BRITISH STANDARD

BS EN
1680 : 1997
BS 2782 :
Part 11 :
Method 1133A :
1997

Plastics piping systems — Valves for polyethylene (PE) piping systems — Test method for leaktightness under and after bending applied to the operating mechanism

The European Standard EN 1680 : 1997 has the status of a British Standard

ICS 23.060.01

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee PRI/61, Plastics piping systems and components, upon which the following bodies were represented:

British Gas plc
British Plastics Federation
British Plumbing Fittings Manufacturers' Association
British Valve and Acuator Manufacturers' Association
Chartered Institution of Water and Environment Management
Department of the Environment (British Board of Agrèment)
Department of the Environment (Building Research Establishment)
Department of Transport
Electricity Association
Health and Safety Executive
Institute of Building Control
Institute of Materials
Institution of Civil Engineers
Institution of Gas Engineers
National Association of Plumbing, Heating and Mechanical Services Contractors
Pipeline Industries Guild
Plastics Land Drainage Manufacturers' Association
Society of British Gas Industries
Society of British Water Industries
Water Companies Association
Water Services Association of England and Wales

The following bodies were also represented in the drafting of this standard, through subcommittees and panels:

ERA Technology Ltd.
Engineering Equipment and Materials Users' Association
RAPRA Technology Ltd.

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 July 1997

Amendments issued since publication

Amd. No.	Date	Text affected

The following BSI references relate to the work on this standard:
Committee reference PRI/61
Draft for comment 95/121246 DC

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Contents

National foreword

This British Standard has been prepared by Technical Committee PRI/61 and is the English language version of EN 1680 : 1997 *Plastics piping systems — Valves for polyethylene (PE) piping systems — Test method for leaktightness under and after bending applied to the operating mechanism*, published by the European Committee for Standardization (CEN).

It is incorporated into BS 2782 *Methods of testing plastics : Part 11 : Thermoplastics pipes, fittings and valves* as Method 1133A : 1997, for association with related test methods for plastics materials and plastics piping components.

This test method has been prepared for reference by other standards under preparation by CEN for specification of plastics piping and ducting systems and components. It has been implemented to enable experience of the method to be gained and for use for other fresh applications.

It is also for use for the revision or amendment of other national standards as practicable, but it should not be presumed to apply to any existing standard or specification which contains or makes reference to a different test method until that standard/specification has been amended or revised to make reference to this method and adjust any requirements as appropriate.

Cross-references

Publication referred to	Corresponding British Standard
EN 837-1 : 1996 (see note 2)	BS EN 837 *Pressure gauges* — Part 1 : 1997 *Bourdon tube pressure gauges — Dimensions, metrology, requirements and tests*
ISO 4065	BS ISO 4065 : 1997 *Thermoplastics pipes — Universal wall thickness table*
ISO 11413	BS 2782 *Methods of testing plastics* — Part 11: *Thermoplastics pipes, fittings and valves* — Method 1150E : 1997 *Plastics pipes and fittings — Preparation of test piece assemblies between a polyethylene (PE) pipe and an electrofusion fitting*
ISO 11414	Method 1130B : 1997[1)] *Plastics pipes and fittings — Preparation of test piece assemblies between pipe/pipe or pipe/fitting in polyethylene (PE) by butt fusion*

NOTE 1. In the descriptors, the term 'driving squares' is irrelevant: it appears to be a mistranslation of a French descriptor for 'closing torque'. The term 'cocks' should be read as 'valves'.

NOTE 2. In clause **2**, for EN 837-1 the reference to 1994 appears to correspond to the issue of prEN 837-1.

NOTE 3. In **5.2**, reference has been introduced to the 'same classification system' of the pipes and the valve, without reference to the basis thereof. Technical Committee PRI/61 considers this to be a reference to the material classification number according to EN ISO 12162 : 1995 (≡ BS EN ISO 12162 : 1996 and BS 2782 : Part 11 : Method 1121 : 1996)

NOTE 4. In **6.2.2**, reference has been introduced to the acronym 'MOP', without reference to the basis thereof. Technical Committee PRI/61 considers this to be a reference to 'maximum operating pressure (MOP)' according to prEN 12008-1 *Specific functional recommendations for PE systems — MOP ≤10 bar* and that otherwise the relevant MOP has to be identified by the standard making reference to this standard as though this was a further item in the list in the note which follows clause **3**, to support **6.2.2**.

