RULES FOR CLASSIFICATION(STEEL SHIPS)

(Part 2 Materials and Welding)

- After Sub-committee -

2025.10.

Machinery Rule Development Team

- Main Amendments -

(1) Enter into force on 1 July 2026 (the contract date for ship/offshore construction or the application date for certification of material)

◉ To reflect IACS UR W7(Rev.5 Feb 2025)
◉ To reflect Request for Establishment/Revision of Classification Technical Rules

Present	Amendment	reason
CHAPTER 1 MATERIALS **Section 1 ~ Section 5 <Omitted>** **Section 6 Steel Forgings** **601. Steel forgings** **1. Application** (1) The requirements in **601.** are to apply to the steel forgings(except those specified in **602., 603.** and **604.**) intended to be used for the components of hull construction, equipments, and machinery specified in each Part, and where relevant, these requirements are also applicable to material for forging stock and to rolled bars intended to be machined into components of simple shape (hereinafter referred to as the "**steel forgings**"). (2) Steel forgings having characteristics differing from those specified in **601.** are to comply with the requirements in **101. 2**. **2. ~ 4.** <Omitted> **5. Chemical composition** (1) The chemical composition of steel forgings is to comply with the requirements given in **Table 2.1.87**. (2) ~ (3) <Omitted> **6. Mechanical properties** (1) The mechanical properties of steel forgings are to comply with the requirements given in **Table 2.1.88** and **2.1.89**. (2) ~ (3) <Omitted>	**CHAPTER 1 MATERIALS** **Section 1 ~ Section 5 <Same as the present Rules>** **Section 6 Steel Forgings** **601. Steel forgings** **1. Application** (1) The requirements in **601.** are to apply to the steel forgings(except those specified in **602., 603.** and **604.**) intended to be used for the components of hull construction, equipments, machinery and offshore units specified in each Part, and where relevant, these requirements are also applicable to material for forging stock and to rolled bars intended to be machined into components of simple shape (hereinafter referred to as the "**steel forgings**"). (2) Steel forgings having characteristics differing from those specified in **601.** are to comply with the requirements in **101. 2**. **2. ~ 4.** <Same as the present Rules> **5. Chemical composition** (1) The chemical composition of steel forgings is to comply with the requirements given in **Table 2.1.87**. (2) ~ (3) <Same as the present Rules> **6. Mechanical properties** (1) The mechanical properties of steel forgings are to comply with the requirements given in **Table 2.1.88** and **2.1.89**. (2) ~ (3) <Same as the present Rules>	* To reflect IACS UR W7(Rev.5 Feb 2025)

<Present>

Table 2.1.87 Chemical Composition *(2017) (2021) (2023)*

Steel type		Chemical composition (%)									
		C	Si	Mn	P	S	Cr	Mo	Ni	Cu[3]	Total residual
Hull and General purpose steel forging[4]	Carbon steel	0.23[1][2] max.	0.45 max.	0.30-1.50	0.035 max.	0.035 max.	0.30[3] max.	0.15[3] max.	0.40[3] max.	0.30 max.	0.85 max.
	Alloy steel	0.23 max.	0.45 max.	0.30-1.00	0.035 max.	0.035 max.	0.40[6] min.	0.15[6] min.	0.40[6] min.	0.30 max.	-
Machinery steel forging	Carbon steel	0.23[1][2] max.	0.45 max.	0.30-1.50	0.035 max.	0.035 max.	0.30[3] max.	0.15[3] max.	0.40[3] max.	0.30 max.	0.85 max.
	Alloy steel[5]	0.45 max.	0.45 max.	0.30-1.00	0.035 max.	0.035 max.	0.40[6] min.	0.15[6] min.	0.40[6] min.	0.30 max.	-

NOTES :

(1) The carbon content may be increased above this level provided that the carbon equivalent (Ceq) is not more than 0.41 %.

(2) The carbon content of carbon steel forgings not intended for welded construction may be 0.65 % maximum.

(3) Elements are considered as residual elements.

(4) Rudder stocks and pintles should be of weldable quality.

(5) Where alloy steel forgings are intended for welded constructions, the proposed chemical composition is subject to approval by the Society.

(6) One or more of the elements is to comply with the minimum content.

<Amendment>

Table 2.1.87 Chemical Composition *(2017) (2021) (2023)*

Steel type		Chemical composition (%)									
		C	Si	Mn	P	S	Cr	Mo	Ni	Cu[3]	Total residual
Hull and General purpose steel forging[4]	Carbon steel	0.23[1][2] max.	0.45 max.	0.30-1.50	0.035 max.	0.035 max.	0.30[3] max.	0.15[3] max.	0.40[3] max.	0.30 max.	0.85 max.
	Alloy steel	0.23 max.	0.45 max.	0.30-1.00	0.035 max.	0.035 max.	0.40[6] min.	0.15[6] min.	0.40[6] min.	0.30 max.	-
Machinery steel forging	Carbon steel	0.23[1][2] max.	0.45 max.	0.30-1.50	0.035 max.	0.035 max.	0.30[3] max.	0.15[3] max.	0.40[3] max.	0.30 max.	0.85 max.
	Alloy steel[5]	0.45 max.	0.45 max.	0.30-1.00	0.035 max.	0.035 max.	0.40[6] min.	0.15[6] min.	0.40[6] min.	0.30 max.	-

NOTES :

(1) The carbon content may be increased above this level provided that the carbon equivalent (Ceq) is not more than 0.41 %.

