



BSI Standards Publication

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

This is a preview of "BS EN 1401-1:2019+A1...". [Click here to purchase the full version from the ANSI store.](#)

National foreword

This British Standard is the UK implementation of EN 1401-1:2019+A1:2023. It supersedes BS EN 1401-1:2009, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by $\boxed{A1}$ $\langle A1 \rangle$.

The UK participation in its preparation was entrusted to Technical Committee PRI/88/1, Plastics piping for non-pressure applications.

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

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

Selection and application of stiffness classes

BS EN 1401-1:2019 specifies four stiffness classes of pipes and fittings, designated SN2, SN4, SN8 and SN16 (see Table 6 and Table 8).

In buried pipelines, deformation is resisted by ring stiffness of the pipe, together with support provided by the native soil and the compacted sidefill in the trench.

The pipeline designer specifies the maximum (long-term) acceptable deflection limit, which for adoptable drains and sewers in the UK is typically 6% and for highways works is typically 5%. The UK committee advises that, when installed in accordance with BS EN 1610, the SN4 class (short-term ring stiffness ≥ 4 kN/m²) be used to achieve the necessary resistance to long-term deformation.

If it is proposed to use pipes or fittings of lower short-term ring stiffness (SN2), the UK committee advises that structural design load calculations be undertaken and the installation technique modified to suit the results of that calculation.

Additional information

For ancillary fittings not covered by BS EN 1401-1 and intended for use with pipe conforming to BS EN 1401-1, reference is made to BS 4660 and BS EN 13598-1.

The UK committee advises that swept bends and branches meet the requirements of the relevant parts of BS 4514. Guidance on swept bends and branches is given in the Building Regulations 2010 Approved Document H 2015.

When pipe conforming to BS EN 1401-1 is perforated for infiltration trenches and filter drains, the UK committee advises that the perforations meet the requirements given in the National Highways *Manual of Contract Documents for Highway Works (Volume 1) Specification for Highway Works — Series 500 Drainage and Service Ducts*.

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Amendments/corrigenda issued since publication

Date	Text affected
30 April 2023	Implementation of CEN amendment A1:2023
30 April 2023	Correction to implementation paragraph
31 May 2023	Correction to title

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English Version

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

Systèmes de canalisations en plastique pour les branchements et les collecteurs d'assainissement enterrés sans pression - Poly(chlorure de vinyle) non plastifié (PVC-U) - Partie 1 : Spécifications pour tubes, raccords et le système

Kunststoff-Rohrleitungssysteme für erdverlegte drucklose Abwasserkanäle und -leitungen - Weichmacherfreies Polyvinylchlorid (PVC-U) - Teil 1: Anforderungen an Rohre, Formstücke und das Rohrleitungssystem

This European Standard was approved by CEN on 12 May 2019 and includes Amendment 1 approved by CEN on 21 January 2023.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 1401-1:2019+A1:2023) 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 October 2023, and conflicting national standards shall be withdrawn at the latest by October 2023.

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 includes Amendment 1 approved by CEN on 21 January 2023.

This document supersedes $\boxed{A_1}$ EN 1401-1:2019 $\boxed{A_1}$.

The start and finish of text introduced or altered by amendment is indicated in the text by tags $\boxed{A_1}$ $\boxed{A_1}$.

This revision of the EN 1401 series is proposed by CEN/TC155/WG6 members in order to improve the "level of sustainability" and the "environmental impact" of PVC piping systems, whilst improving the recommendations and safe use of recycled material. Recycled material is categorized as non-virgin material in this document.

Regarding this specific target, some superfluous requirements and inconsistencies existing in the old version of EN 1401-1 were deleted, and more focus was given to the control of applied formulation and to the final characteristics and performance of products.

Compared to the previous version, the main changes are listed below:

- a) clarification of product covered (Clause 1);
- b) introduction of a new pipe series SN 16 (SDR 27,6) (7.2.5 and 7.4.1.2);
- c) deletion of former clause on dimension of "o-ring type joints";
- d) complete review of non-virgin (recyclates) material use (Clause 5 and Annex A);
- e) addition of a footnote e) to Table 14 for DSC to lower the minimum B-onset temperature to 180 °C for formulation with CaZn stabilizers.

This document 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.

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

EN 1401 consists of the following parts, under the general title *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* (this document);
- *Part 2: Guidance for assessment of conformity* (CEN/TS under revision).

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 organizations 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 the requirements for solid wall pipes with smooth internal and external surfaces, extruded from the same formulation throughout the wall, fittings and the system of unplasticized poly(vinyl chloride) (PVC-U) piping systems in the field of non-pressure underground drainage and sewerage:

- buried in ground outside the building structure (application area code "U"), and
- both buried in ground, within the building structure and outside the building (application area code "UD").

NOTE 1 The intended use is reflected in the marking of products by "U" or "UD".

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

NOTE 2 Multilayer pipes with different formulations throughout the wall and foamed core pipes are covered by EN 13476-2 [1].

This document covers a range of nominal sizes, a range of pipes and fittings series and a range of stiffness classes and gives recommendations concerning colours.

NOTE 3 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.

It is applicable to PVC-U pipes and fittings, their joints and to joints with components of other plastics and non-plastics materials intended for buried piping systems for non-pressure underground drainage and sewerage.

NOTE 4 Pipes, fittings and other components conforming to any of the plastics product standards listed in Annex C 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 Table 16.

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 — Material 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 14680, *Adhesives for non-pressure thermoplastics piping systems — Specifications*

EN 14814, *Adhesives for thermoplastic piping systems for fluids under pressure — Specifications*

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

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