22-440

# RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

## Part N Ships Carrying Liquefied Gases in Bulk

**Rules for the Survey and Construction of Steel Ships**
**Part N 2022 AMENDMENT NO.1**
**Guidance for the Survey and Construction of Steel Ships**
**Part N 2022 AMENDMENT NO.1**

Rule No.45 / Notice No.31 30 June 2022
Resolved by Technical Committee on 26 January 2022

ClassNK
NIPPON KAIJI KYOKAI

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

# RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

RULES

## Part N Ships Carrying Liquefied Gases in Bulk

**2022 AMENDMENT NO.1**

Rule No.45 30 June 2022

Resolved by Technical Committee on 26 January 2022

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

Rule No.45 30 June 2022
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

## Chapter 6 MATERIALS OF CONSTRUCTION AND QUALITY CONTROL

### 6.4 Requirements for Metallic Materials (with reference to *IGC Code* 6.4)

#### 6.4.1 General Requirements for Metallic Materials*

**1** The requirements for materials of construction are shown in the tables as follows:

(1) **Table N6.1**: Plates, pipes (seamless and welded), sections and forgings for cargo tanks and process pressure vessels for design temperatures not lower than 0°C.

(2) **Table N6.2**: Plates, sections and forgings for cargo tanks, secondary barriers and process pressure vessels for design temperatures below 0°C and down to -55°C.

(3) **Table N6.3**: Plates, sections and forgings for cargo tanks, secondary barriers and process pressure vessels for design temperatures below -55°C and down to -165°C.

(4) **Table N6.4**: Pipes (seamless and welded), forgings and castings for cargo and process piping for design temperatures below 0°C and down to -165°C.

(5) **Table N6.5**: Plates and sections for hull structures required by **4.19.1-2** and **4.19.1-3**.

(6) Castings for cargo and process piping for design temperatures not lower than 0°C are to be as deemed appropriate by the Society.

**2** Metallic materials specified in this Part, according to the requirements in **1.1.1-2**, **Part K of the Rules**, are to comply with the requirements of **Part K of the Rules** in addition to those specified in this Part.

Table N6.1 has been amended as follows.

Table N6.1 Plates, Pipes (Seamless and Welded)[1][2], Sections and Forgings for Cargo Tanks and Process Pressure Vessels for Design Temperatures Not Lower than 0°C

| | | |
|---|---|---|
| Chemical Composition and Head Treatment:<br>Carbon - manganese steel (to be Fully killed fine grain steel)<br>Small additions of alloying elements by agreement with the Society<br>Composition limits to be approved by the Society<br>Normalized, or quenched and tempered[4] | | |
| Tensile and Toughness (Impact) Test Requirements: | | |
| Sampling frequency: | | |
| Plates | Each “piece” to be tested | |
| Sections and Forgings | Each “lot” to be tested | |
| Mechanical properties: | | |
| Tensile Properties | Specified minimum yield stress not to exceed 410*N/mm*$^2$[5] | |
| Toughness (Charpy *V*- Notch Test): | | |
| Plates | Transverse test pieces. Minimum average energy value (*KV*) 27 *J* | |
| Sections and Forgings: | Longitudinal test pieces. Minimum average energy value (*KV*) 41 *J* | |
| Test Temperature: | Thickness *t* (*mm*)[3] | Test temperature (°C) |
| | $t \leq 20$ | 0 |
| | $20 < t \leq 40$[3] | -20 |
| | $40 < t \leq 50$[6] | -20[7] |
| | | -30[8] |

Notes:

(1) For seamless pipes and fittings the requirements of **Part K** applies. The use of longitudinally and spirally welded pipes are to be specially approved by the Society.

(2) Charpy *V*-notch impact tests are not required for pipes.

(3) This table is generally applicable for material thicknesses up to ~~40~~ 50 *mm*. Proposals for greater thicknesses are to be approved by the Society.

(4) A controlled rolling procedure or *TMCP* may be used as an alternative.

(5) Materials with specified minimum yield stress exceeding 410 *N/mm*$^2$ may be specially approved by the Society. For these materials, particular attention is to be given to the hardness of the weld and heat affected zone.

(6) In addition to **6.3.2-2**, test specimens are to be taken at portions where the axis of the test specimen corresponds to approximately 1/2 the thickness from the surface. This, however, does not apply to the rolled steels for hulls and high strength rolled steels for offshore structures respectively specified in **3.1** and **3.8**, **Part K of the Rules**.