(2) The carbon content of carbon steel forgings not intended for welded construction may be 0.65 % maximum.

(3) Elements are considered as residual elements.

(4) Rudder stocks and pintles should be of weldable quality.

(5) For alloy steel forgings intended for welded constructions, the proposed composition requires approval by the Society. *(2026)*

(6) One or more of the elements is to comply with the minimum content.

<Present>

Table 2.1.88 Kinds and Mechanical Properties for Hull Steel Forgings *(2017) (2023)*

Steel type	grades	Tensile test						Charpy V-notch impact test[6]		
		Tensile strength (N/mm^2)	Yield strength (N/mm^2)	Elongation(%) ($L=5.65\sqrt{A}$) (minimum)		Reduction of area(%) (minimum)		Test temperature(℃)	Minimum average energy(J)	
									L[4]	T[4]
				L	*T*	*L*	*T*			
Carbon steel forgings	*RSF* 400*H*	400 min.	200 min.	26	19	50	35	0	27	18
	RSF 440*H*	440 min.	220 min.	24	18	50	35			
	RSF 480*H*	480 min.	240 min.	22	16	45	30			
	RSF 520*H*	520 min.	260 min.	21	15	45	30			
	RSF 560*H*	560 min.	280 min.	20	14	40	27			
	RSF 600*H*	600 min.	300 min.	18	13	40	27			
Alloy steel forgings	*RSF* 550*AH*	550 min.	350 min.	20	14	50	35			
	RSF 600*AH*	600 min.	400 min.	18	13	50	35			
	RSF 650*AH*	650 min.	450 min.	17	12	50	35			

Notes ;

(1) Where it is proposed to use a steel with a specified minimum tensile strength intermediate to those given, corresponding minimum values for the other properties may be obtained by interpolation and the value at the first decimal place is to be subjected to the method of counting fractions over 1/2 as one and disregarding the rest.

(2) For the upper limit of tensile strength, the following ranges for tensile strength may be additionally specified:

Specified minimum tensile strength (N/mm^2)	Range of upper limit(N/mm^2)
< 600	120
≥ 600	150

(3) In the case of large forgings requiring two tension tests, the range of tensile strength is not to exceed 70 N/mm^2

(4) *L* (or *T*) denotes that the longitudinal axis of the test specimen is arranged parallel (or tangential) to the direction of forging.

(5) For rudder stocks intended for ships with ice class notation(Grade IA Super, IA, IB and IC), Charpy V-notch impact testing is to be carried out for all steel types at -10℃ and the average energy value is to be minimum 27 *J* (longitudinal test).

(6) Special consideration may be given to alternative requirements for Charpy V-notch test, depending on design and application and subject to agreement by the Society.

<Amendment>

Table 2.1.88 Kinds and Mechanical Properties for Hull Steel Forgings *(2017) (2023)*

Steel type	grades	Tensile test						Charpy V-notch impact test[5][6]		
		Tensile strength (N/mm^2)	Yield strength (N/mm^2)	Elongation(%) ($L=5.65\sqrt{A}$) (minimum)		Reduction of area(%) (minimum)		Test temperature(℃)	Minimum average energy(J)	
									L[4]	T[4]
				L	*T*	*L*	*T*			
Carbon steel forgings	*RSF* 400*H*	400 min.	200 min.	26	19	50	35	0	18	12
	RSF 440*H*	440 min.	220 min.	24	18	50	35			
	RSF 480*H*	480 min.	240 min.	22	16	45	30			
	RSF 520*H*	520 min.	260 min.	21	15	45	30			
	RSF 560*H*	560 min.	280 min.	20	14	40	27			
	RSF 600*H*	600 min.	300 min.	18	13	40	27			
Alloy steel forgings	*RSF* 550*AH*	550 min.	350 min.	20	14	50	35			
	RSF 600*AH*	600 min.	400 min.	18	13	50	35			
	RSF 650*AH*	650 min.	450 min.	17	12	50	35			

Notes ;

(1) Where it is proposed to use a steel with a specified minimum tensile strength intermediate to those given, corresponding minimum values for the other properties may be obtained by interpolation and the value at the first decimal place is to be subjected to the method of counting fractions over 1/2 as one and disregarding the rest.

(2) For the upper limit of tensile strength, the following ranges for tensile strength may be additionally specified:

Specified minimum tensile strength (N/mm^2)	Range of upper limit(N/mm^2)
< 600	120
≥ 600	150

(3) In the case of large forgings requiring two tension tests, the range of tensile strength is not to exceed 70 N/mm^2

(4) *L* (or *T*) denotes that the longitudinal axis of the test specimen is arranged parallel (or tangential) to the direction of forging.

(5) For rudder stocks intended for ships with ice class notation(Grade IA Super, IA, IB and IC), Charpy V-notch impact testing is to be carried out for all steel types at -10℃ and the average energy value is to be minimum 27 *J* (longitudinal test).

