

Amendments to the “Rules for the Type Approval of Mechanical Joints for Pipes”

RFP/042/AMN/01

Effective from 1/7/2022

List of the amendments:

Paragraph amended	Reason
Tab 1, [5.3], [5.5.6]	to introduce IACS UR P2.11 (Rev 5 - Jan 2021) “Type Approval of Mechanical Joints”

1 PREMISE

In the Rules for the Classification of Ships, use is foreseen of mechanical joints type approved by Tasneef.

The expression “mechanical joints” means devices, as described in Pt C, Ch 1, Sec 10, [2.4.5] of the Rules for the classification of ships, intended for direct connection of pipe lengths other than by welding, flanges or threaded joints.

2 FIELD OF APPLICATION

These Rules apply to mechanical joints, where their use is foreseen by Pt C, Ch 1, Sec 10, [2.4.5] of the Rules for the Classification of Ships.

These requirements apply to any mechanical joint submitted for approval from 1 January 2008 and to any existing mechanical joint from the date of the first renewal of approval after 1 January 2008.

3 DOCUMENTATION

The request for type approval is to be submitted to Tasneef by the Manufacturer or by the Applicant, if authorised by the Manufacturer, and is to include:

- a) the Manufacturer;
- b) the designation of the product;
- c) the product quality assurance system implemented;
- d) a complete description of the product;
- e) typical sectional drawings with all dimensions necessary for evaluation of joint design;
- f) complete specification of materials used for all components of the assembly;
- g) the proposed test procedure as required in [5];
- h) the field of application with indication of:

- maximum design pressures (pressure and vacuum);
 - maximum and minimum design temperatures;
 - conveyed media;
 - intended services;
 - maximum axial, lateral and angular deviation allowed by the Manufacturer;
 - installation details;
- i) documentation relevant to previous tests and approvals, if any.

4 MATERIALS

The materials used for mechanical joints are to be compatible with the piping material and internal and external media.

The Manufacturer is to submit evidence to substantiate that all components are adequately resistant to working the media at the design pressure and temperature specified.

5 TESTS

5.1 General

The type tests specified in Tab 1 are to be carried out.

Tasneef reserves the right both to require more severe testing conditions and additional tests, if considered necessary to ensure the intended reliability, and also to accept alternative testing in accordance with national or international standards where applicable to the intended use and application.

Unless otherwise specified, the water or oil test fluid is to be used.

Table 1

Tests	Type of mechanical joint				References
	Compression couplings and pipe unions	Slip-on Joints			
		Grip type and Machine grooved type	Slip type		
1 Tightness test	+	+	+	[5.5.1]	
2 Vibration (fatigue) test	+	+	-	[5.5.2]	
3 Pressure pulsation test (1)	+	+	-	[5.5.3]	
4 Burst pressure test	+	+	+	[5.5.4]	
5 Pull-out test	+	+	-	[5.5.5]	
6 Fire endurance test	+	+	+	[5.5.6] if required in Pt C, Ch 1, Sec 10, [2.4.5] of the Rules for the Classification of Ships	
7 Vacuum test	+(3)	+	+	[5.5.7] for suction lines only	
8 Repeated assembly test	+(2)	+	-	[5.5.8]	

Abbreviations: + test is required
- test is not required

Notes/Footnotes: 1) for use in those systems where pressure pulsation other than water hammer is expected.
2) except press type and swage type.
3) except joints with metal-to-metal tightening surfaces

5.2 Selection of test specimens

Type tests are to be carried out in the presence of a Tasneef Surveyor on at least one sample of each type and size of mechanical joint for which type approval is required.

Where there is a variety of size of joints requiring approval, a minimum of three separate sizes, representative of the range, from each type of joint to be tested in accordance with Tab 1 are to be selected.

5.3 Mechanical joint assembly

Assembly of mechanical joints is to consist of components selected in accordance with [5.2] and the pipe sizes appropriate to the design of the joints. Where pipe material ~~would—effect~~ affect the performance of mechanical joints, the selection of joints for testing is to take the material into consideration.

