GUIDANCE FOR THE APPROVAL AND TYPE APPROVAL OF MATERIALS AND EQUIPMENT FOR MARINE USE

Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use 2022 AMENDMENT NO.2

Notice No.70 27 December 2022
Resolved by Technical Committee on 27 July 2022

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NIPPON KAIJI KYOKAI

Notice No.70 27 December 2022
AMENDMENT TO THE GUIDANCE FOR THE APPROVAL AND TYPE APPROVAL OF MATERIALS AND EQUIPMENT FOR MARINE USE

"Guidance for the approval and type approval of materials and equipment for marine use" has been partly amended as follows:

Amendment 2-1

Part 1 METALLIC MATERIALS

Chapter 1 APPROVAL OF MANUFACTURING PROCESS OF ROLLED STEELS

1.4 Approval Test

1.4.2 Selection of Test Samples

Sub-paragraph -3 has been amended as follows.

3 Where the maximum manufacturing thickness of rolled steels for hull, rolled steels for low temperature service and high strength rolled steels for offshore structures is more than 50 *mm*, ~~40 *mm* and 50 *mm* respectively,~~ and in the case of first approval of at least one item of deoxidation practice, grain refining and micro-alloying elements, heat treatment, steel making process and steel casting process, Society may request an additional test samples of which thickness is indicated with a ● mark in **Table 1.1-1** or other proper thickness, in addition to the test samples in accordance with **-2**.

Table 1.1-1 has been amended as follows.

Table 1.1-1 Standard Thickness and Dimensions of Test Samples

Material symbol		Deoxidation, grain refining, etc.	Thickness[(1)] (*mm*)	
			0 10 20 30 40 50 60 70	
Rolled steels for hull	*KA*	Any method except rimmed	● ●	
	KB	Any method except rimmed	● ●	
	KD	Killed and fine grain treated	● ●	
	KE	Killed and fine grain treated	● ● (35)	
	*KA*32 *KA*36	Killed and fine grain: without *Nb* and/or *V*	● ● (12.5)	
		Killed and fine grain: with *Nb* and/or *V*	● ●	
	*KD*32 *KD*36	Killed and fine grain: without *Nb* and/or *V*	● ●	
		Killed and fine grain: with *Nb* and/or *V*	● ●	
	*KE*32 *KE*36	Killed and fine grain treated	● ●	(2)
	*KA*40	Killed and fine grain treated	● ●	
	*KD*40		● ●	
	*KE*40		● ●	
	*KF*32		● ●	
	*KF*36		● ●	
	*KF*40		● ●	
	*KE*47		● ●	
Rolled steels for low temperature service	*KL*24*A*	Aluminium treated killed and fine grain treated	● ●	
	*KL*24*B*		● ●	
	*KL*27		● ●	
	*KL*33		● ●	
	*KL*37		● ●	(2)
	*KL*2*N*30		● ●	
	*KL*3*N*32		● ●	
	*KL*5*N*43		● ●	
	*KL*9*N*53		● ●	
	*KL*9*N*60		● ●	
High strength rolled steels for offshore structure	*KA*420, *KD*420 *KE*420, *KF*420	Killed and fine grain treated	● ●	
	*KA*460, *KD*460 *KE*460, *KF*460		● ●	
	*KA*500, *KD*500 *KE*500, *KF*500		● ●	
	*KA*550, *KD*550 *KE*550, *KF*550		● ●	
	*KA*620, *KD*620 *KE*620, *KF*620		● ●	(2)
	*KA*690, *KD*690 *KE*690, *KF*690		● ●	
	*KA*890, *KD*890 *KE*890		● ●	
	*KA*960, *KD*960 *KE*960		● ●	

Notes:

(1) The colored portion (and) show the range or thickness for which normalizing of quenching and tempering treatment have been specified for steel plates respectively, while the uncolored portion shows the as-rolled condition. However, quenching and tempering is included for *KE*40, *KF*32, *KF*36 ~~and~~, *KF*40, *KL*24*A*, *KL*24*B*, *KL*27, *KL*33 and *KL*37, and normalizing and tempering, and quenching and tempering is included for *KL*2*N*30, *KL*3*N*32 and *KL*5*N*43, and *KL*9*N*53 is to be double normalized and tempered, and quenching and tempering.

