SLOVENSKI STANDARD
SIST EN 1704:1999

01-julij-1999

Cevni sistemi iz polimernih materialov - Ventili iz plastomernih materialov - Metode za preskus neoporečnosti ventila, ki je bil podvržen izpostavljen cikličnim spremembam temperature in upogibanju

Plastics piping systems - Thermoplastics valves - Test method for the integrity of a valve after temperature cycling under bending

Kunststoff-Rohrleitungssysteme - Thermoplast-Armaturen - Prüfverfahren der Unversehrtheit einer Armatur nach Temperaturwechseln unter Biegung

Systemes de canalisations en plastique - Robinets thermoplastiques - Méthode d'essai pour la vérification d'un robinet apres des cycles thermiques sous flexion

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English version

Plastics piping systems - Thermoplastics valves - Test method for the integrity of a valve after temperature cycling under bending

Systèmes de canalisations en plastique - Robinets thermoplastiques - Méthode d'essai pour la vérification d'un robinet après des cycles thermiques sous flexion

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This European Standard was approved by CEN on 1996-10-27. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 155 "Plastics piping systems and ducting systems", the secretariat of which is held by NNI.

The material-dependent parameters and/or performance requirements are incorporated in the System Standard(s) concerned.

This standard is one of a series of standards on test methods which support System Standards for plastics piping systems and ducting systems.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 1997, and conflicting national standards shall be withdrawn at the latest by July 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This standard specifies a method for determining the leaktightness and ease of operation of a valve under bending following the application of temperature cycling.

This standard is applicable to thermoplastics valves with DN 63 or smaller.

2 Normative references

This standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter.
For dated references, subsequent amendments to, or revisions of, any of these publications apply to this standard only when incorporated in it by amendment or revision.
For undated references the latest edition of the publication referred to applies.

EN 837-1 *Pressure gauges - Part 1: Bourdon tube pressure gauges - Dimensions, metrology, requirements and testing*

EN 28233 *Thermoplastics valves - Torque - Test method*

3 Principle

A valve assembly is exposed to a continuous temperature cycling between a low and a high temperature for a specified number of cycles. Unless otherwise specified in the referring standard, the lower and upper test temperatures are -20 °C and +40 °C respectively. During the test the assembly is held at a fixed bend radius. Following temperature cycling the valve is tested for ease of operation and leaktightness.

NOTE: It is assumed that the following test parameters are set by the standard making reference to this standard:

a) the bending radius if other than 25 d_n (see 5.1.2);

b) the number of test pieces to be tested in each configuration (see clause 5);

c) the lower and/or upper cycle temperatures, if not as given in 6.3;

d) the number of cycles (see 6.4).

4 Apparatus

4.1 A bending frame, capable of producing a constant bending radius of 25 d_n, using a three point bending load over a span of 10 d_n as shown in figure 1.

The stationary frame of the machine shall include two supports, S, with a 5 mm radius of curvature, having parallel axes and adjustable spacing (see figure 1).

Depending upon the type of valve, the moving part of the machine shall make contact via a tool having a 5 mm radius or a semi-cylindrical face or a yoke, the axis of which is parallel to that of the supports. The tool and the supports shall be made of hardened steel.

The apparatus shall include force and deflection measuring indicators conforming to accuracy class 2 in accordance with EN 45501.

4.2 A temperature-controlled water bath, maintained at (20 ± 1) °C and capable of receiving the bending frame.

4.3 A temperature-controlled environment, capable of receiving the bending frame and being cycled between two temperatures as specified (see 6.3).

4.4 Other equipment, as follows:

a) a device for measuring the operating torque of the valve;

b) a compressed air supply, variable up to at least 6 bar (see 6.9);

c) a manometer, with a range of 0 mbar to 50 mbar (class 0,6 or better conforming to EN 837-1;

d) a thermometer capable of checking conformity to the temperature(s) specified in 4.2 and/or 6.3, as appropriate;

e) end closures connected to the ends of the valve, allowing, by means of an appropriate system, sealing and connecting to the pressurising equipment. By means of an appropriate system, both end closures shall allow sealing, connection to pressurising equipment and venting (see 6.10 and 6.12).

5 Test pieces

5.1 Preparation

5.1.1 Two test pieces shall be prepared as assemblies as follows. The valve shall be assembled between two pipes of the same d_n as the valve and of sufficient length to provide a span of at least 10 d_n when the applicable bending radius is achieved (see 5.1.2) as shown in figure 1.

The free ends of the pipes shall be fitted with closures conforming to e) of 4.4. If a pipe is to be connected to the valve by fusion, the material of the pipe shall conform to the same MRS-class as the material of the valve.

5.1.2 One test piece, with the valve fully closed, shall be held in a bending frame (4.1) with the valve spindle in the plane of bending and the operating cap in the outer circumference as shown in figure 1.

The assembly shall be put into the bending frame in such a way that a constant bending radius is assured. Unless otherwise specified in the referring standard, the radius shall be 25 d_n.

The other test piece, with the valve in the half open position, shall be held in a bending frame (4.1) with the valve spindle perpendicular to the plane of bending.

5.2 Number of test pieces

The number of test pieces to be tested in each configuration shall be as specified in the referring standard.

6 Procedure

6.1 Apply the procedures given in 6.2 to 6.12 inclusive to each test piece in each configuration (see clause 5).

6.2 Measure and record the opening and closing torques of the valve in accordance with EN 28233. Restore the valve to its initial position, i.e. closed or half open (see 5.1).

6.3 [See c) in the note to clause 3] Place the fixture in a temperature-controlled environment at (-20 ± 2) °C for 10 h. Then raise the temperature of the environment to (40 ± 2) °C and maintain that temperature for 10 h.

6.4 Repeat the temperature cycle given in 6.3 to complete the total number of cycles specified in the referring standard.

6.5 With the bending radius still applied, and without any prior operating, measure and record in accordance with EN 28233 the opening and closing torques of the valve at (40 ± 1) °C. Restore the valve to its initial position.

6.6 With the bending radius still applied, condition the valve at (-20 ± 2) °C for 24 h and measure and record in accordance with EN 28233 the opening and closing torques of the valve. Set the valve to its half open position.

6.7 With the bending radius still applied, connect the assembly to a pneumatic pressure source and place the assembly in a water bath maintained at (20 ± 1) °C. Condition the assembly in that bath for a minimum of 12 h.

6.8 Pressurise the test piece pneumatically to at least 25 mbar greater than the maximum hydrostatic head produced by the water, i.e. that at the lowest point of the outside of the valve.

Maintain this pressure for at least 5 h and monitor the test piece for, and record, any external leakage.

6.9 Increase the pressure pneumatically in the test piece to at least 6 bar. Maintain that pressure for at least 5 h and monitor for, and record, any external leakage.

NOTE: Attention is drawn to the need to contain the possible effects of failure of components subjected to impact testing or destructive testing.

6.10 Close the valve, vent the downstream end of the test piece and remove the non-pressurised end closure from that end of the test piece.

6.11 Repeat once the procedures given in 6.8 and 6.9 and monitor the valves for, and record, any internal leakage.

6.12 Repeat once the procedures given in 6.9 and 6.10 to test the internal leaktightness of the other side of the valve.