Where not specified, the length of pipes to be connected by means of the joint to be tested is to be at least five times the pipe diameter. Before assembling the joint, conformity of components to the design requirements is to be verified. In all cases the assembly of the joint is only to be carried out according to the Manufacturer's instructions. No adjustment operations on the joint assembly, other than that specified by the Manufacturer, are permitted during the test.

5.4 Test results acceptance criteria

Where a mechanical joint assembly does not pass all or any part of the tests in Tab 1, two assemblies of the same size and type that failed are to be tested and only those tests where the mechanical joint assembly failed in the first instance are to be repeated. In the event that one of the assemblies fails the second test, that size and type of assembly is to be considered unacceptable.

The methods and results of each test are to be recorded and reproduced as and when required.

5.5 Test methods

5.5.1 Tightness test

In order to ensure correct assembly and tightness, all mechanical joints are to be subjected to a tightness test, as follows.

a) The mechanical joint assembly test specimen is to be connected to the pipe or tubing in accordance with the requirements of [5.3] and the Manufacturer's instructions, filled with test fluid and de-aerated. Mechanical joint assemblies intended for use in rigid connections of pipe lengths are not to be longitudinally restrained.

The pressure inside the joint assembly is to be slowly increased to 1,5 times the design pressure. This test pressure is to be retained for a minimum period of 5 minutes.

In the event of a drop in pressure or visible leakage, the test (including the fire test) is to be repeated for two further specimens. If during the repeat test one test piece fails, the coupling is regarded as having failed.

An alternative tightness test procedures, such as a pneumatic test, may be accepted.

- b) For compression couplings a static gas pressure test is to be carried out to demonstrate the integrity of the mechanical joint assembly for tightness under the influence of gaseous media. The pressure is to be raised to design pressure or 7 MPa, whichever is the lesser.
- c) Where the tightness test is carried out using gaseous media as permitted in a) above, the static pressure test mentioned in b) above need not be carried out.

5.5.2 Vibration (fatigue) test

In order to establish the capability of the mechanical joint assembly to withstand fatigue, which is likely to occur due to vibrations under service conditions, the mechanical joint assemblies are to be subjected to the following vibration test.

At the conclusion of the vibration test the coupling is to show no leakage or damage.

a) Testing of compression couplings and pipe unions

Compression couplings and pipe intended for use in rigid pipe connections are to be as follows. Rigid connections are joints connecting pipe length without free angular or axial movement.

Two lengths of pipe are to be connected by means of the joint to be tested. One end of the pipe is to be rigidly fixed while the other end is to be fitted to the vibration rig. The test rig and the joint assembly specimen being tested are to be arranged as shown in Fig 1.

The joint assembly is to be filled with test fluid, de-aerated and pressurised to the design pressure of the joint.

The pressure during the test is to be monitored. In the event of a drop in pressure and visible leakage, the test is to be repeated as described in [5.4].

Visual examination of the joint assembly is to be carried out.

Re-tightening may be accepted once during the first 1000 cycles.

Vibration amplitude is to be within 5% of the value calculated from the following formula:

$$A = \frac{2 \times S \times L^2}{3 \times E \times D}$$

5.5.6 Fire endurance test

In order to establish the capability of the mechanical joints to withstand the effects of fire which may be encountered in service, the joints are to be subjected to a fire endurance test. The fire endurance test is to be conducted on the selected test specimens as per the following standards:

- a) ISO19921:2005(E): Ships and marine technology – Fire resistance of metallic pipe components with resilient and elastomeric seals - Test methods
- b) ISO19922:2005(E): Ships and marine technology – Fire resistance of metallic pipe components with resilient and elastomeric seals - Requirements imposed on the test bench.