(6) Special consideration may be given to alternative acceptance criteria for the Charpy V-notch impact test (which may be supported by historical and statistical test data), or for alternative test and inspection arrangements, subject to agreement with the Society. *(2026)*

<Present>

Table 2.1.89 Kinds and mechanical properties for machinery steel forgings *(2017) (2023)*

Steel type	Grades	Tensile test						Hardness test(5)	Charpy V-notch impact test(4)(6)		
		Tensile strength(2) (N/mm^2)	Yield strength (N/mm^2)	Elongation(%) ($L=5.65\sqrt{A}$) (minimum)		Reduction of area(%) (minimum)		Hardness (H_{BW})	Test temperature(℃)	Minimum average energy(J)	
				L(3)	T(3)	L(3)	T(3)			L(3)	T(3)
Carbon steel forgings	*RSF* 400*M*	400 min.	200 min.	26	19	50	35	110 - 150	AT(7)	27	18
	RSF 440*M*	440 min.	220 min.	24	18	50	35	125 - 160			
	RSF 480*M*	480 min.	240 min.	22	16	45	30	135 - 175			
	RSF 520*M*	520 min.	260 min.	21	15	45	30	150 - 185			
	RSF 560*M*	560 min.	280 min.	20	14	40	27	160 - 200			
	RSF 600*M*	600 min.	300 min.	18	13	40	27	175 - 215			
	RSF 640*M*	640 min.	320 min.	17	12	35	27	185 - 230			
	RSF 680*M*	680 min.	340 min.	16	12	35	24	200 - 240			
	RSF 720*M*	720 min.	360 min.	15	11	35	24	210 - 250			
	RSF 760*M*	760 min.	380 min.	14	10	35	24	225 - 265			
Alloy steel forgings	*RSF* 600*AM*	600 min.	360 min.	18	14	50	35	175 - 215			
	RSF 700*AM*	700 min.	420 min.	16	12	45	30	205 - 245			
	RSF 800*AM*	800 min.	480 min.	14	10	40	27	235 - 275			
	RSF 900*AM*	900 min.	630 min.	13	9	40	27	260 - 320			
	RSF 1000*AM*	1000 min.	700 min.	12	8	35	24	290 - 365			
	RSF 1100*AM*	1100 min.	770 min.	11	7	35	24	320 - 385			

Table 2.1.89 Kinds and mechanical properties for machinery steel forgings(cont'd) ***(2017) (2023)***

NOTES :

(1) Where it is proposed to use a steel with a specified minimum tensile strength intermediate to those given, corresponding minimum values for the other properties may be obtained by interpolation and the value at the first decimal place is to be subjected to the method of counting fractions over 1/2 as one and disregarding the rest.

(2) For the upper limit of tensile strength, the following ranges for tensile strength may be additionally specified:

Specified minimum tensile strength (N/mm^2)	Range of upper limit (N/mm^2)
< 900	150
≥ 900	200

(3) *L* (or *T*) denotes that the longitudinal axis of the test specimen is arranged parallel (or tangential) to the direction of forging.

(4) For materials used for machinery exposed to sea water temperature, such as propeller shafts and shaft bolts, intended for ships with ice class notation(Grade IA Super, IA, IB and IC), Charpy V-notch impact testing is to be carried out for all steel types at −10 ℃ and the average energy value is to be minimum 20 J (longitudinal test). One individual value may be less than the required average value provided that it is not less than 70% of this average value. Impact test for important components as crankshaft and gears for machinery is to be in accordance with the Guidance relating to the Rules specified by the Society.
【See Guidance】

(5) The hardness values are typical and are given for information purposes only.

(6) Special consideration may be given to alternative requirements for Charpy V-notch test, depending on design and application and subject to agreement by the Society.

(7) AT refers to Ambient Temperature (i.e. 23°C ± 5°C), which is specified in **ISO 148-1:2016**.

<Amendment>

Table 2.1.89 Kinds and mechanical properties for machinery steel forgings *(2017) (2023)*

Steel type	Grades	Tensile test						Hardness test[5]	Charpy V-notch impact test[4][6]		
		Tensile strength[2] (N/mm^2)	Yield strength (N/mm^2)	Elongation(%) ($L=5.65\sqrt{A}$) (minimum)		Reduction of area(%) (minimum)		Hardness (H_{BW})	Test temperature(℃)	Minimum average energy(J)	
				L[3]	T[3]	L[3]	T[3]			L[3]	T[3]
Carbon steel forgings	*RSF* 400*M*	400 min.	200 min.	26	19	50	35	110 - 150	AT[7]	18	12
	RSF 440*M*	440 min.	220 min.	24	18	50	35	125 - 160			
	RSF 480*M*	480 min.	240 min.	22	16	45	30	135 - 175			
	RSF 520*M*	520 min.	260 min.	21	15	45	30	150 - 185			
	RSF 560*M*	560 min.	280 min.	20	14	40	27	160 - 200			
	RSF 600*M*	600 min.	300 min.	18	13	40	27	175 - 215			
	RSF 640*M*	640 min.	320 min.	17	12	35	27	185 - 230			
	RSF 680*M*	680 min.	340 min.	16	12	35	24	200 - 240			
	RSF 720*M*	720 min.	360 min.	15	11	35	24	210 - 250			
	RSF 760*M*	760 min.	380 min.	14	10	35	24	225 - 265			
Alloy steel forgings	*RSF* 600*AM*	600 min.	360 min.	18	14	50	35	175 - 215			
	RSF 700*AM*	700 min.	420 min.	16	12	45	30	205 - 245			
	RSF 800*AM*	800 min.	480 min.	14	10	40	27	235 - 275			
	RSF 900*AM*	900 min.	630 min.	13	9	40	27	260 - 320			
	RSF 1000*AM*	1000 min.	700 min.	12	8	35	24	290 - 365			
	RSF 1100*AM*	1100 min.	770 min.	11	7	35	24	320 - 385			

Table 2.1.89 Kinds and mechanical properties for machinery steel forgings(cont'd) ***(2017) (2023)***

NOTES :

(1) Where it is proposed to use a steel with a specified minimum tensile strength intermediate to those given, corresponding minimum values for the other properties may be obtained by interpolation and the value at the first decimal place is to be subjected to the method of counting fractions over 1/2 as one and disregarding the rest.