(7) Applicable to type *C* independent tanks and process pressure vessels. In addition, post-weld stress relief heat treatment is to be performed. When an alternative approach is to be used in lieu of post-weld stress relief heat treatment, the Society’s approval is required.

(8) Applicable to cargo tanks other than type *C* independent tanks.

Table N6.2 has been amended as follows.

Table N6.2 Plates, Sections and Forgings[1] for Cargo Tanks, Secondary Barriers and Process Pressure Vessels for Design Temperatures below 0℃ and down to -55℃ (Maximum Thickness 25 *mm*[2])

| | | | | | |
|---|---|---|---|---|---|
| Chemical Composition and Head Treatment: | | | | | |
| Carbon-manganese Steel (to be fully-killed aluminium treated grain steel) | | | | | |
| Chemical composition (ladle analysis) | | | | | |
| *C* | *Mn* | *Si* | *S* | *P* | |
| 0.16%max[3] | 0.70 - 1.60% | 0.10 - 0.50% | 0.025%max. | 0.025%max. | |
| Optional additions: Alloys and grain refining elements may be generally in accordance with the following: | | | | | |
| *Ni* | *Cr* | *Mo* | *Cu* | *Nb* | *V* |
| 0.80%max. | 0.25%max. | 0.08%max. | 0.35%max. | 0.05%max. | 0.10%max. |
| *Al* content total 0.02% min (Acid soluble 0.015% min) | | | | | |
| Normalized or quenched and tempered[4] | | | | | |
| Tensile and Toughness (Impact) Test Requirements: | | | | | |
| Sampling frequency: | | | | | |
| Plates | Each “piece” to be tested | | | | |
| Sections and Forgings | Each “lot” to be tested | | | | |
| Mechanical properties: | | | | | |
| Tensile properties | Specified minimum yield stress not to exceed 410 *N/mm*$^2$[5] | | | | |
| Toughness (Charpy *V*- Notch Test): | | | | | |
| Test Temperatures Plates | Test temperatures 5℃ below the design temperatures or -20℃ whichever is lower | | | | |
| Sections and Forgings[1] | Transverse test pieces. Minimum average energy value (*KV*) 27 *J* | | | | |
| | Longitudinal test pieces. Minimum average energy value (*KV*) 41 *J* | | | | |

Notes:

(1) The Charpy *V*-notch and Chemistry requirements for forgings may be specially considered by the Society.

(2) For material thickness of more than 25 *mm*, Charpy *V*-notch tests are to be conducted as follows:

| Material thickness (*mm*) | Test temperature (℃) |
|---|---|
| $25 < t \leq 30$ | 10℃ below design temperature or -20℃, whichever is lower |
| $30 < t \leq 35$ | 15℃ below design temperature or -20℃, whichever is lower |
| $35 < t \leq 40$ | 20℃ below design temperature |
| ~~$40 < t$~~ | ~~Temperature approved by the Society~~ |
| Type *C* independent tanks and process pressure vessels | |
| $40 < t \leq 50$ | 5℃ below design temperature or -20℃ whichever is lower |
| $50 < t$ | Temperature approved by the Society |
| Fuel tanks other than type *C* independent tanks | |
| $40 < t \leq 45$ | 25℃ below design temperature |
| $45 < t \leq 50$ | 30℃ below design temperature |
| $50 < t$ | Temperature approved by the Society |

The minimum average energy value is to be in accordance with the table for the applicable type of test specimen.

Materials for tanks and parts of tanks which are completely thermally stress relieved after welding may be tested at a temperature 5℃ below design temperature or -20℃ whichever is lower.

For thermally stress relieved reinforcements and other fittings, the test temperature are to be the same as that required for the adjacent tank-shell thickness.

Where thickness is greater than 40 *mm*, in addition to **6.3.2-2**, test specimens are to be taken at portions where the axis of the test specimen corresponds to approximately 1/2 the thickness from the surface. This, however, does not apply to the rolled steels for hulls and high strength rolled steels for offshore structures respectively specified in **3.1** and **3.8, Part K of the Rules**.

Where steels with thicknesses greater than 40 *mm* but not more than 50 *mm* are used for type *C* independent tanks and process pressure vessels, post-weld stress relief heat treatment is to be performed. When an alternative approach is to be used in lieu of post-weld stress relief heat treatment, the Society’s approval is required.

