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 2020 AMENDMENT NO.1

Notice No.38 30 June 2020
Resolved by Technical Committee on 22 January 2020

ClassNK
NIPPON KAIJI KYOKAI

Notice No.38 30 June 2020
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 1-1

Part 4 NON-METALLIC MATERIALS AND COATING MATERIALS FOR HULL

Chapter 1 APPROVAL OF FIRE PROTECTION MATERIALS

1.1 General

Paragraph 1.1.1 has been amended as follows.

1.1.1 Scope

The requirements of this Chapter apply to the tests and inspections for the approval of fire protection material specified in **(1)** through **(1~~1~~2)** below in accordance with the requirements of **Part P** and **Part R of the Rules for the Survey and Construction of Steel Ships** (hereinafter referred to as "the Rules").
((1) to (11) are omitted.)
(12) Fire retardant adhesives

1.2 Definitions

Paragraph 1.2.15 has been added as follows.

1.2.15 Fire Retardant Adhesives

"Fire retardant adhesives" are the adhesives requiring low flame spread as specified in *Section* 3.5.1.1, *PART* 3, *ANNEX* 1 of the *FTP* Code which are used for specimens of "*A*" and "*B*" class constructions.

1.3 Requirements

Paragraph 1.3.14 has been added as follows.

1.3.14 Fire Retardant Adhesives

The test procedures for the fire retardant adhesives specified in **1.2.15** are to be in accordance with the "Test for Surface Flammability" specified in **1.13.5**.

1.4 Application Procedure for Approval

1.4.3 Submission of Attached Documents to the Application

Sub-paragraph -1(7) has been amended as follows.

1 When obtaining the approval of fire protection materials other than fire retardant coatings, the documents including the following data are submitted to the Society together with the application specified in **1.4.1**:
((1) to (6) are omitted.)
(7) Test report of the required fire tests specified in **1.3.1** through **1.3.1~~3~~4**.
((8) to (10) are omitted.)

1.10 Periodical Test

1.10.2 Periodical Tests for Approved Materials other than Fire Retardant Coatings

Sub-paragraph -2 has been amended as follows.

2 The tests specified in **1.3.1** to **1.3.8** as well as **1.3.10** to **1.3.1~~3~~4** are to be carried out. However, the tests may be omitted in accordance with the provision 5.2 or 8.3 of the *FTP* Code if the Society considers appropriate.

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 30 June 2020.
2. Notwithstanding the amendments to the Guidance, the current requirements apply to materials other than those for which the application for which is submitted to the Society on or after the effective date.

Amendment 1-2

Part 6 MACHINERY

Chapter 8 APPROVAL OF USE OF DIESEL AND GAS-FUELLED ENGINES

8.5 Approval Tests

8.5.2 Details of Tests

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

2 During the stage *B*, the following items of tests are to be included. Deviations from the items, if any, are to be agreed with the Society.
((1) to (10) are omitted.)
(11) For low pressure gas-fuelled engines, the following are also to be applied.
((a) to (g) are omitted.)
(h) For engines intended to produce electrical power, the characteristics of governors specified in ~~**2.4.2-1**~~**2.4.1-5(1)** and **(2), Part ~~H~~D of the Rules for the Survey and Construction of Steel Ships** are to be verified.
((i) is omitted.)
((12) is omitted.)

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

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

Amendment 1-3

Part 8 TYPE TESTS OF ELECTRICAL EQUIPMENT AND CABLES

Chapter 1 GENERAL

1.1 General

Paragraph 1.1.2 has been amended as follows.

1.1.2 Definitions

The type tested products are those certified that they have passed through the type tests specified in **Chapter 2** to ~~6~~**7**.

Paragraph 1.1.3 has been amended as follows.

1.1.3 Articles

Electrical equipment cables subject to the type test are to be as follows.

(1) Fuses
Cartridge type fuses (renewable and non-renewable) and plug type fuses.

(2) Circuit breakers
Low-voltage breakers, air circuit breakers and molded case circuit breakers (including molded case circuit breakers with fuses and molded case circuit breakers used for the protection of induction motors simultaneously. Hereinafter, these are referred to as "molded case circuit breakers" unless otherwise specified.).

(3) Electromagnetic contactors
Electromagnetic contactors used for motors and other loads.

(4) Explosion protected electrical equipment
Electrical equipment of the flameproof type, intrinsically safe type, increased safety type and pressurized protected type (limited to sealed type) used in the spaces on board flammable or explosive gas or vapour (hereinafter referred to as explosive gas) exists or may exist in the atmosphere.