(2) For the upper limit of tensile strength, the following ranges for tensile strength may be additionally specified:

Specified minimum tensile strength (N/mm^2)	Range of upper limit (N/mm^2)
< 900	150
≥ 900	200

(3) *L* (or *T*) denotes that the longitudinal axis of the test specimen is arranged parallel (or tangential) to the direction of forging.

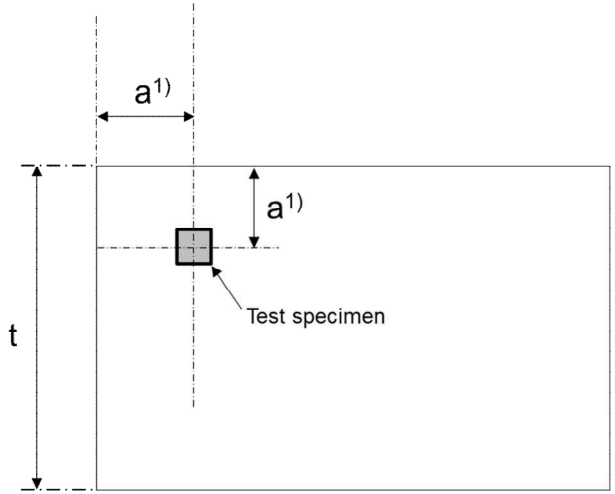
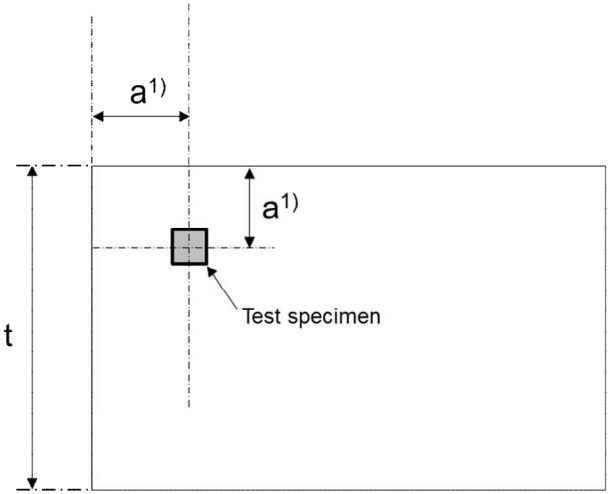
(4) For materials used for machinery exposed to sea water temperature, such as propeller shafts and shaft bolts, intended for ships with ice class notation(Grade IA Super, IA, IB and IC), Charpy V-notch impact testing is to be carried out for all steel types at −10 ℃ and the average energy value is to be minimum 20 J (longitudinal test). One individual value may be less than the required average value provided that it is not less than 70% of this average value. Impact test for important components as crankshaft and gears for machinery is to be in accordance with the Guidance relating to the Rules specified by the Society.
【See Guidance】

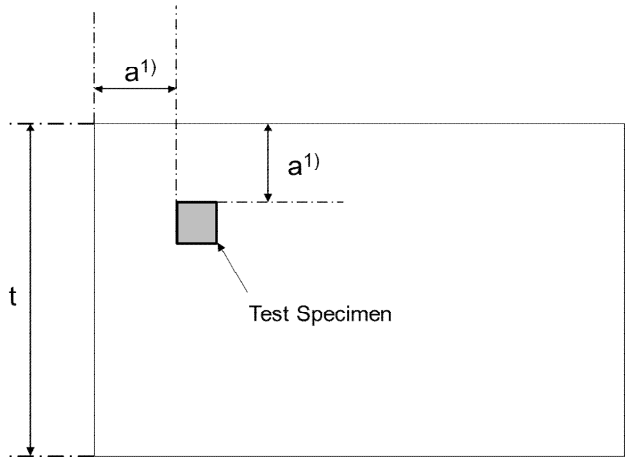
(5) The hardness values are typical and are given for information purposes only.

(6) Special consideration may be given to alternative acceptance criteria for the Charpy V-notch impact test (which may be supported by historical and statistical test data), or for alternative test and inspection arrangements, subject to agreement with the Society. *(2026)*

(7) AT refers to Ambient Temperature (i.e. 23°C ± 5°C), which is specified in **ISO 148-1:2016**.