(2) See **1.4.2-3**.

EFFECTIVE DATE AND APPLICATION (Amendment 2-1)

1. The effective date of the amendments is 27 December 2022.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to steel for which the application for approval is submitted to the Society before the effective date.

Amendment 2-2

Part 1 METALLIC MATERIALS

Chapter 1 APPROVAL OF MANUFACTURING PROCESS OF ROLLED STEELS

1.4 Approval Test

1.4.3 Details of Test

Sub-paragraph -1 has been amended as follows.

1 Approval tests for each of rolled steels are to be performed for each test item indicated with a ○ mark in **Table 1.1-2** and the test procedure and judgement standard are to be accordance with **Table 1.1-3**. However, when deemed necessary by the Society, Society may request the increase of test piece, addition of test item (except the test item indicated in **Table 1.1-2** which is included the test related to hot workability, fatigue test, weld cracking test, *CTOD* tests of welded joints, etc.) and submission of proper technical information.

Table 1.1-3 has been amended as follows.

Table 1.1-3 Approval Testing Method and Acceptance Criteria (continued)

Approval test item		Selected location of test samples (1) (2)	Length direction of test specimen (3) (4)	Testing method	Acceptance criteria	Notes
(Omitted)						
Brittle fracture test	*CTOD* test or deep notch test	Top	Parallel	To be consulted with the Society the dimension of test specimen, test condition etc. When newly performing tests at the time of approval.	To be as deemed appropriate by the Society.	-
	Temperature gradient *ESSO* test, double tension test or *CAT* evaluation test	Top	Parallel	In accordance with **Annex K3.12.3-1 or Annex K3.12.3-2, Part K of the Rules.**		-
	NRL drop weight test	Top	Parallel	*ASTM E* 208:2019 or equivalent method.		・ Nil-ductility transition temperatures (*NDTT*) and photographs of test specimens after testing are to be included in test reports.
(Omitted)						

Notes:

(1) In the case of ingot casting, “top” means edge of top side of ingot for length direction specified in **1.4.2-1(2)**, “bottom” means edge of another side. In case of continuous casting, any edge is available of both edge for length direction specified in **1.4.2-1(2)**. However, in the case of ingot casting for high strength rolled steels for offshore structures, “top” and “bottom” mean the edge corresponding to the top and bottom of the ingot specified in **1.4.2-1(3)**.

(2) Selected position at width direction or section for each kind is to meet the requirements in **3.1.6-4**, **Part K of the Rules**.

(3) “Length direction of test specimen” denotes the direction of the test sample to the direction of final rolling.

(4) For steel products other than steel plate (i.e. steel sections, steel bars), when it is difficult to be taken test specimens with their longitudinal axis transverse to the rolling direction, test specimens may be taken parallel to the rolling direction subject to the approval with the Society.

(5) The bevel preparation is to be 1/2V or K related to thickness, and the test sample is to be welded by procedures commonly used for the relevant steels in consideration of the welding heat inputs specified in **Table 1.1-6**.

(6) In test records, the figure indicated the details of edge preparations, layer or pass sequence and measuring position of hardness are to be included, in addition to macroscopic photograph of welded section, welding procedure, welding consumables (brand, mark, shielded gas, backing, etc.), welding parameter (amperage, voltage, welding speed, heat input, current, etc.), preheating temperature and interpass temperature. However, where only requested maximum hardness test, these requirements may not be applied.

(7) Weldability tests are, in principle, to be carried out on the thickest plate.

(8) Regardless of **(2)** above, selected locations of test samples in the width direction are to meet the requirements in **3.12.4-2, Part K of the Rules**.