(5) Cables
(a) Cables used power circuits, lighting circuits, supply and distribution circuits of interior-communication, control circuits, etc.
(b) Flexible cords used for power supply and distribution circuits.
(c) 150 *V* multicore *PVC* insulated cables for electronic equipment.

(6) Semiconductor converters for power
Semiconductor converters for power of not less than 5 *kW* that are used for supplying power to the following electrical equipment:
(a) Rotating machines for propulsion and their respective control equipment;
(b) Ship service generators (main, auxiliary and emergency);
(c) Main and emergency switchboards;
(d) Motors for auxiliary machinery specified in **1.1.6-1(1)** to **1.1.6-1(3), Part D of the Rules for the Survey and Construction of Steel Ships**; and
(e) Controlgears for those motors specified in **(d)** above.

1.3 Type Tests

Paragraph 1.3.2 has been amended as follows.

1.3.2 Type Tests

Detailed requirements of type tests are to be in accordance with **Chapters 2** to ~~6~~7 according to the types of equipment. In case where the Society deems necessary, however, additional tests may be requested.

Chapter 7 has been added as follows.

Chapter 7 SEMICONDUCTOR CONVERTERS FOR POWER

7.1 General

7.1.1 Scope

1 The requirements in this chapter apply to the type tests of semiconductor converters for power in accordance with the requirements in **Chapter 1**.

2 For items specially provided in this chapter, the requirements in this chapter apply in lieu of the requirements in **Chapter 1**.

7.2 Type Tests

7.2.1 Type Tests

Detailed requirements for type tests are to be in accordance with the following standards or other standards which are deemed appropriate by the Society.

(1) *IEC* 60146-1-1 (Semiconductor converters - General requirements and line commutated converters - Part 1-1: Specification of basic requirements)

(2) *IEC* 61800-5-1 (Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy)

Annex 4 PROCEDURES FOR PROTOTYPE TESTS FOR TYPE APPROVAL AND PRODUCTION TESTS OF LAUNCHING APPLIANCES OF LIFEBOATS, RESCUE BOATS AND LIFERAFTS

Chapter 1 PROCEDURES FOR PROTOTYPE TESTS FOR TYPE APPROVAL OF LAUNCHING APPLIANCES

1.1 Strength and Performance Tests

1.1.2 Davits and Launching Appliances

Sub-paragraph -1 has been amended as follows.

1 Overload Test [8.1.1]

For lifeboats other than free-fall lifeboats, davits and launching appliances, except winches, are to be subjected to a static proof load of 2.2 times their maximum working load (L_{max}). With the load at the full outboard position, the load is to be swung through an arc of approximately 10 degrees to each side of vertical in the intended fore and aft plane. The test is to be done first in the upright position, followed by tests simulating a shipboard condition of list of 20 degrees both inboard and outboard. There is to be no evidence of significant deformation or other damage as a result of this test. For free-fall lifeboats, the launching appliances for lowering a free-fall lifeboat by falls, except ~~the~~ winches ~~brakes~~, are to be subjected to a static proof load of 2.2 times the maximum working load (L_{max}) at the full outboard position. The launching ramp and its connection to the release mechanism ~~is~~ are to be subjected to a static proof load of 2.2 times the maximum working load. There is to be no evidence of significant deformation or other damage as a result of this test.

EFFECTIVE DATE AND APPLICATION (Amendment 1-3)

1. The effective date of the amendments is 30 June 2020.

Amendment 1-4

Part 4 NON-METALLIC MATERIALS AND COATING MATERILAS FOR HULL

Chapter 1 APPROVAL OF FIRE PROTECTION MATERIALS

1.1 General

Paragraph 1.1.1 has been amended as follows.

1.1.1 Scope

1 The requirements of this Chapter apply to the tests and inspections for the approval of fire protection material specified in **(1)** through **(11)** below in accordance with the requirements of **Part P** and **Part R of the Rules for the Survey and Construction of Steel Ships** (hereinafter referred to as "the Rules").

(1) Non-combustible materials
(2) "*A*" class divisions
(3) "*B*" class divisions
(4) Continuous "*B*" class divisions
(5) Fire retardant base materials
(6) Fire retardant veneers
(7) Fire retardant surface floorings
(8) Primary deck coverings
(9) Fire retardant coatings
(10) Low smoke generation materials
(11) "*H*" class divisions

2 The watertightness of bulkheads, etc. penetrating cable penetrations constructed of the materials specified in **-1(2)** and **(3)** that have been issued a *Certificate of Approval for Fire Protection Material* in accordance with this chapter, may be approved in accordance with the requirements of this chapter when requested by manufacturers.

