RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

RULES

Part N Ships Carrying Liquefied Gases in Bulk

2016 AMENDMENT NO.2

Rule No.82 27th December 2016

Resolved by Technical Committee on 27th July 2016

Approved by Board of Directors on 20th September 2016

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

Rule No.82 27th December 2016

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

6.3 General Test Requirements and Specifications (*IGC Code* 6.3)

6.3.2 Toughness Test*

Sub-paragraph -4 has been amended as follows.

4 If the average value of the three initial Charpy *V*-notch specimens fails to meet the stated requirements, or the value for more than one specimen is below the required average value, or when the value for one specimen is below the minimum value permitted for a single specimen, three additional specimens from the same material may be tested and the results be combined with those previously obtained to form a new average. If ~~this~~ the new average obtained from the six specimens complies with the requirements as well as ~~and if~~ no more than two individual results are lower than the required average and no more than one result is lower than the required value for a single specimen, then the piece or lot may be accepted.

Title of Section 6.4 has been amended as follows.

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

Paragraph 6.4.2 has been added as follows.

6.4.2 Marking

Steels which have passed the required tests are to be marked with identification marks in accordance with the requirements in **Part K**; in addition, in the case of steel for which impact tests are required, the impact testing temperature and "*T*" are to be added to the markings. (Example: *KL*33-50*T*. -0*T* as suffix for 0°C.)

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°C and down to -165°C [2] (Maximum Thickness 25*mm*[3][4])

Minimum design temp. (°C)	Chemical composition[5] and heat treatment	Impact test temp (°C)
-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, 304*L*, 316, 316*L*, 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 — Transverse test pieces. Minimum average energy value (*KV*) 27*J* Sections and Forgings — 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°C 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 (°C)
$25 < t \leq 30$	10°C below design temperature
$30 < t \leq 35$	15°C below design temperature
$35 < t \leq 40$	20°C 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*mm*, the Charpy *V*-notch values are to be specially considered.

(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°C upon special agreement with the Society, provided that the impact tests are carried out at-196°C

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

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

EFFECTIVE DATE AND APPLICATION

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

2. Notwithstanding the amendments to the Rules, the current requirements apply to ships other than ships that fall under the following:

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

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

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

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

3. Notwithstanding the provision of preceding **2.**, the amendments to the Rules apply to the ships that fall under the following:

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

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

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE

Part N Ships Carrying Liquefied Gases in Bulk

2016 AMENDMENT NO.2

Notice No.83 27th December 2016
Resolved by Technical Committee on 27th July 2016

Notice No.83 27th December 2016
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 2-1

N3 SHIP ARRANGEMENTS

N3.2 Accommodation, Service and Machinery Spaces and Control Stations

Paragraph N3.2.6 has been amended as follows.

N3.2.6 Closing Devices of Air Intakes, Outlets and Other Openings

1 For the purpose of the requirements in **3.2.6, Part N of the Rules**, closing devices for air intakes and openings are to have suitable gas-tightness where steel made fire protection flaps without gaskets are not accepted.

2 For the purpose of the requirements in **3.2.6, Part N of the Rules**, the closing devices in ships intended to carry toxic products the following requirements **(1)** and **(2)** are to be complied with:

(1) The requirements in the **-1** above are to be complied with.

(2) ~~When internal closing is required, this is to include both ventilation intakes and outlets.~~ The requirement for fitting air intakes and openings with closing devices operated from inside the space need not apply to engine room casings, cargo machinery spaces, electric motor rooms and steering gear compartments.

N3.5 Access to Spaces in the Cargo Area

Paragraph N3.5.3 has been amended as follows.

N3.5.3 Access to Hold Spaces, etc.

~~The details of minimum opening size required in **3.5.3(1)(b)** and **(c), Part N of the Rules** are to be as shown in **Fig. N3.5.3.**~~

1 With respect to the provisions of **3.5.3(1)(b), Part N of the Rules**, the minimum clear opening of 600 *mm* × 600 *mm* may have corner radii up to 100 *mm* maximum. In such a case where as a consequence of structural analysis of a given design the stress is to be reduced around the opening, it is considered appropriate to take measures to reduce the stress such as making the opening larger with increased radii, e.g. 600 *mm* × 800 *mm* with 300 *mm* radii, in which a clear opening of 600 *mm* × 600 *mm* with corner radii up to 100 *mm* maximum fits. (*See* **Fig. N3.5.3-1**)

2 With respect to the provisions of **3.5.3(1)(c), Part N of the Rules**, the minimum clear opening of not less than 600 *mm* × 800 *mm* may also include an opening with corner radii of 300 *mm.* (*See* **Fig. N3.5.3-1**) An opening of 600 *mm* in height × 800 *mm* in width may be accepted as access openings in vertical structures where it is not desirable to make large opening in the structural

strength aspects, i.e. girders and floors in double bottom tanks.