(3) By special agreement with the Society, the carbon content may be increased to 0.18% maximum provided the design temperature is not lower than -40℃

(4) A controlled rolling procedure or *TMCP* may be used as an alternative.

(5) Materials with specified minimum yield stress exceeding 410 $N/mm^2$ may be approved by the Society. For these materials, particular attention is to be given to the hardness of the welded and heat affected zones.

Guidance:

For materials exceeding 25 *mm* in thickness for which the test temperature is -60℃ or lower, the application of specially treated steels or steels in accordance with **Table N6.3** may be necessary.

Table N6.3 has been amended as follows.

Table N6.3 Plates, Sections and Forgings[1] for Cargo Tanks, Secondary Barriers and Process Pressure Vessels for Design Temperatures below -55℃ and down to -165℃[2] (Maximum Thickness 25 *mm*[3][4])

| Minimum design temp. (℃) | Chemical composition[5] and heat treatment | Impact test temp (℃) |
|---|---|---|
| -60 | 1.5% nickel steel - normalized or normalized and tempered or quenched and tempered or *TMCP*[6] | -65 |
| -65 | 2.25% nickel steel - normalized or normalized and tempered or quenched and tempered or *TMCP*[6][7] | -70 |
| -90 | 3.5% nickel steel - normalized or normalized and tempered or quenched and tempered or *TMCP*[6][7] | -95 |
| -105 | 5% nickel steel - normalized or normalized and tempered or quenched and tempered[6][7][8] | -110 |
| -165 | 9% nickel steel - double normalized and tempered or quenched and tempered[6] | -196 |
| -165 | Austenitic stainless steels, such as types *304*, *304L*, *316*, *316L*, *321* and *347* solution treated[9] | -196 |
| -165 | Aluminium alloys[10]: such as type *5083* annealed | Not required |
| -165 | Austenitic *Fe-Ni* alloy (36% nickel) Heat treatment as agreed | Not required |
| Tensile and Toughness (Impact) Test Requirements: Sampling frequency: Plates — Each "piece" to be tested; Sections and Forgings — Each "lot" to be tested. Toughness (Charpy *V*- Notch Impact Test): Plates Sections and Forgings — Transverse test pieces. Minimum average energy value (*KV*) 27 *J*; Longitudinal test pieces. Minimum average energy value (*KV*) 41 *J* | | |

Notes:

(1) The impact test required for forgings used in critical applications is to be subject to special consideration by the Society.

(2) The requirements for design temperatures below -165℃ is to be specially agreed with the Society.

(3) For materials 1.5% *Ni*, 2.25% *Ni*, 3.5% *Ni* and 5% *Ni*, with thicknesses greater than 25 *mm*, the impact tests are to be conducted as follows:

| Material thickness (*mm*) | Test temperature (℃) |
|---|---|
| $25 < t \leq 30$ | 10℃ below design temperature |
| $30 < t \leq 35$ | 15℃ below design temperature |
| $35 < t \leq 40$ | 20℃ below design temperature |
| $40 < t \leq 45$ | 25℃ below design temperature |
| $45 < t \leq 50$ | 30℃ below design temperature |

In no case is the test temperature to be above that indicated in **Table N6.3**.

The minimum average energy value is to be in accordance with the table for the applicable type of test specimen. For material thickness of more than ~~40~~ 50 *mm*, the Charpy *V*-notch values are to be specially considered.

Where thickness is greater than 40 *mm*, in addition to **6.3.2-2**, test specimens are to be taken at portions where the axis of the test specimen corresponds to approximately 1/2 the thickness from the surface.

(4) For 9% *Ni*, austenitic stainless steels and aluminium alloys, thicknesses greater than 25 *mm* may be used at the discretion of the Society.

(5) The chemical composition limits are to be in accordance with recognized standards deemed appropriate by the Society.

(6) *TMCP* nickel steels will be subject to acceptance by the Society.

(7) A lower minimum design temperature for quenched and tempered steels may be specially agreed with the Society.

(8) A specially heat treated 5% nickel steel, for example triple heat treated 5% nickel steel, may be used down to -165℃ upon special agreement with the Society, provided that the impact tests are carried out at-196℃

(9) The impact test may be omitted subject to agreement with the Society.

(10) For aluminium alloys other than type 5083, additional tests may be required to verify the toughness of the material.

## 6.6 Other Requirements for Construction in Metallic Materials (*IGC Code* 6.6)

Paragraph 6.6.2 has been amended as follows.

### 6.6.2 Independent Tank*

(-1 is omitted.)

