TÜRK LOYDU

TECHNICAL CIRCULAR

Circular No: S-P 07/13 **Revision: 1** **Page:** 1 **Adoption Date:** 12.04.2013

Related Requirement: TL- R G3
Subject: Tests of Piping Components and Pumps Prior to Installation On Board for Liquefied Gas Carriers
Entry into Force Date:

1 Application *(See Note)*

These requirements are to be uniformly implemented for piping components and pumps:

i) when an application for testing is dated on or after 1 January 2014; and
ii) which are installed in new ships for which the date of contract for construction is on or after 1 January 2014.

2 Valves

2.1 Prototype Testing

Each size and type of valve intended to be used at a working temperature below -55°C is to be approved through design assessment and prototype testing. Prototype testing for all valves to the minimum design temperature or lower and to a pressure not lower than the maximum design pressure foreseen for the valves is to be witnessed in the presence of the representative of **TL**. Prototype testing is to include hydrostatic test of the valve body at a pressure equal to 1.5 times the design pressure, and cryogenic testing consisting of valve operation or safety valve set pressure, and leakage verification. In addition, for valves other than safety valves, a seat and stem leakage test at a pressure equal to 1.1 times the design pressure.

For valves intended to be used at a working temperature above -55°C, prototype testing is not required.

2.2 Unit Production Testing

All valves are to be tested at the plant of manufacturer in the presence of the representative of **TL**. Testing is to include hydrostatic test of the valve body at a pressure equal to 1.5 times the design pressure for all valves, seat and stem leakage test at a pressure equal to 1.1 times the design pressure for valves other than safety valves. In addition, cryogenic testing consisting of valve operation and leakage verification for a minimum of 10% of each type and size of valve for valves other than safety valves intended to be used at a working temperature below -55°C. The set pressure of safety valves is to be tested at ambient temperature.

As an alternative to the above, if so requested by the relevant Manufacturer, the certification of a valve may be issued subject to the following:

• The valve has been approved as required by 2.1 for valves intended to be used at a working temperature below -55°C, and

• The manufacturer has a recognized quality system that has been assessed and certified by **TL** subject to periodic audits, and

• The quality control plan contains a provision to subject each valve to a hydrostatic test of the valve body at a pressure equal to 1.5 times the design pressure for all valves and seat and stem leakage test at a pressure equal to 1.1 times the design pressure for valves other than safety valves. The set pressure of safety valves is to be tested at ambient temperature. The manufacturer is to maintain records of such tests, and
• Cryogenic testing consisting of valve operation and leakage verification for a minimum of 10% of each type and size of valve for valves other than safety valves intended to be used at a working temperature below -55°C in the presence of the representative of **TL**.

3 Bellows

The following prototype tests are to be performed on each type of expansion bellows intended for use on cargo piping, primarily on those used outside the cargo tank:

• An overpressure test. A type element of the bellows, not precompressed, is to be pressure tested to a pressure not less than five times the design pressure without bursting. The duration of the test is not to be less than 5 minutes.

• A pressure test on a type expansion joint complete with all the accessories (flanges, stays, articulations, etc) at twice the design pressure at the extreme displacement conditions recommended by the Manufacturer. No permanent deformations are allowed.

Depending on materials it may be required that the test be performed at the minimum design temperature.

• A cycle test (thermal movements). The test is to be performed on a complete expansion joint, which is to successfully withstand at least as many cycles, under the conditions of pressure, temperature, axial movement, rotational movement and transverse movement, as it will encounter in actual service. Testing at room temperature, when conservative, is permitted.

• A cycle fatigue test (ship deformation): The test is to be performed on a complete expansion joint, without internal pressure, by simulating the bellows movement corresponding to a compensated pipe length for at least 2000000 cycles at a frequency not higher than 5 cycles/second. The test is only required when, owing to the piping arrangement, ship deformation loads are actually experienced. **TL** may waive performance of the above mentioned tests provided that complete documentation is supplied to establish the suitability of the expansion joints to withstand the expected working conditions.

When the maximum internal pressure exceeds 0,1 N/mm^2 (1 bar) this documentation is to include sufficient test data to substantiate the design method used, with particular reference to correlation between calculation and test results.

4 Cargo Pumps

4.1 Prototype Testing

Each size and type of pump is to be approved through design assessment and prototype testing. Prototype testing is to be witnessed in the presence of the representative of **TL**. In lieu of prototype testing, satisfactory in-service experience, of an existing pump design approved by a Society submitted by the manufacturer may be considered.

Prototype testing is to include hydrostatic test of the pump body equal to 1.5 times the design pressure and a capacity test. 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. After completion of tests, the pump is to be opened out for examination.

4.2 Unit Production Testing

All pumps are to be tested at the plant of manufacturer in the presence of the representative of **TL**. Testing is to include hydrostatic test of the pump body equal to 1.5 times the design pressure and a capacity test. 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.

As an alternative to the above, if so requested by the relevant Manufacturer, the certification of a pump may be issued subject to the following:

• The pump has been approved as required by 4.1, and

• The manufacturer has a recognised quality system that has been assessed and certified by the **TL** subject to periodic audits, and

• The quality control plan contains a provision to subject each pump to a hydrostatic test of the pump body equal to 1.5 times the design pressure and a capacity test. The manufacturer is to maintain records of such tests.

Note:

1. The requirements of TL-R G3.6 Rev.3 are to be uniformly implemented for piping components and pumps:

i) when an application for testing is dated on or after 1 July 2010; and
ii) which are installed in new ships for which the date of contract for construction is on or after 1 July 2010.

2. The requirements of TL- R G3.6 Rev.4 are to be uniformly implemented for piping components and pumps:

i) when an application for testing is dated on or after 1 January 2012; and
ii) which are installed in new ships for which the date of contract for construction is on or after 1 January 2012.

3. The "contracted for construction" date means the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. For further details regarding the date of "contract for construction", refer to TL- PR 29.