / Diameter of test rope</th><th>Vinylon rope
polyester rope
nylon rope</th><th>Polyethylene rope
polypropylene rope</th></tr>
<tr><td rowspan="2">12 ~ 24 mm</td><td>Wet condition(1)</td><td>Wet condition(3)</td></tr>
<tr><td>Dry condition(2)</td><td>Dry condition(2)</td></tr>
<tr><td rowspan="2">40 ~ 60 mm</td><td>Wet condition(1)</td><td>Wet condition(3)</td></tr>
<tr><td>Dry condition(2)</td><td>Dry condition(2)</td></tr>
<tr><td colspan="3">NOTES:
(1) The test specimen is to be soaked in water at normal temperature for a period of 30 minutes or more, then taken out and subjected to tensile test at room temperature.
(2) The test specimen in dry condition is to be subjected to tensile test at room temperature.
(3) The test specimen is to be soaked in warm water at temperature of 35 ± 2°C for a period of 30 minutes or more, then taken out and immediately subjected to tensile test at room temperature.</td></tr>
</table>
</td><td>(1) Respective breaking loads are to satisfy the requirements specified in Pt 4, Ch 8, Sec 6, of the Rules.
(2) Values with respect to elongation are to be for reference only.</td></tr>
</table>

- The industrial standards contains the same provisions in the Guidance, resulting in a double deduction, so revision is necessary.

Draft amendments of the Guidance for Approval of Manufacturing Process and Type Approval, etc.

Jan. 2024

Hull Rule Development Team

- Main Amendments -

(1) Effective date : 1 July 2024 (For ships contracted for construction)

◉ IACS UI SC299(New July 2023) reflected

- the requirements for type approval of watertightness test where materials readily rendered ineffective by heat used for pipe penetrations through watertight bulkheads or decks on passenger ships are newly added.

Present	Amendment	Note
CHAPTER 3 TYPE APPROVAL **Section 1 ~ Section 40 〈omitted〉** 〈newly added〉	**CHAPTER 3 TYPE APPROVAL** **Section 1 ~ Section 40 〈same as the current Guidance〉** **Section 41 Watertight bulkheads or deck pipe penetrations on passenger ships *(2024)*** **4101. Application** 1. The requirements of this Section apply to tests and inspection for type approval of watertightness test where materials (PVC, FRP, aluminium alloy, lead, etc) readily rendered ineffective by heat specified in **Pt 8, Annex 8-2** 1.2 of the Guidance are used for pipe penetrations through watertight bulkheads or decks on passenger ships. 2. Where applying 1. above, fire test specified in **Ch 3, Sec 26, Table 3.26.3** "Piping and Duct Penetrations" of this Guidance shall be conducted followed by watertightness test. Therefore, one of the two cases below may be applied. Case 1) Watertightness test on pipe penetrations that have already been type approved as fire test specified in Part 3 of Annex 1 to the 2010 FTP Code : Conduct fire test for the relevant fire rating with the same configuration as the already approved pipe penetration part + watertightness test Case 2) Pipe penetration that is not type approved as fire test : Conduct fire test with required fire protection level + watertightness test 3. It shall be applicable to heat-sensitive piping systems and shall not be applied to cable penetrations in watertight bulkheads and decks. **4102. Data to be submitted** The following reference data are to be submitted to the Society in addition to those specified in **102.** (1) Product details and scope of service (2) Detail drawing of penetration and test layout including type and cross-section of the pipes, etc. (3) Work and maintenance manual	- IACS UI SC299 (New July 2023) reflected

Present	Amendment	Note
〈newly added〉	**4103. Type tests** 1. Approval of pipe penetrations fitted to ensure the watertight integrity of a bulkhead or deck where heat-sensitive materials are used should include a prototype test of watertightness after having undergone the standard fire test appropriate for the location in which the penetrations are to be installed*. 1) The fire tested pipe penetration should then be tested to a test pressure of not less than 1.5 times the design pressure as defined in SOLAS Ch. II-1 Reg. 2.18. The pressure should be applied to the same side of the division as the fire test. 2) The fire tested pipe penetration should be tested for a period of at least 30 minutes under hydraulic pressure equal to the test pressure, but minimum 1.0 bar. There should be no leakage during this test. 3) The fire tested pipe penetration should continue to be tested for a further 30 minutes with the test pressure. The quantity of water leakage is not to exceed a total of 1 litre. 4) The prototype test should be considered valid only for the pipe typology (e.g. thermoplastic and multilayer), pressure classes, the maximum/minimum dimensions tested, and the type and fire rating of the division tested. Note : * Refer to the requirements for A-class division set out in Part 3 of Annex 1 to the 2010 FTP Code 2. The pressure test need not be carried out on the hot penetration arrangement. Ample time may be given to prepare for the pressure test, i.e. dismantling the fire testing equipment and rigging the pressure test equipment. 1) The pressure test should be carried out with the pipe section used in the fire test still in place. 2) Any pipe insulation fitted for the purpose of the fire test may be removed before the pressure test. 3) Prototype testing for fire test and watertightness test need not be carried out if the pipe penetration is made of steel or equivalent material having a thickness of 3 mm or greater and a length of not less than 900 mm (preferably 450 mm on each side of the division), and there are no openings. Such penetrations shall be suitably insulated by extension of the insulation at the same level of the division. See also SOLAS Ch. II-2 Reg. 9.3.1 with respect to piping. However, the penetration must still comply with the watertight integrity requirement in SOLAS Ch. II-1 Reg. 2.17.	- Para 4 of IACS UI SC299 (New July 2023) reflected - Para 4.1 of IACS UI SC299 reflected - Para 4.2 of IACS UI SC299 reflected - Para 4.3 of IACS UI SC299 reflected - Para 4.4 of IACS UI SC299 reflected - Para 5 of IACS UI SC299 reflected - Para 5.1 of IACS UI SC299 reflected - Para 5.2 of IACS UI SC299 reflected - Para 5.3 of IACS UI SC299 reflected

Amendments of Guidance for Approval of Manufacturing Process and Type Approval, Etc.

2024. 01.

Machinery Rule Development Team

- Main Amendments -

(1) Effective date : 1 Jul. 2024 (Date of the application for certification)

◉ The name of diesel engine and internal combustion engine has been modified to reciprocating internal combustion engine.

(2) Effective date : 1 Jul. 2024 (Date of the application for certification)

◉ By reflecting IACS UR M73(Rev.2 May 2023), the low cycle test target of the exhaust gas turbocharger has been clarified for the low, medium, and high-speed engines.

