

Welding Requirements for Pressure Vessels and Application Requirements for Rolled Stainless Steels

Object of Amendment

Rules for the Survey and Construction of Steel Ships Part D and K
Guidance for the Survey and Construction of Steel Ships Part D and K

Reason for Amendment

Parts D and K of the Rules for the Survey and Construction of Steel Ships specify requirements related to the welding of pressure vessels and the application of rolled stainless steels, and some of these material requirements have been applied based on past examination results, even though this has not been explicitly stated. To clarify this practice, the Society has now decided to formally document it. In addition, the Society also reviewed the reference numbers of the standards applicable to pressure vessel design and revised them applicable to pressure vessel design to ensure they align with the latest versions.

Accordingly, the relevant requirements are amended based on the findings of these reviews.

Outline of the Amendment

- (1) Clarifies that Charpy impacts tests may be omitted during production weld tests of Group I pressure vessels made of austenitic stainless steel.
- (2) Clarifies the proof requirements applicable to rolled stainless steels used for tanks such as LNG and alternative fuels, or tanks for corrosion-resisting service being used for other equipment.
- (3) Amends references standards related to the loads or external forces considered when designing pressure vessels to indicate the most recent version number.

Effective Date and application

This amendment applies to ships for which the date of contract for construction is on or after 1 July 2025.

Notwithstanding the above, this amendment may be applied prior to the effective date upon request of the shipowner.

An asterisk (*) after the title of a requirement indicates that there is also relevant information in the corresponding Guidance.

ID:DD24-29

Amended-Original Requirements Comparison Table
(Welding Requirements for Pressure Vessels and Application Requirements for Rolled Stainless Steels)

Amended	Original	Remarks
<p>RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS</p> <p>Part D MACHINERY INSTALLATIONS</p> <p>Chapter 11 WELDING FOR MACHINERY INSTALLATIONS</p> <p>11.5 Welding of Pressure Vessels</p> <p>11.5.4 Production Weld Tests</p> <p>1 In cases where pressure vessels of Group I are of welded construction, production weld tests specified in 11.5.4 are to be carried out.</p> <p>(1) (Omitted)</p> <p>(2) Mechanical tests for test plates such as a tensile test for joints, a bend test and a Charpy impact test are to be carried out. Guided bend tests or roller bend tests may be accepted as the bend test. In this case, the number and dimensions of the test specimens are to be as given in Table D11.5. <u>In addition, Charpy impact tests for the welded parts of austenitic stainless steel may be omitted.</u></p> <p>(3) (Omitted)</p>	<p>RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS</p> <p>Part D MACHINERY INSTALLATIONS</p> <p>Chapter 11 WELDING FOR MACHINERY INSTALLATIONS</p> <p>11.5 Welding of Pressure Vessels</p> <p>11.5.4 Production Weld Tests</p> <p>1 In cases where pressure vessels of Group I are of welded construction, production weld tests specified in 11.5.4 are to be carried out.</p> <p>(1) (Omitted)</p> <p>(2) Mechanical tests for test plates such as a tensile test for joints, a bend test and a Charpy impact test are to be carried out. Guided bend tests or roller bend tests may be accepted as the bend test. In this case, the number and dimensions of the test specimens are to be as given in Table D11.5.</p> <p>(3) (Omitted)</p>	<p>Outline of Amendment(1)/ Omission of a Charpy Impact Test:</p> <p>In production weld tests for pressure vessels such as gas carriers, Charpy impact tests are conducted to verify resistance to low-temperature brittleness. However, in the case of austenitic stainless steels, low-temperature brittleness does not occur due to the crystal structure, so this test can be omitted.</p> <p>In consideration of the above, amends that the handling of the Charpy impact test specified in Part D to be aligned with Parts N and GF.</p>

