SLOVENSKI STANDARD
SIST EN 12100:1999

01-julij-1999

Cevni sistemi iz polimernih materialov - Ventili iz polietilena (PE) - Metoda za preskus odpornosti proti upogibanju med podporami

Plastics piping systems - Polyethylene (PE) valves - Test method for resistance to bending between supports

Kunststoff-Rohrleitungssysteme - Armaturen aus Polyethylen (PE) - Prüfverfahren für den Widerstand gegen Biegen bei Dreipunktbelastung

Systemes de canalisations en plastiques - Robinets en polyéthylene (PE) - Méthode d'essai de résistance a la flexion entre supports

Ta slovenski standard je istoveten z: **EN 12100:1997**

ICS:

83.140.30	Cevi, fitingi in ventili iz polimernih materialov	Plastics pipes, fittings and valves

SIST EN 12100:1999 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12100

August 1997

ICS 23.040.01

Descriptors: fluid pipelines, plastics, plastic tubes, cocks, polyethylene, tests, flexural strength

English version

Plastics piping systems - Polyethylene (PE) valves - Test method for resistance to bending between supports

Systèmes de canalisations en plastiques - Robinets en polyéthylène (PE) - Méthode d'essai de résistance à la flexion entre supports

Kunststoff-Rohrleitungssysteme - Armaturen aus Polyethylen (PE) - Prüfverfahren für den Widerstand gegen Biegen bei Dreipunktbelastung

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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.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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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 February 1998, and conflicting national standards shall be withdrawn at the latest by February 1998.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, 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 test method for the resistance to bending of a valve installed between supports.

This standard is applicable to valves with a polyethylene (PE) body for use with pipes having a nominal outside diameter from greater than 63 mm up to and including 225 mm and intended for the transport of fluids.

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.

prEN 837-1:1994	*Pressure gauges - Part 1 : Bourdon tube pressure gauges - Dimensions, metrology, requirements and testing*
EN 28233:1991	*Thermoplastic valves - Torque - Test method (ISO 8233:1988)*
EN 45501:1992	*Metrological aspects of non-automatic weighing instruments*
ISO 5208:1993	*Industrial valves - Pressure testing of valves*

3 Principle

A valve body is subjected to a bending load, by applying a given constant force to the body connected to two pipe sections resting on two supports. The valve is pressurized with air. Tightness and actuation torque are respectively checked and measured before, during and after loading.

The test is carried out at an ambient temperature of (23 ± 2) °C.

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

a) the sampling procedure (see 5.1);

b) the number of test pieces to be used (see 5.2);

c) the bending force to be applied to the valve (see 6.3.1);

d) any test conditions, e.g., test pressure, test duration, which differ from those given in ISO 5208:1993 (see 6.2).

4 Apparatus

4.1 Tensile testing machine or similar apparatus, with a device capable of applying a specified force constant to within 2 %.

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.

NOTE: The force should not be applied directly on the body of the valve, so as not to create any damage on the obturating mechanism.

The apparatus shall include force and deflection measuring indicators conforming to accuracy class II in accordance with EN 45501:1992.

4.2 Torque measuring device, accurate to ± 5 % (e.g. a torque wrench).

4.3 Compressed air supply, 0 mbar to 50 mbar[1)] (0 MPa to 0,005 MPa), with a pressure regulator.

4.4 Pressure gauge, 0 mbar to 50 mbar (0 MPa to 0,005 MPa), conforming to accuracy class 1,6 in accordance with prEN 837-1:1994.

4.5 Leak-detecting device, accurate to within 0,1 cm^3/h, (typically with a capacity of 35 cm^3) and graduated to enable measurement of volumes of 0,1 cm^3 (e.g. having a graduated tube with a conical base).

4.6 Airtight piping systems, equipped with the following:

a) fittings for connecting to the pipe sections;

b) shut-off devices enabling the valve to be connected to the compressed air supply and the leak-detecting device [e.g. pressure gauge (4.4) and graduated tube (4.5)].

5 Test pieces

5.1 Preparation

The test piece shall comprise a complete valve, obtained by sampling in accordance with the referring standard, assembled between two lengths of PE pipe, each having a length such that the overall length of the test piece can be supported (see 6.1.3). The valve ends shall be fitted with plugging or capping devices (4.6).

5.2 Number

The number of test pieces shall be as specified in the referring standard.