Present	Amendment	Reason
# CHAPTER 3 TYPE APPROVAL ## Section 8 Diesel Engines **801. Application** **1.** The requirements in this Section apply to tests and inspection for the approval of new type diesel engines or no service records to the Society on the basis of the requirements in **Pt 5, Ch 2, 211. 3** of the Rules. **Table 3.8.1 Details of test in stage A, B and C** Test stage / Details of test stage A: 〈omitted〉 stage B: (1) ~ (6) 〈omitted〉 (7) For electronically controlled diesel engines integration tests shall verify that the response of the complete mechanical, hydraulic and electronic system is as predicted for all intended operational modes. The scope of these tests shall be agreed with the Society for selected cases based on the FMEA. (hereafter, omitted) (hereafter, omitted)	# CHAPTER 3 TYPE APPROVAL ## Section 8 Reciprocating Internal Combustion Engines **801. Application** **1.** The requirements in this Section apply to tests and inspection for the approval of new type reciprocating internal combustion engines or no service records to the Society on the basis of the requirements in **Pt 5, Ch 2, 211. 3** of the Rules. **Table 3.8.1 Details of test in stage A, B and C** Test stage / Details of test stage A: 〈same as the present〉 stage B: (1) ~ (6) 〈same as the present〉 (7) For electronically controlled reciprocating internal combustion engines integration tests shall verify that the response of the complete mechanical, hydraulic and electronic system is as predicted for all intended operational modes. The scope of these tests shall be agreed with the Society for selected cases based on the FMEA. (hereafter, same as the present) (hereafter, same as the present)	〈Guidance for Approval of Manufacturing Process and Type Approval, Etc.〉 (Amendment) The name of diesel engines has been modified to reciprocating internal combustion engines. 〈application date: the date of contract for construction on or after 1 Jul. 2024〉 - As the gas-fueled engines appeared, the name of diesel engines have a limit in representativeness, so the name of diesel engines has been modified to reciprocating internal combustion engines.

Present	Amendment	Reason
Section 11 Exhaust Gas Turbochargers **1101. ~ 1102. 〈omitted〉** **1103. Type tests** Type tests are to be carried out for Categories B and C. The type test for a generic range of turbo-chargers may be carried out either on an engine (for which the turbo-charger is foreseen) or in a test rig. **1.** Turbo-chargers are to be subjected to at least 500 load cycles at the limits of operation. This test may be waived if the turbo-charger together with the engine is subjected to this kind of low cycle testing. The suitability of the turbo-charger for such kind of operation is to be preliminarily stated by the manufacturer. The rotor vibration characteristics shall be measured and recorded in order to identify possible sub-synchronous vibrations and resonances. **2.** The type test shall be completed by a hot running test at maximum permissible speed combined with maximum permissible temperature for at least one hour. After this test, the turbocharger shall be opened for examination, with focus on possible rubbing and the bearing conditions. (hereafter, omitted)	**Section 11 Exhaust Gas Turbochargers** **1101. ~ 1102. 〈same as the present〉** **1103. Type tests** Type tests are to be carried out for Categories B and C. The type test for a generic range of turbo-chargers may be carried out either on an engine (for which the turbo-charger is foreseen) or in a test rig. **1.** Turbo-chargers <u>for the low, medium, and high-speed engines</u> are to be subjected to at least 500 load cycles at the limits of operation. This test may be waived if the turbo-charger together with the engine is subjected to this kind of low cycle testing. The suitability of the turbo-charger for such kind of operation is to be preliminarily stated by the manufacturer. The rotor vibration characteristics shall be measured and recorded in order to identify possible sub-synchronous vibrations and resonances. **2.** The type test shall be completed by a hot running test at maximum permissible speed combined with maximum permissible temperature for at least one hour. After this test, the turbocharger shall be opened for examination, with focus on possible rubbing and the bearing conditions. (hereafter, same as the present)	〈Guidance for Approval of Manufacturing Process and Type Approval, Etc.〉 (Amendment) Reflecting IACS UR M73(Rev.2 May 2023) 〈application date: the date of application for certification on or after 1 Jul. 2024〉 - Reflecting M73 3.4.3.
Section 13 Air Compressors **1301. Application** **1. 〈omitted〉** **2.** The air compressors to which the requirements of this Section apply are those used for the starting of <u>diesel engines</u>, controls of machinery and equipment, power sources and general service, and are of the piston type or vane type. (hereafter, omitted)	**Section 13 Air Compressors** **1301. Application** **1. 〈same as the present〉** **2.** The air compressors to which the requirements of this Section apply are those used for the starting of <u>reciprocating internal combustion engines</u>, controls of machinery and equipment, power sources and general service, and are of the piston type or vane type. (hereafter, same as the present)	- As the gas-fueled engines appeared, the name of diesel engines have a limit in representativeness, so the name of diesel engines has been modified to reciprocating internal combustion engines.

Present	Amendment	Reason
Section 15 Machinery and Equipment for Ships **1501. Application** **1. 〈omitted〉** (1) ~ (2) 〈omitted〉 (3) Resilient mountings for internal combustion engine (Pt 5, Ch 2, 202. 1 (3) of the Rules). In addition, this guidance may apply for type approval of the resilient mountings for gear transmissions, generators, steam turbines, gas turbines and auxiliary machinery at the request of the manufacturers. *(2020)*	**Section 15 Machinery and Equipment for Ships** **1501. Application** **1. 〈same as the present〉** (1) ~ (2) 〈same as the present〉 (3) Resilient mountings for reciprocating internal combustion engine (Pt 5, Ch 2, 202. 1 (3) of the Rules). In addition, this guidance may apply for type approval of the resilient mountings for gear transmissions, generators, steam turbines, gas turbines and auxiliary machinery at the request of the manufacturers. *(2020)*	〈Guidance for Approval of Manufacturing Process and Type Approval, Etc.〉 - As gas turbines were included in internal combustion engines, they have been modified to reciprocating internal combustion engines for more clarity.
Table 3.15.1 Type test item of machinery and equipment of ship (continued)	**Table 3.15.1 Type test item of machinery and equipment of ship (continued)**	
Kinds: Type test item 〈omitted〉 Resilient Mountings for internal combustion engine *(2020)*: 〈omitted〉 〈omitted〉 flexible couplings: 〈omitted〉 (a) ~ (c) 〈omittd〉 (d) Testing all the possible combinations of the conditions mentioned above (a), (b), (c) is not required. When the one parameter is tested, the other parameters are kept constant as reference conditions (* marked above). For flexible couplings not to be used in diesel engines the tests at reference condition may be sufficient. However, for typically flexible couplings which the stiffness progressively increase with torque, all permissible combinations of mean and vibratory torques are to be tested. (hereafter, omitted)	Kinds: Type test item 〈same as the present〉 Resilient Mountings for reciprocating internal combustion engine *(2020)*: 〈same as the present〉 〈same as the present〉 flexible couplings: 〈same as the present〉 (a) ~ (c) 〈same as the present〉 (d) Testing all the possible combinations of the conditions mentioned above (a), (b), (c) is not required. When the one parameter is tested, the other parameters are kept constant as reference conditions (* marked above). For flexible couplings not to be used in reciprocating internal combustion engines the tests at reference condition may be sufficient. However, for typically flexible couplings which the stiffness progressively increase with torque, all permissible combinations of mean and vibratory torques are to be tested. (hereafter, same as the present)	- As the gas-fueled engines appeared, the name of diesel engines have a limit in representativeness, so the name of diesel engines has been modified to reciprocating internal combustion engines.
(hereafter, omitted)	(hereafter, same as the present)	

