
**Specifications for thermoplastics
covers and frames for manholes and
inspection chambers used in non-
traffic areas**

*Spécifications pour couvercles et cadres en matériaux
thermoplastiques pour regards et chambres d'inspection utilisés dans
les zones sans circulation*

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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 15398 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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Introduction

This International Standard is based on the results of the work being undertaken in ISO/TC 138 "*Plastics pipes, fittings and valves for the transport of fluids*", CEN Committee TC 165 and CEN Committee TC 155.

They are supported by separate standards on test methods and by European Standards for covers and frames to which references are made throughout the System Standard.

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Specifications for thermoplastics covers and frames for manholes and inspection chambers used in non-traffic areas

1 Scope

This International Standard specifies the definitions and requirements for thermoplastics covers and frames for inspection chambers and other such pipeline access products installed in light vehicular access and pedestrian areas and manufactured from unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP), polypropylene with mineral modifier (PP-MD) or polyethylene (PE). The products are rated up to B 125 max. and are intended for use either inside or outside buildings including swimming pool areas but are not intended for use in the carriageway of trafficked areas.

This International Standard is only applicable to those covers and frames where the manufacturer has clearly stated in the documentation how the frames are installed and assembled to the intended access product, identifying as necessary the manufacturer and grades of product or riser to which the frame is intended to fit.

NOTE 1 The cover and frame are normally manufactured by injection moulding.

NOTE 2 Fibre reinforced covers and frames are not covered by this International Standard.

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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*

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

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 2507-1, *Thermoplastics pipes and fittings — Vicat softening temperature — Part 1: General test 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 3506-1, *Mechanical properties of corrosion-resistant stainless steel fasteners — Part 1: Bolts, screws and studs*

ISO 3506-2, *Mechanical properties of corrosion-resistant stainless steel fasteners — Part 2: Nuts*

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

- ISO 4892-2, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps*
- ISO 4892-3, *Plastics — Methods of exposure to laboratory light sources — Part 3: Fluorescent UV lamps*
- ISO 8256:2004, *Plastics — Determination of tensile-impact strength*
- 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)*
- 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 13272, *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 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*
- EN 124:1994, *Gully tops and manhole tops for vehicular and pedestrian areas — Design requirements, type testing, marking, quality control*
- 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 12164:2011, *Copper and copper alloys — Rod for free machining purposes*
- ENV 12633:2003, *Method of determination of unpolished and polished slip/skid resistance value*
- CEN/TS 14541, *Plastics pipes and fittings for non-pressure applications — Utilization of non-virgin PVC-U, PP and PE materials*
- EN 14680, *Adhesives for non-pressure thermoplastic piping systems — Specifications*
- 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 14814, *Adhesives for pressure thermoplastic piping systems — Specifications*

3 Terms, definitions, symbols and abbreviations

For the purposes of this document, the terms, definitions and abbreviations given in ISO 4435, ISO 8772, ISO 8773, ISO 21138-1, ISO 21138-2, ISO 21138-3, EN 14758-1, ISO 13272, 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

NOTE 1 It can be supplied either with an integral riser or a separate a riser shaft in both cases having a 200 mm minimum outer diameter and an inner diameter of less than 800 mm. For non-circular chambers the minimum clear opening should be 200 mm with a maximum opening width of 800 mm

NOTE 2 The opening 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

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.

3.1.3

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

3.1.4

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

3.1.5

cover frame

component that provides a stable support for the cover on its top surface and on its bottom surface attaches to the riser or near surface components or alternatively is imbedded in concrete as required by the installation details supplied by the manufacturer of the chamber or manhole

3.1.6

clear opening

CO

diameter of the largest circle that can be inscribed in the clear area of the frame

NOTE 1 Expressed in mm.

NOTE 2 See EN 124.

3.1.7

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

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

4 Material

A material fulfilling the requirements in one of the standards listed in Table 1 may be used for manufacturing covers and frames without additional material requirements.

Table 1 — Standard materials and corresponding pipe standards

Standard material	Corresponding pipe standard
Unplasticized poly(vinyl chloride) (PVC-U)	ISO 4435, ISO 21138-2, ISO 21138-3 & ISO 13272
Polypropylene (PP)	ISO 8773, ISO 21138-2, ISO 21138-3 & ISO 13272
Polyethylene (PE)	ISO 8772, ISO 21138-2, ISO 21138-3 & ISO 13272
Polypropylene with mineral modifiers (PP-MD)	EN 14758-1 & ISO 13272

4.1 Other materials

When a material not fulfilling the material requirements of the standards listed in Table 1 is used for manufacturing covers and frames the requirements specified in Annex A and Table A.1 apply.

4.2 Utilization of non-virgin materials

Manufacturers may use their own rework material and externally purchased reformulated material with agreed specification up to their specified dosing levels for the manufacture of covers and frames.

Externally purchased re-processable and recyclable material (excluding reformulated) shall be permitted when classified as specified 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.1.

4.3 UV resistant formulations

Formulations meeting either the requirements of 4.3.1 or 4.3.2 shall be deemed to satisfy the non-equatorial ageing and tensile impact requirements of Table 4.

4.3.1 Carbon black requirements for UV resistant polyolefines

Black UV resistant polyolefines should contain at least 2.5 % by weight of carbon black when determined by ISO 6964. The carbon black should have a particle size in the range of 10 – 25 nm.

4.3.2 Titanium Dioxide requirements for UV resistant PVC-U

UV resistant PVC-U should contain ≥ 2 % of rutile titanium dioxide.

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.

NOTE Sealing rings may be retained using components made from materials other than those of the actual cover and frame.

4.5 Metallic fixings

The material used for any metallic fixings shall normally conform to either ISO 3506-1 and -2 or a copper zinc lead alloy of EN 12164 (Table 2).

4.6 Solvent cement

Any solvent cement adhesive shall conform to EN 14680 or EN14814.

5 General characteristics

5.1 General

All covers shall be secured to their frames by screw fixings or other types of mechanical fixing. The fixings shall meet the requirements of 4.5.

All frames shall be provided with a means of securing them to riser shafts. Details of how the frame is secured to a shaft shall be described/specified in cover and frame manufacturers/suppliers literature.

For frames of PVC-U being connected to a PVC-U riser shaft this could be by use of solvent cement meeting the requirements of 4.6 otherwise fixings meeting the requirements of 4.5 should be used.

5.2 Removal of covers from frames

Provision shall be made for enabling effective loosening and opening of covers from frames by means of the usual tools. The method of loosening shall be described in the cover and frame manufacturer's/supplier's literature.

5.3 Appearance

When viewed without magnification, the internal and external surfaces of covers and frames shall be clean and free from defects likely to prevent conformity with this International Standard.

5.4 Colour

Covers and frames shall be coloured black or white unless otherwise specified by agreement between manufacturer and supplier.

6 Geometrical characteristics

6.1 Dimensions - general

The nominal internal diameter of the riser shaft to which the frame is intended to fit shall be used to classify the nominal size of covers and frames.