Warning note. This British Standard, which is identical with EN 1680 : 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 method 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, pages i and ii, the EN title page, pages 2 to 6, an inside back cover and a back cover.

[1)] Under preparation.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1680

January 1997

ICS

Descriptors: Plastic tubes, gas pipelines, cocks, driving squares, pressure tests, leak tests, bend tests, verification

English version

Plastics piping systems — Valves for polyethylene (PE) piping systems — Test method for leaktightness under and after bending applied to the operating mechanism

Systèmes de canalisations en plastique — Robinets pour les systèmes de canalisations en polyéthylène (PE) — Méthode d'essai d'étanchéité sous et après une flexion appliquée au mécanisme d'entraînement

Kunststoff-Rohrleitungssysteme — Armaturen für systeme aus Polyethylen (PE) — Prüfverfahren für die Dichtheit während und nach der Aufbringung eines Biegemomentes auf den Betätigungsmechanismus

This European Standard was approved by CEN on 1996-11-07. 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 any CEN member.

This European Standard exists 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.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

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

Central Secretariat: rue de Stassart 36, B-1050 Brussels

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.

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.

This standard is based on the International Standard ISO/DIS 10933 *Polyethylene (PE) valves for gas distribution systems*, published by the International Organization for Standardization (ISO). It is a modification of ISO/DIS 10933 for reasons of applicability to other plastics materials and/or other test conditions and alignment with texts of other standards on test methods.

The modifications are:

– test parameters are omitted;

– no material-dependent requirements are given;

– editorial changes have been introduced.

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.

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 testing the ability of a valve, intended for use in polyethylene (PE) piping systems for gas supply, to maintain its pressure-retaining capabilities under and after being subject to a bending moment applied to the operating mechanism (cap).

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 : 1994	*Pressure gauges — Part 1: Bourdon tube pressure gauges — Dimensions, metrology, requirements and testing*
ISO 4065	*Thermoplastics pipes — Universal wall thickness table*
ISO 11413	*Plastics pipes and fittings — Preparation of test piece assemblies between a polyethylene (PE) pipe and an electrofusion fitting*
ISO 11414	*Plastics pipes and fittings — Preparation of test piece assemblies between pipe/pipe or pipe/fitting in polyethylene (PE) by butt fusion*

3 Principle

A bending moment is applied to the operating mechanism of a valve in the plane of its operating stem and at the position of its operating cap. The valve, in a half-open pressurized condition in an assembly with PE pipes, is then tested for external leaktightness. Following removal of the bending moment the valve is tested for internal and external leaktightness when subjected to pressure testing.

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

a) the sampling requirements (see **5.1**);

b) the number of test pieces (see **5.3**).

4 Apparatus

4.1 Temperature-controlled tank

4.1.1 *A watertight tank*, capable of accommodating a valve test assembly (**5.1**) and loading apparatus (**4.2**).

4.1.2 *Thermostatic control*, capable of maintaining the water within the tank (**4.1.1**), around the test assembly at $\left(20^{+\,3}_{-1}\right)$ °C

4.2 Apparatus

A steel frame or other similar member capable of supporting the valve during the test, as shown in figure 1. The supports shall be applied to the spigot ends of the valve or to the pipework adjacent to the fused sockets, as applicable.

The frame shall be constructed so that a bending moment can be applied directly onto the operating stem with the force being generated by weights or other loading apparatus.

The bending force shall be applied in the plane of the operating stem to create a bending moment of $\left(55^{+\,0}_{-5}\right)$ N·m on the top of the operating cap. The plane of bending shall also be perpendicular to the axis of the valve.