1.3 Requirements

1.3.2 "*A*" Class Divisions

Sub-paragraph -2 has been renumbered to -3, and Sub-paragraph -2 has been added as follows.

1 The test procedures for "*A*" class divisions are in accordance with "Test for "*A*" and "*B*" Class Divisions" specified in **1.13.3**.

2 Cable penetrations for the uses specified in **1.2.2-2(7)** which penetrate bulkheads, etc. and which are required to be watertight tested are to be watertight tested after complete the fire test in accordance with **1.13.3-4**.

~~**2**~~**3** For approval, the certificates issued by the Society or the test results of fire tests, non-combustibility test and test for surface flammability of components are to be submitted.

1.3.3 "*B*" Class Divisions

Sub-paragraph -2 has been renumbered to -3, and Sub-paragraph -2 has been added as follows.

1 The test procedures for "*B*" class divisions are in accordance with the provisions specified in **1.3.2-1**.

2 Cable penetrations for the uses specified in **1.2.3-2(9)** which penetrate bulkheads, etc. and which are required to be watertight tested are to be watertight tested after complete the fire test in accordance with **1.13.3-4**.

~~**2**~~**3** For approval, the certificates issued by the Society or the test results of components are to be submitted in accordance with **1.3.2-2**.

1.4 Application Procedure for Approval

Paragraph 1.4.3 has been amended as follows.

1.4.3 Submission of Attached Documents to the Application

1 When obtaining the approval of fire protection materials other than fire retardant coatings, the documents including the following data are submitted to the Society together with the application specified in **1.4.1**:

(1) Historical record of the company
(2) Outline of the facilities of works
(3) If applicable, the documents (a copy of the certificate or the document of compliance) on Quality control system of the company (both of the applicant and the manufacturer)
(4) Kinds of materials (names and trade names of the materials specified in **1.1** and **1.2**)
(5) Constituent materials and their properties
(6) Specifications of the products (including detail drawings)
(7) Test report of the required fire tests specified in **1.3.1** through **1.3.13**
(8) Records of service
(9) Marking (label, etc.)
(10) Other items which the Society considers necessary

2 When the watertight tests specified in **1.3.2-2** and **1.3.3-2** have been carried out, the following documents, in addition those specified in to **-1(1)** to **(10)**, are to be submitted to the Society.

(1) Test report of the watertight test.
(2) Specifications of the cable penetration which is seeking approval. (Description in English is required, and detailed drawings, details of installation when used onboard and information on the maximum design pressure for the penetration seeking approval are to be included.)

~~**2**~~**3** When obtaining the approval of fire retardant coatings, the documents including the following data are submitted to the Society together with the appropriate application form specified in **1.4.1**:

(1) Historical record of the company
(2) Outline of the facilities of works
(3) If applicable, the documents (a copy of the certificate or the document of compliance) on quality control system of the companies (both of the applicant and the manufacturer)
(4) Kinds of materials (names and trade names of the materials specified in **1.1** and **1.2**)
(5) List of coating system (**Form 4-2_5**)
(6) Table of chemical composition
(7) Test report of the required fire tests specified in **1.3.9** (including actual coating condition and dry film thickness of the test specimen)
(8) Records of service

(9) Marking (label, etc.)
(10) Other items which the Society considers necessary
~~3~~**4** The table of chemical composition required in **-~~2~~3(6)** above provides organic and inorganic components separately so that organic substance can be estimated.
~~4~~**5** The test reports required in **-1(7), -2** and **-~~2~~3(7)** above are an original or a duplicate copy issued by a testing laboratory specified in **1.6.1-1**.

1.6 Approval Tests

1.6.1 Approval Tests

Sub-paragraph -2 has been renumbered to -3, and Sub-paragraph -2 has been added as follows.

1 The tests required for each fire protection materials specified in **1.3** are carried out in testing laboratories recognized by the Society.
2 Although the watertight tests specified in **1.13.3-4** are not necessarily subject to **-1**, the tests are to be witnessed by a Society surveyor.
~~2~~**3** The Society may require additional tests, however, if it considers necessary.

1.7 Notice of Approval

Paragraph 1.7.1 has been amended as follows.

1.7.1 Notice of Approval
1 The Society issues the *Certificate of Approval for Fire Protection Material* in accordance with the *FTP* Code after having approved the material by the general judgment on the basis of the results of examination of the submitted documents and the results of the confirmatory survey of manufacturer for approval and approval tests.
2 When the Society approves watertightness in accordance with **1.3.2-2** and **1.3.3-2**, such information may be added to the *Certificate of Approval for Fire Protection Material* by the Society along with the approved maximum design pressure. In cases where maximum design pressure is different for each installation, each design pressure is to be indicated.

