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 2016 AMENDMENT NO.2

Notice No.90 27th December 2016
Resolved by Technical Committee on 27th July 2016

ClassNK
NIPPON KAIJI KYOKAI

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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

1.1 General

1.1.1 Scope

Sub-paragraph -2 has been amended as follows.

2 For those materials required to be approved by the Society under the requirements in **1.1.1-~~2~~3, Part K of the Rules**, the requirements of this chapter correspondingly apply to the tests and inspection for the approval of the manufacturing process of rolled steels.

Chapter 1B APPROVAL OF MANUFACTURING PROCESS OF SEMI-FINISHED PRODUCTS

1B.1 General

1B.1.1 Scope

Sub-paragraph -2 has been amended as follows.

2 For those materials required to be approved by the Society under the requirements in **1.1.1-~~2~~3, Part K of the Rules**, the requirements of this chapter correspondingly apply to the tests and inspection for the approval of the manufacturing process of semi-finished products.

Chapter 2 APPROVAL OF MANUFACTURING PROCESS OF STEEL PIPES

2.1 General

2.1.1 Scope

Sub-paragraph -2 has been amended as follows.

2 Of those materials required to be approved by the Society under the requirements in **1.1.1-~~2~~3, Part K of the Rules**, the requirements of this chapter correspondingly apply to the tests and inspection for the approval of the manufacturing process of steel pipes.

Chapter 3 APPROVAL OF MANUFACTURING PROCESS OF STEEL CASTINGS AND STEEL FORGINGS

3.1 General

3.1.1 Scope

Sub-paragraph -3 has been amended as follows.

3 This chapter applies correspondingly to the testing and inspection for the approval of manufacturing process of casting and forging which being required approval by the Society in accordance with the requirements of **1.1.1-~~2~~3, Part K of the Rules**.

Chapter 5 APPROVAL OF MANUFACTURING PROCESS OF ALUMINIUM ALLOYS

5.1 General

5.1.1 Scope

Sub-paragraph -2 has been amended as follows.

2 Of those materials required to be approved by the Society under the requirements in **1.1.1-~~2~~3, Part K of the Rules**, the requirements of this chapter correspondingly apply to the tests and inspection for the approval of the manufacturing process of aluminium alloys.

Chapter 6 APPROVAL OF MANUFACTURING PROCESS OF PROPELLER CASTINGS

6.1 General

6.1.1 Scope

Sub-paragraph -2 has been amended as follows.

2 Among the materials required to be approved by the Society in accordance with the requirements of **1.1.1-~~2~~3, Part K of the Rules**, the tests and inspection for the approval of the manufacturing process of propeller castings are to be in accordance with the requirements of this Chapter.

Part 4 NON-METALLIC MATERIALS AND COATING MATERIALS FOR HULL

Title of Chapter 2 has been amended as follows.

Chapter 2 TYPE APPROVAL OF MATERIALS FOR ~~REFRIGERATED CHAMBERS~~ INSULATION AND OIL-IMPERVIOUS COVERINGS

2.1 General

Paragraph 2.1.1 has been amended as follows.

2.1.1 Scope

1 The requirements in this chapter apply to tests and inspection for the type approval of materials intended to be used for insulating the refrigerated chambers and oil-impervious composition provided for the surface of oil tanks adjacent refrigerated chambers (hereinafter referred to as "oil-impervious covering") in accordance with the requirements of **5.2.1-1** and **5.2.5 of the Rules for Cargo Refrigerating Installations**.

2 Tests and inspections related to the type approval of materials intended to be used for the insulation of ships carrying liquefied gases in bulk requiring Society approval in accordance with the requirements of **Chapter 4, Part N of the Rules for the Survey and Construction of Steel Ships** are to follow the requirements specified in this chapter.

3 Tests and inspections related to the type approval of materials intended to be used for the insulation of ships using low-flashpoint fuels requiring Society approval in accordance with the requirements of **Chapter 6, Part GF of the Rules for the Survey and Construction of Steel Ships** are to follow the requirements specified in this chapter.

2.4 Approval Test

2.4.2 Insulation Materials

Sub-paragraphs (3) and (4) have been added as follows.

(1) The items represented by mark ○ in **Table 4.2-1** are to be tested for the insulation materials. However, materials not given in the table are to be considered in each case.

(2) Testing procedure and acceptance criteria
Loading Limit for Liquefied Gas Fuel TanThe testing procedure and acceptance criteria are to be in accordance with the requirements of *JIS* or other recognized standards.

