

BRITISH STANDARD**BS EN
12106 : 1998
BS 2782 :
Part 11 :
Method 1127C :
1998**

Plastics piping systems — Polyethylene (PE) pipes — Test method for the resistance to internal pressure after application of squeeze-off

The European Standard EN 12106 : 1997 has the status of a
British Standard

ICS 23.040.20

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National foreword

This British Standard is the English language version of EN 12106 : 1997.

This European Standard is incorporated into BS 2782 *Methods of testing plastics : Part 11 : Thermoplastics pipes, fittings and valves*, as Method 1127C, 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.

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.

In particular, BS EN 12106 is not technically equivalent to appendix I of BS 7281 : 1990, which should now be used only for the purposes of BS 7281, which in turn is subject to standstill pending completion and implementation of EN 1555 to provide a revision of BS 7281.

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 12106 : 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, the EN title page, pages 2 to 4, an inside back cover and a back cover.

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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EUROPEAN STANDARD
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EN 12106

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Descriptors: Plastic tubes, polyethylene, pressure tests, crushing tests, determination, pressure resistance, hydrostatic pressure

English version

Plastics piping systems — Polyethylene (PE) pipes —
Test method for the resistance to internal pressure
after application of squeeze-off

Systèmes de canalisations en plastique — Tubes en
polyéthylène (PE) — Méthode d'essai de résistance
à la pression interne après application de
l'écrasement

Kunststoff-Rohrleitungssysteme — Rohre aus
Polyethylen (PE) — Bestimmung der
Widerstandsfähigkeit gegen Innendruck nach
Abquetschen

This European Standard was approved by CEN on 1997-03-28. 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.

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.

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European Committee for Standardization
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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.

This standard is based on annex B (informative) of the International Standard ISO 4437 : 1988 *Buried polyethylene (PE) pipes for the supply of gaseous fuels — Metric series — Specification*, published by the International Organization for Standardization (ISO).

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.

The logo for MAHCO features a large, stylized, light blue graphic element resembling a flame or a series of overlapping shapes, positioned above the word "MAHCO" in a large, bold, light blue serif font.

1 Scope

This standard specifies a method for determining the resistance to internal pressure of polyethylene (PE) pipes after being subjected to a squeeze-off procedure.

2 Normative reference

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 921 : 1994 *Plastics piping systems — Thermoplastics pipes — Determination of resistance to internal pressure at constant temperature*

3 Principle

A polyethylene (PE) pipe, conditioned to 0 °C, is squeezed between two parallel circular-section bars located at right angles to the pipe centreline, at a position midway between the pipe ends. The squeeze is subsequently released after an appropriate time period. The pipe is then subjected to a hydrostatic strength test at 80 °C.

NOTE 1. In certain countries the technique of squeeze-off is used to restrict the flow of fluid in PE piping systems whilst effecting maintenance and repair operations. The test described herein may be used to assess the effect of squeeze-off on the strength of pipes.

NOTE 2. It is assumed that the following test parameters are set by the standard making reference to this standard:

- a) the diameter and series of the pipe to be tested (see 5.1);
- b) the number of test pieces (see 5.2);
- c) the parameters for the hydrostatic strength test at 80 °C (see 6.5).

4 Apparatus

4.1 *Squeeze-off equipment*, comprising a compressive loading device with a combination of a fixed bar and a moveable bar contained within a framework designed to withstand the forces generated by the squeeze-off action.

Each bar shall have a circular cross section having sufficient rigidity to ensure a uniform separation between and along the bars in the course of squeeze-off. Each bar shall have the same diameter, which shall be not less than the applicable minimum value given in table 1.

The moveable bar may be hydraulically or mechanically operated to achieve the applicable level of squeeze-off given in table 1.

Means shall be provided for the measurement and maintenance of the bar displacement to within ± 0,2 mm of the required squeeze-off level *L* during the squeeze-off phase.

4.2 *Temperature conditioning apparatus*, capable of establishing and maintaining the test piece temperature (before squeeze-off) at (0 ± 1,5) °C.

4.3 *Pipe test equipment*, conforming to EN 921 : 1994 for the following items:

- a) *pressurizing equipment*;
- b) *timer*;
- c) *tank*, filled with water or other liquid for immersion of test pieces, maintained at (80 ± 1) °C;
- d) *end caps*, of type a).

Table 1. Squeeze-off levels

| Nominal outside diameter d_n | Minimum bar diameter mm | Squeeze-off level <i>L</i> % ¹⁾ |
|--------------------------------|-------------------------|--|
| $d_n \leq 63$ | 25,0 | 80 |
| $63 < d_n \leq 250$ | 38,0 | 80 |
| $250 < d_n \leq 630$ | 50,0 | 90 |

¹⁾ The squeeze-off level, *L*, is the percentage ratio of the distance between the squeeze-off bars, in millimetres, and twice the specified minimum wall thickness of the pipe, e_{min} , in millimetres.

5 Test pieces

5.1 Preparation

The test piece shall be a pipe of which the minimum free length, between end caps of any type, shall be 250 mm or six times the nominal outside diameter, d_n , of the pipe, whichever is the greater.

The diameter and series of the pipe shall be as specified in the referring standard.

For pressure testing (see 6.5) the test piece shall be closed with end caps of type a) (4.3).

5.2 Number

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

6 Procedure

6.1 Calculate the final distance, e_q , to be applied between the squeeze-off bars, in millimetres, using the following equation:

$$e_q = 0,02L \times e_{\min.}$$

where:

$e_{\min.}$ is the minimum wall thickness specified for the pipe;

L is the squeeze-off level conforming to table 1.

6.2 Condition the pipe at 0 °C for a time at least as long as that required in EN 921 : 1994 for the appropriate pipe wall thickness. Any conditioning fluids used shall not affect the properties of the test piece.

6.3 Position the test piece between squeeze bars set at right angles to the pipe centreline and midway between the pipe ends. Using a squeeze bar closure rate between 25 mm/min and 50 mm/min, squeeze-off at ambient temperature of not more than 25 °C to the distance, e_q , calculated in accordance with 6.1, within the following time interval after its removal from the conditioning environment:

- a) 90 s for $d_n \leq 110$;
- b) 180 s for $110 < d_n \leq 250$;
- c) 300 s for $d_n > 250$.

6.4 Maintain the squeeze-off level for a hold time period of (60 ± 5) min. Immediately after that hold time has elapsed, release the squeeze progressively so that the squeeze applied by the bars is fully released within 1 min.

6.5 Prepare the test piece for determination of hydrostatic strength at 80 °C in accordance with EN 921 : 1994 and conduct that test using the pressure, testing time and failure criteria as specified in the referring standard [see c) of note 2 to clause 3].

6.6 After testing, inspect the test piece and record the position and mode of any failure, as applicable (see 6.5).

7 Test report

The test report shall include the following information:

- a) the reference to this standard and to the referring standard;
- b) a complete identification of the pipe, including manufacturer, type of material (e.g. PE 80) and production date;
- c) the nominal diameter, d_n , of the pipe;
- d) the minimum wall thickness, $e_{\min.}$, of the pipe;
- e) the squeeze-off bar diameter;
- f) the final distance, e_q , between squeeze-off bars;
- g) the test pressure;
- h) the duration of testing at 80 °C;
- i) details of the position and mode of any failure;
- j) any factors which may have affected the results, such as any incidents or any operating details not specified in this standard;
- k) the date of test.

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