Present	Amendment	reason
7. Selection of test specimens (1) ~ (3) <Omitted> (4) The test specimen is to be positioned as follows. *(2023)* (A) For forgings having a thickness, t, or diameter D up to maximum 50 mm, the longitudinal axis of the test specimen is to be located at a distance of t/2 or D/2 below the heat treated surfaces. (B) For forgings having a thickness, t, or diameter D greater than 50 mm, the longitudinal axis of the test specimen is to be located at a distance of t/4 or D/4 (mid-radius) or 80mm, whichever is less, below any heat treated surface. Test specimen is to be located with its longitudinal axis at a distance from any heat treated surface as shown in **Fig 2.1.18**. (C) For ring and disc forgings (noting that the test specimen locations for these shaped forgings may be different to elongated or free form forgings), tangential sample shall be taken at t/2 for thickness ≤ 25mm and 12.5 mm below the surface for thickness >25 mm~~, in both the vertical and horizontal direction~~. Where achievable, for thickness > 25 mm, no part of the test material shall be closer than 12.5 mm to any heat treated surface, as shown in **Fig 2.1.18**. (5) ~ (12) <Omitted> **8. ~ 13.** <Omitted>	**7. Selection of test specimens** (1) ~ (3) <Same as the present Rules> (4) The test specimen is to be positioned as follows. *(2023)* (A) For forgings having a thickness, t, or diameter D up to maximum 50 mm, the longitudinal axis of the test specimen is to be located at a distance of t/2 or D/2 below the heat treated surfaces. (B) For forgings(other than ring and disc forgings) having a thickness, t, or diameter D greater than 50 mm, the longitudinal axis of the test specimen is to be located at a distance of t/4 or D/4 (mid-radius) or 80mm, whichever is less, below any heat treated surface. Test specimen is to be located with its longitudinal axis at a distance from any heat treated surface as shown in **Fig 2.1.18**. *(2026)* (C) For ring and disc forgings (noting that the test specimen locations for these shaped forgings may be different to elongated or free form forgings), tangential samples shall be taken at t/2 for thickness ≤ 25mm and 12.5 mm below any surface for thickness >25 mm. Where achievable, for thickness > 25 mm, no part of the test material shall be closer than 12.5 mm to any heat treated surface, as shown in **Fig 2.1.19**. *(2026)* (5) ~ (12) <Same as the present Rules> **8. ~ 13.** <Same as the present Rules>	* To reflect IACS UR W7(Rev.5 Feb 2025)

Present	Amendment	reason
 (Notes) (1) "a" is the distance from the test specimen to heat treated surface based on the above (B) or (C). Fig 2.1.18 Position of the test specimen *(2023)*	 (Notes) (1) "a" is the distance from the test specimen axis to heat treated surface based on the above 7. (4) (B). Fig 2.1.18 Position of the test specimen *(2023)* ***(2026)***	* To reflect IACS UR W7(Rev.5 Feb 2025)

Present	Amendment	reason
Fig 2.1.19 〈New〉	 (Notes) (1) “a” is the distance from the test specimen to heat treated surface based on the above 7. (4) (C). Fig 2.1.19 Position of the test specimen *(2026)*	* To reflect IACS UR W7(Rev.5 Feb 2025)

Present	Amendment	reason
14. Test certificates ***(2017)***	**14. Test certificates** ***(2017)***	
The manufacturer is to provide the required type of inspection certificate giving the following particulars for each forging or batch of forgings which has been accepted:	The manufacturer is to provide the required type of inspection certificate giving the following particulars for each forging or batch of forgings which has been accepted:	
(1) Purchaser's name and order number (2) Description of forgings and steel quality (3) Identification number (4) Steelmaking process, cast number and chemical analysis of ladle sample (5) Results of mechanical tests (6) Results of non-destructive tests, where applicable (7) Details of heat treatment, including temperature and holding times	(1) Purchaser's name and order number (2) Grade of forgings *(2026)* (3) Identification number (4) Steelmaking process, cast number and chemical analysis of ladle sample (5) Results of mechanical tests (6) Results of non-destructive tests, where applicable (7) Details of heat treatment, including temperature and holding times	* To reflect IACS UR W7(Rev.5 Feb 2025)
15. ~ 18. <Omitted>	**15. ~ 18.** <Same as the present Rules>	

Present	Amendment	reason
CHAPTER 2 WELDING **Section 1 ~ Section 3 <Omitted>** **Section 4 Welding Procedure Qualification Tests** **401. ~ 403. <Omitted>** **404. Tests for butt welded joints** **1. ~ 7.** <Omitted> **8. Visual & Non-destructive inspection** (1) Test assemblies are to be examined for the whole length(excepting discard area of test assembly of **Fig 2.2.6**) by visual and by non-destructive testing prior to the cutting of test specimen. Visual and non-destructive examinations should be carried out after any required post weld heat treatment, natural or artificial ageing, and prior to the cutting of the test specimens. *(2019)* (2) For weldable high strength steels ~~with specified minimum yield strength of 420 N mm~~ and above the visual and non-destructive testing are to be delayed for a minimum of 48 hrs, unless heat treatment has been carried out. *(2019)* (a) ~ (b) <New> **9. ~ 10.** <Omitted>	**CHAPTER 2 WELDING** **Section 1 ~ Section 3 <Same as the present Rules>** **Section 4 Welding Procedure Qualification Tests** **401. ~ 403. <Same as the present Rules>** **404. Tests for butt welded joints** **1. ~ 7.** <Same as the present Rules> **8. Visual & Non-destructive inspection** (1) Test assemblies are to be examined for the whole length(excepting discard area of test assembly of **Fig 2.2.6**) by visual and by non-destructive testing prior to the cutting of test specimen. Visual and non-destructive examinations should be carried out after any required post weld heat treatment, natural or artificial ageing, and prior to the cutting of the test specimens. *(2019)* (2) For weldable high strength steels or equivalent structural steels with minimum yield strength, the visual and non-destructive testing are to be delayed for a minimum following time, unless heat treatment has been carried out. *(2019) (2026)* (a) the non-destructive testing for strength level 420 N mm – 690 N mm is to be delayed for a minimum of 48 hours (b) the non-destructive testing for strength level 890 N mm – 960 N mm is to be delayed for a minimum of 72 hours **9. ~ 10.** <Same as the present Rules>	- Conformity with relevant Rules