- Main Amendments -

(1) Effective date : 1 Jul. 2024 (Date of contract for construction or an application for certification of an engine)

◉ Reflecting IACS UR M82 (New Mar 2023), the requirements for type approval for explosion relief device (ERD) for internal combustion engines using gas as fuel have been established.

(2) Effective date : 1 Jul. 2024 (Date of contract for construction or an application for approval)

◉ The requirement for real ship tests for propeller shafts with corrosion resisting has been deleted.

Present	Amendment	Reason
# CHAPTER 3 TYPE APPROVAL ## Section 9 Crankcase Explosion Relief valves (hereafter, omitted)	# CHAPTER 3 TYPE APPROVAL ## Section 9-1 Crankcase Explosion Relief valves (hereafter, same as the present Rules) ## Section 9-2 Explosion Relief Devices for Reciprocating Internal Combustion Engines Using Gas as Fuel *(2024)* **911. General** **1. Application** The requirements in this Section specify testing procedure for explosion relief devices for combustion air inlet manifold and exhaust gas manifold of reciprocating internal combustion engines using gas as fuel. **2. Definitions** (1) Definitions addressing gas as fuel as given in **Pt 5, Annex 5-7, 1** (2) of the Guidance, Safety of Internal Combustion Engines Supplied with Low Pressure Gas, apply. (2) **Explosion relief device (ERD)** means a device to protect a component against a determined overpressure in the event of a gas explosion. The device is fitted with a flame arrester and may be a valve, a rupture disc or other, as applicable. **912. Data to be submitted** The following reference data are to be submitted to the Society in addition to those specified in **102.** (1) Specification data sheet including operating conditions and design limits such as: (A) Maximum permissible operating pressure, resulting from maximum charging air or exhaust gas back pressure (B) Maximum permissible operating temperature, resulting from maximum charging air or exhaust gas temperature (C) Static opening pressure, resulting from maximum charging air or exhaust gas back pressure (D) Maximum explosion pressure, i.e. maximum pressure that the device can withstand (E) Geometric relief area	〈Guidance for Approval of Manufacturing Process and Type Approval, Etc.〉 - As Section 9-2 was newly added, Section 9 was renamed to Section 9-1. (Amendment) Established type approval requirements for explosion relief device (ERD) for internal combustion engines using gas as fuel. Reflecting IACS UR M82 (New Mar 2023) 〈application date: the date of contract for construction or an application for certification of an engine, on or after 1 Jul. 2024〉 - UR M82 1, 2, 3

Present	Amendment	Reason
	(2) Test program (3) Specification of test vessel	
	913. Type tests	- UR M82 4.1
	1. Test specimens	
	(1) The ERD used for the explosion test is to be selected from the manufacturer's production line by a representative of the Society: (2) If necessary, an additional ERD may need to be selected for the demonstration of the opening pressure. The selected ERD has to be clearly marked. (3) If applicable, the selected ERD is to be representative for the type range and operating conditions, for example: (A) Kind of ERD (valve, rupture disc, etc.), (B) Mounting orientation (vertical, horizontal) (C) Design of ERD (e.g., spring design, sealing) (D) Design of flame arrester (E) ERD intended to be fitted to the air inlet or exhaust gas manifold of an engine having a turbocharger with characteristics as per the testing conditions for test vessel in **Table 3.9.2**. The selection of the representative ERD is subject to approval by the Society.	
	2. Demonstration of opening pressure	- UR M82 4.2
	The ERD which has been selected is to be subjected to a pressure test at the manufacturer's works to demonstrate that the static opening pressure is kept within the manufacturer's specification and that the ERD is air tight at the maximum permissible operating pressure for at least 30 seconds.	
	3. Type tests are to comply with the requirements given in **Table 3.9.2**.	

Present	Amendment	Reason
	Table 3.9.2 Type test for ERD	

Kinds	Requirements
Test facility	(1) The test facilities are to be accredited to a national or international standard, e.g. (KS Q) ISO/IEC 17025:2017, and are to be acceptable to the Society. (2) The test facilities are to be equipped so that they can perform and record explosion testing in accordance with this procedure. (3) The test facilities are to have equipment for controlling and measuring a methane gas concentration within a test vessel to an accuracy of ± 0.1%. (4) The test facilities are to be capable of effective point-located ignition of a methane/air mixture. (5) The test facility arrangements are to be capable of measuring and recording the pressure changes throughout an explosion test at a frequency recognizing the speed of the events during an explosion (10 kHz or above). (6) ERD test (stage 2) is to be documented by high speed (250 frames/s or above) video recording. The video recording shall be provided with a time stamp.
Test vessel	(1) The test vessel is a simplified model of the air inlet or exhaust gas manifold. The free area of the connected turbo charger (compressor or turbine wheel) is to be considered. (2) The test vessel is to comply with the following requirements: (A) The shape of the test vessel is to correspond to a pipe with L/D ≥ 10. (B) The test vessel is to be equipped with a rupture disc at one front end to simulate the turbo charger. The relief area of the rupture disc is to be in relationship to the test vessel diameter based on turbocharger manufacturer data for an equivalent free area of compressor or turbine wheel. The opening pressure is to be ± 10% of the static opening pressure of the ERD. (C) The volume of the test vessel is to comply with the specific relief area of the ERD of 700 cm^2/m^3 ± 15%. (D) The test vessel is to be provided with all necessary flanges and connection to mount the ERD in the intended position, to mount a rupture disc as turbo charger simulation, to connect the Methane-air mixture supply and the measurement equipment. (E) The ignition is to be made at the middle of the test vessel. (F) The test vessel is to be designed to verify a homogeneous air/methane mixture inside the vessel. (G) The test vessel is to have connections for measuring the pressure in the test vessel in at least two positions, one at the ERD and the other at the test vessel center. (H) The test vessel is to have a design pressure of not less than the maximum explosion pressure of a stoichiometric air/methane mixture at test conditions in explosion test method. (I) The test vessel configuration is subject to approval by the Society.

