
**Plastics piping systems —
Thermoplastics pipes and fittings for hot
and cold water — Test method for the
resistance of joints to pressure cycling**

*Systèmes de canalisations en plastiques — Tubes en matières
thermoplastiques et raccords pour l'eau chaude et froide — Méthode
d'essai de la résistance des assemblages aux cycles de pression*

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Foreword

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ISO 19892 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 5, *General properties of pipes, fittings and valves of plastic materials and their accessories — Test methods and basic specifications*.

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Plastics piping systems — Thermoplastics pipes and fittings for hot and cold water — Test method for the resistance of joints to pressure cycling

1 Scope

This International Standard specifies a method for testing the resistance of joints to pressure cycling. It is applicable to piping systems based on thermoplastics pipes intended to be used in hot and cold water applications.

2 Principle

An assembly of pipes and fittings is subjected to water pressure cycling between two positive pressure limits, while being maintained at a specified temperature and inspected for leakage.

NOTE It is assumed that the following test parameters are set by the reference standard (i.e. the standard making reference to this International Standard), as applicable (see Clause 4):

- a) the test temperature;
- b) the number of test pieces;
- c) the test pressure limits;
- d) the duration of one cycle;
- e) the number of cycles.

3 Apparatus

3.1 Pressurizing device, capable of applying and regulating the water pressure in the test piece in a sinusoidal or trapezoidal form between pressure limits as specified in the reference standard.

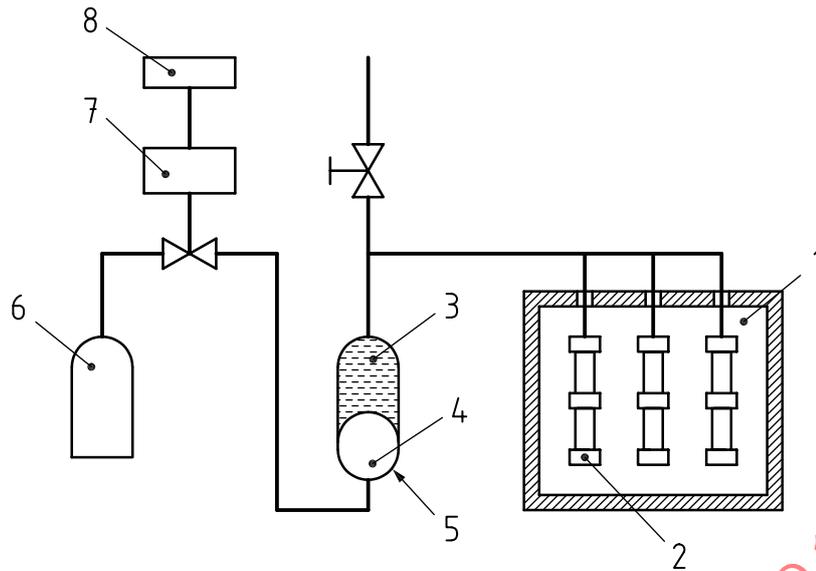
3.2 Pressure measurement device, capable of measuring the water pressure in the test piece to an accuracy of $\pm 5\%$. The device measurement shall be capable of producing a record of the sinusoidal or trapezoidal wave form.

3.3 Test chamber, capable of maintaining the specified test temperature (see Clause 4) to an accuracy of $\pm 2\text{ }^{\circ}\text{C}$.

3.4 Thermometer(s), capable of checking conformity to the specified test temperature (see 3.3).

3.5 End-sealing device, of appropriate size and sealing method for sealing the non-joined end of the test piece. The device shall be restrained in a manner which does not exert longitudinal forces on the joints.

A typical test arrangement is shown in Figure 1.



Key

- 1 temperature controlled test chamber
- 2 test assemblies
- 3 water
- 4 air
- 5 pressure converter
- 6 compressed air cylinder
- 7 valve
- 8 electric control

Figure 1 — Schematic test arrangement

4 Test parameters

Unless specified otherwise in the reference standard, the test parameters given in Table 1 shall apply.

Table 1 — Test parameters

Parameter	Value
Number of test pieces	3
Conditioning and test temperature	(23 ± 2) °C
Test pressure limits	Shall conform to Table 3
Cycle frequency	(30 ± 5) cycles per minute
Number of cycles	10 000

5 Test pieces

5.1 Number

The number of test pieces shall conform to Clause 4.

5.2 Preparation

The test piece shall comprise an assembly of pipes and at least one fitting joined in accordance with the manufacturer's recommended practice.

The free length on each side of the fitting under test shall be not less than either $1,5d_n$ or 300 mm, whichever is the greater, where d_n is the nominal outside diameter of the pipe.

In order to include the required number of pipes and fitting(s), several test pieces may be tested simultaneously, provided the failure of one test piece does not affect the others under test.

6 Conditioning

6.1 Fill each test piece with water so that all the air is expelled.

6.2 Bring the test piece and water therein to the specified temperature (see Clause 4).

6.3 Condition the test piece at the applicable temperature (see Clause 4) in accordance with Table 2 before or after connecting the test piece(s) to the pressurizing device. If subsequent connection is necessary, ensure that all air is again expelled and that the conditioning has been completed immediately before connection to the pressurizing device.

Table 2 — Conditioning periods

Pipe wall thickness e mm	Minimum conditioning period h
$e < 3$	1
$3 \leq e < 8$	3
$8 \leq e < 16$	6
$16 \leq e < 32$	10

7 Procedure

7.1 Unless specified otherwise in the reference standard, subject the test piece to the applicable pressure limits conforming to Table 3 and for the number of cycles and cycle frequency conforming to Clause 4, while, for the duration of the test and on completion

- a) maintaining the test temperature,
- b) monitoring the test piece for any signs of leaks, and
- c) checking wave form at the start, at regular intervals and at the end of the test and recording them.

Table 3 — Test pressure limits

Design pressure <i>p</i> _D bar	Test pressure limits	
	Upper limit bar	Lower limit bar
4	6	0,5
6	9	0,5
8	12	0,5
10	15	0,5

NOTE 1 bar = 0,1 MPa = 10⁵ Pa; 1 MPa = 1 N/mm².

7.2 If leakage occurs prior to completion of the number of cycles, record the number of elapsed cycles and the position and nature of the leak.

7.3 On completion of the number of cycles, inspect all joints for any sign of leakage.

8 Test report

The test report shall include the following information:

- a) a reference to this International Standard, i.e. ISO 19892:2011, and to the reference standard;
- b) the material and other identification and the number of the components under test, including their operating pressure;
- c) the test temperature;
- d) the test pressures comprising the lowest and the highest of the cycle;
- e) the cycle frequency;
- f) the number of cycles;
- g) a record of the wave form at the start, at regular intervals and at the end of each test;
- h) the signs of leakage, if any, and where and when they occurred;
- i) any factors which can have affected the results, such as any incident or any operating detail not specified in this International Standard;
- j) the date of test.