3 With respect to the provisions of **3.5.3(1)(c), Part N of the Rules**, subject to verification of easy evacuation of injured person on a stretcher the vertical opening 850 *mm* × 620 *mm* with wider upper half than 600 *mm*, while the lower half may be less than 600 *mm* with the overall height not less than 850 *mm* is considered an acceptable alternative to the traditional opening of 600 *mm* × 800 *mm* with corner radii of 300 *mm* as, for example, shown in **Fig. N3.5.3-2**.

4 With respect to the provisions of **3.5.3(1)(c), Part N of the Rules**, if a vertical opening is at a height of more than 600 *mm* steps and handgrips are to be provided. In such arrangements it is to be demonstrated that an injured person can be easily evacuated.

5 The requirements of **3.5.3(1)(b)** and **(c), Part N of the Rules** do not apply to spaces separated from hold spaces for independent tanks not requiring a secondary barrier.

Fig. N3.5.3 has been deleted, and Fig. N3.5.3-1 and Fig. 3.5.3-2 have been added as follows.

~~Fig. N3.5.3 Opening Details~~

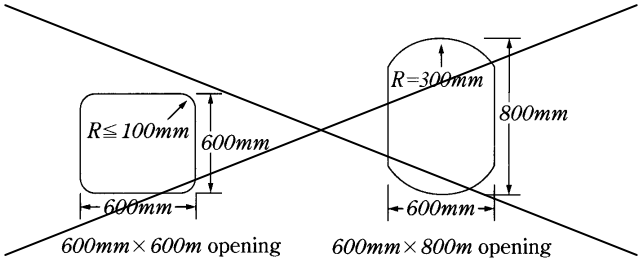
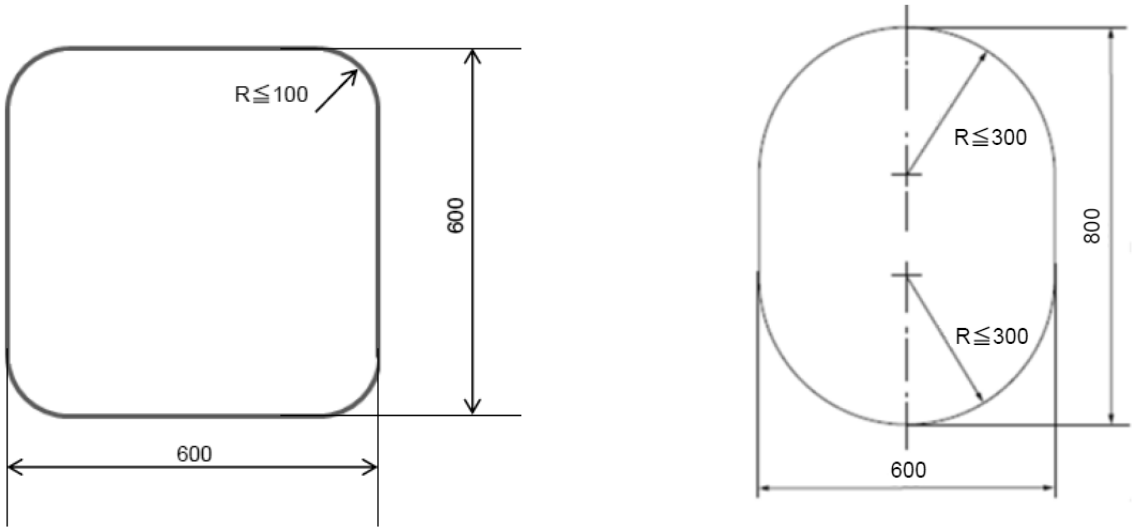