4.3 Ancillary equipment

a) *Manometer*, 0 mbar[1)], to 50 mbar, conforming to class 0,6 or better, in accordance with EN 837-1:1994;

b) *Pressure measurement device(s)*, capable of checking conformity to the specified pressure(s) (see **6.2**);

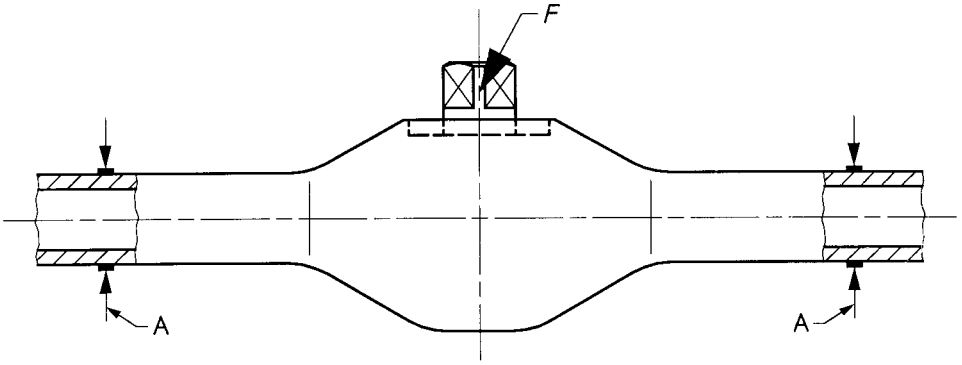
c) *Temperature measurement device*, capable of checking conformity to **4.1.2** and **6.1**;

d) *End closures*, connected to the ends of the valve by means of an appropriate system and allowing sealing and connecting to the pressurizing equipment;

e) *Loading apparatus* (see **4.2**);

f) *A device for checking conformity to the bending moment on the valve* (see **4.2**).

[1)] 1 bar = 10^5 N/m^2 = 0,1 MPa



A Position of support

F Bending force

Figure 1. Point of application of the bending force

5 Test pieces

5.1 Sampling

The sampling requirements shall be as specified in the referring standard.

5.2 Preparation of test pieces

The test pieces shall comprise a test assembly having PE pipes of the same classification system and/or the same SDR as the valve, as defined in ISO 4065.

The test piece assembly shall be made in accordance with ISO 11413 or ISO 11414, as applicable, so that each pipe is fused to an end of the valve and fitted with a pressure test enclosure.

The valve shall be in the half-open position.

The test assembly shall be positioned into the loading apparatus (**4.2**) with the operating stem centrally located beneath the loading mechanism.

5.3 Number of test pieces

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

6 Procedure

6.1 General

6.1.1 *Application of bending force*

Connect the air supply to the test piece. Place the test piece in the water tank maintained at $\left(20^{+\,3}_{-\,1}\right)$ °C (**4.1**) so that the depth of immersion from the top of the valve spigot end to the surface of the water does not exceed 550 mm. Measure and record the immersion depth to the top of the valve spigot.

6.1.2 Calculate the applied force to create a bending moment of $\left(55^{+\,0}_{-\,5}\right)$ N·m using the following equation:

$$F = M / L$$

where:

F is the force required, in newtons;

M is the bending moment, in newton metres;

L is the distance to the valve support, in metres.

6.1.3 Apply this force to the operating cap in the plane of the operating stem of the test piece. Keep the test piece under the bending force at specified temperature for a minimum duration of 1 h.

6.1.4 During testing in accordance with **6.2**, record any evidence of internal (seat) or external (stem) leakage.

6.2 Leaktightness tests

6.2.1 Pressurize the test piece pneumatically to a pressure of 25 mbar over and above the hydrostatic head produced by the water at the top of the valve spigot for at least 1 h and monitor for external leaktightness.

6.2.2 Repressurize the test piece pneumatically to a pressure of 6 bar or (1,5 × MOP) bar, whichever is the greater, for at least 1 h and monitor for external leaktightness.

6.2.3 Remove the bending moment and close the valve. Repeat the leaktightness tests given in **6.2.1** and **6.2.2**.

7 Test report

The test report shall include the following information:

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

b) full identification of the product, including manufacturer and production date;

c) the test temperatures;

d) the duration of each test;

e) the test pressures applied;

f) the force applied to the stem and the distance to the supports;

g) the test results;

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 test.

List of references

See national foreword.

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