Present	Amendment	reason
405. Tests for fillet welded joints **1. Application** The requirements stated hereunder apply to the fillet joints welded by manual, semi-automatic or automatic welding in any welding position. **2. Kinds of test** The kinds of test and number of test specimens are to be given in **Table 2.2.11** and **Table 2.2.12**. The kinds of test for machinery installations are to be in accordance with **Table 2.2.11**. Additional tests may be required if found necessary by the Society. *(2019) (2023)* **【See Guidance】**	**405. Tests for fillet welded joints** **1. Application** The requirements stated hereunder apply to the fillet joints welded by manual, semi-automatic or automatic welding in any welding position. **2. Kinds of test** The kinds of test and number of test specimens are to be given in **Table 2.2.11** and **Table 2.2.12**. The kinds of test for machinery installations are to be in accordance with **Table 2.2.11**. Additional tests may be required if found necessary by the Society. *(2019) (2023)* **【See Guidance】**	- In cases where fracture testing is difficult due to small pipe diameter or material properties, macrostructure inspection can be performed as an alternative test. (Table 2.2.12)

<Present>

Table 2.2.12 Kinds of Test for machinery installations's fillet welded joints *(2019) (2023)*

<table>
<tr><td colspan="2" rowspan="2">Divisions</td><td colspan="5">Kinds of test and number of specimens taken from test assembles (1)(2)</td></tr>
<tr><td>Macro-structure inspection</td><td>Visual insp.</td><td>Surface crack detection</td><td>Hard. test</td><td>Fracture test</td></tr>
<tr><td rowspan="3">Welding of boiler and pressure vessel</td><td>Boiler and class 1 pressure vessel</td><td rowspan="2">1</td><td rowspan="2">Welding positions of whole length</td><td rowspan="2">Welding positions of whole length :NDT for surface (MT or PT)</td><td rowspan="2">–</td><td rowspan="2">2</td></tr>
<tr><td>Class 2 pressure vessel</td></tr>
<tr><td>Class 3 pressure vessel</td><td colspan="5">The tests may be omitted according to the discretion of the Surveyor.</td></tr>
<tr><td rowspan="4">Welding of piping</td><td>The steel pipes for low temperature service</td><td rowspan="4">2</td><td rowspan="4">Welding positions of whole length</td><td rowspan="4">Welding positions of whole length :NDT for surface (MT or PT)</td><td>1</td><td rowspan="4">2</td></tr>
<tr><td>Stainless steel pipes</td><td rowspan="3">–</td></tr>
<tr><td>The pipes for ordinary piping</td></tr>
<tr><td>The pipes used for high temperature and high pressure(3)</td></tr>
<tr><td colspan="7">Notes :
(1) In a case where special materials are used, special welding procedure is employed or where deemed necessary by the Society, the other tests or test conditions than those specified in this Section for the welding procedure qualification may be required
(2) For the welding procedure qualification tests on materials used at high temperature, the Society may require a creep test or high temperature tensile test.
(3) For steam pipes and flanges to be used in the place where the design pressure is not less than 30 kgf/cm^2 and the design temperature exceeds 400℃.
(4) 〈New〉</td></tr>
</table>

<Amendment>

Table 2.2.12 Kinds of Test for machinery installations's fillet welded joints *(2019) (2023)*

<table>
<tr><th colspan="2" rowspan="2">Divisions</th><th colspan="5">Kinds of test and number of specimens taken from test assembles [1][2]</th></tr>
<tr><th>Macro-structure inspection</th><th>Visual insp.</th><th>Surface crack detection</th><th>Hard. test</th><th>Fracture test</th></tr>
<tr><td rowspan="3">Welding of boiler and pressure vessel</td><td>Boiler and class 1 pressure vessel</td><td rowspan="2">1</td><td rowspan="2">Welding positions of whole length</td><td rowspan="2">Welding positions of whole length :NDT for surface (MT or PT)</td><td rowspan="2">–</td><td rowspan="2">2</td></tr>
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<tr><td>Stainless steel pipes</td><td rowspan="3">–</td></tr>
<tr><td>The pipes for ordinary piping</td></tr>
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<tr><td colspan="7">Notes :
(1) In a case where special materials are used, special welding procedure is employed or where deemed necessary by the Society, the other tests or test conditions than those specified in this Section for the welding procedure qualification may be required
(2) For the welding procedure qualification tests on materials used at high temperature, the Society may require a creep test or high temperature tensile test.
(3) For steam pipes and flanges to be used in the place where the design pressure is not less than 30 kgf/cm^2 and the design temperature exceeds 400℃.
(4) Two additional macrostructure inspections may alternatively be performed for the fracture test. *(2026)*</td></tr>
</table>