Reason
- UR M82 4.3.1
- UR M82 4.3.2 - reference standard: EN14994

Present	Amendment	Reason
	Table 3.9.2 Type test for ERD (continued)	

Kinds	Requirements
Test vessel	(3) Typical test vessel configurations All test vessel configurations to be equipped with a rupture disc (1) (turbo charger simulation) at one front end. The ignition is in the centre of the test vessel (↯). The pressure sensors are mounted at the valve flanges (p1) and at the test vessel centre (p2). The measuring of the methane concentration to verify a homogeneous air/methane mixture can be performed at both ends of the test vessel, e.g. (c1) and (c2).  **Fig 3.9.2 Configuration without ERD (flanges for ERDs closed (2))**  **Fig 3.9.3 Configuration with ERD (3) mounted at the front end of the test vessel**  **Fig 3.9.4 Configuration with ERD (3) mounted on top of the test vessel**

Present	Amendment	Reason
	Table 3.9.2 Type test for ERD (continued)	

Kinds		Requirements
Explosion test process	General	(1) The explosion testing is to be performed in two stages below for each ERD that is required to be approved as type tested. (2) The explosion testing is to be witnessed by a Society surveyor. (3) Calibration records for the instrumentation used to collect data are to be presented to, and reviewed by, the attending surveyor.
	Reference test (stage 1)	(1) Explosion test without ERD (2) Two explosion tests are to be carried out in the test vessel without ERD. The test vessel configuration is shown in **Fig 3.9.2**. (3) The aim of this test is to establish a reference pressure level in the test vessel which can be used for determination of the capability of a relief valve in terms of pressure relief.
	ERD test (stage 2)	(1) Explosion test with ERD (2) Two explosion tests are to be carried out in the test vessel with the same ERD at the required position. If the ERD is a rupture disc with flame arrester, the rupture disc shall be replaced. (3) If shielding arrangements to deflect the emission of explosion combustion products at the ERD are intended, the ERD are to be tested with the shielding arrangements fitted. The test vessel configuration is shown in **Fig 3.9.3** or **Fig 3.9.4**.
Explosion test method		(1) The test conditions shall comply with the intended use of the ERD, such as: (A) Pipe diameter (B) Operating pressure (C) Operating temperature (D) Installation orientation (2) All explosion tests are to be carried out using an air and methane mixture with a volumetric methane concentration of 9.5% ± 0.5%. A homogeneous air/methane mixture inside the test vessel is to be verified. The concentration of methane shall not differ by more than 0.5%. (3) The initial pressure in the test vessel is to be the specified maximum operating pressure of the ERD. (4) The initial temperature in the test vessel is to be the specified maximum operating temperature of the ERD. (5) If the initial pressure and/or initial temperature deviate from the design limits, the ERD manufacturer shall prove the acceptability of this deviation either using standards or generally applicable calculation methods. (6) The ignition is to be made using an explosive charge of 50 – 100 Joule.

Reason
- UR M82 4.3.3
- UR M82 4.3.4
- UR M82 4.3.5
- UR M82 4.3.6

Present	Amendment	Reason
	Table 3.9.2 Type test for ERD (continued)	

Kinds	Requirements
Explosion test method	(7) Successive explosion testing to establish an ERD functionality is to be carried out as quickly as possible during stable weather conditions. (8) The pressure rise and decay during all explosion testing is to be recorded. (9) The effect of an ERD in terms of pressure relief following an explosion is ascertained from maximum pressure recorded at the centre of the test vessel during the two stages. The pressure relief within the test vessel due to the installation of an ERD is the difference between average pressure of the two explosions of the reference test (stage 1) and the average of the two explosions of the ERD test (stage 2). (10) For acceptance of correct functioning of the flame arrester, there is to be no indication of flame or combustion outside of the ERD during ERD test (stage 2). This is to be monitored by a high-speed video camera, for which ambient light conditions are to be considered to maximise the potential for flame/combustion detection. The use of a dark, ideally matt finish, background and an avoidance of direct light onto the video camera monitored area are recommended. (11) After each ERD test (stage 2), the external condition of the flame arrester to be examined for signs of damage and/or deformation that may affect the operation of the ERD.
Check of ERD components	After completing the explosion tests, the ERDs are to be dismantled and the condition of all components are to be ascertained and documented.

	- UR M82 4.4
4. Test report (1) A complete test report for the demonstration of opening pressure in **2** and the explosion test in **3** has to be submitted to the Society . (2) The reports shall include respective information according to the requirements in **903.**, as applicable: (A) Test specimens (B) Test facility, including measuring equipment and test vessel (C) Measuring results (pressures, temperatures, flame velocities, volumetric methane concentration, ambient conditions etc.) (D) Video documentation of explosion tests (E) Photo documentation of ERD components	- UR M82 5

<table>
<tr>
<th>Present</th>
<th>Amendment</th>
<th>Reason</th>
</tr>
<tr>
<td>

CHAPTER 3 TYPE APPROVAL

Section 15 Machinery and Equipment for Ships

(hereafter, omitted)

</td>
<td>

CHAPTER 3 TYPE APPROVAL

Section 15 Machinery and Equipment for Ships

(same as the present Rules)

Table 3.15.1 Type test item of machinery and equipment of ship *(2018)*

<table>
<tr><th>Kinds</th><th>Type test item</th></tr>
<tr><td rowspan="2">Kind 1 propeller shafts with corrosion resisting</td><td>(A) 〈same as the present〉</td></tr>
<tr><td>(B) In the type tests of kind 1 propeller shafts with synthetic resin sleeve, following items are to be included.
(a) Watertightness verification test with the test shaft worked up in accordance with the "Work Procedure Manual"
This test is to be carried out as the endurance test of the watertightness at the portion between synthetic resin sleeve and copper alloy sleeve under repeated twisting and bending loads. In this case, the construction drawing of the test shaft and the drawing of the test rig are to be indicated in the type test program.
(b) Adhesion test correspondingly in accordance with KS M 6518 (adhesion between the bonded areas of synthetic resin, shaft and sleeve)
(c) Water absorption rate test at the portion of synthetic resins is to be as deemed appropriate by the Society.
(d) Falling ball impact test at the portion of synthetic resins correspondingly in accordance with (KS M) ISO 6603-1 (2019)
~~(e) Real ship tests~~
~~The shafts which have passed the type tests, are to be subjected to real ship tests. In ships having a post-installing period of two years, the condition of coatings is to be confirmed in the presence of the Surveyor.~~
(e) 〈same as the present〉</td></tr>
</table>

(hereafter, same as the present Rules)

</td>
<td>

〈Guidance for Approval of Manufacturing Process and Type Approval, Etc.〉

(Amendment) Deletion of the real ship tests requirement for propeller shafts with synthetic resin coating. (New Mar 2023) 〈application date: date of contract for construction or an application for approval, on or after 1 Jul. 2024〉

- Deleted according to the results of internal deliberation.