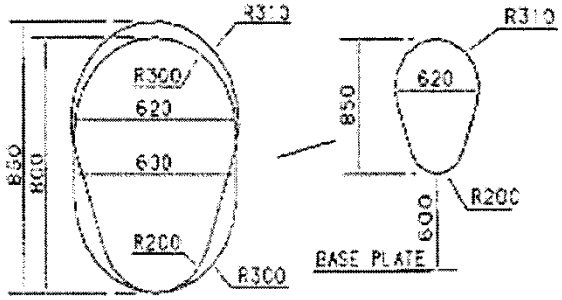
Fig. N3.5.3-1 Opening Details



600 *mm* × 600 *mm* opening

600 *mm* × 800 *mm* opening

Fig. N3.5.3-2 Example of vertical opening



EFFECTIVE DATE AND APPLICATION (Amendment 2-1)

1. The effective date of the amendments is 27 December 2016.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to ships the keels of which were laid or which were 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.

Amendment 2-2

N2 SHIP SURVIVAL CAPABILITY AND LOCATION OF CARGO TANKS

N2.7 Survival Requirements

N2.7.1 Survival Requirements

Sub-paragraph -3 has been added as follows.

3 In applying the requirements of **2.7.1-3(1), Part N of the Rules**, "other openings capable of being closed weathertight" do not include ventilators provided with weathertight closing appliances in accordance with the requirements of **23.6.5-2, Part C of the Rules** or **21.6.5-2, Part CS of the Rules** that for operational reasons have to remain open to supply air to the engine room or emergency generator room (if the same is considered buoyant in the stability calculation or protecting openings leading below) for the effective operation of the ship.

EFFECTIVE DATE AND APPLICATION (Amendment 2-2)

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

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

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

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

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

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

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

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

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

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

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

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

Note:
This Procedural Requirement applies from 1 July 2009.

Amendment 2-3

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

N5.8 Piping Fabrication and Joining Details

Paragraph N5.8.2 has been amended as follows.

N5.8.2 Direct Connections

1 The wording "recognized standards" specified in **5.8.2(2), Part N of the Rules** means *JIS B* 2316 or *JIS F* 7810 or other equivalent standards.

2 The wording "~~screwed couplings~~recognized standards" specified in **5.8.2(3), Part N of the Rules** ~~are to conform to the requirements of~~ means *JIS B* 0203 or ~~the~~ other equivalent standards.

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

Chapter 1 GENERAL

Section 1.2 has been amended as follows.

1.2 Submission of Plans and Documents

According to the requirements in **2.1.2-1(~~6~~7)** and **2.1.3-2, Part B of the Rules**, the following plans and documents relating to the equipment, etc. and those specified in **Chapter 2** and thereafter where appropriate are to be submitted to the Society:
((1) and (2) are omitted.)

Chapter 6 RELIEF VALVES

6.4 Tests and Inspection

6.4.2 Capacity Test

Sub-paragraph -1 has been amended as follows.

1 The tests to measure the relieving capacity and coefficient of discharge (hereinafter referred to as "capacity test") are to be conducted when the coefficient *K* is intended to be increased from the value approved by the prototype test ~~or otherwise approved according to the requirements in **Chapter 3, Part 6 of the Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use**~~.

EFFECTIVE DATE AND APPLICATION (Amendment 2-3)

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

2. Notwithstanding the amendments to the Guidance, the current requirements apply to ships other than ships that fall under the following:

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

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

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

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

Amendment 2-4

N6 MATERIALS OF CONSTRUCTION AND QUALITY CONTROL

N6.4 Requirements for Metallic Materials

Paragraph N6.4.1 has been amended as follows.

N6.4.1 General Requirements for Metallic Materials

(-1 and -2 are omitted.)

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

(1) For the purpose of the requirements in Note 2 of the Table, aluminium alloy of 5083, austenitic stainless steel, 36%*Ni* steel and 9%*Ni* steel may be used at the design temperature up to -196°C.

(2) For the purpose of the requirements in Note 4 of the table, 9% *Ni* steel greater than 25 *mm* and up to 40 *mm* in thickness is to be in accordance with the requirements for 9% *Ni* steel not greater than 25 *mm*.

(~~2~~3) For the purpose of the requirements in Note 5 of the Table, the chemical composition limit of a material, if the material specified in **Part K of the Rules**, is to be in accordance with the relevant requirements in **Part K**.

