BS EN 12666-1:2026

BSI Standards Publication

Plastics piping systems for non-pressure underground drains and sewers — Polyethylene (PE)

Part 1: Specifications for pipes, fittings and the system



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National foreword

This British Standard is the UK implementation of EN 12666-1:2026. It supersedes BS EN 12666-1:2005+A1:2011, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/88, Plastics piping systems.

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

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Plastics piping systems for non-pressure underground drains and sewers - Polyethylene (PE) - Part 1: Specifications for pipes, fittings and the system

Systèmes de canalisations en plastique pour les branchements et les collecteurs d'assainissement enterrés sans pression - Polyéthylène (PE) - Partie 1 : Spécifications pour les tubes, les raccords et le système

Kunststoff-Rohrleitungssysteme für erdverlegte Abwasserkanäle und -leitungen - Polyethylen (PE) - Teil 1: Anforderungen an Rohre, Formstücke und das Rohrleitungssystem

This European Standard was approved by CEN on 20 April 2026.

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European foreword

This document (EN 12666-1:2026) has been prepared by Technical Committee CEN/TC 155 “Plastics piping systems and ducting systems”, the secretariat of which is held by NEN.

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of an identical text or by endorsement, at the latest by November 2026, and conflicting national standards shall be withdrawn at the latest by November 2026.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12666-1:2005+A1:2011.

This revision of the EN 12666 series is proposed by CEN/TC 155/WG 13 members in order to improve the "level of sustainability" and the "environmental impact" of PE piping systems, whilst improving the recommendations and safe use of recycled material.

Compared to the previous version EN 12666-1:2005+A1:2011, the main changes are listed below:

— the title has been changed;

— the document follows a new template;

— definitions for waste water and surface water have been added;

— material definitions have been updated in line with EN 14541-1:2022;

— the material Clause 5 has been rewritten;

— Annex A, utilization of PE recyclates has been added;

— in 12.2, the maximum marking interval has been changed.

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

System Standards are based on the results of the work being 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).

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

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

EN 12666:2026 consists of the following parts under the general Plastics piping systems for non-pressure underground drains and sewers — Polyethylene (PE)

— Part 1: Specifications for pipes, fittings and the system (this document);

— Part 2: Assessment of conformity (CEN/TS).

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This part of EN 12666 includes Annex B (informative) “General characteristics of PE pipes and fittings”.

For guidance for installation, see CEN/TS 1046 [11], and for guidance for design, see CEN/TS 15223:2025 [10].

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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1 Scope

This document specifies definitions and requirements for solid-wall pipes with or without internal skin and smooth internal and external surfaces extruded from the same compound throughout the wall, fittings and the system of polyethylene (PE) piping systems to be intended for use in non-pressure underground drains and sewers for wastewater.

NOTE 1 Products complying with this document can also be used in non-pressure underground drains and sewers for surface water.

This document is applicable to:

a) non-pressure drains and sewers, which are intended to be used buried underground outside the building structure, reflected in the marking of products by "U";

b) non-pressure drains and sewers, which are intended to be used buried underground both outside (application area code "U") and within the building structure, reflected in the marking of products by "UD".

This document specifies test methods referred to in this document and test parameters.

This document is applicable to pipes and fittings with or without an integral socket.

This document covers a range of pipe and fitting sizes, stiffness classes, tolerance classes and gives recommendations concerning colours.

NOTE 2 It is the responsibility of the purchaser or specifier to make the appropriate selections from these aspects, taking into account their particular requirements and any relevant national regulations and installation practices or codes.

In conjunction with CEN/TS 12666-2 [1] it is applicable to PE 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 drains and sewers.

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

This document is applicable to PE pipes and fittings for the following types of joints:

— elastomeric ring seal joints;

— butt fused joints;

— electrofusion joints;

— mechanical joints.

NOTE 3 Pipes, fittings and other components conforming to any of the plastics product standards listed in the Annex C (informative) can be used with pipes and fittings conforming to this document, provided they conform to the requirements for joint dimensions given in Clause 7 and to the requirements of Clause 7 and Table 13.