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Amended	Original	Remarks
<p>RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS</p> <p>Part K MATERIALS</p> <p>Chapter 3 ROLLED STEELS</p> <p>3.5 Rolled Stainless Steels</p> <p>3.5.1 Application*</p> <p>1 The requirements are to apply to the rolled stainless steels for tanks of liquefied gas carriers or ships using low-flashpoint fuels, or corrosion-resisting service (hereinafter referred to as “steels” in 3.5).</p> <p>2 <u>Notwithstanding -1 above, such steels may be used for other equipment in cases where deemed appropriate by the Society.</u></p> <p>3 (Omitted)</p> <p>4 (Omitted)</p>	<p>RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS</p> <p>Part K MATERIALS</p> <p>Chapter 3 ROLLED STEELS</p> <p>3.5 Rolled Stainless Steels</p> <p>3.5.1 Application*</p> <p>1 The requirements are to apply to the rolled stainless steels for tanks of liquefied gas carriers or ships using low-flashpoint fuels, or corrosion-resisting service (hereinafter referred to as “steels” in 3.5).</p> <p>2 <u>Where deemed necessary by the Society, steel bars specified in this Section may be used for propeller shafts and so on.</u></p> <p>3 (Omitted)</p> <p>4 (Omitted)</p>	<p>Outline of Amendment(2)/ Relevant of Rolled Stainless Steels:</p> <p>Amends that Rolled stainless steels used for tanks such as LNG and alternative fuels or tanks for corrosion- resisting service are applicable for other equipment.</p> <p>The background to this is that there is an actual production of manufacturing rotating section casings using stainless rolled steel and taking into consideration the usage conditions of the rotating section casing (it can withstand seawater pressure and coated by corrosion prevention measures), it was determined that stainless rolled steel was fully satisfactory, and so the use of this rolled steel is permitted.</p> <p>The wording has been revised to clarify the abovementioned matters.</p>

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<p>GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS</p> <p>Part D MACHINERY INSTALLATIONS</p> <p>D10 PRESSURE VESSELS</p> <p>D10.3 Design Requirements</p> <p>D10.3.2 Design Loads When designing pressure vessels, the load or external force specified in 10.3.2-1 and -2, Part D of the Rules is to be taken into account in the cases specified below:</p> <p>(1) (Omitted)</p> <p>(2) In cases where the internal pressure may become lower than the external pressure during in service. In this case, the calculation procedure is to be taken in accordance with <u>Annex E of JIS B 8265 “Construction of pressure vessel - General principles”</u> or Section VIII, Division 1 of the <u>ASME “Boiler and Pressure Vessel Code”</u>.</p> <p>(3) In cases where dynamic loads caused by ship’s motions can be considered. In this case, the dynamic loads are to be estimated under the conditions of inclination angle specified in</p>	<p>GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS</p> <p>Part D MACHINERY INSTALLATIONS</p> <p>D10 PRESSURE VESSELS</p> <p>D10.3 Design Requirements</p> <p>D10.3.2 Design Loads When designing pressure vessels, the load or external force specified in 10.3.2-1 and -2, Part D of the Rules is to be taken into account in the cases specified below:</p> <p>(1) (Omitted)</p> <p>(2) In cases where the internal pressure may become lower than the external pressure during in service. In this case, the calculation procedure is to be taken in accordance with <u>Section VIII, Division 2, Appendix 2 of the “Boiler and Pressure Vessel Code” of ASME</u>.</p> <p>(3) In cases where dynamic loads caused by ship’s motions can be considered. In this case, the dynamic loads are to be estimated under the conditions of inclination angle specified in</p>	<p>Outline of Amendment(3)/ Relevant of Pressure Vessels: Updates that the reference standards to the latest version. Adds JIS standards to align with the Rules for Japanese-flagged vessels.</p>

