

Plastic piping systems for non-pressure underground drainage and sewerage — Polypropylene (PP) —

Part 1: Specifications for pipes, fittings and the system

The European Standard EN 1852-1:1997, with the incorporation of amendment A1:2002, has the status of a British Standard

ICS 83.140.30; 91.140.80; 93.030

National foreword

This British Standard is the English language version of EN 1852-1:1997, including amendment A1:2002, published by the European Committee for Standardization (CEN).

The start and finish of text introduced or altered by amendment is indicated in the text by tags **A1** **A1**. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by **A1** **A1**.

The UK participation in its preparation was entrusted by Technical Committee PRI/61, Plastics piping systems and components, to Subcommittee PRI/61/1, Thermoplastics piping systems and components for non-pressure applications, 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 subcommittee can be obtained on request to its secretary.

The responsible UK technical committee offers the following advice in respect of the contents of this standard.

1. Selection and application of stiffness classes

This document specifies three classes of pipes and fittings of differing stiffness, designated SN 8, SN 4 and SN 2 (see Table 3a and Table 6a).

From the viewpoint of installation, the SN 8 class has to be used if the system is to be installed in accordance with BS EN 1610, BS EN 752-1, BS EN 752-2, BS EN 752-3, BS EN 752-4 or BS 5955-6, in order to achieve the intended resistance to long-term deformation.

If it is intended to use the other, less stiff (SN 2 or SN 4), classes of pipe or fitting, the installation should first be subject to a structural design soil load calculation and the installation technique modified to suit the results of that calculation.

The appropriate calculation method is given in the National Annex for BS EN 1295-1. The *E* modulus for the material should be taken as 1250 MPa and 350 MPa for the short-term and long-term values respectively.

Attention is also drawn to the *Materials selection manual for sewers, pumping mains and manholes* as published by the Foundation for Water Research, Allen House, The Listons, Liston Road, Marlow, Bucks SL7 1FD, under reference WSA/FWR-04.

2. Marking requirements

For the marking requirements given in Clause 11, some aspects lack an objective basis for assessment of conformity, and this may lead to dispute unless manufacturers and purchasers declare or agree on the implications of the requirements as applicable.

Amendments issued since publication

Amd. No.	Date	Comments
14514	6 August 2003	See national foreword

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 March 1998

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For the purposes of 11.1.1, pending issue of and reference to a related document giving the intended limits of storage/weathering/handling/installation conditions, the extent to which legibility has to be maintained is unclear.

For 11.1.1a), there is no basis for assessment of conformity to “durable in use”, which is subjective in the absence of any constraints or guidance on the conditions or period of use.

Likewise, for 11.1.1b), there are no time limits set for the interval between sale and installation, and therefore uncertainty as to how much resistance to light exposure or other weathering aspects is considered necessary prior to burial of the marked component or label.

In 11.1.2, the wording “not ... adversely influence the performance of the pipe or fitting” could be argued as a reason to reject piping components which exhibited any measurable deterioration, unless this requirement is clearly related to the ability or otherwise of the component to continue to conform to the requirements of the standard for the intended or agreed period and conditions of service.

Cross-references

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

Where reference is made to specific details in a reference document, the date of the relevant edition should be provided, since the detail may not be consistent with a later edition. The responsible UK Technical Committee has noted that for the following standards the editions cited here were those available at the date of ratification of EN 1852-1 by CEN (1997-01-27).

EN 743:1994	(separate references to methods A and B in Table 10);
EN 744:1995	(reference to type d 90 striker in Table 7);
EN 763:1994	(reference to method A in Table 11);
EN 921:1994	(reference to types a or b end caps in table 1);
EN 1055:1996	(reference to test assembly b) (Figure 2 ...) in Table 12);
EN 1277:1996	(separate references to condition B and condition C in Table 12);
EN 1411:1996	(reference to type d 90 striker in Table 8).

Warning note. This British Standard, which is identical with EN 1852-1:1997, 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.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its 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 32, an inside back cover and a back cover.

