

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

The European Standard EN 12100 : 1997 has the status of a
British Standard

ICS 23.060.01

National foreword

This British Standard is the English language version of EN 12100 : 1997 published by the European Committee for Standardization (CEN).

This European Standard is incorporated into BS 2782 *Methods of testing plastics* : Part 11: *Thermoplastics pipes, fittings and valves*, as Method 1133D, for association with related test methods for plastics materials and plastics piping components.

The UK participation in its preparation was entrusted to Technical Committee PRI/61, Plastics piping systems and components, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

The responsible UK Technical Committee considers that it is necessary to clarify the combination of figure 1 and the text of sub-clause 6.1 in respect of

- a) the orientation of figure 1;
- b) whether and how compensation should be made to the force to be applied in accordance with 6.3 in any arrangement where the weight of the test piece would interact with the specified force.

With the operating member now shown in figure 1, vertical and opposite the point of application of the force as required by 6.1.1 in conjunction with a reference to the figure, together with the instruction in 6.1.4 to place the test piece on the supports S the UK Technical Committee has concluded that for consistency, figure 1 should be regarded as though it is an elevation view with the downward direction towards the top of the page.

In this condition, the UK Technical Committee considers that the force should be applied at the value specified in accordance with 6.3.1 and item c) of the note to clause 3, with the effect of the weight of the test piece incidentally supplementing that of the applied force.

The UK Technical Committee considers that figure 1 should not be presumed to represent an elevation view with the force applied upwards and the test piece restrained by overhead supports, because the effect of the weight of the test piece would then oppose the applied force and undermine the rigour of the test, as well as being inconsistent with 6.1.4.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled 'International Standards Correspondence Index', or by using the 'Find' facility of the BSI Standards Electronic Catalogue.

Warning note. This British Standard, which is identical with EN 12100 : 1997, does not necessarily detail all the precautions necessary to meet the requirements of the Health and Safety at Work etc. Act 1974. Attention should be paid to any appropriate safety precautions and the test methods should be operated only by trained personnel.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 4, an inside back cover and a back cover.

Amendments issued since publication

Amd. No.	Date	Text affected

This British Standard, having been prepared under the direction of the Sector Board for Materials and Chemicals, was published under the authority of the Standards Board and comes into effect on 15 February 1998

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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

This European Standard was approved by CEN on 1997-07-05. 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 NNL.

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 $(23 \pm 2) ^\circ\text{C}$.

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

- the sampling procedure (see 5.1);
- the number of test pieces to be used (see 5.2);
- the bending force to be applied to the valve (see 6.3.1);
- 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 $\pm 5 \%$ (e.g. a torque wrench).

4.3 Compressed air supply, 0 mbar to 50 mbar¹⁾ (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 cm³/h, (typically with a capacity of 35 cm³) and graduated to enable measurement of volumes of 0,1 cm³ (e.g. having a graduated tube with a conical base).

4.6 Airtight piping systems, equipped with the following:

- fittings for connecting to the pipe sections;
- 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.

¹⁾ 1 bar = 10⁵ N/m²

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).

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 $25 \text{ mm/min} \pm 10 \%$ (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.

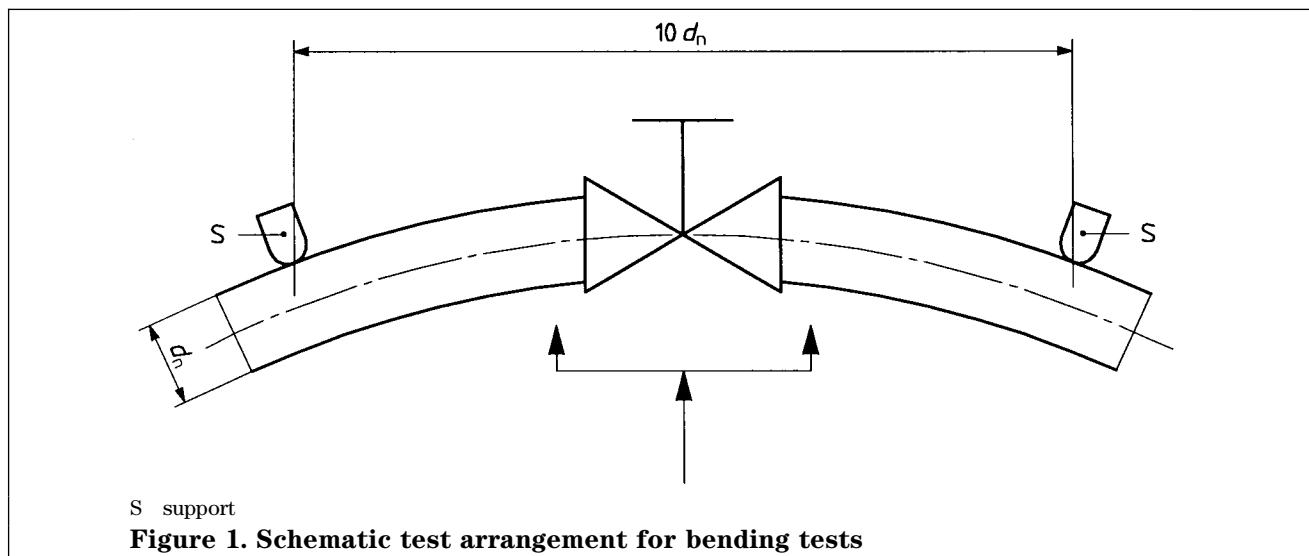
6.4 Final characteristics after removing the force

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.



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