

# Plastics piping systems — Thermoplastics fittings — Test method for mechanical strength or flexibility of fabricated fittings

The European Standard EN 12256:1998 has the status of a  
British Standard

ICS 23.040.45

## National foreword

This British Standard is the English language version of EN 12256:1998.

It is also incorporated into BS 2782 *Methods of testing Plastics: Part 11: Thermoplastics pipes, fittings and valves*, as Method 1111F:1998, for association with related test methods for plastics materials and plastics piping systems.

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 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.

### Additional information

#### a) Apparatus (clause 3)

For the purposes of **6.1** air pressure or vacuum may be used instead of water as the medium for internal pressure, in which case relevant pneumatic supply and control devices will also be necessary.

#### b) Water temperature

When filling the assembly with water in accordance with **6.1** or **6.2**, as applicable, it is important that the temperature of the water does not cause the temperature of the test piece to deviate from the specified range of  $(23 \pm 5) ^\circ\text{C}$ . Hence the water introduced should be at  $(23 \pm 5) ^\circ\text{C}$  or the filled assembly should be (re)conditioned at  $(23 \pm 5) ^\circ\text{C}$  until the assembly and its contents are within that temperature range throughout before commencing to apply the necessary force.

#### c) Procedure

When testing in accordance with **6.1** the internal fluid may be water or air pressure or a vacuum. Introduction of air pressure or vacuum as alternatives to water together with rearrangement of the text of the draft for public comment means that as ratified no limits are specified for the internal pressure, nor is any one medium identified for use in case of dispute.

For consistency with **6.2**, the UK technical committee makes the following recommendations.

- 1) When applying and maintaining the necessary force to obtain the specified moment, the internal water or air pressure should be equivalent to a water head of between 200 mm and 300 mm above the critical point.
- 2) If inspection is performed after relaxing the force or displacement, the internal water or air pressure or vacuum, as applicable, should be equivalent to a water head of between 200 mm and 300 mm above the critical point.

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 October 1998

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### Amendments issued since publication

Amd. No.	Date	Text affected

- 3) In case of dispute, the internal medium should be water, unless otherwise specified in the referring standard.

**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 12256:1998, 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.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

**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 5 and a back cover.



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ICS 23.040.45

Descriptors: plastic tubes, pipe fittings, thermoplastic resins, sanitation, buried pipes, tests, mechanical strength, flexibility

English version

## Plastics piping systems — Thermoplastics fittings — Test method for mechanical strength or flexibility of fabricated fittings

Systèmes de canalisations en plastique — Raccords  
thermoplastiques — Méthode d'essai de la  
résistance mécanique ou de la flexibilité des  
raccords façonnés

Kunststoff-Rohrleitungssysteme — Formstücke aus  
Thermoplasten — Prüfverfahren der mechanischen  
Festigkeit oder Elastizität von handgefertigten  
Formstücken

This European Standard was approved by CEN on 9 January 1998.

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.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, 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.

The material dependent parameters and/or performance requirements are incorporated in the system standards(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 November 1998, and conflicting national standards shall be withdrawn at the latest by November 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.

## **Contents**

	Page
Foreword	2
1 Scope	3
2 Principle	3
3 Apparatus	3
4 Test piece	4
5 Conditioning	4
6 Procedure	4
7 Test report	5

## 1 Scope

This standard specifies a method for testing the mechanical strength or flexibility of a fabricated thermoplastics fitting intended to be used in non-pressure underground applications.

NOTE The method is intended to be used for type-testing.

## 2 Principle

An assembly of a fabricated fitting and the relevant number of adjacent pipes(s) and anchorages (see Figures 1 and 2) is subjected to a moment at the critical point. The critical point is where structural damage is most likely to start when increasing the moment.

Either a specified moment,  $M$ , or a specified displacement,  $A$ , becomes the determining factor, whichever is reached first.

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

- the sampling procedure and the number of test pieces (see 4.2);
- the conditioning temperature, if other than  $(23 \pm 5) ^\circ\text{C}$  (see clause 5);
- the conditioning time, if other than 21 days (see clause 5);
- if appropriate, the moment ( $M = F \times L$ ) or displacement to be applied (see clause 6).

