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# **RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS**

**RULES**

**Part N**

**Ships Carrying Liquefied Gases in Bulk**

**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.

Rule No.47      30 June 2020

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

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

**Part N            SHIPS CARRYING LIQUEFIED GASES IN BULK**

**Amendment 1-1**

**Chapter 5    PROCESS PRESSURE VESSELS AND LIQUID, VAPOUR, AND  
PRESSURE PIPING SYSTEMS**

**5.11      Piping System Component Requirements (*IGC Code 5.11*)**

**5.11.2      Pipe Wall Thickness\***

Sub-paragraph -4 has been amended as follows.

**4**    Where necessary for mechanical strength to prevent damage, collapse, excessive sag or buckling of pipes due to superimposed loads, the wall thickness is to be increased over that required by **5.11.2-2** or, if this is impracticable or would cause excessive local stresses, these loads may be reduced, protected against or eliminated by other design methods. Such superimposed loads may be due to: supporting structures, ship deflections, liquid pressure surges during transfer operations, the weights of suspended valves, reactions to loading arm connections, or otherwise.

**EFFECTIVE DATE AND APPLICATION (Amendment 1-1)**

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

## Chapter 11 FIRE PROTECTION AND EXTINCTION

### 11.1 Fire Safety Requirements (*IGC Code* 11.1)

#### 11.1.1 General\*

Sub-paragraph -1(5) has been amended as follows.

**1** The requirements for tankers in **Part R** are to apply to ships covered by this Part, irrespective of tonnage including ships of less than 500 *gross tonnage*, except those specified in **(1)** to **(5)** below.

- (1) **1.1.1** (except **1.1.1-2**), **4.5.1-6** and **-8**, **4.5.10** and **Chapter 21**, **Part R** are not to apply;
- (2) **10.4** and **10.5** (except **10.5.5**), **Part R** are to apply, as they would apply to tankers of 2,000 *gross tonnage* and over;
- (3) **10.5.5**, **Part R** is to apply to ships of 2,000 *gross tonnage* and over.
- (4) The following requirements in other Parts related to tankers are not to apply and are to be replaced by Chapters and Sections of this Part as detailed in **Table N11.1**.
- (5) **4.2.2(8)**, **13.3.3** and **13.4.7**, **Part R** are to apply to ships of 500 *gross tonnage* and over.

#### 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 ships for which the date of contract for construction is before 1 July 2003.

## Chapter 5 PROCESS PRESSURE VESSELS AND LIQUID, VAPOUR, AND PRESSURE PIPING SYSTEMS

### 5.12 Materials (*IGC Code 5.12*)

Paragraph 5.12.5 has been added as follows.

#### **5.12.5 Outer Pipes or Ducts in which Gas Fuel Piping is Installed**

The effects of both pressure and possible low temperature in the event of a high pressure line failure are to be taken into account for materials used for an outer pipe or a duct equipped with mechanical exhaust ventilation having a capacity of at least 30 air changes per hour in accordance with 16.4.3(2).

### EFFECTIVE DATE AND APPLICATION (Amendment 1-3)

1. The effective date of the amendments is 1 January 2021.
  2. Notwithstanding the amendments to the Rules, the current requirements apply to piping components other than those which fall under the following:
    - (1) Piping components used on ships for which the date of contract for construction\* is on or after the effective date;
    - (2) Piping components for which the application for surveys is submitted to the Society on or after 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.

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# **GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS**

**Part N**

**Ships Carrying Liquefied Gases in Bulk**

**GUIDANCE**

**2020          AMENDMENT NO.1**

Notice No.26          30 June 2020

Resolved by Technical Committee on 22 January 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 N SHIPS CARRYING LIQUEFIED GASES IN BULK**

**Amendment 1-1**

**N4 CARGO CONTAINMENT**

**N4.19 Materials**

Paragraph N4.19.1 has been amended as follows.

