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Plastics piping systems for non-pressure underground drainage and sewerage -  
 Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) -  
 Part 2: Specifications for manholes and inspection chambers in traffic areas and deep  
 underground installations

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Kunststoff-Rohrleitungssysteme für erdverlegte drucklose Abwasserkanäle und -  
 leitungen - Weichmacherfreies Polyvinylchlorid (PVC-U), Polypropylen (PP) und  
 Polyethylen (PE) - Teil 2: Anforderungen an Einsteigschächte und Kontrollschächte für  
 Verkehrsflächen und tiefe Erdverlegung

Systemes de canalisations en plastiques pour les branchements et les collecteurs  
 d'assainissement enterrés sans pression - Poly(chlorure de vinyle) non plastifié (PVC-U),  
 polypropylène (PP) et polyéthylène (PE) - Partie 2: Spécifications relatives aux regards  
 et aux boîtes d'inspection et de branchement dans les zones de circulation et dans les  
 réseaux enterrés profondément

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Plastics piping systems for non-pressure underground drainage  
and sewerage - Unplasticized poly(vinyl chloride) (PVC-U),  
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**iTeh STANDARD PREVIEW**

This European Standard was approved by CEN on 11 November 2008.

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

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## EN 13598-2:2009 (E)

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## Foreword

This document (EN 13598-2:2009) 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 July 2009, and conflicting national standards shall be withdrawn at the latest by July 2009.

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

This European standard is a supplementary standard for System Standards 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 being undertaken in ISO/TC 138 "*Plastics pipes, fittings and valves for the transport of fluids*", which is a Technical Committee of the International Organisation for Standardisation (ISO).

They are supported by separate standards on test methods and by European Standards for thermoplastic underground drainage and sewerage systems, 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.

This European Standard 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), polypropylene (PP) and polyethylene (PE)*:

- *Part 1: Specification for ancillary fittings including shallow inspection chambers*
- *Part 2: Specifications for manholes and inspection chambers in traffic areas and deep underground installation* (this standard)
- *Part 3: Assessment of conformity* (CEN/TS under preparation)

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

**EN 13598-2:2009 (E)****1 Scope**

This European Standard specifies the definitions and requirements for buried manholes and inspection chambers installed to a maximum depth of 6 m from ground level to the invert of the main chamber and manufactured from unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP), polypropylene with mineral modifier (PP-MD) or polyethylene (PE). These products are intended for use in pedestrian or vehicular traffic areas and underground installations conforming to the general requirements given in EN 476 and are used outside the building structure (application area code "U"). They are therefore marked accordingly with a "U". Such products are also deemed to meet the requirements of EN 13598-1 for application area U without the need for further testing. If additionally marked application area D then these products must additionally be tested to show compliance to the elevated temperature cycling requirement of Clause 10 of EN 13598-1.

This European Standard is only applicable to those chamber / manhole items where the manufacturer has clearly stated in the documentation how the components shall be assembled to create a complete manhole or inspection chamber.

The inspection chambers covered by this European Standard comprise the following:

- inspection chambers providing access to the drainage or sewerage system by means of inspection and cleaning equipment.
- chambers, designated as manholes providing man access to the drainage or sewerage system.

The inspection chamber / manhole can be manufactured by various methods e.g. injection moulding, rotational moulding, low-pressure moulding or fabricated from components made in accordance with other standards.

The jointing of components can be achieved using:

- elastomeric ring seal joints; [SIST EN 13598-2:2009](https://standards.iteh.ai/catalog/standards/sist/6eccc6f-034a-43ae-a222-21b7611bbe8b/sist-en-13598-2-2009)
- adhesive joints for PVC-U, <https://standards.iteh.ai/catalog/standards/sist/6eccc6f-034a-43ae-a222-21b7611bbe8b/sist-en-13598-2-2009>
- welded joints for PVC-U, PP and PE;
- extrusion welding;
- mechanical jointing.

**NOTE** Both manholes and inspection chambers can be site assembled from different components, but can also be manufactured as a single unit. In either case, the following functional parts can be recognized:

- a) base (always present)  
In case of a one-piece chamber or manhole, the base part ends at a distance of 300 mm measured from the top of the main channel;
- b) riser (depth dependent);
- c) telescopic part (design dependent);
- d) cone (dependent on the design of near surface components and their recommended installation);
- e) other near surface components

**2 Normative references**

The following referenced documents are indispensable for the application 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 124:1994, *Gully tops and manhole tops for vehicular and pedestrian areas — Design requirements, type testing, marking, quality control*

EN 476:1997, *General requirements for components used in discharge pipes, drains and sewers for gravity systems*

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 681-3, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 3: Cellular materials of vulcanized rubber*

EN 681-4, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 4: Cast polyurethane sealing elements*

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

EN 744:1995, *Plastics piping and ducting systems — Thermoplastics pipes — Test method for resistance to external blows by the round-the-clock method*