**2** For type *C* tanks of carbon and carbon-manganese steel, post-weld heat treatment is to be performed after welding, if the design temperature is below -10°C. Post-weld heat treatment in all other cases and for materials other than those mentioned above is to be at the discretion of the Society. The soaking temperature and holding time are to be at the discretion of the Society.

**3** In the case of type *C* tanks and large cargo pressure vessels of carbon or carbon-manganese steel with thicknesses of not more than 40 *mm* for which it is difficult to perform the heat treatment, mechanical stress relieving by pressurizing may be carried out as an alternative to the heat treatment and subject to the following conditions:

(1) Complicated welded pressure vessel parts such as sumps or domes with nozzles, with adjacent shell plates are to be heat treated before they are welded to larger parts of the pressure vessel;

(2) The mechanical stress relieving process is to preferably be carried out during the hydrostatic pressure test required by **4.23.6**, by applying a higher pressure than the test pressure required by **4.23.6-1**. The pressurizing medium is to be water;

(3) For the water temperature, **4.23.6-2** applies;

(4) Stress relieving is to be performed while the tank is supported by its regular saddles or supporting structure or, when stress relieving cannot be carried out on board, in a manner which will give the same stresses and stress distribution as when supported by its regular saddles or supporting structure;

(5) The maximum stress relieving pressure is to be held for 2 *hours* per 25 *mm* of thickness, but in no case less than 2 *hours*;

(6) The upper limits placed on the calculated stress levels during stress relieving are to be the following:
   (a) Equivalent general primary membrane stress: 0.9 $R_e$;
   (b) Equivalent stress composed of primary bending stress plus membrane stress: 1.35 Re, where $R_e$ is the specific lower minimum yield stress or 0.2% proof stress at test temperature of the steel used for the tank;

(7) Strain measurements will normally be required to prove these limits for at least the first tank of a series of identical tanks built consecutively. The location of strain gauges is to be included in the mechanical stress relieving procedure to be submitted in accordance with **6.6.2-3**;

(8) The test procedure is to demonstrate that a linear relationship between pressure and strain is achieved at the end of the stress relieving process when the pressure is raised again up to the design pressure;

(9) High-stress areas in way of geometrical discontinuities such as nozzles and other openings are to be checked for cracks by dye penetrant or magnetic particle inspection after mechanical stress relieving. Particular attention in this respect is to be paid to plates exceeding 30 *mm* in thickness;

(10) Steels which have a ratio of yield stress to ultimate tensile strength greater than 0.8 are to generally not be mechanically stress relieved. If, however, the yield stress is raised by a method giving high ductility of the steel, slightly higher rates may be accepted upon consideration in each case;

(11) Mechanical stress relieving cannot be substituted for heat treatment of cold formed parts of tanks, if the degree of cold forming exceeds the limit above which heat treatment is required;

(12) The thickness of the shell and heads of the tank are to not exceed 40 *mm*. Higher thicknesses

may be accepted for parts which are thermally stress relieved;

(13) Local buckling is to be guarded against, particularly when tori-spherical heads are used for tanks and domes; and

(14) The procedure for mechanical stress relieving is to be submitted beforehand to the Society for approval.

**4** Where carbon or carbon-manganese steels with thicknesses of greater than 40 *mm* but not more than 50 *mm* are used for type *C* independent tanks and process pressure vessels, post-weld stress relief heat treatment may be omitted subject to agreement with the Society.

## EFFECTIVE DATE AND APPLICATION

**1.** The effective date of the amendments is 1 July 2022.

**2.** Notwithstanding the amendments to the Rules, 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.

# GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE

## Part N Ships Carrying Liquefied Gases in Bulk

**2022 AMENDMENT NO.1**

Notice No.31 30 June 2022

Resolved by Technical Committee on 26 January 2022

Notice No.31 30 June 2022
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

## N6 MATERIALS OF CONSTRUCTION AND QUALITY CONTROL

### N6.4 Requirements for Metallic Materials

### N6.4.1 General Requirements for Metallic Materials

Sub-paragraph -1 has been amended as follows.

**1** For the purpose of the requirements in **Table N6.1, Part N of the Rules**, the following requirements **(1)** to **(~~4~~3)** are to be complied with:

(1) The use of the longitudinally or spirally welded pipes given in the Note 1 of the Table is to be in accordance with the relevant requirements in **Chapter 4**, **Part K of the Rules**.