**N4.19.1 Materials Forming Ship Structure**

(-1 to -3 are omitted)

**4** For the purpose of 4.19.1-6, Part N of the Rules, the following (1) to (3) are to be complied with:

- (1) “Heating system” referred to in the requirements in **4.19.1-6, Part N of the Rules** is to be such that in the case of a single failure of a mechanical or electrical component in any part of the system, heating can be maintained at not less than 100 % of the theoretical heat requirement. ~~With respect to the requirement, the following 5 and 6 are to be complied with.~~
- ~~5~~(2) Where ~~4~~(1) above are met by duplication of the system components, i.e., heaters, glycol circulation pumps, electrical control panel, auxiliary boilers etc., all electrical components of at least one of the systems are to be supplied from the emergency source of electrical power switchboard.
- ~~6~~(3) Where duplication of the primary source of heat, e.g., oil-fired boiler is not feasible, alternative proposals, such as an electric heater capable of providing 100\_% of the theoretical heat requirement provided and supplied by an individual circuit arranged separately on the emergency switchboard, may be accepted. Other solutions may be considered towards satisfying the requirements of **4.19.1-6(1), Part N of the Rules** provided a suitable risk assessment is conducted to the satisfaction of the Administration. The requirement of ~~5~~(2) above continues to apply to all other electrical components in the system.

## 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 ships the keels of which are laid or which are at *a similar stage of construction* before 1 July 2019.

(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.



**Annex 1                      GUIDANCE FOR EQUIPMENT AND FITTINGS OF SHIPS  
CARRYING LIQUEFIED GASES IN BULK**

**Chapter 3    CARGO PUMPS**

**3.6        Tests and Inspection**

**3.6.1        Type Tests**

Sub-paragraph -2 has been amended as follows.

- 1**     Each size and type of pump are to be subjected to design assessments and type testing.
- 2**     Regarding the tests specified in -1 above, the tests and inspections specified in the following **(1) through (5)** are to be conducted. However, where a satisfactory in-service history of an existing pump design previously approved by the Society is submitted by the manufacturer and deemed appropriate by the Society, tests and inspections in the presence of the Surveyor may be substituted for manufacturer tests and inspections.  
((1) to (5) are omitted.)

**3.6.2        Product Inspections**

Sub-paragraph -3 has been added as follows.

- 1**     At time of manufacture, pumps are to be subjected to the tests and inspections specified in the following **(1) through (3)**:
  - (1)**    Material tests:  
As per the requirements given in the relevant Chapters of **Part K of the Rules** and **Table N6.4, Part N of the Rules**.
  - (2)**    Hydraulic tests or hydrostatic tests:  
The pressure bearing parts of pumps are to be subjected to a hydrostatic test or a pressure test by air or other suitable fluid. The test pressure is to be 1.5 times design pressure.
  - (3)**    Operating tests:  
Pumps are to be subjected to design temperature operational tests. For submerged electric motor driven pumps, the capacity test is to be carried out with the design medium or with a medium below the minimum working temperature. For shaft driven deep well pumps, the capacity test may be carried out with water.
- 2**     After being installed onboard ships, pumps are to be subjected to the service tests specified in **5.13.2-5, Part N of the Rules**.
- 3**     With respect to the tests and surveys specified in -1, in cases where manufacturers have been assessed in accordance with the “Rules for Approval of Manufacturers and Service Suppliers”, the items requiring testing in the presence of a surveyor may be reduced by the submission of test results.

## EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

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

## N4 CARGO CONTAINMENT

### N4.20 Construction Processes

Paragraph N4.20.1 has been amended as follows.

#### N4.20.1 Weld Joint Design

**1** In application of the requirements in **4.20.1-1, Part N of the Rules**, welded corners (i.e. corners made of weld metal) are not to be used in the main tank shell construction, i.e. corners between shell side (sloped plane surfaces parallel to hopper or top side inclusive if any) and bottom or top of the tank, and between tank end transverse bulkheads and bottom, top or shell sides (sloped plane surfaces inclusive if any) of the tank. Instead, tank corners which are constructed using bent plating aligned with the tank surfaces and connected with in-plane welds are to be used. Tee welds can be accepted for other localised constructions of the shell such as suction well, sump, dome, etc. where tee welds of full penetration type are also to be used.

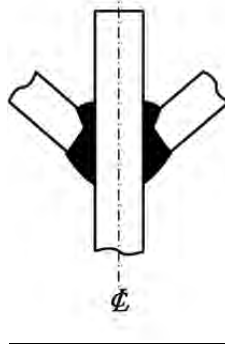
**2** The “dome-to-shell connections” referred to in the requirements in **4.20.1, Part N of the Rules** are applicable to tanks with *MARVS* is 0.07 MPa or below, and the connections mean ordinary cargo pipes or other penetrations of equivalent size sufficiently small when compared with the size of dome.