(3) The test items and testing procedure, etc. for materials intended to be used for the insulation of ships carrying liquefied gases in bulk are to comply with the requirements in the "Guidance for Equipment and Fittings of Ships Carrying Liquefied Gases in Bulk".

(4) The test items and testing procedure, etc. for materials intended to be used for the insulation of ships using low-flashpoint fuels are to be comply with the requirements in the "Guidance for Equipment and Fittings of Ships Using Low-flashpoint Fuels".

Part 6 MACHINERY

Chapter 2 TYPE APPROVAL OF USE OF MACHINERY AND EQUIPMENT

2.1 General

Paragraph 2.1.1 has been amended as follows.

2.1.1 Scope

The requirements of this chapter deal with the tests and inspection relating to the approval of the machinery and equipment listed for which approval of the Society is to be obtained in advance before they are used in ships as required by **the Rules for the Survey and Construction of Steel Ships** (hereinafter referred to as "the Rules").

(1) Power transmission systems other than gearings (**5.2.4-1, Part D of the Rules**)
(2) Kind 1 propeller shafts with rubber sleeve (**6.2.7-1, Part D of the Rules**)
(3) Kind 1 propeller shafts with synthetic resin sleeve (**6.2.7-1, Part D of the Rules**)
(4) Propeller shafts made of corrosion resistant materials (**6.2.7-1, Part D of the Rules**)
(5) Stern tube bearings (**6.2.10-1(3), Part D of the Rules**)
(6) Stern tube sealing devices (**6.2.10-2, Part D of the Rules**)
(7) Pipes of special materials (**12.1.6-1, Part D of the Rules**)
(8) Special valves and pipes fittings (**12.3.2, Part D of the Rules**)
(9) Systems and equipment for ships carrying liquefied gases in bulk (**Part N of the Rules** and **Part N of the Guidance for the Survey and Construction of Steel Ships**)
(10) Air pipe automatic closing devices (**13.6.2-2, Part D of the Rules**)
(11) Flexible hose assemblies (**12.3.4-2, Part D of the Rules**)
(12) Systems and equipment for ships using low-flashpoint fuels (**Part GF of the Rules** and **Part GF of the Guidance for the Survey and Construction of Steel Ships**)
(1~~2~~3) Others which are considered necessary by the Society

Chapter 3 APPROVAL OF COEFFICIENT FOR DISCHARGE OF SAFETY VALVES, ETC.

3.1 General

Paragraph 3.1.1 has been amended as follows.

3.1.1 Scope

The requirements of this chapter apply to tests and inspections related to the approval shown below.

(1) The approval of coefficient *K* in the calculation formula of the discharge capacity of safety valves of boilers (excluding the low-lift safety valves, hereinafter the same in this chapter), based on **9.9.3-5(1), Part D of the Rules for the Survey and Construction of Steel Ships** (hereinafter referred to as "the Rules").

~~(2) The approval of the coefficient *K* in the calculation formula of the discharge capacity of pressure relief valves of the cargo containment system, process pressure vessels, cargo piping and process piping, based on **8.2.5, Part N of the Rules** and **Chapter 6, Annex 1, Part N of the Guidance for the Survey and Construction of Steel Ships.**~~

EFFECTIVE DATE AND APPLICATION (Amendment 2-1)

1. The effective date of the amendments is 1 January 2017.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to materials and equipment for marine use of ships other than ships that fall under the following:

(1) for which the building contract is placed on or after the effective date; or

(2) in the absence of a building contract, the keels of which are laid or which are at *a similar stage of construction* on or after 1 July 2017; or

(Note) The term "*a similar stage of construction*" means the stage at which the construction identifiable with a specific ship begins and the assembly of that ship has commenced comprising at least 50 *tonnes* or 1%* of the estimated mass of all structural material, whichever is the less.

* For high speed craft, "1%" is to be read as "3%".

(3) the delivery of which is on or after 1 January 2021.

3. Notwithstanding the provision of preceding **2.**, the amendments to the Guidance apply to materials and equipment for marine use of ships that fall under the following:

(1) which convert to using low-flashpoint fuels on or after the effective date; or

(2) which, on or after the effective date, undertake to use low-flashpoint fuels different from those which it was originally approved to use before the effective date.

Amendment 2-2

Part 2 EQUIPMENT

Chapter 9 APPROVAL OF USE OF FIBER REINFORCED PLASTIC (FRP)

9.4 Approval Tests

9.4.2 Testing Procedures and Criteria

1 Fire Integrity

The fire integrity requirements for FRP are according to **Table 1.3.1**, **Annex C1.1.7-5**, **Part C of the Guidance for the Survey and Construction of Steel Ships**. Test procedures are to be in accordance with the following:

((1) to (3) are omitted.)