(2) Fittings of Type *C* independent tanks and process pressure vessels with the design pressure not exceeding 3 *MPa* and design temperature of 0°C or more and nominal diameter less than 100*A*.

(3) The controlled rolling as a substitution for normalizing may be of the temperature controlled rolling or Thermo-Mechanical Controlled Processing (*TMCP*).

~~(4) For materials with the thickness of greater than 40 *mm* and not more than 50 *mm*, the impact test is to be carried out at the temperature of -30°C.~~

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

**1.** The effective date of the amendments is 1 July 2022.

**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 1-2

# Annex 4 GUIDANCE FOR LOW PRESSURE DUAL FUEL ENGINES

## Chapter 2 CONSTRUCTION AND EQUIPMENT OF LOW PRESSURE DF ENGINES

### 2.4 Accessory Equipment

### 2.4.4 Gas Fuel Injection Pipes

Sub-paragraph -4(5) has been amended as follows.

**4** For piping attached to low pressure DF engines, the following **(1)** to **(5)** also apply.
((1) to (4) are omitted.)
(5) Gas admission valves
Gas admission valves are to be certified safe as follows:
(a) (Omitted)
(b) (Omitted)
(c) (Omitted)
(d) However, if they are not rated for the zone they are intended for, it is to be documented that they are suitable for that zone. Documentation and analysis is to be based on *IEC* 60079-10-1:2015 or *IEC* 60092-502:1999.

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

**1.** The effective date of the amendments is 1 July 2022.
**2.** Notwithstanding the amendments to the Guidance, the current requirements apply to gas-fuelled engines other than those which fall under the following:
(1) gas-fuelled engines for which the application for approval of use is submitted to the Society on or after the effective date; or
(2) gas-fuelled engines for which the date of renewal of approval of use is on or after the effective date.

Amendment 1-3

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

## N5.4 Design Pressure

Paragraph N5.4.4 has been amended as follows.

### N5.4.4 Outer Ducts in Gas Fuel Piping Systems

**1** The term "duct" specified in **5.4.4, Part N of the Rules** includes the equipment enclosures required by **16.4.3, Part N of the Rules** as well as structural pipe ducts intended to contain any release of gas from inner pipes or equipment. The term "structural pipe duct" means an outer duct forming part of a structure such as hull structures, superstructures or deck houses, where permitted, other than gas valve unit rooms.

**2** The "gas valve unit rooms" specified in **-1** above are to be in accordance with the following **(1)** to **(3)**:

(1) be gastight toward other enclosed spaces;

(2) be equipped with mechanical exhaust ventilation having a capacity of at least 30 air changes per hour and arranged to maintain a pressure less than atmospheric pressure; and

(3) be able to withstand the maximum built-up pressure arising in the room in the case of a gas pipe rupture, as documented by suitable calculations taking into account the ventilation arrangements.

**3** The wording "design pressure of the outer pipe or duct" specified in **5.4.4, Part N of the Rules** means one of the following:

(1) The maximum pressure that can act upon the outer pipe or equipment enclosure after an inner pipe rupture. This pressure is to be documented by suitable calculations taking into account the venting arrangements; or

(2) For gas fuel systems with an inner pipe working pressure greater than 1 *MPa*, the maximum built-up pressure arising in the annular space after an inner pipe rupture. This pressure is to be calculated in accordance with **9.8.2, Part GF of the Rules**.

## N5.13 Testing Requirements

### N5.13.2 System Testing Requirements

Sub-paragraph -3 has been renumbered to Sub-paragraph -4, and Sub-paragraph -3 has been added as follows.

**1** For the purpose of **5.13.2-3, Part N of the Rules**, the leak test of piping systems are to be conducted at a pressure which are 90 % of the design pressure of the piping. Test pressures, however, may be modified when the test is conducted using a liquid which has high leak detecting ability.

**2** The wording "maximum pressure at gas pipe rupture" specified in **5.13.2-4, Part N of the Rules** is the maximum pressure to which the outer pipe or duct is subjected after the inner pipe rupture. For testing purposes, it is the same as the design pressure specified in **5.4.4, Part N of the Rules**.

**3** The term "duct" specified in **5.13.2-4, Part N of the Rules** means that specified in **N5.4.4-1.**

**~~3~~4** For the purpose of **5.13.2-5, Part N of the Rules**, tests are to be conducted according to the

requirements in **N4.20.3-4** to **-7**.

EFFECTIVE DATE AND APPLICATION (Amendment 1-3)

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

**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.