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English version

Plastics piping systems for non-pressure underground drainage and sewerage — Polypropylene (PP) — Part 1: Specifications for pipes, fittings and the system (includes amendment A1:2002)

Systèmes de canalisations en plastique pour les
branchements et les collecteurs enterrés
d'assainissement sans pression —
Polypropylène (PP) —
Partie 1: Spécifications pour les tubes, les
raccords et le système
(inclut l'amendement A1:2002)

Kunststoff-Rohrleitungssysteme für
erdverlegte Abwasserkanäle und -leitungen —
Polypropylen (PP) —
Teil 1: Anforderungen an Rohre, Formstücke
und das Rohrleitungssystem
(enthält Änderung A1:2002)

This European Standard was approved by CEN on 1997-01-27. Amendment A1 was approved by CEN on 2002-05-30. 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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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, in liaison with CEN/TC 165, Waste water engineering, the Secretariat of which is held by NNI.

This standard is a part of a System Standard for plastics piping systems of a particular material for a specified application. There are a number of such System Standards.

System Standards are based on the results of the work undertaken in ISO/TC 138, Plastics pipes, fittings and valves for the transport of fluids, which is a Technical Committee of the International Organization for Standardization (ISO).

They are supported by separate standards on test methods, to which references are made throughout the System Standard.

The System Standards are consistent with general standards on functional requirements and on recommended practice for installation.

EN 1852 consists of the following parts, under the general title, *Plastics piping systems for non-pressure underground drainage and sewerage — Polypropylene (PP)*:

- *Part 1: Specifications for pipes, fittings and the system (the present standard)*¹⁾;
- *Part 2: Guidance for the assessment of conformity*;
- *Part 3: Guidance for installation*.

This part of EN 1852 includes the following annexes.

- Annex A (informative) General characteristics of PP pipes and fittings.
- Annex B (informative) Bibliography.

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.

For pipes and fittings which have conformed to the relevant national standard before January 1997, as shown by the manufacturer or by a certification body, the national standard may continue to be applied until January 1999.

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.

Foreword to amendment A1

This amendment EN 1852-1:1997/A1:2002 to the EN 1852-1:2002 has been prepared by Technical Committee CEN/TC 155, Plastics piping systems and ducting systems, the Secretariat of which is held by NEN.

This amendment to the European Standard EN 1852-1:2002 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2003, and conflicting national standards shall be withdrawn at the latest by February 2003.

According to the CEN/CENELEC International 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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

The amendment contains addition of a new wall thickness series for class SN 8 (see Table 3b, Table 6b and Table 7). In **A.2** a higher modulus of elasticity is specified for information. In **A.3**, the relation between the S-series and the ring stiffnesses are informed about.

The reason for this amendment is the development of a new generation of polypropylene materials having higher moduli. The moduli of elasticity on these materials are 1 700 MPa or higher.

¹⁾ This standard does not cover ancillary components. For ancillary components a separate standard is foreseen.

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1 Scope

This part of EN 1852 specifies the requirements for pipes, fittings and the system of polypropylene (PP) piping systems in the field of:

- non-pressure underground drainage and sewerage outside the building structure (application area code “U”); and
- non-pressure underground drainage and sewerage for both buried in ground within the building structure (application area code “D”) and outside the building structure.

This is reflected in the marking of products by “U” and “UD”.

It also specifies the test parameters for the test methods referred to in this standard.

A1) This standard covers PP materials both with normal E-moduli and with higher E-moduli, designated as HM (higher modulus), and gives a range of nominal sizes, and pipe series and gives recommendations concerning colours.

NOTE 0 PP materials with normal E-moduli have an E-modulus between 1 250 MPa and 1 700 MPa; PP materials with higher moduli (PP-HM materials) have an E-modulus $\geq$ 1 700 MPa. **A1)**

NOTE 1 It is the responsibility of the purchaser or specifier to make the appropriate selection from these aspects, taking into account their particular requirements and any relevant national regulations and installation practices or codes.

In conjunction with Part 2 and Part 3 of EN 1852 it is applicable to PP pipes and fittings, their joints and to joints with components of other plastics and non-plastics materials intended to be used for buried piping systems for non-pressure underground drainage and sewerage.