</td>
</tr>
</table>

Amendments of the Guidance for Manufacturing Process and Type Approval, Etc.

(Development Review : For external opinion inquiry)

2024. 1.

Machinery Rule Development Team

Effective Date : 1 July 2024

(The contract date for ship construction)

Present	Amendment	Note
CHAPTER 3 TYPE APPROVAL **Section 1 - 21 〈same as the present Rules〉** **Section 22 Cable Laying** **2201. - 2202. 〈same as the present Rules〉** **2203. Type test** **1. - 3. 〈same as the present Rules〉** **Table 3.22.2 type tests for cable trays/protective casings made of plastics materials** Test item: Resistivity Test Approval test method and acceptance criteria: (a) Cable trays/protective casings passing through a hazardous area should be electrically conductive. The cable tray/protective casings should be tested in accordance with IEC 62631-3-1:2016 and IEC 62631-3-2:2015. (b) The volume resistivity level of the cable trays/protective casings and fittings should be below $10^5\Omega$ and the surface resistivity should be below 10^6 Ωm. The resistance to earth from any point in these appliances should not exceed $10^6\Omega$.	**CHAPTER 3 TYPE APPROVAL** **Section 1 - 21 〈same as the present Rules〉** **Section 22 Cable Laying** **2201. - 2202. 〈same as the present Rules〉** **2203. Type test** **1. - 3. 〈same as the present Rules〉** **Table 3.22.2 type tests for cable trays/protective casings made of plastics materials** Test item: Resistivity Test Approval test method and acceptance criteria: Cable trays/protective casings of plastic materials passing through a hazardous area are to be complied with the following. (a) They should not be electrically non-conductive and should ensure satisfactory earthing between any point in these appliances and the ship's hull. ~~The cable tray/protective casings should be tested in accordance with IEC 62631-3-1:2016 and IEC 62631-3-2:2015.~~ (b) The volume resistivity level of the cable trays/protective casings and fittings should be below $10^5\Omega$m and the surface resistivity should be below ~~10^6~~$10^8\Omega$. ~~The resistance to earth from any point in these appliances should not exceed $10^6\Omega$.~~ (c) The cable tray/protective casings should be tested in accordance with IEC 62631-3-1:2016 and IEC 62631-3-2:2015.	(Amended) - It has been amended surface resistivity for non-metal materials to apply to IACS Rec.73(Rev.2 Jan 2023). - The requirements have been amended for clarity.

Present	Amendment	Note
Section 23 Automatic and Remote Control Systems **2301. - 2303. 〈same as the present Rules〉** **2304. Type test** **1. Hardware** (1) 〈same as the present Rules〉 (2) **Test methods and criteria** (A) After the drawings and documents submitted in accordance with the requirements in **2302.** have been examined, tests are to be carried out in accordance with the testing condition and method of **Table 3.23.1** in the presence of the Society's surveyor, and they are to be proven to satisfy the criteria of **Table 3.23.1.** (B) - (D) 〈same as the present Rules〉 **2. - 3. 〈same as the present Rules〉** **Section 24 - 38 〈same as the present Rules〉**	**Section 23 Automatic and Remote Control Systems** **2301. - 2303. 〈same as the present Rules〉** **2304. Type test** **1. Hardware** (1) 〈same as the present Rules〉 (2) **Test methods and criteria** (A) After the drawings and documents submitted in accordance with the requirements in **2302.** have been examined, tests are to be carried out in accordance with the testing condition and method of **Table 3.23.1** in the presence of the Society's surveyor, and they are to be proven to satisfy the criteria of **Table 3.23.1.** **Table 3.23.1 〈see the next page〉** (B) - (D) 〈same as the present Rules〉 **2. - 3. 〈same as the present Rules〉** **Section 24 - 38 〈same as the present Rules〉**	(Amended) - It has been amended to apply to UR E10(Rev,9 Aug 2023). - Requirements for functional and performance tests have been aligned with both the Korean and English versions of the rules, as well as the unified requirements.

〈Amendments〉

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

No.	Test item	testing condition and method	Criteria
1-5	〈same as the present Rules〉		
6	Dry heat test	〈same as the presnet Rules〉	· No abnormality is observed. · The equipment is comply with the requirements of performance test and functional test.
7	Damp heat test	〈same as the presnet Rules〉	No abnormality is observed. · The equipment is comply with the requirements of performance test and functional test.
8	Vibration test	〈same as the present Rules〉 More severe conditions may exist for example automatic and reomte contol systems installed on exhaust manifolds or fuel oil injection systems of diesel engines. For equipment specified for increased vibration levels the vibration test is to be conducted at the agreed vibration level, frequency range and duration. Values may be required to be in these cases 40 Hz to 2000 Hz- acceleration ±10.0 g at 600 ℃ duration 90 minutes. · 〈same as the present Rules〉	No abnormality is observed. · The equipment is comply with the requirements of performance test and functional test.
9-11	·〈same as the presnet Rules〉		