Chapter 5 APPROVAL OF MANUFACTURING PROCESS OF ALUMINIUM ALLOYS

5.2 Approval Application

5.2.2 Data to be Submitted

Sub-paragraph -2 has been amended as follows.

2 For aluminium alloys specified in **Table K8.3(a)**, **Part K of the Rules**, in the *H*116 and *H*321 tempers intended for use in marine hull construction or in marine applications where frequent direct contact with seawater is expected, the manufacturer is to submit the documents which exhibits the relationship between microstructure and resistance to corrosion in addition to the requirements in preceding **-1**. This documents is to include a reference photomicrograph (approx. 500x) intended for use in metallographic examination as specified in **8.1.8**, **Part K of the Rules**. A reference photomicrograph are to be taken for each of the alloy-tempers under the conditions specified in *ASTM B*928:2015 9.4.1 and thickness ranges relevant from samples which have passed the corrosion test as specified in **K8.1.8(2)**, **Part K of the Guidance for the Survey and Construction of Steel Ships**.

5.4 Approval Test

5.4.2 Details of Test

Table 1.5-2 has been amended as follows.

Table 1.5-2 Approval Testing Method and Acceptance Criteria

Approval test items	Selection of test specimen		Testing method	Acceptance criteria
	Location	Direction(1)		
Chemical analysis	T (Top Part)		*JIS H* 1305, *H* 1306 or equivalent method. Ladle analysis and product analysis are to be performed.	Chemical composition by ladle analysis is to comply with the Requirements in **Chapter 8, Part K of the Rules**(2)
	B (Bottom Part)			
Macro-structure	T	-	To be as deemed appropriate by the Society.	To be as deemed appropriate by ~~T~~the Society.
	B			
Micro-structure	T	-		
	B			
Tensile test at room temperature	T	Parallel	In accordance with **Part K of the Rules**.	Chemical composition by ladle analysis is to comply with the requirements in **Chapter 8, Part K of the Rules**.
		Transverse		
	B	Parallel		
		Transverse		
Tensile test at low temperature	T	Parallel	The tensile tests are to be carried out at -196℃ by using of the tensile test specimens of the same size and the room temperature.	To be as deemed appropriate by the Society.
	B	Transverse		
	T	Parallel		
	B	Transverse		
Tensile test of notched round bar	T	Parallel	The tensile tests are to be carried out at -196℃ by using of the tensile test specimens of notch; Angle of notch : 60° Root radius of notch: 0.05 *mm* or less	
		Transverse		
	B	Parallel		
		Transverse		
Tensile test in the direction of thickness	T	Direction of thickness	The test specimens are to be selected in the direction of thickness, and tensile tests are to be carried out.	
	B	Direction of thickness		
Bend test	T	Parallel	To be as deemed appropriate by the Society.	No crack is to be accepted.
		Transverse		
	B	Parallel		
		Transverse		
Tear test	T	Transverse	Tear strength and crack propagation energy are to be determined. Size and dimensions of tear test specimens are to be as deemed appropriate by the Society.	To be as deemed appropriate by the Society.
	B	Transverse		
Corrosion test	T B	Parallel	*ASTM G* 66:2018 and *G* 67:2018 or equivalent method.	To be as deemed appropriate by the Society. (3)

Notes:

(1) When the test specimens used for the approval test cannot be taken from the test samples because of their dimensions or shapes, the direction of the selection of the specimens to be determined on a case-by-case basis upon mutual consultation by the manufacturer and the Society.

(2) Excess difference in the chemical composition between ladle analysis and product analysis is not to be accepted.

(3) When subjected to the test described in *ASTM G* 66:2018, the samples are to have exhibited no evidence of exfoliation corrosion and a pitting rating of *N*, *PA* or *PB*. When subjected to the test described in *ASTM G* 67:2018, the samples are to have exhibited resistance to intergranular corrosion at a mass loss no greater than 15 mg/cm^2.

EFFECTIVE DATE AND APPLICATION (Amendment 2-2)

1. The effective date of the amendments is 1 January 2023.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to steels and aluminium alloys for which the application for approval is submitted to the Society before the effective date.