Present	Amendment	reason
3. <Omitted>	**3.** <Same as the present Rules>	
4. Visual & non-destructive inspection	**4. Visual & non-destructive inspection**	
(1) Test assemblies are to be examined by visual and by non-destructive testing(PT or MT) prior to the cutting of test specimen. In case that any post-weld heat treatment is required or specified non-destructive testing and visual inspection are to be performed after heat treatment. *(2019)*	(1) Test assemblies are to be examined by visual and by non-destructive testing(PT or MT) prior to the cutting of test specimen. In case that any post-weld heat treatment is required or specified non-destructive testing and visual inspection are to be performed after heat treatment. *(2019)*	
(2) For weldable high strength steel ~~with specified minimum yield strength of 420 N mm and above~~ the non-destructive testing and visual inspection are to be delayed for a minimum of 48 hrs, unless heat treatment has been carried out. *(2019)*	(2) For weldable high strength steel or equivalent structural steels with minimum yield strength, the non-destructive testing and visual inspection are to be delayed for a minimum following time, unless heat treatment has been carried out. *(2019) (2026)*	
(a) ~ (b) <New>	(a) the non-destructive testing for strength level 420 N mm – 690 N mm is to be delayed for a minimum of 48 hours	- Conformity with relevant Rules
	(b) the non-destructive testing for strength level 890 N mm – 960 N mm is to be delayed for a minimum of 72 hours	
5. <Omitted>	**5.** <Same as the present Rules>	
6. Hardness test *(2019)*	**6. Hardness test *(2019)***	
(1) Hardness distribution at positions shown in **Fig 2.2.12** is to be measured.	(1) Hardness distribution at positions shown in **Fig 2.2.12** is to be measured.	
(2) The results from the hardness test are to be in accordance with **Table 2.2.10**. *(2019)*	(2) The results from the hardness test are to be in accordance with **Table 2.2.10**. A higher value up to 380 HV10 may be accepted for single pass fillet welds subject to special consideration by the Society. *(2019) (2026)*	- While single pass fillet welding does result in increased hardness due to rapid cooling, the use of low-hydrogen welding consumables, etc. allows for a slightly wider range of acceptable hardness requirements.
7. <Omitted>	**7.** <Same as the present Rules>	
406. ~ 407. <Omitted>	**406. ~ 407. <Same as the present Rules>**	
<hereafter, omitted>	**<hereafter, same as the present Rules>**	

GUIDANCE RELATING TO THE RULES FOR THE CLASSIFICATION OF STEEL SHIPS

(Guidance Part 2 Materials and Welding)

- For Devleopment Verification -

2026. 02.

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.).

Machinery Rule Development Team

- Main Amendments -

(1) Enter into force on 1 July 2026 (the contract date for ship construction or the date of application for certification of material)

◉ To reflect Request for Establishment/Revision of Classification Technical Rules

Present	Amendment	reason
CHAPTER 1 ~ CHAPTER 2 <Omitted>	**CHAPTER 1 ~ CHAPTER 2** <Same as the Present Guidance>	
Annex 2-1 ~ Annex 2-6 <Omitted>	**Annex 2-1 ~ Annex 2-6** <Same as the present Guidance>	
Annex 2-7 Guidance for non-destructive testing of ship hull steel welds	**Annex 2-7 Guidance for non-destructive testing of ship hull steel welds**	
1. General	**1. General**	
(1) **Application**	(1) **Application**	
(A) This Guidance applies to the Non-destructive inspection for all hull welds of ships whose, in general, length exceeds 30 m to confirm the quality of the hull welds. Effective date of this Guidance is the date of contract for construction.	(A) This Guidance applies to the Non-destructive inspection for all hull welds of ships whose, in general, length of 30 m and more to confirm the quality of the hull welds. Effective date of this Guidance is the date of contract for construction.	- A ship with length of 30m is defined.
(B) In ships of less than 30m in length, the range of the inspection, the members to be inspected and the number of checkpoints are to be determined by the Surveyor based on consultation with the manufacturer.	(B) In ships of less than 30m in length, the range of the inspection, the members to be inspected and the number of checkpoints are to be determined by the Surveyor based on consultation with the manufacturer.	
(C) ~ (H) <Omitted>	(C) ~ (H) <Same as the present Guidance>	
(2) ~ (4) <Omitted>	(2) ~ (4) <Same as the present Guidance>	
(5) **Means of Non-destructive Inspection**	(5) **Means of Non-destructive Inspection**	
(A) ~ (D) <Omitted>	(A) ~ (D) <Same as the present Guidance>	
(E) For welded joints of hull construction in thickness of 8 mm and above, a part or all of radiographic inspection may be replaced by the ultrasonic inspection based on the requirements given in **4**, in case that the shipyard submitting ultrasonic testing specifications containing information on the items mentioned below	(E) For welded joints of hull construction in thickness of 8 mm and above, a part or all of radiographic inspection may be replaced by the ultrasonic inspection based on the requirements given in **4**, in case that the shipyard submitting ultrasonic testing specifications containing information on the items mentioned below	
(a) Approval of inspection manual Prior to carrying out the inspection, the shipyard has to submit the inspection manual containing the items mentioned below, and have the manual approved by the Society.	(a) Approval of inspection manual Prior to carrying out the inspection, the shipyard has to submit the inspection manual containing the items mentioned below, and have the manual approved by the Society.	
(i) Type of ultrasonic detector and kind of probe (nominal frequency and material, dimension, type and nominal angle of refraction of transducer), and the applicable range of the testing (thickness, welding process, etc.)	(i) Type of ultrasonic detector and kind of probe (nominal frequency and material, dimension, type and nominal angle of refraction of transducer), and the applicable range of the testing (thickness, welding process, etc.)	