EN 922, *Plastics piping and ducting systems — Pipes and fittings of unplasticized poly(vinylchloride)(PVC-U) — Specimen preparation for determination of the viscosity number and calculation of the K-value*

EN 1277:2003, *Plastics piping systems — Thermoplastics piping systems for buried non-pressure applications — Test methods for leaktightness of elastomeric sealing ring type joints*

EN 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 1852-1, *Plastics piping systems for non-pressure underground drainage and sewerage — Polypropylene (PP) — Part 1: Specifications for pipes, fittings and the system*

EN 12061, *Plastics piping systems — Thermoplastics fittings — Test method for impact resistance*

EN 12666-1, *Plastics piping systems for non-pressure underground drainage and sewerage — Polyethylene (PE) — Part 1: Specifications for pipes, fittings and the system*

EN 13101:2002, *Steps for underground man entry chambers — Requirements, marking, testing and evaluation of conformity*

EN 13476-1, *Plastics piping systems for non-pressure underground drainage and sewerage — Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) — Part 1: General requirements and performance characteristics*

EN 13476-2, *Plastics piping systems for non-pressure underground drainage and sewerage — Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) — Part 2: Specifications for pipes and fittings with smooth internal and external surface and the system, Type A*

EN 13476-3, *Plastics piping systems for non-pressure underground drainage and sewerage — Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) — Part 3: Specifications for pipes and fittings with smooth internal and profiled external surface and the system, Type B*

EN 14396:2004, *Fixed ladders for manholes*

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CEN/TS 14541, *Plastics pipes and fittings for non-pressure applications — Utilization of non-virgin PVC-U, PP and PE materials*

EN 14758-1, *Plastics piping systems for non-pressure underground drainage and sewerage — Polypropylene with mineral modifiers (PP-MD) — Part 1: Specifications for pipes, fittings and the system*

EN 14802:2005, *Plastics piping systems — Thermoplastics shafts or risers for inspection chambers and manholes — Determination of resistance against surface and traffic loading*

EN 14830, *Thermoplastics inspection chamber and manhole bases — Test methods for buckling resistance*

EN 14982, *Plastics piping and ducting systems — Thermoplastics shafts or risers for inspection chambers and manholes — Determination of ring stiffness*

EN ISO 580:2005, *Plastics piping and ducting systems. Injection-moulded thermoplastics fittings. Methods for visually assessing the effects of heating (ISO 580:2005)*

EN ISO 1043-1, *Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics (ISO 1043-1:2001)*

EN ISO 1133:2005, *Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of the thermoplastics (ISO 1133:2005)*

EN ISO 1183-1, *Plastics — Methods for determining the density of non cellular plastics — Part 1: Immersion method, liquid pycnometer method and titration method (ISO 1183-1:2004)*

EN ISO 1183-2, *Plastics — Methods for determining the density of non-cellular plastics — Part 2: Density gradient column method (ISO 1183-2:2004)*

EN ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions (ISO 3126:2005)*

### **3 Terms, definitions, symbols and abbreviations**

For the purposes of this document, the terms, definitions and abbreviations given in EN 1401-1, EN 1852-1, EN 12666-1, EN 13476-1, EN 13476-2, EN 13476-3, EN 14758-1, EN ISO 1043-1 and the following apply.

#### **3.1 Terms and definitions**

##### **3.1.1**

##### **inspection chamber**

drainage or sewerage fitting used to connect drainage or sewerage installations and/or to change the direction of drainage or sewerage runs, which terminates at ground level with a riser shaft of 200 mm minimum outer diameter and an inner diameter of less than 800 mm

NOTE 1 See also EN 476 for non-circular chambers.

NOTE 2 The termination at ground level permits the introduction of cleaning, inspection and test equipment and the removal of debris but does not provide access for personnel.



**3.1.2****manhole**

drainage or sewerage fitting used to connect drainage or sewerage installations and/or to change the direction of drainage or sewerage runs, which terminates at ground level with a riser shaft of 800 mm minimum inner diameter

NOTE 1 See also EN 476 for non circular manholes.

NOTE 2 The termination at ground level permits the introduction of cleaning, inspection and test equipment and the removal of debris and provides access for personnel.

NOTE 3 Chamber and manhole components are subject to national safety regulations and / or local provisions regarding man-entry limitations. The installer should check for compliance prior to installation

**3.1.3****base component**

base part of a manhole or inspection chamber, allowing direct connection to buried drain or sewer pipes and including integrally formed channels with benching as appropriate

**3.1.4****riser shaft**

usually circular structure providing a vertical conduit between the base unit and the near ground level

NOTE The riser shaft can be supplied either as a separate component for site jointing to the base unit, or integrally formed with the base unit by the manufacturer.