1.10 Periodical Test

1.10.3 Periodical Test for Fire Retardant Coatings

Sub-paragraph -1 has been amended as follows.

1 The appropriate application form (**Form 4-4**) accompanied by necessary copies of the records of manufacture and the list of coating system and the table of chemical composition specified in **1.4.3-~~2~~3(5)** and **(6)** respectively is submitted to the Society (Head Office).

1.13 Test Procedures

Paragraph 1.13.3 has been amended as follows.

1.13.3 Fire Test and Watertight Test for "*A*" and "*B*" Class Divisions
1 Test procedures are to be in compliance with the requirements for "*A*" and "*B*" class divisions

specified in "Test for "*A*", "*B*" and "*F*" class divisions" carried out in accordance with the *FTP* Code.

2 The approval of fire doors of marginally larger dimensions than the standard specimen size (2,440 *mm* width and 2,500 *mm* height) is to be in accordance with *MSC*.1/*Circ*.1319 "*Recommendation for the Evaluation of Fire Performance and Approval of Large Fire Doors*".

3 In applying section 1.13 of *APPENDIX* 1, *PART* 3, *ANNEX* 1 to the *FTP* Code, "*A*" class division penetrations constructed without structural sleeves of minimum 3 *mm* thickness and minimum 60 *mm* length welded or bolted to the division and/or constructed with removable, soft or intumescent filling material are to be in accordance with *MSC*.1/*Circ*.1488 "*Unified Interpretation of Part 3 of Annex 1 to the 2010 FTP Code*".

4 The watertight tests specified in **1.3.2-3** and **1.3.3-3** are to be carried out in accordance with following:

(1) Design of penetrations used for testing

(a) The penetrations used for testing are not to be installed on actual bulkheads and decks.

(b) The maximum and minimum sizes (in terms of width and diameter) of each type of cable penetration for which approval is sought are to be tested.

(c) The cables fitted to the penetrations are to be firmly supported and fixed to prevent them from moving during the test.

(d) The penetrations used for testing are to incorporate a range of different types of cables (e.g. in terms of number, type and size) and to be constructed so that their assembly represents a practical situation which may be found on board.

(e) Tests are to be conducted for the maximum and minimum fill based upon the inside cross-sectional area of each penetration.

(f) The distance between adjacent cables is to be the minimum specified by the manufacturer, and the cables are to be placed as close as possible to the centre of the penetrations.

(g) For penetrations using the materials in **i)** or **ii)**, the following are to be used for the testing:

i) Filling materials subject to **1.13.3-3**

Penetrations are to be filled at least 30 days before testing. After filling, the penetration is to be kept at room temperature during that period.

ii) Packing materials

Packing materials are to be set at least 24 hours before testing begins.

(2) Watertight testing procedures

(a) The penetration is to be tested at the test pressure for 30 minutes, with the test pressure being, at a minimum, 0.1 *MPa* at hydrostatic pressure.

(b) The penetration is to then to be re-tested at the same test pressure for an additional 30 minutes.

(c) Test pressure is to be 1.5 times the design pressure of the penetration or higher. The design pressure is to be more than the maximum hydrostatic pressure acting upon the intended installation location of the penetration, as calculated from intact stability and damage stability calculations, but be at least the hydrostatic pressure acting upon the penetration from the height of the bulkhead deck.

(d) Testing may be carried out at 0.1 *MPa* or the test pressure, whichever is higher, for an hour.

(3) Approval Criteria

(a) There is no leakage during the 30-minute testing specified in **(2)(a)**.

(b) There may be leakage during the additional 30-minute testing specified in **(2)(b)**, but it is not to exceed 1 litre.

(c) The test results obtained are also valid for penetrations which use cables of the same type

and size as those tested or cables of the same type and smaller in size than those tested.

EFFECTIVE DATE AND APPLICATION (Amendment 1-4)

1. The effective date of the amendments is 1 July 2020.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to the tests for the cable penetrations for:

(1) which the application for approval is submitted to the Society before 1 July 2020; or

(2) which are to be on the ships for which the date of contract for construction is before1 July 2020.

Amendment 1-5

Part 6 MACHINERY

Title of Chapter 8 has been amended as follows.