Sub-paragraph (4) has been added as follows.

(4) The test procedures for FRP products used for safe access to bow specified in **23.7.2**, **Part C of the Rules** are to be in accordance with *ASTM F*3059-14, *Standard Specification for Fiber-Reinforced Polymer* (*FRP*) *Gratings Used in Marine Construction and Shipbuilding*.

EFFECTIVE DATE AND APPLICATION (Amendment 2-2)

1. The effective date of the amendments is 1 January 2017.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to ships for which the date of contract for construction* is before the effective date.

* "contract for construction" is defined in the latest version of IACS Procedural Requirement (PR) No.29.

IACS PR No.29 (Rev.0, July 2009)

1. The date of "contract for construction" of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding.

2. The date of "contract for construction" of a series of vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder.

For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a "series of vessels" if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided:

(1) such alterations do not affect matters related to classification, or

(2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval.

The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed.

3. If a contract for construction is later amended to include additional vessels or additional options, the date of "contract for construction" for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a "new contract" to which **1.** and **2.** above apply.

4. If a contract for construction is amended to change the ship type, the date of "contract for construction" of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder.

Note:
This Procedural Requirement applies from 1 July 2009.

Amendment 2-3

Part 6 MACHINERY

Chapter 2 TYPE APPROVAL OF USE OF MACHINERY AND EQUIPMENT

2.4 Approval Tests

2.4.2 Details of Tests

Sub-paragraph -10(1)(b)ix) has been amended as follows.

10 Air pipe automatic closing devices are to be designed and tested in accordance with **(1)** and **(2)** respectively.

(1) Materials and Construction

((a) is omitted.)

(b) Construction

i) Air pipe automatic closing devices are to be so designed that they will withstand both ambient and working conditions, and be suitable for use at inclinations up to and including ±40 *degrees*.

ii) Air pipe automatic closing devices are to be constructed to allow inspection of the closure and the inside of the casing as well as changing the seals.

iii) Efficient ball or float seating arrangements are to be provided for the closures. Bars, cage or other devices are to be provided to prevent the ball or float from contacting the inner chamber in its normal state and made in such a way that the ball or float is not damaged when subjected to water impact due to a tank being overfilled.

iv) Air pipe automatic closing devices are to be self-draining.

v) The clear area through an air pipe closing device in the open position is to be at least equal to the area of the inlet.

vi) An automatic closing device is to:

1) Prevent the free entry of water into the tanks,

2) Allow the passage of air or liquid to prevent excessive pressure or vacuum coming on the tank.

vii) In the case of air pipe closing devices of the float type, suitable guides are to be provided to ensure unobstructed operation under all working conditions of heel and trim as specified in **i)**.

viii) The maximum allowable tolerances for wall thickness of floats are not to exceed ±10% of thickness.

ix) The inner and the outer chambers of an automatic air pipe head is to be of a minimum thickness of 6 *mm*. In case where side covers are provided and their function is integral to providing functions of the closing device as specified in **vi)**, they are to have a minimum wall thickness of 6 *mm*. If, however, the air pipe head can meet the tightness test as specified in **(2)(a)** without the side covers attached,

then the side covers are not considered to be integral to the closing device. In such cases, side covers with wall thicknesses of less than 6 *mm* may be used.

(2) Testing

(a) Tightness tests during immerging/emerging in water

An automatic closing device is to be subjected to a series of tightness tests involving not less than two (2) immersion cycles under each of the following conditions:

i) The automatic closing device is to be submerged slightly below the water surface at a velocity of approximately 4 *m/min* and then returned to the original position immediately. The quantity of leakage is to be recorded.

ii) The automatic closing device is to be submerged to a point slightly below the surface of the water. The submerging velocity is to be approximately 8 *m/min* and the air pipe vent head is to remain submerged for not less than 5 *minutes*. The quantity of leakage is to be recorded.

iii) Each of the above tightness tests is to be carried out in the normal position as well as at an inclination of 40 *degrees* under the strictest conditions for the device. In cases where such strictest conditions are not clear, tests are to be carried out at an inclination of 40 *degrees* with the device opening facing in three different directions: upward, downward, and sideways (to the left or to the right). (*See* **Fig. 6.2**).

The maximum allowable leakage per cycle is not to exceed 2 *ml/mm* of nominal diameter of inlet pipe during any individual test.

((b) to (e) are omitted.)