(~~3~~4) For the purpose of the requirements in Note 9 of the Table, the omission of the impact test given in Note 9 of this Table may generally be accepted for the austenitic stainless steel of the type referred to in the Table.

4 For the purpose of the requirements in **Table N6.4**, **Part N of the Rules**, the following requirements **(1)** through **(5)** are to be complied with:

(1) The use of vertically or spirally welded pipes given in Note 1 of the Table is to be in accordance with the requirements in the preceding **-1(1)**.

(2) The requirements for forgings and castings given in Note 2 of the Table are to be in accordance with the relevant requirements in the **Part K**, if specified.

(3) For the design temperature given in Note 3 of the Table lower than -165°C, the provision in the preceding **-3(1)** are to apply.

(4) The chemical composition limit given in Note 5 of the Table is to be in accordance with the requirements in the preceding **-3(~~2~~3)**.

(5) The omission of the impact test given in Note 8 of this Table are to be in accordance with the requirements in the preceding **-3(~~3~~4)**.

5 For the purpose of the requirements in **6.4.1(6)**, **Part N of the Rules**, the specifications of a certain type of material, if specified in **Part K of the Rules**, is to be in accordance with the relevant requirements in **Part K of the Rules**.

EFFECTIVE DATE AND APPLICATION (Amendment 2-4)

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

2. Notwithstanding the amendments to the Guidance, the current requirements apply to ships other than ships that fall under the following:

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

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

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

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

3. Notwithstanding the provision of preceding **2.**, the amendments to the Guidance apply to the ships that fall under the following:

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

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

Amendment 2-5

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

Chapter 5 VALVES

5.1 General

Paragraph 5.1.1 has been amended as follows.

5.1.1 Application

The requirements in this chapter apply to valves directly fitted onto cargo tanks or interbarrier spaces, ~~and~~ valves for cargo and process piping, and valves for accessory piping or instrumentation piping in accordance with the requirements in **Chapter 5, Part N of the Rules**. Relief valves subject to the requirements in **Chapter 6** are exempt from these requirements.

5.3 Tests and Inspection

5.3.2 Product Inspection

Sub-paragraph -4 has been added as follows.

1 At time of manufacture, valves are to be subjected to the tests and inspection specified in the following **(1)** to **(4)**:

(1) Material test:
As per the requirements in the relevant Chapters of **Part K of the Rules** and **Table N6.4, Part N of the Rules**.

(2) Hydraulic test:
Test is to be conducted at room temperature at a test pressure of 1.5 times the design pressure. However, for those to be fitted directly on type *C* independent tanks, the test is to be conducted at a pressure of twice the design pressure. Where test is conducted by a medium other than water, the requirements in **5.13.2-2, Part N of the Rules** are to be complied with.

(3) Airtightness test:
Test is to be conducted at 1.1 times the design pressure at room temperature.

(4) Leakage verification test for valve seat:
Leakage verification test for valve seat is to be conducted at room temperature at 1.1 times the design pressure for all the number of valves. Further, in case where the design temperature is below -55$^{\circ}C$ at least 10% of the total number of valves are to be tested at the temperature not more than the minimum design temperature and the pressure not less than 1.1 times the design pressure for each size and type of valves. When part of this sampling test failed, test for part or the whole of the valves not sampled at the temperature not more than the minimum design temperature will be requested.

2 After assembled in the ship, valves are to be subjected to service test specified in **5.13.2-3** and **5.13.2-5, Part N of the Rules**.

3 With respect to the tests and surveys specified in **-1**, except in the case of leakage verification tests for valve seats, are to be conducted at a temperature not more than the minimum design temperature specified in **-1(4)**, in cases where manufactures have been assessed in accordance with the "**Rules for Approval of Manufacturers and Service Suppliers**", the items requiring testing in the presence of Surveyors attendance may be reduced by the submission of test results.

4 With respect to the tests and surveys specified in **-1**, in the case of valves used for isolating instrumentation in piping which has a diameter not exceeding 25 *mm*, the surveyor of the Society need not be present during the performing of required tests and surveys provided that the results of in-house tests are submitted to the Society for review.

EFFECTIVE DATE AND APPLICATION (Amendment 2-5)

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

2. Notwithstanding the amendments to the Guidance, the current requirements apply to valves for which the application for testing is dated before the effective date and which are installed on 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.