Chapter 8 APPROVAL OF USE OF ~~DIESEL AND GAS-FUELLED~~ RECIPROCATING INTERNAL COMBUSTION ENGINES

8.1 General

8.1.1 General

Sub-paragraph -1 has been amended as follows.

1 The requirements in this chapter apply to the approval of use for the following **(1)** and **(2)**. ~~of diesel engines required by **2.1.1-3** and **2.6.1-3, Part D of the Rules for the Survey and Construction of Steel Ships**, **2.1.1-2, Part 7 of the Rules for High Speed Craft** as well as **2.1.1-2, Part 9** and **2.6.1-3, Part 7 of the Rules for the Survey and Construction of Inland Waterway Ships**. They also apply to the approval of use of low pressure gas-fuelled engines required by **4.1 of Annex 4, Part GF** or **5.1 of Annex 4, Part N of the Guidance for the Survey and Construction of Steel Ships** (in such cases, the term "diesel engine" is to be read as "gas-fuelled engine").~~ In addition, requirements for low pressure gas-fuelled engines in this Chapter ~~they~~ apply mutatis mutandis to the approval of use of high pressure gas fuelled engines (as required by **3.1 of Annex 3, Part GF** or **4.1 of Annex 3, Part N of the Guidance for the Survey and Construction of Steel Ships**).

(1) Approval of use of reciprocating internal combustion engines as required by **2.1.1-3** and **2.6.1-3, Part D of the Rules for the Survey and Construction of Steel Ships**, **2.1.1-2, Part 7 of the Rules for High Speed Craft** as well as **2.1.1-2** and **2.6.1-3, Part 7 of the Rules for the Survey and Construction of Inland Waterway Ships**; and

(2) Approval of use of low pressure gas-fuelled engines as required by **4.1 of Annex 4, Part GF** or **5.1 of Annex 4, Part N of the Guidance for the Survey and Construction of Steel Ships**.

Sub-paragraph -6 has been amended as follows.

6 For ~~diesel~~ reciprocating internal combustion engines, testing is to be carried out in accordance with this Chapter and is to be witnessed by the Surveyor.

8.1.2 Terminology

Sub-paragraphs -1 to -3 have been amended as follows.

1 "Low-speed engines" are ~~diesel~~ reciprocating internal combustion engines having a rated speed of less than 300 *rpm*.

2 "Medium-speed engines" are ~~diesel~~ reciprocating internal combustion engines having a rated speed of 300 *rpm* and above, but less than 1400 *rpm*.

3 "High-speed engines" are ~~diesel~~ reciprocating internal combustion engines having a rated speed of 1400 *rpm* or above.

8.2 Application and Approval of Submitted Documents

8.2.2 Drawings and Data

Sub-paragraph -1 has been amended as follows.

1 Drawings and data to be submitted are as specified in the following **(1)** and **(2)**, as appropriate for the type of the ~~diesel~~ reciprocating internal combustion engine. Upon review and approval of the submitted drawings and data, they are returned to the licensor.

(~~2~~1) Drawings and data to be submitted for information for approval
((a) to (x) are omitted.)

(~~1~~2) Drawings and data to be submitted for information on an overview of the engine's design, engine characteristics and performance
((a) to (ab) are omitted.)
(ac) Information on installation arrangements of auxiliary systems of the ~~diesel~~ engine and the list of capacities, technical specifications and requirements, along with information needed for maintenance and operation of the ~~diesel~~ engine
((ad) and (ae) are omitted.)

Sub-paragraph -2 has been amended as follows.

2 Notwithstanding **-1** above, after the Society has approved the ~~diesel~~ engine type for the first time, only those drawings and data as listed in **-1** above, which have undergone substantive changes, will have to be resubmitted to the Society.

Sub-paragraph -4 has been amended as follows.

4 In addition to those required by **-1** to **-3** above, those listed in the following **(1)** to **(6)** below, each in triplicate, are to be submitted for the purpose of confirming whether the manufacturing facility (including production and assembly lines, machining units, special tools and devices, assembly and testing rigs as well as all lifting and transportation devices) is equipped in a way which allows it to consistently produce engines and relevant engine components of a stable quality in accordance with required standards.

(1) Outline of the manufacturing plant
(2) Information on the manufacturing facility and the manufacture and quality control of the ~~diesel~~ engine
(3) Records of manufacture and delivery of the ~~diesel~~ engine
(4) Approval test plan (the place and scheduled date of the test are to be included)
(5) Test records (when a preliminary test is carried out)
(6) Other data considered necessary by the Society

8.5 Approval Tests

8.5.2 Details of Tests

Sub-paragraph -1 has been amended as follows.

