GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE

Part N Ships Carrying Liquefied Gases in Bulk

2011 AMENDMENT NO.1

Notice No.90 1st November 2011
Resolved by Technical Committee on 7th July 2011

Notice No.90 1st November 2011
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

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

Chapter 3 CARGO PUMPS

3.6 Tests and Inspection

Paragraph 3.6.1 has been amended as follows.

3.6.1 Type Tests

1 Each size and type of pump is 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 deemed appropriate by the Society, tests and inspections in the presence of the Surveyor may be substituted for manufacturer tests and inspections.

(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. ~~In cases where pumps are intended to be used at working temperatures below -55°C, they are to be subjected to operational tests at their minimum working temperature by using a suitable liquid as deemed appropriate by the Society~~ 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. In addition, for shaft driven deep well pumps, a spin test to demonstrate satisfactory operation of bearing clearances, wear rings and sealing arrangements is to be carried out at the minimum design temperature. The full length of shafting is not required for the spin test, but must be of sufficient length to include at least one bearing and sealing arrangements.

(4) Open up inspections:
After the completion of the tests specified in **(3)** above, pumps are to be opened up and inspected for abnormalities.

(5) Other tests and inspection as deemed necessary by the Society depending on the type of pumps.

3.6.2 Product Inspections

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. ~~In cases where pumps are intended to be used at working temperatures below -55°C, they are to be subjected to operational tests at their minimum working temperature by using a suitable liquid as deemed appropriate by the Society~~ 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 **5.5.4, Part N of the Rules**.

EFFECTIVE DATE AND APPLICATION (Amendment 1-1)

1. The effective date of the amendments is 1 January 2012.

2. Notwithstanding the amendments to the Guidance, the current requirements may apply to cargo pumps for which the application for survey is submitted to the Society before the effective date and cargo pumps 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.

Amendment 1-2

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

Chapter 14 has been amended as follows.

Chapter 14 OXYGEN CONTENT MEASURING EQUIPMENT

14.1 General

14.1.1 Application

The requirements in this Chapter apply to the fixed type and portable type oxygen content measuring equipment used to verify that the oxygen content is less than the controlled value in accordance with the requirements in **N13.6.14**.

14.2 Materials, Construction and Performance

14.2.1 Materials

~~The requirements in the preceding **13.3.1** are to be complied with.~~ The materials of the measuring equipment are to be corrosion resistant or to be subjected to corrosion-resisting processing. Particularly, those parts liable to be exposed to cargo vapour are to be suitable for use in the atmosphere of such vapours.

14.2.2 Construction

~~The requirements in the preceding **13.3.2** are to be complied with where, however, those in **-6** may be excluded~~

1 The measuring equipment is to be provided with an indication device capable of clearly showing that the equipment is in service when it is in operation.

2 The measuring equipment, which is used in a flammable atmosphere, is to have necessary explosion proof performance.

3 In the measuring equipment provided with a suction pump, the capacity of such a pump is to be sufficient to draw detecting air in a volume sufficient for detection and measurement.

4 Sampling heads are to be arranged by taking into account the properties of the oxygen.

5 The sampling lines from each sampling head to the measuring device are to be independent with each other.

6 The measuring equipment is to be provided with a function to display location of the sampling head under detection and to identify the alarm point when alarm is issued.

7 For the measuring equipment serving to detect one sampling point and portable type oxygen content measuring equipment, the requirements in the preceding **-5** and **-6** do not apply.

14.2.3 Oxygen Content Indicating Part

The equipment is to be capable of indicating oxygen content in percent volume.

14.2.4 Alarm Systems

1 ~~The requirements in the preceding **13.3.4** are to be complied with. However, those in **-3** and **-4**~~

~~of the same may be excluded. The terms "vapour" and "vapour concentration" are to be construed as "oxygen" and "oxygen content" respectively, hereinafter.~~ The oxygen content measuring equipment is to be provided with audible and visible alarm systems capable of issuing alarms when the setting value is exceeded.

2 The setting values of such alarms are to be changeable as necessary, and they are to be readily recognizable.

~~**2**~~**3** Except specifically required, the alarm set point is to be not more than 5% (volume).

4 The alarm systems are to be in accordance with the following requirements **(1)** through **(4)**:

(1) Alarms are to continue until resetting is caused even when the oxygen concentration assumes a value lower than the setting value of the alarm.

(2) Audible alarms are to be arranged so that they can be temporary stopped.