Amendment 2-3

Part 6 MACHINERY

Chapter 8 APPROVAL OF USE OF RECIPROCATING INTERNAL COMBUSTION ENGINES

8.2 Application and Approval of Submitted Documents

8.2.2 Drawings and Data

Sub-paragraph -1(2) has been amended as follows.

(2) Drawings and data to be submitted for information on an overview of the engine's design, engine characteristics and performance
((a) to (w) are omitted.)
(x) FMEA (for engine control system)
Where engines rely on hydraulic, pneumatic or electronic control of fuel injection and/or valves, a failure mode and effects analysis (FMEA) is to be submitted to demonstrate that failure of the control system will not result in the operation of the engine being degraded beyond acceptable performance criteria for the engine. ~~The FMEA reports required will not be explicitly approved by the Society.~~
((y) to (ae) are omitted.)

EFFECTIVE DATE AND APPLICATION (Amendment 2-3)

1. The effective date of the amendments is 1 January 2023.

Amendment 2-4

Part 7 CONTROL AND INSTRUMENTATION EQUIPMENT AND ELECTRICAL INSTALLATIONS

Chapter 7 APPROVAL OF USE OF GAS DETECTION EQUIPMENT

7.2 Application

Paragraph 7.2.1 has been amended as follows.

7.2.1 Application Form

The manufacturer, who intends to obtain the approval of use, is to submit the appropriate application form (**Form 7-~~9~~7**) filled in with necessary data and information to the Society (Head office).

Chapter 9 has been added as follows.

Chapter 9 APPROVAL OF USE FOR ACCUMULATOR BATTERY SYSTEMS

9.1 General

9.1.1 Scope

This chapter applies to tests and inspections for the exemption approval of shop tests for cells, modules and accumulator battery systems intended to be installed on board ships in accordance with **1.4.3-1 and -2, Annex 2.11.1-2, Part H of the Rules for the Survey and Construction of Steel Ships**.

9.2 Application Procedures

9.2.1 Application Procedures

1 Manufacturers (applicants) of accumulator battery systems intending to apply the requirements in this chapter are to submit an appropriate application form (**Form 7-9**) accompanied with three copies each of the drawings and documents referred to in **1.1.3-2, Annex 2.11.1-2, Part H of the Rules for the Survey and Construction of Steel Ships** to the Society.

2 In addition to **-1** above, three copies of each of the following

(1) Documents related to manufacturing and quality control standards for cells and modules

(2) Past manufacturing and delivery records for cells and modules

(3) Documents related to manufacturing and quality control standards for *BMS*

(4) Past manufacturing and delivery records for *BMS*

9.3 Tests

9.3.1 Cell and Module Tests

After the drawings and documents submitted in accordance with **9.2.1** have been examined, tests for cells and modules used for accumulator battery systems are to be carried out in accordance with **Table 1, Annex 2.11.1-2, Part H of the Rules for the Survey and Construction of Steel Ships** in the presence of a Society surveyor.

9.3.2 Accumulator Battery System Tests

After the drawings and documents submitted in accordance with **9.2.1** have been examined, tests for accumulator battery systems are to be carried out in accordance with **Table 2** and **Table 3, Annex 2.11.1-2, Part H of the Rules for the Survey and Construction of Steel Ships** in the presence of a Society surveyor. In addition, cells or modules used for accumulator battery systems that are undergoing testing are to be confirmed to be appropriate based on the results of the tests specified in **9.3.1**.

9.3.3 Accumulator Battery System Equipment Subject to Tests

In tests according to **9.3.2**, it is acceptable to use only those components (e.g. battery packs) of accumulator battery systems installed on board that have the minimum functions required for verification of tests.

9.3.4 Test Records

After completion of tests, manufacturers are to prepare test reports, have such reports confirmed by Society surveyors, and then submit three copies of the confirmed reports to the Society for approval.