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

No.	Test item	Testing condition and method	Criteria
12	Cold test	· The test shall be carried out at 25 ±10 ℃ in atmospheric temperature. · The equipment is switched off except for the ~~operation~~functional test and apply the environmental condition of +5 ±3 ℃ for 2 hours. And functional test is to be carried out during the last hour at the test temperature and after recovery. · For the equipment installed in open decks, etc., the environmental condition of −25 ±3 ℃ is applied for 2 hours. · Insulation resistance measurements are carried out before and after cold test. · Detailed test methods are referred to Test Ab or Test Ad of IEC 60068-2-1:2007. **Fig 3.23.3 〈same as the present Rules〉**	· No abnormality is observed. · The equipment is comply with the requirements of ~~performance test and~~ functional test.
13	Salt mist test (2)	· Salt mist test is to be carried out for equipment installed in weather exposed areas. · The equipment is switched off except when its operation is checked. Apply four cycles of the environmental condition of spraying NaCl liquid (saline solution, 5 % NaCl, pH 6.5 ~ 7.2, 20 ±2 ℃) for 2 hours and leaving for 7 days. Check the operation of the equipment during the 7th day of each cycle and after recovery. · Damp chamber conditions for storage are to be maintained as follows; – Temp. : 40℃±2℃ – Relative humidity : 93% +2% −3% · The test is carried out according to the following procedure – Insulation resistance and functional test before test – Functional test on the 7th day of each cycle period – Insulation resistance and ~~functional~~performance test : 4 to 6 hours after recovery · On completion of exposure, the equipment is to be examined to verify that deterioration or corrosion (if any) is superficial in nature. · Detailed test methods are referred to Test Kb of IEC 60068-2-52:2017.	· No abnormality is observed. · The equipment is comply with the requirements of performance test and functional test.
14	〈same as the present Rules〉		

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

<table>
<tr><th>No.</th><th>Test item</th><th>Testing condition and method</th><th>Criteria</th></tr>
<tr><td>15</td><td>Electromagnetic field immunity test</td><td>· Check the operation of the equipment when the radiated radio frequency immunity test is carried out according to the following condition.
<table><tr><td>Frequency range</td><td>80 MHz ~ 6 GHz</td></tr><tr><td>Modulation</td><td>80 % AM at 1,000 Hz</td></tr><tr><td>Field strength</td><td>10 V/m</td></tr><tr><td>Frequency sweep rate</td><td>≤ 1.5 × 10⁻³ decades/sec.
(or 1 %/3 sec.)</td></tr></table>· If for tests of equipment an input signal with a modulation frequency of 1,000 Hz is necessary, a modulation frequency(80 % AM) of 400 Hz may be chosen.
· The test is to be confined to the appliances exposed to direct radiation by transmitters at their place of installation.
· If an equipment is intended to receive radio signals for the purpose of radio communication (e.g. wifi router, remote radio controller), then the immunity limits at its communication frequency do not apply, subject to the requirements in Pt 6, Ch 2, ~~406. 2~~ 407. 2 (2) of Rules for the Classification of Steel Ships.
· Detailed test methods are referred to Test level 3 of IEC 61000-4-3:2020 or IEC 61000-4-3:2006+AMD1:2007+AMD2:2010.</td><td>· Performance Criterion A(2)</td></tr>
<tr><td>16-19</td><td colspan="2">〈same as the present Rules〉</td></tr>
</table>

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

<table>
<tr><th>No.</th><th>Test item</th><th>Testing condition and method</th><th>Criteria</th></tr>
<tr><td>20</td><td>Radiated emission test</td><td>· Radiated emission test is to be carried out according to the following.

〈Limits below 1,000 Mhz〉
<table><tr><td colspan="2">For equipment installed in the bridge and deck zone.</td></tr><tr><td>Frequency range</td><td>Quasi peak limits</td></tr><tr><td>150 kHz ~ 300 kHz</td><td>80 ~ 52 dBμV/m</td></tr><tr><td>300 kHz ~ 30 MHz</td><td>52 ~ 34 dBμV/m</td></tr><tr><td>30 MHz ~ 1,000 MHz</td><td>54 dBμV/m</td></tr><tr><td>156 MHz ~ 165 MHz</td><td>24 dBμV/m</td></tr><tr><td colspan="2">For equipment installed in a zone other than bridge and deck zone</td></tr><tr><td>150 kHz ~ 30 MHz</td><td>80 ~ 50 dBμV/m</td></tr><tr><td>30 MHz ~ 100 MHz</td><td>60 ~ 54 dBμV/m</td></tr><tr><td>100 MHz ~ 1,000 MHz</td><td>54 dBμV/m</td></tr><tr><td>156 MHz ~ 165 MHz</td><td>24 ddBμV/m</td></tr></table>
〈Limits above 1,000 MHz〉
<table><tr><td>Frequency range</td><td>Average limit</td></tr><tr><td>1,000 MHz ~ 6,000 MHz</td><td>54 dBμV/m</td></tr></table>
· Distance between equipment and antenna is to be 3 m.
· For the frequency band 156 MHz to 165 MHz the measurement shall be repeated with a receiver bandwidth of 9 kHz (as per IEC 60945).
· Alternatively the radiation limit at a distance of 3 m from the enclosure port over the frequency 156 MHz to 165 MHz is to be 30 dBμV/m peak. (as per IEC 60945:2002).
· Equipment intended to transmit radio signals for the purpose of radio communication (e.g. wifi router, remote radio controller) may be exempted from limit, within its communication frequency range, subject to the requirements in Pt 6, Ch 2, <s>406. 2</s> 407. 2 (2) of Rules for the Classification of Steel Ships.
· Detailed test methods are referred to CISPR 16-2-3:2016 and IEC 60945:2002(for 156 ~ 165 MHz).</td><td>· Radiated emission is to be within limits in the table.(4)</td></tr>
<tr><td>21-23</td><td colspan="2">〈same as the present Rules〉</td></tr>
</table>

Present	Amendment	Note
Section 39 Electric Power Converters *(2022)*	**Section 39 Electric Power Converters *(2022)***	
3901. 〈same as the present Rules〉	**3901. 〈same as the present Rules〉**	
3902. Type tests Type tests are to be carried out in accordance with **Table 3.39.1** or **Table 3.39.2** and supplementary tests may be required where deemed necessary by the Society. Type tests may be partly or wholly exempted, subject to the approval by the Society, in cases where the manufacturer submits the test reports issued by an authorized test laboratory in accordance with the standard approved by the Society.	**3902. Type tests** Type tests are to be carried out in accordance with **Table 3.39.1,** ~~or~~ **Table 3.39.2** or **Table 3.39.3** and supplementary tests may be required where deemed necessary by the Society. Type tests may be partly or wholly exempted, subject to the approval by the Society, in cases where the manufacturer submits the test reports issued by an authorized test laboratory in accordance with the standard approved by the Society.	(Amended) - One of insulation resistance tests in Table 3.39.1 and 3.39.2 has been deleted to be complied with IEC 60146-1-1. - One of test method for the high voltage test in Table 3.39.1 and 3.39.2 has been deleted because the method is the same as IEC 61800-5-1. (Newly added) - Table 3.39.1 has been updated specifically for UPS and Table 3.39.3 for power supply converters has been newly added.
Section 40 〈same as the present Rules〉	**Section 40 〈same as the present Rules〉**	