(3) Alarms are to resume when the gas concentration of other sampling point exceed the setting value of the alarm even when audible alarms are temporarily stopped.

(4) The alarm system is to be capable of issuing alarm in the event of a system failure such as the loss of power supply and disconnecting of wiring. The visible alarm issued in such an event is to be capable of being distinguished from those issued in the cases given in the preceding **-1**.

5 For portable system, alarm function may not be provided, but means are to be provided to verify the effectiveness of the batteries.

14.2.5 Performance

1 ~~The requirements in the preceding **13.3.5** are to be complied with. However, those in **-4** and **-5** may be excluded.~~ The measuring equipment is to be capable of functioning in the environmental conditions, including varying temperature and humidity, vibrations and ship motion generally conceivable on board ships.

2 For the measuring equipment of suction type, no significant effects are to be given on the indicating accuracy and alarming accuracy, or means are to be provided to compensate or correct these differences in temperature or humidity even when differences in temperature or humidity are caused between the sampling heads and measuring equipment.

3 The measuring equipment is to be capable of becoming ready for detection with least possible delay time when the power supply switch is turned on.

~~**2**~~**4** The equipment is to be capable of indicating oxygen content with an error within ±0.7% (volume). However, where detection of oxygen content less than 5% is required, the performance is to be such that the error is within ±20% of the maximum allowable oxygen content.

~~**3**~~**5** The equipment is to be capable of issuing an alarm with an error within ±20% of the alarm set value.

14.3 Marking and Maintenance/Inspection

14.3.1 General

~~The requirements in the preceding **13.4** are to be complied with correspondingly.~~

1 The measuring equipment is to be marked with the following items **(1)** through **(5)**:

(1) Name of manufacturer, date of manufacture and type number

(2) In the case of explosion-proof construction, the type and the explosion-proof capability

(3) The type of detectable gas and measuring range

(4) Rated voltage and frequency (or type and number of batteries)

(5) Alarm set values

2 The measuring equipment is to be provided with instruction manuals and where necessary, correction tables or equations for temperature corrections.

3 The details of periodical inspection and maintenance checks necessary for the maintenance of the performance of the measuring equipment are to be noted in the instruction manual. Further, record books of periodical inspection and maintenance checks, also necessary test gases and associated fittings are to be provided.

14.4 Tests and Inspection

14.4.1 General

~~The requirements in the preceding **13.5** are to be complied with correspondingly~~ The portable oxygen content measuring equipment is to pass the tests specified in **14.4.4** for each type.

14.4.2 Approval Tests for Use

The fixed type oxygen content measuring equipment is to pass the tests specified in **14.4.4** for each type. However, when tests are conducted for individual equipment, no approval may be required for its use.

14.4.3 Shipboard Inspection

In the case of the fixed type oxygen content measuring equipment, operating test is to be conducted after completion of all the piping systems and accessories on board the ship. In this time, at least issuing alarm is to be verified to draw the test gas from each sampling headers.

14.4.4 Test Standards

1 Visual inspection

In visual inspection, it is to be verified that the construction, materials and dimensions are as specified on the drawings and specifications.

2 Performance test

On all the vapours to be detected, the following tests **(1)** through **(7)** are to be conducted. The concentration of the oxygen used in the test is to be analysed by gas chromatography or similar other equally effective method.

(1) Verification of indicating accuracy

It is to be verified that the indicating accuracy at 5% of oxygen concentration conforms to that stated on the specification.

(2) Verification of alarming accuracy

By gradually raising the concentration of a vapour, it is to be verified that the concentration when alarm is issued is within the allowable range of error.

(3) Verification of reproducibility

Tests identical with the preceding **(1)** and **(2)** are to be conducted with drawing of the gas and nitrogen repeated alternately at proper intervals. In the case of the portable gas detection equipment, making and breaking of power supply are to be included in the test.

(4) Verification of response performance

By introducing the test gas, the period before the indication of gas concentration reaches 90% of the value of final indication is to be measured. Further, a test gas with a concentration corresponding to 110% of the alarm set value is to be induced whereby the period before issuing an alarm is to be measured. In the case of the fitted type, the period is to be not more than 30 *seconds*; in the case of the portable types, the period is to be not more than 20 *seconds*.

(5) Verification of operation of alarm system

It is to be verified that the alarm system functions properly for each cause of alarm.

(6) Verification of initiation of operation

The test specified in the preceding **(2)** is to be conducted after an elapse of the period given in

the specification on the measuring equipment which had been placed in normal operation once, then break the power supply and make it after it was left for 24 *hours*.