1 During the stage *A*, the following items of tests are to be included:

(1) Operation at the load points 25 %, 50 %, 75 %, 100 % and 110 % of the maximum rated power for continuous operation and other load points considered important, at the following engine speeds:

(a) along the nominal (theoretical) propeller curve and at constant speed for ~~propulsion~~ engines which may be used as main propulsion machinery of ships other than electric propulsion ships (if applicable mode of operation, i.e., driving controllable pitch propellers)

(b) at constant speed for engines ~~intended for~~ which may be used as main propulsion machinery for electric propulsion ships or as engines driving generating sets or auxiliary machinery (including a test at no load and rated speed)

((2) is omitted.)

(3) For high-speed engines, a 100-hour full load test.

(4) For engines which are classified as high-speed engines and may be used as main propulsion ~~engines~~ machinery for ships subject to the **Rules for High Speed Craft**, the low cycle fatigue test.

In this case, load changes are to be the steepest load ramp that the control system (or operation manual if not automatically controlled) permits and are normally to be repeated at least 500 cycles (idle - full load - idle). The duration at each end is to be sufficient for reaching stable temperatures of the hot parts.

((5) is omitted.)

(6) For electronically-controlled ~~diesel~~ engines, continuous operation tests for the following components are to be carried out to confirm the durability within the period prescribed by the manufacturer.

((a) and (b) are omitted.)

(7) For electronically-controlled ~~diesel~~ engines, the functions included in the software of the control system are to be confirmed.

(8) For electronically-controlled ~~diesel~~ engines, an operation test is to be carried out under one cylinder cut-off condition.

((9) and (10) are omitted.)

Sub-paragraph -2 has been amended as follows.

2 During the stage *B*, the following items of tests are to be included. Deviations from the items, if any, are to be agreed with the Society.

((1) is omitted.)

(2) Operation at each load point below (an operating time of two *hours* is to be required at the load point in **(a)** and two sets of readings are to be taken at a minimum interval of one *hour*. An operating time per each load point other than **(a)** depends upon the engine size (achievement of steady state condition) and on the time for collection of the operating values, but 0.5 *hour*s can be normally assumed. However, sufficient time is to be allowed for visual inspection by the surveyor.)

The data to be measured and recorded when testing the engine at each load point have to include all engine parameters listed in **8.5.1-4**. During all these load points, engine parameters

are to be within the specified and approved values. If operation of the engine at the limits defined by its specified alarm system (e.g.~~,~~ at alarm levels of lubrication oil pressure and inlet temperature) is required, the test is to be made at the load point in **(a)**.

((a) and (b) are omitted.)

(c) Maximum permissible torque (at least and normally 110 %) at 100 % speed (corresponding to load point 3 in **Fig. 6.8-1**) or maximum permissible power (at least and normally 110 %) and at 103.2 % speed according to nominal propeller curve (corresponding to load point 3a in **Fig. 6.8-1**). Load point 3a applies to reciprocating internal combustion engines only driving fixed pitch propellers or waterjet propulsion systems. Load point 3 applies to all other purposes.

In the case of engines for which intermittent overload is approved, the following **i)** and **ii)** ~~is~~are to be applied.

(i) and ii) are omitted.)

((d) is omitted.)

(e) For ~~propulsion~~ reciprocating internal combustion engines which may be used as main propulsion machinery, minimum permissible speed at 90 % torque (corresponding to load point 5 in **Fig. 6.8-1**)

(f) Part loads, *e.g.* 25 %, 50 %, and 75 % of rated power and speed according to nominal propeller curve (corresponding to load points 6, 7 and 8 in **Fig. 6.8-1**) for ~~propulsion~~ reciprocating internal combustion engines which may be used as main propulsion machinery

(g) Part loads, *e.g.* 25 %, 50 %, and 75 % of rated power and rated speed with constant governor setting (corresponding to load points 9,10 and 11 in **Fig. 6.8-1**) for reciprocating internal combustion engines which may be used for driving ~~intended for~~ generator sets or auxiliary machinery

(h) Crosshead engines not restricted for use with controllable pitch propellers are to be tested with no load at the associated maximum permissible engine speed.

(3) For 2-stroke ~~propulsion~~ engines which may be used as main propulsion machinery, the achievable continuous output is to be determined in the case of turbocharger damage. Reciprocating internal combustion ~~E~~engines which may be used as main propulsion machinery ~~intended~~ driving a single propulsion system with a fixed pitch propeller are to be able to run continuously at a speed (*rpm*) of 40 % of full speed along the theoretical propeller curve when one turbocharger is out of operation. The test can be performed by either by-passing the turbocharger, fixing the turbocharger rotor shaft or removing the rotor.

