
**Plastics piping systems for non-pressure
underground drainage and sewerage —
Unplasticized poly(vinyl chloride)
(PVC-U), polypropylene (PP),
polypropylene with mineral modifiers
(PP-MD) and polyethylene (PE) —
Specifications for manholes and
inspection chambers in traffic areas and
underground installations**

ISO 13272:2011

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*Systèmes de canalisations en plastique pour les branchements et les
collecteurs d'assainissement enterrés sans pression — Poly(chlorure
de vinyle) non plastifié (PVC-U), polypropylène (PP), polypropylène
avec modificateurs minéraux (PP-MD) et polyéthylène (PE) —
Spécifications relatives aux regards et aux boîtes d'inspection et de
branchement dans les zones de circulation et dans les réseaux enterrés*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 13272 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 1, *Plastics pipes and fittings for soil, waste and drainage (including land drainage)*.

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Plastics piping systems for non-pressure underground drainage and sewerage — Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP), polypropylene with mineral modifiers (PP-MD) and polyethylene (PE) — Specifications for manholes and inspection chambers in traffic areas and underground installations

1 Scope

This International Standard specifies the definitions and requirements for buried manholes and inspection chambers (circular or non-circular) 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 modifiers (PP-MD) or polyethylene (PE). These products are intended for use in 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".

This International 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 International 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 or 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 International Standards.

The jointing of components can be achieved using:

- elastomeric ring seal joints;
- adhesive joints for PVC-U;
- 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 the 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.

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

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

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*²⁾

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

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

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

ISO 3127, *Thermoplastics pipes — Determination of resistance to external blows — Round-the-clock method*

ISO 4435, *Plastics piping systems for non-pressure underground drainage and sewerage — Unplasticized poly(vinyl chloride) (PVC-U)*

ISO 8772, *Plastics piping systems for non-pressure underground drainage and sewerage — Polyethylene (PE)*

ISO 8773, *Plastics piping systems for non-pressure underground drainage and sewerage — Polypropylene (PP)*

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

1) To be published. (Revision of ISO 1043-1:2001)

2) To be published. (Revision of ISO 1133:2005 and ISO 1133:2005/Cor.1:2006)

ISO 13229, *Thermoplastics piping systems for non-pressure applications — Unplasticized poly(vinyl chloride) (PVC-U) pipes and fittings — Determination of the viscosity number and K-value*

ISO 13257:2010, *Thermoplastics piping systems for non-pressure applications — Test method for resistance to elevated temperature cycling*

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

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

ISO 13266:2010, *Thermoplastics piping systems for non-pressure underground drainage and sewerage — Thermoplastics shafts or risers for inspection chambers and manholes — Determination of resistance against surface and traffic loading*

ISO 13267, *Thermoplastics piping systems for non-pressure underground drainage and sewerage — Thermoplastics inspection chamber and manhole bases — Test methods for buckling resistance*

ISO 13268, *Thermoplastics piping systems for non-pressure underground drainage and sewerage — Thermoplastics shafts or risers for inspection chambers and manholes — Determination of ring stiffness*

ISO 21138-1, *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: Material specifications and performance criteria for pipes, fittings and system*

ISO 21138-2, *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: Pipes and fittings with smooth external surface, Type A*

ISO 21138-3, *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: Pipes and fittings with non-smooth external surface, Type B*

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

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 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 — Material requirements for pipe joint seals used in water and drainage applications — Part 4: Cast polyurethane sealing elements*

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

EN 14396, *Fixed ladders for manholes*

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*

3 Terms, definitions and abbreviations

For purposes of this International Standard, the terms, definitions, symbols and abbreviated terms given in ISO 1043-1, ISO 4435, ISO 8772, ISO 8773, ISO 21138-1, ISO 21138-2, ISO 21138-3 and EN 14758-1 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 Shallow inspection chambers have a maximum depth from invert to top of the riser of 1,25 m. Deep inspection chambers are intended for installation at depths greater than 1,25 m.

NOTE 2 There are no recommendations for non-circular inspection chamber risers in EN 476.

NOTE 3 See also EN 476 for non-circular chambers.

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 Rectangular riser sections have minimum internal dimensions of 750 mm × 1 200 mm and elliptical risers have minimum axes of 900 mm × 1 000 mm.

NOTE 2 The termination at ground level allows 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.

3.2 Abbreviations

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DN/ID nominal size, inside-diameter-related

DN/OD nominal size, outside-diameter-related
<https://standards.iteh.ai/catalog/standards/sist/6d3ebf80-066f-43ac-b38d-9feca9a60da3/iso-13272-2011>

MFR mass-flow rate

OIT oxidation induction time

PVC-U unplasticized poly(vinyl chloride)

PE polyethylene

PP polypropylene

PP-MD polypropylene with mineral modifiers

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

When a material fulfilling the requirements in one of the standards listed in Table 1 is used for manufacturing inspection chamber and manhole bases, it should be deemed satisfactory, and for deep chambers it shall additionally conform to the 1 000 h durability test specified in Table 2.

4.1.2 Materials not fulfilling one of the standards listed in Table 1

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

4.2 Materials for risers, cones and shallow chamber bases

4.2.1 Materials fulfilling one of the standards listed in Table 1

A material fulfilling the requirements in one of the 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 fulfilling 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 can be manufactured from a combination of two or more of the specified materials.

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

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Table 1 — Standard materials and corresponding standards

Standard material	Corresponding standard
Unplasticized poly(vinyl chloride) (PVC-U)	ISO 4435, ISO 21138-2 and ISO 21138-3
Polypropylene (PP)	ISO 8773, ISO 21138-2 and ISO 21138-3
Polyethylene (PE)	ISO 8772, ISO 21138-2 and ISO 21138-3
Polypropylene with mineral modifiers (PP-MD)	EN 14758-1

Table 2 — Base component requirements

Test parameters		Test method	Requirement
Characteristic	Value		
Durability:			
Test pressure	$-0,1 \times H/R$ bar	Annex A and ISO 13267 ^b	No cracks
Maximum depth of groundwater above invert, <i>H</i>	<i>H</i> equal to the declared ^a value in metres, or ≥ 2 m in any case		
Rating factor, <i>R</i>	Shall conform to Table A.1		
Testing time, <i>t</i>	Shall conform to Table A.1		
Test temperature, <i>T</i>	Shall conform to Table A.1		

^a The manufacturer shall declare the maximum allowable depth of groundwater.
^b When testing for the durability of materials, rubber ring joints between the riser and base or base to base may be welded.

4.3 Utilization 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 reprocessible and recyclable material (excluding reformulated) shall be permitted when they are as specified in the International 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 can be retained using components made from materials other than those of the actual inspection chamber or manhole.

5 General characteristics

5.1 General

When viewed without magnification, the internal and external surfaces of inspection chambers and manholes shall be smooth, clean and free from defects likely to prevent conformity with this International Standard. Pipe ends or spigots on inspection chambers and manholes shall be cleanly cut and square with the axis of the ends of the component and within any cutting zone if so recommended by the manufacturer.

5.2 Colour

Chamber components, if manufactured in layers, shall have their surface layers coloured throughout.

Any colour may be used.

6 Geometrical characteristics

6.1 Dimensions

6.1.1 General

The internal diameter of the riser shaft shall be used to classify the nominal size of inspection chambers or manholes.

All dimensions shall be measured in accordance with ISO 3126.

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.