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2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

EN 681-2, *Elastomeric Seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 2: Thermoplastic elastomers*

EN 12099, *Plastics piping systems — Polyethylene piping materials and components — Determination of volatile content*

EN 15346:2024, *Plastics — Recycled plastics — Characterization of poly(vinylchloride) (PVC) recyclates*

EN ISO 472:2013, *Plastics — Vocabulary (ISO 472:2013)*

EN ISO 527-2, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics (ISO 527-2)*

EN ISO 580, *Plastics piping and ducting systems — Injection-moulded thermoplastics fittings — Methods for visually assessing the effects of heating (ISO 580)*

EN ISO 1043-1, *Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics (ISO 1043-1)*

EN ISO 1133-1, *Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics — Part 1: Standard method (ISO 1133-1)*

EN ISO 1167-1, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 1: General method (ISO 1167-1)*

EN ISO 1167-2, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 2: Preparation of pipe test pieces (ISO 1167-2)*

EN ISO 1183-1, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: lmmersion method, liquid pycnometer method and titration method (ISO 1183-1)*

EN ISO 1183-2, *Plastics — Methods for determining the density of non-cellular plastics — Part 2: Density gradient column method (ISO 1183-2)*

EN ISO 2505, *Thermoplastics pipes — Longitudinal reversion — Test method and parameters (ISO 2505)*

EN ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions (ISO 3126)*

EN ISO 3451-1, *Plastics — Determination of ash — Part 1: General methods (ISO 3451-1)*

EN ISO 9969:2016, *Thermoplastics pipes — Determination of ring stiffness (ISO 9969:2016)*

EN ISO 11357-6, *Plastics — Differential scanning calorimetry (DSC) — Part 6: Determination of oxidation induction time (isothermal OIT) and oxidation induction temperature (dynamic OIT) (ISO 11357-6)*

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EN ISO 13254, *Thermoplastics piping systems for non-pressure applications — Test method for watertightness (ISO 13254)*

EN ISO 13257:2018, *Thermoplastics piping systems for non-pressure applications — Test method for resistance to elevated temperature cycling (ISO 13257:2018)*

EN ISO 13259, *Thermoplastics piping systems for underground non-pressure applications — Test method for leaktightness of elastomeric sealing ring type joints (ISO 13259)*

EN ISO 13263, *Thermoplastics piping systems for non-pressure underground drainage and sewerage — Thermoplastics fittings — Test method for impact strength (ISO 13263)*

EN ISO 13264, *Thermoplastics piping systems for non-pressure underground drainage and sewerage — Thermoplastics fittings — Test method for mechanical strength or flexibility of fabricated fittings (ISO 13264)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 472:2013 and EN ISO 1043-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp/

— IEC Electropedia: available at https://www.electropedia.org/

3.1
drain
pipeline, usually underground, designed to carry wastewater from a source to a sewer

[SOURCE: EN 16323:2014, 2.2.3.1]

3.2
sewer
pipeline or other construction, usually underground, designed to carry wastewater from more than one source

[SOURCE: EN 16323:2014, 2.2.3.12]

3.3
wastewater
water composed of any combination of water discharged from domestic, industrial or commercial premises, surface run-off and accidentally any sewer infiltration water

[SOURCE: EN 16323:2014, 2.3.10.65, modified - sewage (deprecated) deleted]

3.4
surface water
water from precipitation, which has not seeped into the ground and is discharged to the drain or sewer system directly from the ground or from exterior building surfaces

[SOURCE: EN 16323:2014, 2.1.1.3]

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3.5
application area code
code used in the marking of pipes and fittings to indicate the application area(s) for which they are intended, as follows:

U: for the area more than 1 m from the building to which the buried piping system is connected;

UD: for application area U and 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.

3.6
Geometrical definitions

3.6.1
nominal size
DN
numerical designation of the size of a component, which is a convenient round number approximately equal to the manufacturing dimension

Note 1 to entry: Nominal size is expressed in millimetres (mm).

Note 2 to entry: This designation is not used for thread components.

3.6.2
nominal size
DN/OD
nominal size, related to the outside diameter

3.6.3
nominal outside diameter
d_n
specified outside diameter assigned to a nominal size DN/OD

Note 1 to entry: Nominal size is expressed in millimetres (mm).

3.6.4
outside diameter
d_e
value of the measurement of the outside diameter through its cross-section at any point of a pipe or spigot end, rounded up to the next greater 0,1 mm

3.6.5
mean outside diameter
d_{em}
value of the measurement of the outer circumference of a pipe or spigot end of a fitting in any cross-section, divided by π (≈ 3,142), rounded up to the nearest 0,1 mm

3.6.6
mean inside diameter of a socket
d_{sm}
arithmetical mean of a number of measurements of the inside diameter of a socket in the same cross-section

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3.6.7
wall thickness
e
value of the measurement of the wall thickness at any point around the circumference of a component

3.6.8
mean wall thickness
e_m
arithmetical 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

3.6.9
pipe series (S)
number for pipe designation (see ISO 4065 [2])

Note 1 to entry: It is a dimensionless number.