〈Present〉

Table 3.39.1 UPS/Electric power converters for power supply *(2023)*

No.	Test item	Test method	
1	Visual inspection	No.1	Table 3.23.1
2	Electrical power supply failure test	No.3	
3	Electrical power supply variation test	No.4	
4	Dry heat test	No.6	
5	Damp heat test	No.7	
6	Variation test	No.8	
7	Inclination test	No.9	
8	Insulation resistance test[2)]	No.10	
9	Cold test	No.12	
10	Electromagnetic compatibility(EMC) test	No.14~21	
11	High voltage test	IEC 61800-5-1, 5.2.3.2[3)]	
12	Insulation resistance test	IEC 60146-1-1, 7.2.3.1	
13	Temperature rise test	IEC 60146-1-1, 7.4.2	
14	Light load test / Functional test	IEC 62040-3, 6.2.2.3 & 60146-1-1	
15	Input voltage and frequency tolerance test	IEC 62040-3, 6.4.1	
16	Short circuit test	IEC 62040-3, 6.4.2.10	
17	Full load test[1)]	IEC 62040-3, 6.4.3.1 & 6.4.3.2	
18	Dynamic performance test	IEC 62040-3, 6.4.3.3	
19	Stored and restored energy test[1)]	IEC 62040-3, 6.4.4	
20	Capacitor discharge test	IEC 61800-5-1, 5.2.3.7	
21	Cooling failure test	IEC 61800-5-1, 5.2.4.5	

(Note)
1) Only applicable for UPS.
2) The test shall be carried out before and after both No.8 Damp heat test and No.9 Cold Test.
3) Alternatively tests of IEC 60416-1-1, 7.2 or equivalent method may be accepted.

〈Amendments〉

Table 3.39.1 UPS/~~Electric power converters for power supply~~ *(2024)*

No.	Test item	Test method	
1	Visual inspection	No.1	**Table 3.23.1**
2	Electrical power supply failure test	No.3	
3	Electrical power supply variation test	No.4	
4	Dry heat test	No.6	
5	Damp heat test	No.7	
6	Variation test	No.8	
7	Inclination test	No.9	
~~8~~	~~Insulation resistance test[2)]~~	~~No.10~~	
~~9~~ 8	Cold test	No.12	
~~10~~ 9	Electromagnetic compatibility(EMC) test	No.14~21	
~~11~~ 10	High voltage test	**IEC 61800-5-1, 5.2.3.2**[~~3)~~(1)]	
~~12~~ 11	Insulation resistance test	IEC 60146-1-1, 7.2.3.1	
~~13~~ 12	Temperature rise test	IEC 60146-1-1, 7.4.2	
~~14~~ 13	Light load test / Functional test	IEC 62040-3, 6.2.2.3 & 60146-1-1	
~~15~~	~~Input voltage and frequency tolerance test~~	~~IEC 62040-3, 6.4.1~~	
~~16~~ 14	~~Short circuit~~ Fault clearing capacity test	IEC 62040-3, 6.4.2.~~10~~ 9.2	
~~17~~ 15	~~Full l~~Load test[~~1)~~]	IEC 62040-3, ~~6.4.3.1 & 6.4.3.2~~ 6.2.2.5, 6.4.2.2, 6.4.2.3 & 6.4.2.9.1	
~~18~~	~~Dynamic performance test~~	~~IEC 62040-3, 6.4.3.3~~	
~~19~~ 16	Stored and restored energy test[~~1)~~]	IEC 62040-3, 6.4.~~4~~ 3	
~~20~~ 17	Capacitor discharge test	IEC 61800-5-1, 5.2.3.~~7~~ 8	
~~21~~ 18	Cooling failure test	IEC 61800-5-1, 5.2.4.~~5~~ 13	

(Note)

~~1) Only applicable for UPS.~~

~~2) The test shall be carried out before and after both No.8 Damp heat test and No.9 Cold Test.~~

~~3)~~ (1) Alternatively tests of IEC 60416-1-1, 7.2 or equivalent method may be accepted.

〈Present〉

Table 3.39.2 Electric power converters for essential motors *(2023)*

No.	Test item	Test method	
1	Visual inspection	No.1	**Table 3.23.1**
2	Electrical power supply failure test	No.3	
3	Electrical power supply variation test	No.4	
4	Dry heat test	No.6	
5	Damp heat test	No.7	
6	Variation test	No.8	
7	Inclination test	No.9	
8	Insulation resistance test[2)]	No.10	
9	Cold test	No.12	
10	Electromagnetic compatibility(EMC) test	No.14~21	
11	Impulse voltage test[1)]	IEC 61800-5-1, 5.2.3.1	
12	High voltage test	IEC 61800-5-1, 5.2.3.2[3)]	
13	Insulation resistance test	IEC 60146-1-1, 7.2.3.1	
14	Light load test / Functional test	IEC 60146-1-1, 7.3.1 & 7.5	
15	Rated current test	IEC 60146-1-1, 7.3.2	
16	Temperature rise test	IEC 60146-1-1, 7.4.2, IEC 61800-5-1, 5.2.3.8	
17	Safety requirements : Electric, Thermal and Energy	IEC 61800-5-1, 5	

(Note)

1) The tests shall be carried out if not meet the criteria given in Pt 6, from Table 6.1.20 to Table 6.1.22

2) The test shall be carried out before and after both No.8 Damp heat test and No.9 Cold Test.

3) Alternatively tests of IEC 60416-1-1, 7.2 or equivalent method may be accepted.

3) 〈newly added〉

〈Amendments〉

Table 3.39.2 Electric power converters for essential motors *(2024)*

No.	Test item	Test method	
1	Visual inspection	No.1	**Table 3.23.1**
2	Electrical power supply failure test	No.3	
3	Electrical power supply variation test	No.4	
4	Dry heat test	No.6	
5	Damp heat test	No.7	
6	Variation test	No.8	
7	Inclination test	No.9	
~~8~~	~~Insulation resistance test[2)]~~	~~No.10~~	
~~9~~ 8	Cold test	No.12	
~~10~~ 9	Electromagnetic compatibility(EMC) test	No.14~21	
~~11~~ 10	Impulse voltage test[1)]	IEC 61800-5-1, 5.2.3.~~1~~ 2(3)	
~~12~~ 11	High voltage test	IEC 61800-5-1, 5.2.3.2~~3)~~(2)	
~~13~~ 12	Insulation resistance test	IEC 60146-1-1, 7.2.3.1(3)	
~~14~~ 13	Light load test / Functional test	IEC 60146-1-1, 7.3.1 & 7.5(3)	
~~15~~ 14	Rated current test	IEC 60146-1-1, 7.3.2(3)	
~~16~~ 15	Temperature rise test	IEC 60146-1-1, 7.4.2, IEC 61800-5-1, 5.2.3.810(3)	
~~17~~	~~Safety requirements : Electric, Thermal and Energy~~	~~IEC 61800-5-1, 5~~	

(Note)

(1) The tests shall be carried out if not meet the criteria given in Pt 6, from Table 6.1.20 to Table 6.1.22

~~2) The test shall be carried out before and after both No.8 Damp heat test and No.9 Cold Test.~~

3) (2) Alternatively tests of IEC 60416-1-1, 7.2 or equivalent method may be accepted.