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1) 1 bar = 10^5 N/m^2

6 Procedure

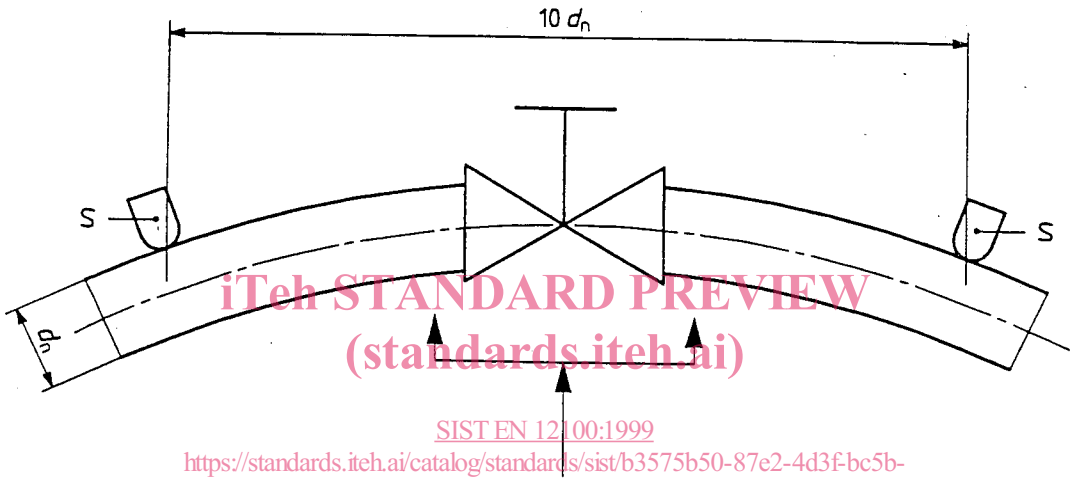
6.1 Arrangements

6.1.1 Carry out the following procedure (6.1.2. to 6.3.5 inclusive), by successively placing the valve operating member:

- vertically, and opposite the point of application of the force (see figure 1), then
- horizontally, and perpendicular to the direction of the force.

6.1.2 Note the ambient temperature at the start of the test.

6.1.3 Separate the machine frame supports by 10 d_n (see figure 1).



S support

Figure 1: Schematic test arrangement for bending tests

6.1.4 Place the test piece on the supports, S, so that the middle of the valve body under test is equidistant from the two supports and its longitudinal axis is perpendicular to the tool axis and the operating member placed in one of the positions specified in 6.1.1.

6.1.5 Connect the valve assembly to the piping system and install the leak-detecting device downstream from the assembly.

6.2 Initial characteristics

Check and record the leaktightness when the valve is half-open (shell test) and when it is closed (obturator tightness test) by testing in accordance with ISO 5208:1993 and any associated test conditions specified in the referring standard.

Measure and record the actuation torque in accordance with EN 28233:1991.

6.3 Characteristics with the force applied

6.3.1 Apply to the valve the force specified in the referring standard at a speed of 25 mm/min ± 10 % (see 4.1).

6.3.2 Maintain the force, *F*, on the valve for 10 h, during which time:

a) check and record in accordance with ISO 5208:1993 the tightness when the valve is open (internal) or half open (external);

b) measure and record the actuation torque in accordance with EN 28233:1991;

c) if and when an internal or external leak or a rupture appears, record the details, including, if possible, its location(s) and report the results in accordance with clause 7. Otherwise proceed in accordance with 6.3.3 to 6.3.5.

6.3.3 Measure and record the amount of deflection present. Release the force *F* on the valve.

6.3.4 Examine the appearance of the valve and its connecting pipe sections and record any deformation.

6.3.5 Repeat the procedure given in 6.1.2 to 6.3.4 inclusive, by setting the operating member in the other position specified in 6.1.1. When this has been completed, proceed in accordance with 6.4.

6.4 Final characteristics after removing the force

Repeat the procedure given in 6.2.

7 Test report

The test report shall include the following information:

a) the reference to this standard and to the referring standard;

b) the complete identification of the test piece;

c) the type of material;

d) the nominal size of the valve;

e) the number of test pieces tested;

f) whether or not any loss of internal and/or external tightness was observed and the position(s) thereof;

g) the torque values, measured in accordance with 6.2, 6.3.2 and 6.4;

h) any factors which may have affected the results, such as any incidents or any operating details not specified in this standard;

i) the date of the test.