(4) For reciprocating internal combustion engines which may be used as main propulsion machinery, ~~V~~verification of the lowest specified propulsion engine speed according to nominal propeller curve as specified by the engine designer. During this operation, no alarm is to occur.

((5) and (6) are omitted.)

(7) For electronically-controlled ~~diesel~~ engines, integration tests are to verify that the response of the complete mechanical, hydraulic and electronic system is as predicted for all intended operational modes.

The scope of these tests is to be agreed upon with the Society for selected cases based upon the FMEA required in **Annex D2.1.1, Part D of the Guidance for the Survey and Construction of Steel Ships**.

((8) to (10) are omitted.)

(11) For low pressure gas-fuelled engines, the following **(a)** to **(i)** are also to be applied.

((a) to (g) are omitted.)

(h) For engines ~~intended to produce electrical power~~ which may be used as engines driving

generator sets, the characteristics of governors specified in **2.4.2-1(1)** and **(2), Part H of the Rules for the Survey and Construction of Steel Ships** are to be verified.

(i) For gas only and pre-mixed engines ~~intended to produce electrical power~~ which may be used as engines driving generator sets, the influences of *LHV*, methane number and ambient conditions on the governor test results are to be theoretically determined and specified in the test report. Referring to the limitations ~~as~~ specified in **2.1-5(1)** and **(2) of Annex 4, Part N** or **2.1-5(1)** and **(2) of Annex 4, Part GF of the Guidance for the Survey and Construction of Steel Ships**, the margin for satisfying characteristics of governors are to be determined.

((12) is omitted.)

8.6 Handling after Approval

8.6.5 Revocation of Approval

Sub-paragraph (5) has been amended as follows.

In cases where either of the following **(1)** to **(5)** applies, the Society will revoke the approval and give notice to the manufacturer.

((1) to (4) are omitted.)

(5) Where there are substantive modifications in the design, in the manufacturing or control processes or in the characteristics of the materials of ~~diesel~~ reciprocating internal combustion engines unless approved in advance by the Society.

Title of Fig.6.8-2 has been amended as follows.

Fig. 6.8-2 Documents Flow for Approval of Use of Reciprocating Internal Combustion Engines

EFFECTIVE DATE AND APPLICATION (Amendment 1-5)

1. The effective date of the amendments is 1 July 2020.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to gas-fuelled engines whose type is the same type of those for which the application for approval of use is submitted to the Society before the effective date.

3. Notwithstanding the provision of preceding **2.**, the amendment to the Guidance applies to gas-fuelled engines for which the date of renewal of approval of use is on or after the effective date.

Amendment 1-6

Part 6 MACHINERY

Title of Chapter 10 has been amended as follows.

Chapter 10 APPROVAL OF USE OF CRANKCASE EXPLOSION RELIEF VALVES FOR RECIPROCATING INTERNAL COMBUSTION ENGINES

10.1 General

10.1.1 Scope

Sub-paragraph -1 has been amended as follows.

1 The requirements in this Chapter apply to testing and inspection for approval of use of crankcase explosion relief valves for reciprocating internal combustion engines in accordance with the requirements of **2.4.3 Part D of the Rules for the Survey and Construction of Steel Ships**.

Chapter 11 APPROVAL OF USE FOR EXHAUST DRIVEN TURBOCHARGERS

11.4 Approval Tests

11.4.2 Details of Tests

Sub-paragraph -1 has been amended as follows.

1 Turbochargers are to be subjected to at least 500 load cycles (idle - full load - idle) at the limits of their operation. The duration at each end is to be sufficient for reaching stable temperatures of the hot parts. However, this test may be waived if the turbocharger together with the engine is subjected to this kind of low cycle testing under the approval of use of ~~diesel~~ reciprocating internal combustion engines in **Chapter 8, Part 6**. The suitability of the turbocharger for such kind of operation is to be stated in advance by the manufacturer.

EFFECTIVE DATE AND APPLICATION (Amendment 1-6)

1. The effective date of the amendments is 1 July 2020.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to crankcase explosion relief valves for which the application for approval of use is submitted to the Society before the effective date.

Amendment 1-7

Part 6 MACHINERY

Chapter 11 APPROVAL OF USE FOR EXHAUST DRIVEN TURBOCHARGERS

11.4 Approval Tests

11.4.2 Details of Tests

Sub-paragraph -1 has been amended as follows.