**3** In welding of the penetrations referred to in the preceding -1 full penetration type welding may not be required, but are to have proper grooves. In this case, all the weld lines for penetrations of pipes with outside diameter exceeding 100 mm, and the partial weld lines for those with outside diameter of 100 mm or below, are to be subjected to non-destructive test as appropriate.

**4** The “very small process pressure vessels” referred to in the requirements in **4.20.1-2(1), Part N of the Rules** means pressure vessels which are so small that it is difficult to remove their backing strip.

**5** In application of the requirements in **4.20.1-2(1), Part N of the Rules**, cruciform full penetration welded joints in a bi-lobe tank with centreline bulkhead can be accepted for the tank structure construction at tank centreline welds with bevel preparation subject to the approval of the Administration or the Society, based on the results of the tests carried out at the approval of the welding procedure. (See **Fig. N4.20.1-1**)

Fig. N4.20.1-1



## EFFECTIVE DATE AND APPLICATION (Amendment 1-3)

1. The effective date of the amendments is 1 July 2020.
2. Notwithstanding the amendments to the Guidance, the current requirements apply to ships other than ships that fall under both of the following:
  - (1) for which the date of contract for construction is on or after the effective date; and
  - (2) the keels of which are laid or which are at *a similar stage of construction* on or after 1 July 2016.

(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.

## **N5 PROCESS PRESSURE VESSELS AND LIQUID, VAPOUR, AND PRESSURE PIPING SYSTEMS**

### **N5.12 Materials**

Paragraph N5.12.3 has been added as follows.

#### **N5.12.3 Cargo Piping Insulation**

**1** The wording “a thermal insulation system as required to minimize heat leak into the cargo during transfer operations” specified in **5.12.3-1, Part N of the Rules** means that properties of the piping insulation are to be taken into consideration when calculating the heat balance of the containment system and capacity of the pressure/temperature control system.

**2** The wording “protect personnel from direct contact with cold surfaces” specified in **5.12.3-1, Part N of the Rules** means that surfaces of cargo piping systems with which personnel are likely to come into contact with under normal conditions are to be protected by thermal insulation, except in cases like the following examples:

- (1)** Surfaces of cargo piping systems which are protected by physical screening measures to prevent such direct contact;
- (2)** Surfaces of manual valves provided with extended spindles to protect the operator from the cargo temperature;
- (3)** Surfaces of cargo piping systems whose design temperatures (to be determined from inner fluid temperature) are above -10 °C.

### **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 ships the keels of which are laid or which are at *a similar stage of construction* before the effective date.  
(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.

## N13 INSTRUMENTATION AND AUTOMATION SYSTEMS

### N13.9 System Integration

Paragraph N13.9.3 has been amended as follows.

#### N13.9.3 Risk Assessment

**1** The wording “integrated system” in **13.9.3, Part N of the Rules** means a combination of computer-based systems which are used for the control, monitoring/alarm and safety functions required for the carriage, handling and conditioning of cargo liquid and vapours that are interconnected in order to allow communication between different computer-based systems and to allow centralized access to monitoring/alarm and safety information and/or command/control. (Refer to *MSC/Circ.891*)

**2** The wording “appropriate risk-based techniques” in **13.9.3, Part N of the Rules** means *FTA*, *FMEA*, *FMECA*, etc.

### 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 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.

## **N16 USE OF CARGO AS FUEL**

### **N16.1 General**

#### **N16.1.1 General**

Sub-paragraph -1 has been amended as follows.

**1** The requirements for gas fuel ~~diesel~~ engines, gas fuel boilers and gas combustion units are to be in accordance with **Annex 3 “GUIDANCE FOR HIGH PRESSURE DUAL FUEL ~~DIESEL~~ ENGINES”** or **Annex 4 “GUIDANCE FOR LOW PRESSURE DUAL FUEL ~~DIESEL~~ ENGINES”**, **Annex 2 “GUIDANCE FOR DUAL FUEL BOILERS”** and **Annex 2A “GUIDANCE FOR GAS COMBUSTION UNITS”** respectively. In addition, gas fuel turbines are to be as deemed appropriate by the Society.