EFFECTIVE DATE AND APPLICATION (Amendment 2-3)

1. The effective date of the amendments is 1 January 2017.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to air pipe automatic closing devices for which the application for approval is submitted to the Society before the effective date.

Amendment 2-4

Part 6 MACHINERY

Chapter 2 TYPE APPROVAL OF USE OF MACHINERY AND EQUIPMENT

2.4 Approval Tests

2.4.2 Details of Tests

Sub-paragraph -11(2)(c) has been amended as follows.

11 Flexible hose assemblies are to be approved in accordance with the following tests.
(2) For non-metallic flexible hose assemblies, the following tests are to be included.
  (a) Pressure test and burst test correspondingly in accordance with *ISO* 1402 (The minimum burst pressure is to be not less than four times the design pressure.)
  (b) Hydraulic impulse test (Correspondingly in accordance with *ISO* 6802 where with flexing during operation or *ISO* 6803 where without flexing during operation)
  (c) Fire resistance test correspondingly in accordance with *ISO* 15540 and 15541 for those hoses used for flammable oil and sea water pipes where failure may result in flooding. However, this does <u>not</u> include hoses installed on exposed open decks <u>and not used for fuel oil lines</u>.
  (d) Other tests as deemed necessary by the Society

EFFECTIVE DATE AND APPLICATION (Amendment 2-4)

1. The effective date of the amendments is 1 January 2017.
2. Notwithstanding the amendments to the Guidance, the current requirements apply to flexible hose assemblies for which the application for approval is submitted to the Society before the effective date.

Amendment 2-5

Part 6 MACHINERY

Chapter 9 APPROVAL OF USE OF MECHANICAL JOINTS

9.3 Approval Tests

9.3.2 Details of Tests

In the approval tests of mechanical joints, the following items **(1)** through **(9)** as deemed necessary by the Society are to be included according to **Table 6.9-1**:

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

(2) Vibration (fatigue) test

(a) Testing of compression couplings and pipe unions

Compression couplings~~,~~ and pipe unions ~~or other similar joints~~ intended for use in rigid pipe connections ~~of pipe~~ are to be tested ~~in accordance with this method described~~ as follows. Rigid connections are joints, connecting pipe length without free angular or axial movement. Two lengths of pipe is to be connected by means of the joint to be tested. One end of the pipe is to be rigidly fixed while the other end is to be fitted to the vibration rig. The test rig and the joint assembly specimen being tested is to be arranged as shown in **Fig.6.9-1**. The joint assembly is to be filled with test fluid, de-aerated and pressurised to the design pressure of the joint. Pressure during the test is to be monitored. The mechanical joint is to be examined visually for loss of pressure and sign of leakage during the test. Visual examination of the joint assembly is to be carried out ~~for signs of damage which may eventually lead to joint leakage~~. Re-tightening may be accepted once during the first 1000 *cycles*. Vibration amplitude is to be within 5% of the value calculated from the following formula. Test specimen is to withstand not less than 10^7 *cycles* with frequency 20-50 *Hz* without leakage or damage.

$$A = \frac{2SL^2}{3ED}$$

A : single amplitude (*mm*)
L : length of the pipe (*mm*)
S : allowable bending stress based on 0.25 of the yield stress (N/mm^2)
E : modulus of elasticity of tube material (N/mm^2)
D : outside diameter of tube (*mm*)

Sub-paragraph (6) has been amended as follows.

(6) Fire endurance test

(a) Fire endurance test is to be conducted in accordance with *ISO* 19921: 2005(E) and *ISO*

19922: 2005(E). After the fire testing, the specimen is to be subjected to a hydrostatic tightness test as defined in **(1)(a)** above. As an alternative, the fire test may be conducted with circulating water at a pressure of at least 0.5 *MPa* and a subsequent pressure test to twice the design pressure. Pressure and temperature during the test is to be monitored. A selection of representative nominal bores may be tested in order to evaluate the fire resistance of a series or range of mechanical joint of the same design. When a mechanical joint of a given nominal bore (*Dn*) is so tested then other mechanical joints falling in the range *Dn* to 2 x *Dn* (both inclusive) are considered accepted.

(b) Alternative test methods and/or test procedures considered to be at least equivalent to the test required in **(a)** may be accepted at the discretion of the Society in cases where the test pieces are too large for the test bench and cannot be completely enclosed by the flames.

(c) Thermal insulation materials applied on couplings are to be non-combustible in dry condition and when subjected to oil spray. A non-combustibility test according to *ISO* 1182 is to be carried out.

EFFECTIVE DATE AND APPLICATION (Amendment 2-5)

1. The effective date of the amendments is 1 January 2017.

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