**3.1.5****near-surface components**

components which, where provided, connect to the top of the riser shaft and provide a seating for the cover and its frame

NOTE Near-surface components are only usually used in areas of vehicular traffic loading and are intended to spread vehicular wheel loadings into the ground and minimize the transmission of this load to the riser shaft.

**3.1.6****telescopic part**

part of the assembly that allows accommodation of settlement that might occur after installation and allows adjustment of the height of the chamber

NOTE Telescopic parts are normally installed within 2 m of the ground level.

**3.1.7****cone**

adapter allowing connection of the base and riser or riser/telescopic part to the near surface components

NOTE Cones are normally installed within 2 m of the ground level.

**3.1.8****chamber assembly**

items collectively forming a buried inspection chamber or manhole

**3.1.9****reformulated material**

recyclable / reprocessable material that has been reformulated, by the use of additives and processing techniques, to meet an agreed specification

NOTE Typically the additives used would be stabilizers, pigments, etc; the reformulated material taking the form of homogeneous pellets, granules, powder, etc. with the produced batch having consistent physical properties.

**EN 13598-2:2009 (E)****3.2 Abbreviations**

DN/ID	: nominal size, inside diameter related
DN/OD	: nominal size , outside diameter related
PVC-U	: unplasticized poly(vinyl chloride)
PE	: polyethylene
PP	: polypropylene

**4 Material****4.1 Material for bases****4.1.1 Materials fulfilling one of the European Standards listed in Table 1**

When a material fulfilling the requirements in one of the European Standards listed in Table 1 is used for manufacturing inspection chamber and manhole bases it shall additionally conform to the 1 000 h durability test specified in Table 2 and Table A.1.

**4.1.2 Materials not fulfilling one of the European Standards listed in Table 1**

When a material not fulfilling the requirements in one of the European Standards listed in Table 1 is used for manufacturing inspection chamber and manhole bases it shall conform to the 3 000 h durability test specified in Table 2 and Table A.1. The material shall also be characterised as specified in clause A.4.

**4.2 Material for risers and cones**

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**4.2.1 Materials fulfilling one of the European Standards listed in Table 1**

A material fulfilling the requirements in one of the European Standards listed in Table 1 may be used for manufacturing risers and cones without additional material requirements.

**4.2.2 Materials fulfilling the requirements given in 4.1.2**

A material already shown to meet the requirements in 4.1.2 may be used for manufacturing risers and cones without additional material requirements.

**4.2.3 Other materials**

When a material not fulfilling 4.2.1 or 4.2.2 is used for manufacturing risers and cones the requirements specified in Table B.1 apply.

**NOTE** Different parts of inspection chamber and manhole assemblies may be manufactured from a combination of two or more of the specified materials.

Plastic components, fabricated or otherwise manufactured, may be used as sub components of the final assembly, provided that they have been manufactured in accordance with the European Standards listed in Table 1.

**Table 1 — Standard materials and corresponding European Standards**

Standard material	Corresponding European Standard
Unplasticized poly(vinyl chloride) (PVC-U)	EN 1401-1, EN 13476-2 & EN 13476-3
Polypropylene (PP)	EN 1852-1, EN 13476-2 & EN 13476-3
Polyethylene (PE)	EN 12666-1, EN 13476-2 & EN 13476-3
Polypropylene with mineral modifiers (PP-MD)	EN 14758-1

**Table 2 — Base component requirements**

Characteristic Parameter	Test parameters		Test method	Requirement
		Value		
<b>Durability:</b> - test pressure - maximum depth of groundwater above invert, $H$ - rating factor, $R$ - testing time, $t$ - test temp. $T$		$-0,1 \times H/R$ bar $H$ equal to be the declared value <sup>a</sup> in m, or $\geq 2$ m in any case Shall conform to Table A.1 Shall conform to Table A.1 Shall conform to Table A.1	Annex A and EN 14830 <sup>b</sup>	No cracks or crazes
<sup>a</sup> The manufacturer shall declare the maximum allowable depth of ground water. <sup>b</sup> When testing for the durability of materials rubber ring joints between the riser and base or base to base may be welded.				

SIST EN 13598-2:2009

### 4.3 Utilisation of non-virgin materials

Manufacturers may use their own rework material and externally purchased reformulated material up to their specified dosing levels in the manufacture of inspection chambers and manholes.

Externally purchased re-processable and recyclable material (excluding reformulated) shall be permitted when as specified in the standards listed in CEN/TS 14541. Their suitability in a specific design shall be proven by testing as described in Annex A and their variability from batch to batch monitored via the material characteristics listed in Table A.2.

### 4.4 Sealing rings

The sealing ring material shall conform to EN 681-1, EN 681-2, EN 681-3 or EN 681-4, as applicable.

The sealing ring shall have no detrimental effects on the properties of the components and shall not cause the test assembly to fail the performance requirements given in Clause 9.

NOTE Sealing rings may be retained using components made from materials other than those of the actual inspection chamber or manhole.