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<p>Table D1.1, Part D of the Rules, and also the calculation procedure is to be taken in accordance with <u>Annex 8 of JIS B 8266 “Alternative standard for construction of pressure vessels”</u> or Section VIII, Division 2, Part 5 of the <i>ASME</i> “Boiler and Pressure Vessel Code”.</p> <p>(4) In cases where fatigue due to thermal stress cannot be disregarded. In this case, the calculation procedure is to be taken in accordance with <u>Annex 8 of JIS B 8266 “Alternative standard for construction of pressure vessels”</u> or Section VIII, Division 2, Part 5 of the <i>ASME</i> “Boiler and Pressure Vessel Code”.</p> <p>(5) In cases where loads from fittings and supporting structures cannot be disregarded. In this case, the calculation procedure is to be taken in accordance with <u>Annex 8 of JIS B 8266 “Alternative standard for construction of pressure vessels”</u> or Section VIII, Division 2, Part 5 of the <i>ASME</i> “Boiler and Pressure Vessel Code”. Also, supporting structures is to be taken in accordance with 6.15 and Annex 11 of <i>JIS B 8266</i> “Alternative standard for construction of pressure vessels”, or <i>JIS B 8278</i> “Saddle supported horizontal pressure vessels”.</p> <p>(6) (Omitted)</p> <p>(7) In case where the Society considers that the others such as the prompt pressure changes, external loads from the outside or external forces cannot be disregarded from a strength standpoint.</p>	<p>Table D1.1, Part D of the Rules, and also the calculation procedure is to be taken in accordance with <u>Section VIII, Division 2, Appendix 4 of the “Boiler and Pressure Vessel Code”</u> of <i>ASME</i>.</p> <p>(4) In cases where fatigue due to thermal stress cannot be disregarded. In this case, the calculation procedure is to be taken in accordance with <u>Section VIII, Division 2, Appendix 5</u> of the “Boiler and Pressure Vessel Code” of <i>ASME</i>.</p> <p>(5) In cases where loads from fittings cannot be disregarded. In this case, the calculation procedure is to be taken in accordance with <u>Section VIII, Division 2, Appendix 4 and 5</u> of the “Boiler and Pressure Vessel Code” of <i>ASME</i>.</p> <p>(6) (Omitted)</p> <p>(7) (Newly added)</p>	

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<p>GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS</p> <p>Part K MATERIALS</p> <p>K3 ROLLED STEELS</p> <p>K3.5 Rolled Stainless Steels</p> <p>K3.5.1 Application In 3.5.1-2, Part K of the Rules, “deemed necessary by the Society” <u>refers to</u> the following (1) and (2) cases.</p> <p><u>(1) When steel bars complying with following (a) to (e) are used for propeller shafts and so on.</u></p> <p>(a) Forging ratio is not to be less than 6. (b) Heat treatment is to comply with 6.2.5, Part K of the Rules. (c) Selection of test specimens is to comply with 6.2.8, Part K of the Rules in addition to the regulations 3.5.7 and 3.5.8, Part K of the Rules. Mechanical tests are to comply with</p>	<p>GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS</p> <p>Part K MATERIALS</p> <p>K3 ROLLED STEELS</p> <p>K3.5 Rolled Stainless Steels</p> <p>K3.5.1 Application In 3.5.1-2, Part K of the Rules, “deemed necessary by the Society” <u>means the case complying with the following requirements.</u> (Newly added)</p> <p>(1) Forging ratio is not to be less than 6. (2) Heat treatment is to comply with 6.2.5, Part K of the Rules. (3) Selection of test specimens is to comply with 6.2.8, Part K of the Rules in addition to the regulations 3.5.7 and 3.5.8, Part K of the Rules. Mechanical tests are to comply with 6.2.7, Part K of the Rules.</p>	<p>Outline of Amendment(2)/ Relevant of Rolled Stainless Steels: Clarifies that the case of “deemed necessary by the Society” as divided (1) and (2). Editorial correction.</p>

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<p>6.2.7, Part K of the Rules.</p> <p>(d) Surface inspection and dimension inspection are to be subjected in accordance with 6.2.9 and 6.2.10, Part K of the Rules.</p> <p>(e) Repair of defects is to comply with 6.1.11, Part K of the Rules.</p> <p>(2) <u>When used in equipment with specifications equivalent to or exceeding those originally required when using steel in consideration of the conditions of use.</u></p>	<p>(4) Surface inspection and dimension inspection are to be subjected in accordance with 6.2.9 and 6.2.10, Part K of the Rules.</p> <p>(5) Repair of defects is to comply with 6.1.11, Part K of the Rules.</p> <p>(Newly added)</p>	<p>Outline of Amendment(2)/ Relevant of Rolled Stainless Steels:</p> <p>Adds that rolled stainless steels used for tanks such as LNG and alternative fuels or tanks for corrosion-resisting service are applicable for other equipment.</p>
EFFECTIVE DATE AND APPLICATION		
<ol style="list-style-type: none"> 1. The effective date of the amendments is 1 July 2025. 2. Notwithstanding the amendments, the current requirements apply to ships for which the date of contract for construction is before the effective date. 3. Notwithstanding the provision of proceeding 2., the amendments may apply to ships for which the date of contract for construction is before the effective date upon request by the owner. 		