This standard is applicable to PP pipes with or without an integral socket.

NOTE 2 The fittings can be manufactured by injection moulding or be fabricated from pipes and/or mouldings.

NOTE 3 Requirements and limiting values for application area code “D” are given in Table 3a, Table 6a and Table 12.

NOTE 4 Pipes, fittings and other components conforming to any of the plastics product standards listed in Annex B may be used with pipes and fittings conforming to this standard when they conform to the requirements for joint dimensions given in Clause 6 and to the requirements of Table 12.

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 496, *Plastics piping and ducting systems — Plastics pipes and fittings — Measurement of dimensions and visual inspection of surfaces.*

EN 681-1, *Elastomeric seals — Material requirements for pipe joint seals used in water and drainage applications — Part 1: Vulcanized rubber.*

prEN 681-2, *Elastomeric seals — Material requirements for pipe joint seals used in water and drainage applications — Part 2: Thermoplastic elastomers.*

EN 728, *Plastics piping and ducting systems — Polyolefin pipes and fittings — Determination of oxidation induction time.*

EN 743, *Plastics piping and ducting systems — Thermoplastics pipes — Determination of the longitudinal reversion.*

EN 744, *Plastics piping and ducting systems — Thermoplastics pipes — Test method for resistance to external blows by the round-the-clock method.*

EN 763, *Plastics piping and ducting systems — Injection-moulded thermoplastics fittings — Test method for visually assessing effects of heating.*

EN 921, *Plastics piping systems — Thermoplastics pipes — Determination of resistance to internal pressure at constant temperature.*

EN 1055, *Plastics piping systems — Thermoplastics piping systems for soil and waste discharge inside buildings — Test method for resistance to elevated temperature cycling.*

EN 1277, Plastics piping systems — Thermoplastics piping systems for buried non-pressure applications — Test methods for leaktightness of elastomeric sealing ring type joints.

prEN 1401-1, Plastics piping systems for non-pressure underground drainage and sewerage — Unplasticized poly(vinyl chloride) (PVC-U) — Part 1: Specifications for pipes, fittings and the system.

EN 1411, Plastics piping and ducting systems — Thermoplastics pipes — Determination of resistance to external blows by the staircase method.

prEN 1852-2, Plastics piping systems for non-pressure underground drainage and sewerage — Polypropylene (PP) — Part 2: Guidance for the assessment of conformity.

prEN 1989, Thermoplastics piping and ducting systems — Joints for buried non-pressure applications — Test method for long-term sealing performance of joints with thermoplastic elastomer (TPE) seals by estimating the sealing pressure.

EN 12061, Plastics piping systems — Thermoplastics fittings — Test method for impact strength.

prEN 12256, Plastics piping systems — Thermoplastics fittings — Test method for mechanical strength or flexibility of fabricated fittings.

EN ISO 9969, Thermoplastics pipes — Determination of ring stiffness.

ISO 472:1988, Plastics — Vocabulary.

ISO 1043-1:1997, Plastics — Symbols — Part 1: Basic polymers and their special characteristics.

ISO 1133:1992, Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics.

ISO 4440-1:1994, Thermoplastics pipes and fittings — Determination of melt mass-flow rate — Part 1: Test method.

ISO 4440-2:1994, Thermoplastics pipes and fittings — Determination of melt mass-flow rate — Part 2: Test conditions.

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of this standard, the following definitions and those given in ISO 472:1988 and ISO 1043-1:1997 apply.

3.1.1

application area code

a code used in the marking of pipes and fittings to indicate the application area for which they are intended, as follows:

- | | |
|---|---|
| U | code for the area more than 1 m from the building to which the buried piping system is connected; |
| D | code for the area under and within 1 m from the building where the pipes and the fittings are buried in ground and are connected to the soil and waste discharge system of the building |

NOTE In code D application areas, the existence of hot water discharge in addition to the external forces from the surroundings is usual.