1 Turbochargers are to be subjected to at least 500 load cycles (idle - full load - idle) at the limits of their operation. ~~The duration at each end is to be sufficient for reaching stable temperatures of the hot parts.~~ However, this test may be waived if the turbocharger together with the engine is subjected to this kind of low cycle testing under the approval of use of diesel engines in **Chapter 8, Part 6**. The suitability of the turbocharger for such kind of operation is to be stated in advance by the manufacturer.
(-2 to -5 are omitted.)

EFFECTIVE DATE AND APPLICATION (Amendment 1-7)

1. The effective date of the amendments is 1 July 2020.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to turbochargers with novel design features or no service records for which the application for approval is submitted to the Society before the effective date.

Amendment 1-8

Part 7 CONTROL AND INSTRUMENTATION EQUIPMENT AND ELECTRICAL INSTALLATIONS

Chapter 1 APPROVAL OF USE OF AUTOMATIC DEVICES AND EQUIPMENT

Table 7.1-1 has been amended as follows.

Table7.1-1 Environmental Test Items, Testing Conditions, Methods, and Criteria

<table>
<tr><th>Test Item</th><th>Testing condition and method</th><th>Criteria</th></tr>
<tr><td></td><td>(Omitted)</td><td></td></tr>
<tr><td>Vibration test</td><td>(Omitted)</td><td>- No abnormality is observed.
- The equipment operates satisfactory.</td></tr>
<tr><td></td><td>- When resonance points do not exist, apply the vibration of acceleration ± 0.7 g at 30 Hz for 90 minutes as an endurance test.
- When resonance points exist, repeat the endurance test after taking measures to avoid the resonance or apply the vibration (same amplitude or acceleration of resonance point) at the resonance frequency for 90 minutes.
- Where several resonance points are found close to each other, the sweeping endurance test for 120 minutes may be applied. In this case, the sweeping frequency range is from 0.8 to 1.2 times the frequency at the largest of several critical resonance points (mechanical resonance that sounds like chattering occurs or the equipment being tested may start to malfunction)where Q≥2.
- Check the operation of the equipment during the test.
- The test is carried out in three axis direction.
- For the equipment intended to be installed in severe vibration conditions such as near <s>diesel</s> <u>reciprocating internal combustion</u> engines or air compressors, the testing conditions specified below are to be applied.
<table>
<tr><th>Frequency</th><th>Amplitude or Acceleration</th></tr>
<tr><td>2 (+3, -0) Hz-25.0 Hz
25.0 Hz-100 Hz</td><td>Amp. ±1.6 mm
Acceleration ±4.0 g</td></tr>
</table>
- For equipment specified for more severe vibration levels (for example, equipment installed on exhaust manifolds and fuel oil injection systems of <s>diesel</s> <u>reciprocating internal combustion</u> engines), tests are to be carried out at agreed vibration levels, frequency ranges and durations. In such cases, the testing condition specified below may be applied as the agreed testing condition.
<table>
<tr><th>Frequency</th><th>Acceleration</th><th>Temperature</th><th>Duration</th></tr>
<tr><td>40 Hz-2000 Hz</td><td>±10.0 g</td><td>600 °C</td><td>90 minutes</td></tr>
</table>
- Detailed test methods are referred to Test Fc of IEC 60068-2-6.</td><td></td></tr>
<tr><td></td><td>(Omitted)</td><td></td></tr>
</table>

EFFECTIVE DATE AND APPLICATION (Amendment 1-8)

1. The effective date of the amendments is 1 July 2020.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to automatic devices and equipment whose applications for approval of use are submitted to the Society before the effective date.

Amendment 1-9

Part 7 CONTROL AND INSTRUMENTATION EQUIPMENT AND ELECTRICAL INSTALLATIONS

Chapter 6 APPROVAL OF USE OF CRANKCASE OIL MIST DETECTION ARRANGEMENTS

6.3 Approval Tests

6.3.3 Functional Test

Sub-paragraph -4 has been amended as follows.

4 It is to be demonstrated that the openings of detector equipment do not become occluded or blocked under the continuous splash and spray of ~~engine~~ lubricating oil of reciprocating internal combustion engines, as may occur in the crankcase atmosphere. Testing is to be in accordance with arrangements proposed by the manufacturer and agreed to by the Society. The temperature, quantity and angle of impact of the oil to be used is to be stated and their selection justified by the manufacturer.

EFFECTIVE DATE AND APPLICATION (Amendment 1-9)

1. The effective date of the amendments is 1 July 2020.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to oil mist detection arrangements for which the application for approval of use is submitted to the Society before the effective date.