
RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

Part K

Materials

RULES

2020 AMENDMENT NO.1

Rule No.47 30 June 2020

Resolved by Technical Committee on 22 January 2020

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

“Rules for the survey and construction of steel ships” has been partly amended as follows:

Part K MATERIALS

Amendment 1-1

Chapter 3 ROLLED STEELS

3.4 Rolled Steels for Low Temperature Service

3.4.4 Heat Treatment

Table K3.15 has been amended as follows.

Table K3.15 Heat Treatment and Mechanical Properties

Grade	Heat treatment	Heat treatment	Tensile test			Impact test ⁽⁴⁾⁽⁵⁾			
			Yield point or proof stress (N/mm ²)	Tensile strength (N/mm ²)	Elongation ⁽³⁾ (L = 5.65 × √A) (%)	Testing temperature (°C)	Minimum mean absorbed energy(J)		
							L	T	
KL24A	Normalized or TMCP	<u>Normalized, quenched and tempered or TMCP⁽¹⁾</u>	235 min.	400 ~ 510	20 min.	-40	41 min.	27 min.	
KL24B					-50				
KL27			265 min.	420 ~ 540					-60
KL33	Quenched and tempered or TMCP	<u>Normalized, normalized and tempered, quenched and tempered or TMCP⁽²⁾</u>	325 min.	440 ~ 560	19 min.	-70			
KL37			360 min.	490 ~ 610					-95
KL2N30			295 min.	420 ~ 570					
KL3N32			315 min.	440 ~ 590		-110			
KL5N43			420 min.	540 ~ 690					
KL9N53	Double normalized and tempered⁽¹⁾⁽²⁾	<u>Double normalized and tempered, quenched and tempered or TMCP⁽²⁾</u>	520 min.	690 ~ 830	18 min.	-196			
KL9N60	Quenched and tempered⁽¹⁾⁽²⁾		590 min.						-196

Notes:

- (1) Controlled rolling may be used as the heat treatment procedure in cases where deemed appropriate by the Society.
- ~~(2)~~ (2) If it is deemed appropriate by the Society, the intermediate heat treatment (the intermediate heat treatment is an operation of cooling from a dual phase composed of austenite and ferrite intended for improving toughness which is carried out prior to tempering) may be applied.
- ~~(2)~~ (2) ~~Heat treatment may be conducted according to TMCP, subject to the special approval by the Society.~~
- (3) The specified value for U1 test specimen other than those of proportional-size type is to be in compliance with the requirements given in **Table K3.16**.
- (4) L (or T) indicates that the longitudinal axis of the test specimen is arranged parallel (or transverse) to the final direction of rolling.
- (5) When the absorbed energy of two or more test specimens among a set of test specimens is less in value than the specified minimum mean absorbed energy or when the absorbed energy of a single test specimen is less in value than 70 % of the specified minimum average absorbed energy, the test is considered to be failed.

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 30 June 2020.
2. Notwithstanding the amendments to the Rules, the current requirements apply to steels for which the application for survey is submitted to the Society before the effective date.

Chapter 5 CASTINGS

5.1 Steel Castings

5.1.4 Chemical Composition

Table K5.1 has been amended as follows.

Table K5.1 Chemical Composition

Kind	Chemical composition (%)										Total residual elements
	<i>C</i>	<i>Si</i>	<i>Mn</i>	<i>S</i>	<i>P</i>	<i>Cu</i>	<i>Cr</i>	<i>Ni</i>	<i>Mo</i>	<i>W</i>	
Carbon steel castings	0.40 max.	0.60 max.	0.50- 1.60	0.040 max.	0.040 max.	0.30 max. ⁽¹⁾	0.30 max. ⁽¹⁾	0.40 max. ⁽¹⁾	0.15 max. ⁽¹⁾	—	0.80 max.
Low alloy steel castings	0.25 max.	0.60 max.	0.50- 0.80	0.030 max.	0.030 max.	0.50 max. ⁽¹⁾	0.30- 1.50 ⁽²⁾	0.50 max. ⁽¹⁾	0.15- 1.20 ⁽²⁾	0.10 max. ⁽¹⁾	1.00 max.

Notes:

- (1) Elements are considered as residual elements. Residual elements are not to be intentionally added to the steel.
- (2) ~~One or more of the elements is to comply with the minimum content.~~ Depending on the kind of steel, if one of these elements which complies with the limit is used, the lower limit of the other element need not be considered.

Chapter 6 STEEL FORGINGS

6.1 Steel Forgings

6.1.4 Chemical Composition

Table K6.2 has been amended as follows.

Table K6.2 Chemical Composition

Kind	Chemical Composition (%) ⁽¹⁾									Total residual elements
	<i>C</i>	<i>Si</i> ⁽²⁾	<i>Mn</i>	<i>P</i>	<i>S</i>	<i>Cr</i>	<i>Mo</i>	<i>Ni</i>	<i>Cu</i>	
Carbon steel forgings	0.65 max.	0.15~ 0.45	0.30~ 1.50	0.030 max.	0.035 max.	0.30 ⁽³⁾ max.	0.15 ⁽³⁾ max.	0.40 ⁽³⁾ max.	0.30 ⁽³⁾ max.	0.85 max.
Low alloy steel forgings ⁽⁴⁾	0.45 max.	0.15~ 0.45	0.30~ 1.00	0.030 max.	0.030 max.	0.40~ 3.50 ⁽⁴⁾	0.15~ 0.70 ⁽⁴⁾	0.40~ 3.50 ⁽⁴⁾	0.30 ⁽³⁾ max.	—

Notes:

- (1) Where other elements are added approved by the Society, the contents are to be described on the test results.
- (2) Where the special deoxidation practice is applied, the value of *Si* may be reduced approved by the Society.
- (3) Elements are considered as residual elements. Residual elements are not to be intentionally added to the steel.
- (4) ~~One or more of the elements is to comply with the minimum content.~~ Depending on the kind of steel, if one of these elements which complies with the limit is used, the lower limits of the other elements need not be considered.