3.6.10
standard dimension ratio (SDR)
numerical designation of a pipe series which is a convenient round number, approximately equal to the dimension ratio of the nominal outside diameter, d_n, and the nominal wall thickness, e_n

3.7
Mechanical definitions

3.7.1
nominal ring stiffness class (SN)
numerical designation of the ring stiffness of the pipe or fitting, which is a convenient round number, indicating the minimum required ring stiffness of the pipe or stiffness of the fitting

3.8
Material definitions

3.8.1
virgin material
plastics material in the form of pellets, granules, powder, floc, etc. that has not been subjected to use or processing other than that required for its initial manufacture

Note 1 to entry: Does not contain any reworked plastics material and/or plastics recyclate.

Note 2 to entry: Sometimes also referred to as “primary material” or “primary plastics feedstock”.

Note 3 to entry: It is understood that the addition of additives such as stabilizers and pigments is still resulting into a virgin (plastics) material.

[SOURCE: EN 14541-1:2022 [20]]

3.8.2
reworked material
plastics material from rejected unused products or trimmings capable of being reclaimed within the same process that generated it

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Note 1 to entry: Reworked material does not change the status of the feedstock.

Note 2 to entry: This definition does not cover the conditions for the use of reworked material-which can be found in the applicable product standard.

Note 3 to entry: Previously referred to as “own reprocessed material”.

[SOURCE: EN 14541-1:2022 [20]]

3.8.3
recyclate
plastics material resulting from the recycling of pre-consumer and post-consumer plastics products

Note 1 to entry: Also referred to as “secondary raw material” or “recycled plastics” or “regenerate”.

Note 2 to entry: Recycling can be chemical, physical or mechanical.

[SOURCE: EN 14541-1:2022 [20]]

3.8.4
pre-consumer material
plastics material diverted from the waste stream during a manufacturing process, excluding reworked (plastics) material

Note 1 to entry: Previously referred to as “post-industrial material”.

Note 2 to entry: Different categories of pre-consumer material may be considered in the applicable product standard.

[SOURCE: EN 14541-1:2022 [20]]

3.8.5
post-consumer material
plastics material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose

Note 1 to entry: This includes returns of material from the distribution chain.

Note 2 to entry: Different categories of post-consumer material may be considered in the applicable product standard.

[SOURCE: EN 14541-1:2022 [20]]

3.8.6
compound
clearly defined homogenous mixture of substances used for the manufacture of the product

Note 1 to entry: In general, the term “compound” is used for polyolefins and the term “formulation” for PVC.

Note 2 to entry: For metals and when dealing with water and food contact regulations the term “composition” is often used instead of compound/formulation.

[SOURCE: EN 14541-1:2022 [20]]

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3.8.7
agreed specification
specification of the relevant material characteristics agreed between the supplier of the recyclate and the pipe and/or fitting manufacturer

Note 1 to entry: The agreed specification is often considered in the context of certification by a third party organization.

4 Symbols and abbreviations

4.1 Symbols

For the purposes of this document, the following symbols apply.

$d_{n,1}$	nominal diameter of the main of a branch
$d_{n,2}$	nominal diameter of the branch of a branch
L_1	insert length
Z_1, Z_2, Z_3	design length of a fitting
α	nominal angle of fitting

4.2 Abbreviations

For the purposes of this document, the following abbreviations apply.

DN	nominal size
DN/ID	nominal size related to inside diameter
DN/OD	nominal size related to outside diameter
PE	polyethylene
S	pipe series S
SDR	standard dimension ratio
SN	ring stiffness class

5 Material

5.1 General

The compound for production of pipes and fittings shall be PE-base material to which additives can be added to enable conformity with the requirements of this document.

PE material may be virgin material, reworked material or recyclates (pre- or post-consumer).

Recyclates are permitted if they comply with Annex A.

The compound (including virgin material, reworked material, recyclates or a mixture, if applicable) shall comply with the requirements given in 5.2.

The maximum amount of recyclate in the compound is calculated based on the amount of separate recyclate added to the compound plus the amount of recyclate present in reworked material which is added to the compound.

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