Notes: [clarifications to the standard requirements in ISO19921:2005, Paragraphs 7.2, 7.4, 7.6 and 7.7:](#)

- 1. If the fire test is conducted with circulating water at a pressure different from the design pressure of the joint (however of at least 0,5 MPa), the subsequent pressure test is to be carried out to ~~1,5 timestwice~~ the design pressure.
- 4-2. [If the fire test is required in Pt C, Ch 1, Sec 10, Tab 16 of the Rules for the Classification of Ships to be “8 min dry + 22 min wet” or “30 min dry”, i.e. conducted for a period of time without circulating of water, the following test conditions apply:](#)

- **[Test condition “8 min dry + 22 min wet”](#)**

[The test piece is not required to be rinsed with the test medium \(water\) in preparation for the test as required in Paragraph 7.2 of ISO 19921:2005. The exposure to fire is to be started and continued for 8 minutes with the sample dry; after 8 minutes of dry test condition the piping system is to be filled with water and test pressure is to be increased up to at least 5 bar within 2 minutes, then maintained to at least 5 bar. After further 22 minutes \(i.e. 30 minutes from initial exposure to fire\) the exposure to fire is to be stopped and a hydrostatic pressure test as specified in 1. is to be carried out.](#)

- **[Test condition “30 min dry”](#)**

[The exposure to fire is to be started and continued for 30 minutes with the sample dry. After 30 minutes the exposure to fire is to be stopped and a hydrostatic pressure test as specified in 1. is to be carried out.](#)

Note:

[For fire tests in dry condition the pressure inside the test specimen is to be monitored for a rise due to heating of the enclosed air. Means of pressure relief should be provided where deemed necessary.](#)

[High pressures created during this test can result in failure of the test specimen. Precautions are to be taken to protect personnel and facilities.](#)

[Paragraph 7.5 of ISO 19921:2005 does not apply to the dry tests and no forced air circulation is to be arranged.](#)

[For fire endurance test requiring exposure time greater than 30 minutes test conditions are adjusted to meet the extended required total exposure time. In all cases for dry-wet test the minimum dry test exposure time is 8 minutes.](#)

- 2.3. A selection of representative nominal bores may be tested in order to evaluate the fire resistance of a

series or range of mechanical joints of the same design. When a mechanical joint of a given nominal bore (DN) is so tested then other mechanical joints falling in the range DN to 2xDN (both inclusive) are considered accepted.

- 34. Alternative test methods and/or test procedures considered to be at least equivalent may be accepted at the discretion of the Classification Society in cases where the test pieces are too large for the test bench and cannot be completely enclosed by the flames.

- 45. [Where thermal insulation is acceptable as a means of providing fire resistance, following requirements apply:](#)

- 1. [Thermal insulation materials applied on couplings are to be non-combustible ~~in dry condition and when subjected to oil spray. A non combustibility test~~ according to ISO 1182:2010 ~~is to be carried out~~ as required by the Fire Test Procedures Code defined in Regulation 3 of SOLAS Chapter II-2 as amended by IMO resolutions up to MSC.421\(98\). Precautions are to be taken to protect the insulation from being impregnated with flammable oils.](#)
- 2. [At least the fire endurance and the vibration testing in Tab 1 are to be carried out with thermal insulation in place.](#)
- 3. [A service restriction is to be stated on the type approval certificate that the mechanical joints are to be fitted with thermal insulation during the installation in cases where the mechanical joints are used where fire resistance is required, unless mechanical joints are delivered already fitted with thermal insulation before installation.](#)

5.5.7 Vacuum test

In order to establish the capability of the mechanical joint assembly to withstand internal pressures below atmosphere, similar to the conditions likely to be encountered in service, the following vacuum test is to be carried out.

The mechanical joint assembly is to be connected to a vacuum pump and subjected to a pressure 0,017 MPa absolute. Once this pressure has stabilised, the mechanical joint assembly specimen being tested is to be isolated from the vacuum pump and this pressure is to be retained for a period of 5 minutes.

Pressure is to be monitored during the test.

No internal pressure rise is permitted.

5.5.8 Repeated assembly test

The mechanical joint test specimen is to be dismantled and reassembled 10 times in accordance with the Manufacturer’s instructions and then subjected to a tightness test as defined in [5.5.1].