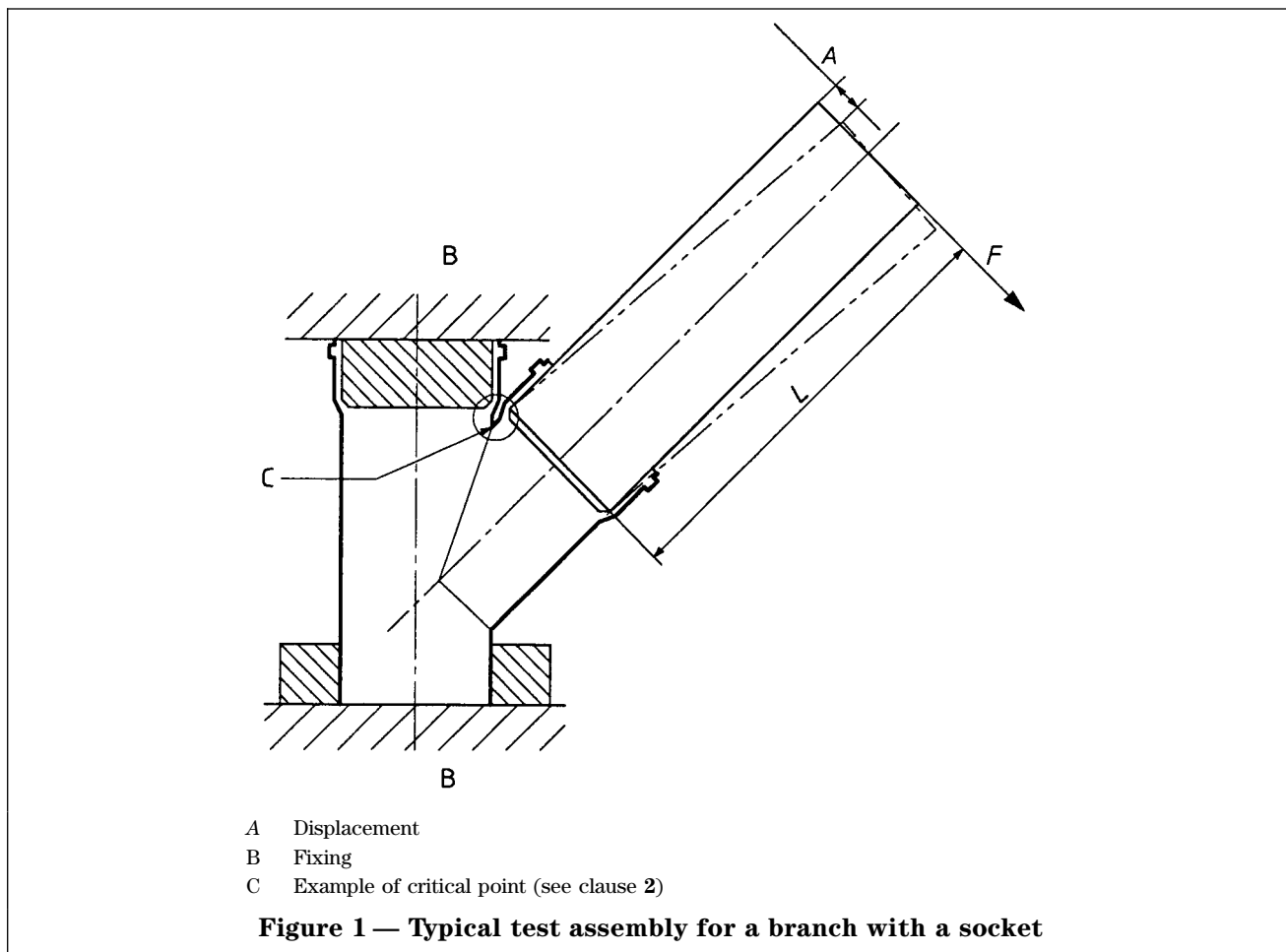
## 3 Apparatus

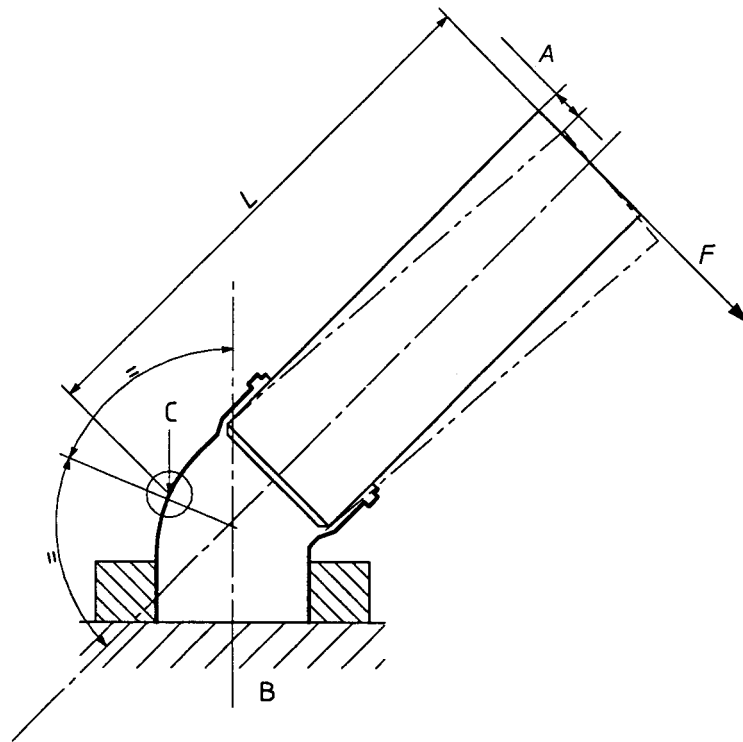
**3.1 Anchorages(s)**, capable of holding the body of the fabricated fitting rigid during the test. The anchorages shall not deform the fitting.

**3.2 Equipment**, capable of applying a force that will result in a moment in the critical point (see clause 6). The direction of the force can be clockwise or anti-clockwise, provided that tensile stresses are applied to the critical point.