(7) Verification of suction pump capacity

It is to be verified that the capacity of the suction pump satisfied the specification.

3 Environmental Tests

(1) The measuring equipment is to be subjected to the tests specified in the preceding **-2(1)** and **(2)** under the environment given in the following **(a)** through **(d)** and pass the testing requirements. In the case of the fixed type oxygen content measuring equipment, **(b)** of the following tests may be omitted:

(a) Psychrometric test

(b) Drop test

(c) Vibration test

(d) Inclining test

(e) Power supply variation test

(2) The testing procedures of each test are to be in accordance with the following requirements:

(a) Psychrometric test

The measuring equipment is to be placed in a thermostatic tank of which environmental conditions are adjusted to 90-95% of humidity and $50\pm2\,℃$ of temperature, and then left for 8 *hours*. The temperature of the thermostatic tank is to be adjusted to $-10\pm2\,℃$ with the humidity left unadjusted, and then left for another 8 *hours*. This cycle is to be repeated 3 times.

(b) Drop test

With the outer protective casing of the gas detection equipment removed (excluding those used with the case fitted), the test object is to be dropped freely in various directions excluding the faces incorporating lenses and glasses onto the floor laid with a 50*mm* thick sheet of cedar on top from a height of 100*mm*.

(c) Vibration test

The gas detection equipment is to be fixed in the vibration testing machine and vibrations with a frequency in a range from 5 to 16*Hz* (double amplitude: 2*mm*) and another frequency in a range from 16 to 60*Hz* (acceleration: 1*G*) are to be applied in the vertical, horizontal transverse and longitudinal directions for 30 *minutes* in each direction (tests are to be progressed from low vibration to high vibration at 10 *minutes* cycle and again from low to high). However, for the fixed type gas detection equipment, the requirements in *JIS F* 8076 “Electrical installation in ships-Part 504: Special feature-Control and instrumentation” or in equivalent standards.

(d) Inclining test

The requirements in *JIS F* 8076 or in equivalent standards are to be complied with.

(e) Power supply variation test

The requirements in *JIS F* 8076 or in equivalent standards are to be complied with.

4 Tests for explosion-proof performance

The requirements in **H2.16** are to be complied with.

Chapter 15 has been amended as follows.

Chapter 15 HUMIDITY MEASURING EQUIPMENT

15.1 General

15.1.1 Application

The requirements in this Chapter apply to the fixed type and portable type humidity measuring equipment used for the purpose of verifying that the humidity is less than the controlled value in accordance with the requirements in **N9.2.2-3(3)(b)**.

15.2 Materials, Construction and Performance

15.2.1 Materials

The requirements in the preceding **1~~3~~4.~~3~~2.1** are to be complied with.

15.2.2 Construction

The requirements in the preceding **1~~3~~4.~~3~~2.2** are to be complied with. ~~However, those in -6 may be excluded.~~

15.2.3 Temperature Indicating Part

The equipment is to be capable of indicating the humidity in terms of dew point (℃) or suitable other means. In the equipment other than dew point indicating system, a table for conversion into dew point equivalent is to be provided.

15.2.4 Alarm Systems

1 The equipment is to be capable of issuing alarm or indicating a readily identifiable indication even in the event of loss of power supply, parting of wiring or malfunction of the measuring equipment.

2 The equipment is to be capable of issuing alarm when the humidity (or dew point) exceeds the preset value.

15.2.5 Performance

1 The requirements in the preceding **1~~3~~4.~~3~~2.5-1** to **-3** are to be complied with. ~~However, those in -4 and -5 may be excluded.~~ The terms "~~vapour~~oxygen" and "~~vapour~~oxygen concentration" are to be construed as "air (when the humidity is controlled)" and "humidity" respectively (hereinafter the same).

2 The equipment is to be capable of indicating dew point with an error corresponding to ±5℃ with an alarm issued.

15.3 Marking and Maintenance/Inspection

15.3.1 General

The requirements in the preceding **1~~3~~4.~~4~~3** are to be complied with correspondingly.

15.4 Tests and Inspection

15.4.1 General

The requirements in the preceding **13~~4~~.5~~4~~** are to be complied with correspondingly.

EFFECTIVE DATE AND APPLICATION (Amendment 1-2)

1. The effective date of the amendments is 1 January 2012.

2. Notwithstanding the amendments to the Guidance, the current requirements may 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.