(3) Alternatively tests of IEC 62447 or equivalent method may be accepted.

〈Newly added〉

Table 3.39.3 Electric power converters for power supply *(2024)*

No.	Test item	Test method	
1	Visual inspection(6)	No.1	Table 3.23.1
2	Electrical power supply failure test	No.3	
3	Electrical power supply variation test(1)(3)	No.4	
4	Dry heat test	No.6	
5	Damp heat test	No.7	
6	Variation test	No.8	
7	Inclination test	No.9	
8	Cold test	No.12	
9	Electromagnetic compatibility(EMC) test	No.14~21	
10	High voltage test(3)	IEC 60146-1-1, 7.2	
11	Insulation resistance test(2)(3)	IEC 60146-1-1, 7.2.3.1	
12	Temperature rise test(6)	IEC 60146-1-1, 7.4.2	
13	Light load test / Functional test	a) IEC 60146-1-1, 7.3.1 and 7.5 b) specification c) Emergency shutdown and restart	
14	Short circuit test(3)(4)	The test is to be carried out at light load (e.g., 10%). The short circuit is through suitable fuses or breakers that meet the manufacturer's or supplier's specification for fault clearing in the event of short circuit.	
15	Full load test(3)(5)	Measure output of voltage and frequency at rated output	
16	Capacitor discharge test(6)	IEC 61800-5-1, 5.2.3.8	
17	Cooling failure test(6)	IEC 61800-5-1, 5.2.4.13	

(Note)
1) Only applicable for UPS.
2) The test shall be carried out before and after both No.8 Damp heat test and No.9 Cold Test.
3) Alternatively tests of IEC 60416-1-1, 7.2 or equivalent method may be accepted.

Amendments of the Guidance

(External review)

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

2023. 07.

Hull Rule Development Team

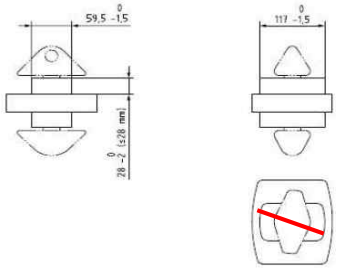
Background and main contents of the amendments

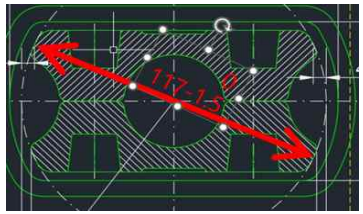
1. Background of amendments

■ **Request (HUC4100-1795-2023)** (effective date 2023. 7. Circular to be issued)

(1) For twistlock of HHS (High Hold Securing) / HHT (High Holding Twistlock) notation, dimensions of the twistlock neck part required by ISO 3874 (ISO1161) are shown as example pictures in Ch.3, Sec.25 of Guidance for Approval and of Manufacturing Process and Type Approval. This is to limit the clearance between twistlock and corner casting.

(2) In the figure(left), the entire twistlock neck is illustrated in a rectangular shape, but some manufacturers develop and present optimal designs that satisfy equal clearance. See picture(right)



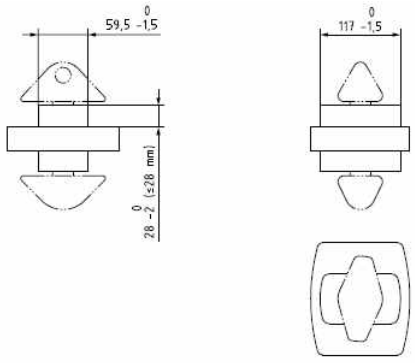
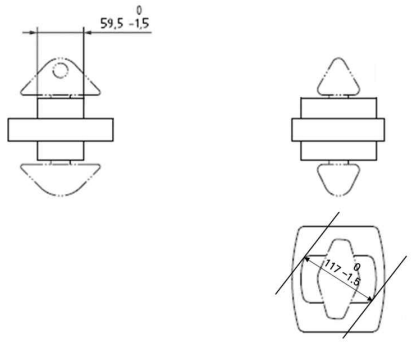


2. Main Contents: Refer to the amendments

(1) ‘ the dimension of the neck of the twistlock should be equal to or greater than the value according to **Fig. 3.25.5**. ’

→ ‘ The dimensions of the neck of the twistlock should be equal to or greater than the value according to **Fig. 3.25.5**. In this case, the neck of the twistlock should be symmetrical in the length/width direction.’

- In figure 3.25.5, a mark indicating the diagonal distance has been added.

Current	Amendment	Notes
Ch. 3 TYPE APPROVAL **Section 25 Securing Device** **2501.~ 2503. 〈omit〉** **2504. Test requirements of additional special feature notation HHS(High Holding Securing)** 1. ~ 5. 〈omit〉 6. The twistlock housing should be fastened with at least one bolt each at the top and bottom. Also the dimension of the neck of the twist lock should be equal to or greater than the value according to **Fig. 3.25.5**. *(2023)*  **Fig. 3.25.5** 7. 〈omit〉 **2505. 〈omit〉**	**Ch. 3 TYPE APPROVAL** **Section 25 Securing Device** **2501.~ 2503. 〈osame as current〉** **2504. Test requirements of additional special feature notation HHS(High Holding Securing)** 1. ~ 5. 〈same as current〉 6. The twistlock housing should be fastened with at least one bolt each at the top and bottom. Also the dimension of the neck of the twistlock should be equal to or greater than the value according to **Fig. 3.25.5**. In this case, the neck of the twistlock should be symmetrical in the length/width direction. *(2023)*  **Fig. 3.25.5** 7. 〈same as current〉 **2505. 〈same as current〉**	- ISO 3874 A 4.3 Collars