**3.3 Equipment capable of determining the length,  $L$** , of the arm to the critical point (see Figures 1 and 2). When the displacement,  $A$ , is the determining factor, the arm,  $L$ , as shown in Figures 1 and 2, shall be  $(1200 \pm 10)$  mm.

**3.4 Force and/or displacement measurement instruments**, capable of determining the force applied and/or the displacement of the end of the arm to which the force is applied, as applicable (see clause 4 and Table 1).





A Displacement  
B Fixing  
C Example of critical point (see clause 2)

**Figure 2 — Typical test assembly for a bend with a socket**

If a socket is designed to take up an angular deflection,  $\beta$ , the total displacement shall be the sum of the displacement given by the design angle  $\beta$ , as declared by the manufacturer, plus the specified displacement. In this case, however, a mechanical arrangement, where the arm is fixed to the socket, is preferred.

**3.5** *If necessary, additional means to ensure the tightness of the joint (see clause 4).*

## 4 Test piece

### 4.1 Preparation

The test piece shall comprise an assembly of the fabricated fitting, with a pipe of the ring stiffness class for which the fitting is designed and fixings as appropriate.

In the case where a fitting is designed for both solid wall and structured-wall pipes, a solid wall pipe shall be used.

If the limiting factor is the moment,  $M$ , the pipe may be replaced by a mechanical arrangement that ensures that the required moment is applied.

If the limiting factor is the displacement,  $A$ , the pipe may be replaced by a mechanical arrangement of longitudinal rigidity not less than that of the specified pipe. In case of dispute the specified pipe shall be used.

Where a joint between a pipe and a fabricated fitting is made, the manufacturer's instructions shall be followed except that additional means may be used to ensure the tightness of the joint during the test.

### 4.2 Sampling procedure and number of test pieces

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

## 5 Conditioning

Samples shall be stored at room temperature of  $(23 \pm 5) ^\circ\text{C}$  for at least 21 days before testing, unless otherwise specified in the referring standard.

## 6 Procedure

### 6.1 Non-mechanical jointed fabricated fittings (cemented or fused)

Carry out the following procedure at  $(23 \pm 5) ^\circ\text{C}$ .

Assemble the fitting with the pipe or mechanical arrangement (see 4.1) and fix it e.g. as shown in Figure 1 or 2.

If possible, fill the assembly with water or air pressure.



Apply the necessary force in 1 s to 20 s to obtain the specified moment at the critical point or the specified displacement as given in Table 1, unless otherwise specified in the referring standard.

Maintain the force or the displacement applied for 15 min while monitoring for and recording any signs of splitting, cracking, separation and/or leakage. The inspection may be performed after the relaxing of force or displacement, and if necessary also after removal from the anchorage, by applying water or air pressure or vacuum.

Record any leakage at the fabricated joint as a failure.

### 6.2 Mechanical jointed fabricated fittings

Carry out the following procedure at  $(23 \pm 5) ^\circ\text{C}$ .

Assemble the fitting with the pipe or mechanical arrangement (see 4.1) and fix it e.g. as shown in Figure 1 or 2.

Fill the assembly with water until the level is between 200 mm and 300 mm above the critical point.

Apply the necessary force between 1 s and 20 s to obtain the specified moment at the critical point or the specified displacement as given in Table 1, unless otherwise specified in the referring standard.

Maintain the force or the displacement applied for 15 min while monitoring for and recording any signs of splitting, cracking, separation and/or leakage.

Record any leakage at the fabricated joint as a failure.

**Table 1 — Moment/displacement to be applied**

Nominal size DN/OD <sup>1)</sup>	Minimum moment kN·m	Minimum displacement mm
110	0,20	170
125	0,29	170
160	0,61	170
200	1,2	170
250	2,3	170
315	3,1	170
355	3,5	170
400	4,0	170
450	4,5	170
500	5,0	170
630	6,3	170
710	7,1	170
800	8,0	170
900	9,0	170
1000	10	170

<sup>1)</sup> For fitting of a DN/ID series conduct the test using the parameters specified for the next larger DN/OD pipe than the actual outside diameter of the corresponding pipe.

NOTE For DN/ODs up to and including 250, the figures of the minimum moment approximate to the following equation:

$$M = 0,15 \times [\text{DN}]^3 \times 10^{-6} \text{ kN}\cdot\text{m}$$

For DN/ODs greater than 250, the following equation is used:

$$M = 0,010 \times [\text{DN}] \text{ kN}\cdot\text{m}$$

## 7 Test report

The test report shall include the following information:

- a reference to this standard and to the referring standard;
- identity of the product(s) tested, including the stiffness of the pipe used, if applicable;
- the method of jointing, e.g. mechanical, cemented, fused;
- the method of determining splitting, cracking, separation and/or leakage;
- the determining factor applicable, i.e. moment or displacement;
- a brief description of the test apparatus;
- the permitted angular deflection, if any (see 3.4);
- the moment or the displacement applied;
- details of any signs of splitting, cracking, separation and/or leakage;
- any factors which may have affected the results, such as any incidents or any operating details not specified in this standard;
- the date of the test.

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