9.4 Use of Approval as Automatic Devices and Equipment

9.4.1 Use of Approval as Automatic Devices and Equipment

Accumulator battery systems are to receive use of approval based on **Chapter 1**. However, in tests according to **1.3.1**, it is acceptable to use only those components (e.g. battery packs) of accumulator battery systems installed on board that have the minimum functions required for verification of tests.

9.5 Approval

9.5.1 Certificates

When the results of the tests specified in **9.3.1 and 9.3.2** are confirmed to be appropriate and accumulator battery systems comply with **9.4**, the Society is to approve the accumulator battery system (hereinafter referred to as "approved equipment") and issue the relevant approval certificate.

9.5.2 Validity

The certificates specified in **9.5.1** are valid until a date not exceeding 5 *years* from their date of issue. However, when approval is renewed in accordance with **9.5.3**, the new certificate is to be valid until a date not exceeding 5 *years* from the date of expiry of the previously issued certificate.

9.5.3 Renewal

1 Manufacturers applying for renewal of approval to submit the appropriate application form (**Form 7-9**) accompanied with copies of previously issued certificates to the Society review. Furthermore, changes in accumulator battery system specifications, if any, are to be described on the application forms.

2 In cases where approved equipment specifications remain unchanged, the Society is to grant the renewal of approval and issue a new certificate. Manufacturers who receive new certificates are to return previously issued certificates to the Society as soon as possible.

9.6 Changes in Particulars, etc. of Approved Equipment

9.6.1 Changes in Particulars, etc. of Approved Equipment

1 In cases where the particulars of approved equipment, or the materials, construction, dimensions, etc. of major components of such approved equipment are intended to be changed, manufacturers are to submit the appropriate application form for changes (**Form 7-9**) accompanied with the following drawings and documents to the Society for approval.

(1) Explanatory notes for changes (three copies)

(2) Necessary drawings and documents (three copies each)

(3) Copies of previously issued certificates

2 Upon examination of drawings and documents submitted in accordance with **-1** above, confirmation tests for the changes are to be carried out when considered necessary by the Society. The details of such confirmation tests are to be determined by the Society in consideration of the nature and extent of changes.

3 When confirmation tests are carried out, manufacturers are to prepare test reports, have such reports confirmed by Society surveyors, and then to submit three copies of the confirmed reports to the Society for approval.

4 When the results of examinations of submitted drawings and documents, and the confirmation tests specified in **-1** to **-3** above are determined to be satisfactory, the Society is to reissue certificates with their contents duly revised. Manufacturers who receive revised certificates are to return previously issued certificates to the Society as soon as possible.

5 In the case of **-4 above**, the validity of certificates does not change in principle.

9.7 Revocation of Approval

9.7.1 Revocation of Approval

1 In cases where any of the following **(1)** to **(5)** is applicable, the Society may revoke approval based on this chapter. In such cases, the Society is to notify manufacturers of such revocation.

(1) In cases where the results of confirmation tests were found unsatisfactory.
(2) In cases where the valid terms of certificates have expired.
(3) In cases where confirmation tests were not carried out without a valid reason.
(4) In cases where withdrawal of approval has been requested by manufacturers.
(5) In cases where the Society judges approved equipment to be unsuitable based on the equipment service records.

2 Manufacturers who receive notices of revocation of approval are to return the relevant certificates to the Society as soon as possible.

9.8 Markings

9.8.1 Markings

Manufacturers of the approved equipment are, in principle, to mark accumulator battery systems before shipment for identification as approved equipment; in addition, at least the following items to be marked at suitable places:

(1) Manufacturer name or equivalent
(2) Type number or symbol
(3) Serial number and date of manufacture
(4) Particulars or ratings
(5) Approval number

EFFECTIVE DATE AND APPLICATION (Amendment 2-4)

1. The effective date of the amendments is 1 January 2023.
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.
3. Notwithstanding the provision of preceding **2.**, the amendments to the Guidance may apply to the surveys for which the application is submitted to the Society before the effective date upon request by the owner.