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

1. The effective date of the amendments is 30 June 2020.
2. Notwithstanding the amendments to the Rules, the current requirements apply to steel castings and forgings for which the application for approval is submitted to the Society before the effective date.

Chapter 5 CASTINGS

5.1 Steel Castings

5.1.13 Additional Requirements for Crank Throws*

Sub-paragraph -1 has been amended as follows.

1 In case where semi-built-up crank throws for ~~diesel~~ reciprocating internal combustion engines are made of steel castings, the manufacturing procedure is to be approved by the Society.

EFFECTIVE DATE AND APPLICATION (Amendment 1-3)

1. The effective date of the amendments is 1 July 2020.
2. Notwithstanding the amendments to the Rules, the current requirements apply to manufacturing procedures of crank throws for which the application for approval is submitted to the Society before the effective date.

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

Part K

Materials

GUIDANCE

2020 AMENDMENT NO.1

Notice No.26 30 June 2020

Resolved by Technical Committee on 22 January 2020

Notice No.26 30 June 2020

AMENDMENT TO THE GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

“Guidance for the survey and construction of steel ships” has been partly amended as follows:

Part K MATERIALS

K5 CASTINGS

K5.1 Steel Castings

K5.1.9 Surface Inspection and Dimension Inspection

Sub-paragraph (2) has been amended as follows.

The surface inspection of steel castings specified in **5.1.9, Part K of the Rules** are to be dealt with as follows :

((1) is omitted.)

(2) Crankshafts

The surface inspections of crankshafts made of steel castings are to comply with the **Annex K5.1.9(2)** “GUIDANCE FOR SURFACE INSPECTION OF ~~DIESEL ENGINE~~ CRANKSHAFTS” of this Part.

K5.1.10 Non-destructive Testing

Sub-paragraph (2) has been amended as follows.

The non-destructive tests for steel castings specified in **5.1.10-1 and -2, Part K of the Rules** are to be dealt with as follows.

((1) is omitted.)

(2) Crankshafts

The non-destructive tests of crankshafts made of steel castings are to comply with the **Annex K5.1.9(2)** “GUIDANCE FOR SURFACE INSPECTION OF ~~DIESEL ENGINE~~ CRANKSHAFTS” and **Annex K5.1.10(2)** “GUIDANCE FOR ULTRASONIC TESTS OF CAST STEEL CRANKTHROWS” of this part.

K6 STEEL FORGINGS

K6.1 Steel Forgings

K6.1.9 Surface Inspection and Dimension Inspection

Sub-paragraph (1) has been amended as follows.

Surface inspections of the steel forgings specified in **6.1.9, Part K of the Rules** are to be dealt with as follows:

(1) Crankshaft

The surface inspection of forged crankshaft is to comply with the **Annex K5.1.9(2)** “GUIDANCE FOR SURFACE INSPECTION OF ~~DIESEL ENGINE~~ CRANKSHAFTS” of this Part.

((2) is omitted.)

K6.1.10 Non-destructive Testing

Sub-paragraph -1(1) has been amended as follows.

1 Non-destructive tests of steel forgings specified in **6.1.10-1** and **-2, Part K of the Rules** are to be dealt with as follows:

(1) Crankshaft

The non-destructive tests of forged steel crankshafts are to comply with the **Annex K5.1.9(2)** “GUIDANCE FOR SURFACE INSPECTION OF ~~DIESEL ENGINE~~ CRANKSHAFTS” and the **Annex K6.1.10(1)** “GUIDANCE FOR ULTRASONIC TESTS OF STEEL FORGINGS” of this Part.

((2) is omitted.)

Title of Annex K5.1.9(2) has been amended as follows.

**Annex K5.1.9(2) GUIDANCE FOR SURFACE INSPECTION OF ~~DIESEL~~
~~ENGINE~~ CRANKSHAFTS**

Title of Annex K6.1.9(2) has been amended as follows.

**Annex K6.1.9(2) GUIDANCE FOR SURFACE INSPECTION OF STEEL
FORGINGS (EXCEPT FOR CRANKSHAFTS)**

1.1 Application

Sub-paragraph (2) has been amended as follows.

((1) is omitted.)

(2) The surface inspection of crankshafts is to be in accordance with the **Annex K5.1.9(2)** “GUIDANCE FOR SURFACE INSPECTION OF ~~DIESEL ENGINE~~ CRANKSHAFTS.”

((3) is omitted.)

**Annex K6.1.10(1) GUIDANCE FOR ULTRASONIC TESTS OF STEEL
FORGINGS**

1.5 Evaluation

Note of Table 4 has been amended as follows.

Table 4 Acceptance Criteria

(Table is omitted.)

Notes:

((1) is omitted.)

(2) Division of the Class is to be in accordance with the **Annex K5.1.9(2)** “GUIDANCE FOR SURFACE INSPECTION OF ~~DIESEL ENGINE~~ CRANKSHAFTS”.

((3) and (4) are omitted.)

EFFECTIVE DATE AND APPLICATION

1. The effective date of the amendments is 1 July 2020.
2. Notwithstanding the amendments to the Guidance, the current requirements apply to the surveys for which the application is submitted to the Society before the effective date.