Present	Amendment	reason
(ii) Calibration block and reference block for calibration (iii) Kind of ultrasonic test process (Angle beam technique is to be of standard one), and extent of the measurements and method for sensitivity adjustment for the process (iv) Judgement criteria for ultrasonic test (The criteria for angle beam technique test is to be in accordance with **Table 11**. For the other kind of ultrasonic test process, judgement criteria are to be described in detail.) (v) Record of the results of ultrasonic test (vi) List of operators and judges (b) The capability of shipyard The capability of shipyard about the reliability of the test methods is to judged by the items mentioned below. (i) Qualification of engineers (ii) Quality control conditions (iii) Reliability (iv) Keeping the Standards and their application ability (v) Documents for type, extent and repair of defects	(ii) Calibration block and reference block for calibration (iii) Kind of ultrasonic test process (Angle beam technique is to be of standard one), and extent of the measurements and method for sensitivity adjustment for the process (iv) Judgement criteria for ultrasonic test (The criteria for angle beam technique test is to be in accordance with **Table 11**. For the other kind of ultrasonic test process, judgement criteria are to be described in detail.) (v) Record of the results of ultrasonic test (vi) List of operators and judges (b) The capability of shipyard The capability of shipyard about the reliability of the test methods is to judged by the items mentioned below. (i) Qualification of engineers (ii) Quality control conditions (iii) Reliability (iv) Keeping the Standards and their application ability (v) Documents for type, extent and repair of defects	-

Present	Amendment	reason
(c) Confirmation by radiographic inspection (i) When the initial ultrasonic inspection is carried out according to this Guidance, ultrasonic testing for 1/10 of welds to be subject, based on the instructions of the Surveyor, to radiographic testing of at least three ships to confirm that the results match those of (a) (iv) and is approved by the Society for the consistence. However the confirmation by radiographic inspection can be waived for the shipyard which has the records to carry out confirmation inspection more than 3 ships.	(c) Confirmation by radiographic inspection (i) When the initial ultrasonic inspection is carried out according to this Guidance, ultrasonic testing for 1/10 of welds to be subject, based on the instructions of the Surveyor, to radiographic testing of at least three ships to confirm that the results match those of (a) (iv) and is approved by the Society for the consistence. However the confirmation by radiographic inspection can be waived for the shipyard which has a track record of conducting ultrasonic inspections in lieu of radiographic inspections for three or more ships. Furthermore, in cases where radiographic inspection is impractical due to national laws and regulations, on-site inspections are conducted in the presence of surveyor. These on-site inspections should be conducted using ultrasonic and radiographic inspection on specimens containing volumetric and planar artificial flaws, and the probability of detection and the accuracy of flaw size should be evaluated to ensure similarity.	- This is a amendment to reflect the fact that shipyard where conducting RT is practically impossible.
(F) Where a yard desires to use ultrasonic inspection as the primary inspection method according to (E), following requirements to be complied. (a) a reasonable amount of checkpoints are to be examined by the radiography or alternative means approved by the Society. The amount examined together with the area covered are to be agreed and marked on the NDE plan specified in (5). (b) Radiographic inspection may be required at random in important locations at the discretion of the Surveyor. (G) ~ (N) <Omitted> (6) ~ (11) <Omitted>	(F) Where a yard desires to use ultrasonic inspection as the primary inspection method according to (E), following requirements to be complied. (a) a reasonable amount of checkpoints are to be examined by the radiography or alternative means approved by the Society. The amount examined together with the area covered are to be agreed and marked on the NDE plan specified in (5). (b) Radiographic inspection may be required at random in important locations at the discretion of the Surveyor. (G) ~ (N) <Same as the present Guidance> (6) ~ (11) <Same as the present Guidance>	
2. ~ 10. <Omitted>	**2. ~ 10.** <Same as the present Guidance>	

Present	Amendment	reason
Annex 2-8 <Omitted> **Annex 2-9 Offshore mooring chain** **1. ~ 2.** <Omitted> **3. Rolled steel bars** (1) <Omitted> (2) **~~Steel manufacture~~** ~~The approval will normally be limited up to the maximum diameter equal to that of the chain diameter tested.~~ the rolling reduction ratio is to be recorded and is to be at least 5:1. the rolling reduction ratio used in production can be higher, but should not be lower than that qualified. (3) ~ (8) <Omitted> **4. ~ 6.** <Omitted> <hereafter, omitted>	**Annex 2-8 <Same as the present Guidance>** **Annex 2-9 Offshore mooring chain** **1. ~ 2.** <Same as the present Guidance> **3. Rolled steel bars** (1) <Same as the present Guidance> (2) The rolling reduction ratio is to be recorded and is to be at least 5:1. The rolling reduction ratio used in production can be higher, but should not be lower than that qualified. (3) ~ (8) <Same as the present Guidance> **4. ~ 6.** <Same as the present Guidance> <hereafter, same as the present Guidance>	- The requirements for approval of manufacturing process have been deleted.