Title of Annex 3 has been amended as follows.

### **Annex 3        GUIDANCE FOR HIGH PRESSURE DUAL FUEL ~~DIESEL~~ ENGINES**

#### **Chapter 1    GENERAL**

##### **1.1        Scope**

Sub-paragraph -1 has been amended as follows.

**1** The Guidance applies to ~~diesel~~ engines so designed that directly inject methane gas fuel (boil-off gases and cargo vapour), which is precompressed to a high pressure, into cylinders at a high pressure, at the termination of the compression stroke and ignite with an appropriate source of ignition for due combustion (hereinafter referred to as “high pressure ~~DFD~~ engine”) and to gas fuel supply systems in accordance with the requirements in **16.1.1, Part N of the Rules**.

Title of Annex 4 has been amended as follows.

## **Annex 4            GUIDANCE FOR LOW PRESSURE DUAL FUEL DIESEL ENGINES**

### **Chapter 1    GENERAL**

#### **1.1        Scope**

Sub-paragraph -1 has been amended as follows.

**1**        The Guidance applies to trunk-piston type ~~diesel~~ engines supplied with low pressure natural gas as fuel (hereinafter referred to as “low pressure DFD engine”) and gas fuel supply systems in accordance with the requirements of **16.1.1, Part N of the Rules**.

#### **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 gas-fuelled engines for which the application for approval is submitted to the Society before the effective date.



## N11 FIRE PROTECTION AND EXTINCTION

### N11.3 Water Spray System

Paragraph N11.3.4 has been added as follows.

#### **N11.3.4 Protection by the Fire Pumps**

**1** The following terms and expressions in **11.3.4, Part N of the Rules** are clarified to mean as follows.

- (1)** The expression “one of the fire pumps or emergency fire pump” refers to those fire pumps required in accordance with **10.2.2, Part R of the Rules** that are installed outside the space where the spray pumps are located.
- (2)** The expression “fire in one compartment” refers to a compartment provided with A-class boundaries in which is located the fire pump(s), or the source of power of the fire pump(s), serving the water-spray system in accordance with **11.3.3, Part N of the Rules**.
- (3)** The term “fire pumps”, in cases where not qualified by the word “emergency”, refers to those fire pumps required in accordance with **10.2.2-2, Part R of the Rules**.

**2** With respect to the requirements of **11.3.4, Part N of the Rules**, the capacity of emergency fire pumps that are also used to supply water spray systems is to be decided in accordance with following **(1)** to **(4)**.

- (1)** In cases where the emergency fire pump is used to meet this requirement, its capacity, in addition to being capable of maintaining two jets of water as required by **32.2.2-1, Part R of the Rules**, is to be increased taking into account the spray application rates stated in **11.3.2-1, Part N of the Rules**, but limiting coverage to boundaries of normally manned superstructures and deckhouses, survival crafts and their muster areas as specified in **11.3.4, Part N of the Rules**.
- (2)** In addition to **(1)** above, if all the fire pumps mentioned in **-1(3)** above supplying the water spray system (for covering the superstructures and deckhouses) are disabled due to a fire in any one compartment, then the emergency fire pump is to be sized to cover:
  - (a)** the water spray system for the boundaries of the superstructures and deckhouses, and lifeboats, liferafts and muster areas facing the cargo area, (as per **11.3.4, Part N of the Rules**); and
  - (b)** two fire hydrants (as per **11.2, Part N of the Rules**).
- (3)** When the ship is also fitted with a total flooding high expansion foam system protecting the engine-room (to comply with **10.5.1-1(2), Part R of the Rules**) and the emergency fire pump is intended to supply sea water to this system, then the emergency fire pump is to also be sized to cover the foam system for dealing with an engine-room fire, when the main fire pumps are disabled.
- (4)** On the basis of the principle of dealing with one single fire incident at a time, the emergency fire pump does not need to be sized to cover all three systems referred to in **(1)**, **(2)** and **(3)** above (i.e. water spray, hydrants and foam) at the same time and is to only need to be sized to cover the most demanding area and required systems, as follows:
  - (a)** the foam system + two hydrants; or
  - (b)** the water spray system + two hydrants;whichever is greater.

## EFFECTIVE DATE AND APPLICATION (Amendment 1-7)

1. The effective date of the amendments is 1 January 2021.
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.