3.1.2 Geometrical definitions

3.1.2.1

nominal size (DN)

a numerical designation of the size of a component, which is a convenient round number approximately equal to the manufacturing dimension, in millimetres

3.1.2.2

nominal size (DN/OD)

nominal size, related to the outside diameter

3.1.2.3**nominal outside diameter (dn)**

the specified outside diameter, in millimetres, assigned to a nominal size (DN/OD)

3.1.2.4**outside diameter (de)**

the value of the measurement of the outside diameter through its cross-section at any point of a pipe or spigot end of a fitting, rounded up to the next greater 0,1 mm

3.1.2.5**mean outside diameter (dem)**

the value of the measurement of the outer circumference of a pipe or spigot end of a fitting in any cross-section, divided by π ($\approx 3,142$), rounded to the next greater 0,1 mm

3.1.2.6**mean inside diameter of a socket (dsm)**

the arithmetic mean of a number of measurements of the inside diameter of a socket in the same cross-section

3.1.2.7**wall thickness (e)**

the value of the measurement of the wall thickness at any point around the circumference of a component

3.1.2.8**mean wall thickness (em)**

the arithmetic mean of a number of measurements of the wall thickness, regularly spaced around the circumference and in the same cross-section of a component, including the measured minimum and the measured maximum values of the wall thickness in that cross-section

3.1.2.9**pipes series S**

a number for pipe designation (see ISO 4065:1996)

3.1.2.10**standard dimension ratio (SDR)**

a numerical designation of a pipe series, which is a convenient round number approximately equal to the ratio of the nominal outside diameter, d_n , and the minimum wall thickness, $e_{\min}$

3.1.2.11**nominal ring stiffness (SN)**

a numerical designation of the ring stiffness of a pipe or fitting, which is a convenient round number, relative to the determined stiffness in kilonewtons per square metre (kN/m^2), indicating the minimum ring stiffness of a pipe or fitting

3.1.2.12**design length (Z)**

the length of a fitting (e.g. the main pipe of a branch), excluding any spigot or socket length. In case of a change in direction (e.g. in case of a bend or the service pipe of a branch), it is the length from one end to the intersection of the straight axis of this end with the straight axis of the other end of the fitting, excluding any spigot or socket length (see the dimensions Z_1 and Z_2 in, e.g. Figure 7, Figure 8, Figure 9, Figure 10 and Figure 11)

3.1.3 Material definitions**3.1.3.1****virgin material**

material in a form such as granules or powder that has not been subjected to use or processing, other than that required for its manufacture, and to which no reprocessible or recyclable material has been added

3.1.3.2

own reprocessable material

material prepared from rejected unused pipes or fittings, including trimmings from the production of pipes or fittings, that will be reprocessed in a manufacturer's plant after having been previously processed by the same manufacturer by a process such as moulding or extrusion, and for which the complete formulation is known

3.1.3.3

external reprocessable material

material comprising either one of the following forms:

- a) material from rejected unused pipes or fittings or trimmings therefrom, that will be reprocessed and that were originally processed by another manufacturer;
- b) material from the production of unused PP products other than pipes and fittings, regardless of where they are manufactured

3.1.3.4

recyclable material

material comprising either one of the following forms:

- a) material from used pipes or fittings which have been cleaned and crushed or ground;
- b) material from used PP products other than pipes or fittings which have been cleaned and crushed or ground

3.2 Symbols

A	length of engagement
C	depth of sealing zone
DN	nominal size
DN/OD	nominal size, outside diameter related
d_e	outside diameter
d_{em}	mean outside diameter
d_n	nominal outside diameter
d_{sm}	mean inside diameter of a socket
e	wall thickness
e_m	mean wall thickness
e_2	wall thickness of a socket
e_3	wall thickness in the groove area
l	effective length of a pipe
L_1	length of spigot
M	length of spigot of a plug
R	radius of swept fittings
Z	design length of (a part of) a fitting
α	nominal angle of a fitting

3.3 Abbreviations

CT	close tolerance
$\square A_1$ PP-HM	polypropylene with high E-modulus $\square A_1$
MFR	melt mass-flow rate
OIT	oxidation induction time
PP	polypropylene
SDR	standard dimension ratio
SN	nominal ring stiffness
TIR	true impact rate