SLOVENSKI STANDARD
SIST EN 124-6:2015

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Pokrovi za odtoke in jaške na voznih površinah in površinah za pešce - 6. del: Pokrovi za odtoke in jaške iz polipropilena (PP), polietilena (PE) ali nemehčanega polivinilklorida (PVC-U)

Gully tops and manhole tops for vehicular and pedestrian areas - Part 6: Gully tops and manhole tops made of polypropylene (PP), polyethylene (PE) or unplasticized poly(vinyl chloride) (PVC-U)

Aufsätze und Abdeckungen für Verkehrsflächen - Teil 6: Aufsätze und Abdeckungen aus Polypropylen (PP), Polyethylen (PE) oder weichmacherfreiem Polyvinylchlorid (PVC-U)

Dispositifs de couronnement et de fermeture pour les zones de circulation utilisées par les piétons et les véhicules - Partie 6 : Dispositifs de couronnement et de fermeture en polypropylène (PP), polyéthylène (PE) ou polychlorure de vinyle non plastifié (PVC-U)

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English Version

Gully tops and manhole tops for vehicular and pedestrian areas - Part 6: Gully tops and manhole tops made of polypropylene (PP), polyethylene (PE) or unplasticized poly(vinyl chloride) (PVC-U)

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This European Standard was approved by CEN on 12 March 2015.

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Foreword

This document (EN 124-6:2015) has been prepared by Technical Committee CEN/TC 165 “Wastewater engineering”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by December 2015 and conflicting national standards shall be withdrawn at the latest by March 2017.

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 document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of the Regulation (EU) No. 305/2011.

For relationship with EU Regulations, see informative Annex ZA, which is an integral part of this document.

Together with EN 124-1:2015, EN 124-2:2015, EN 124-3:2015, EN 124-4:2015 and EN 124-5:2015, the document will supersede EN 124:1994.

EN 124, *Gully tops and manhole tops for vehicular and pedestrian areas*, consists of the following parts:

— *Part 1: Definitions, classification, general principles of design, performance requirements and test methods*;

— *Part 2: Gully tops and manhole tops made of cast iron*;

— *Part 3: Gully tops and manhole tops made of steel or aluminium alloys*;

— *Part 4: Gully tops and manhole tops made of steel reinforced concrete*;

— *Part 5: Gully tops and manhole tops made of composite materials*;

— *Part 6: Gully tops and manhole tops made of polypropylene (PP), polyethylene (PE) or unplasticized poly(vinyl chloride) (PVC-U)*.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard applies to manhole tops and gully tops made of Polypropylene (PP), Polyethylene (PE) or unplasticized poly(vinyl chloride) (PVC-U) by a moulding or extrusion process, with a clear opening up to and including 1 000 mm for covering gullies, manholes and inspection chambers for installation within areas subjected to pedestrian and/or vehicular traffic.

It is applicable to manhole tops and gully tops for use in

— areas which can only be used by pedestrians and pedal cyclists (class A 15), and

— pedestrian areas and comparable areas, car parks or car parking decks (class B 125).

This European Standard gives guidance for combinations of covers/grating made of PP, PE or PVC–U with frames according to EN 124-2, EN 124-3, EN 124-4 and EN 124-5.

This European Standard is not applicable in isolation but only in combination with EN 124-1.

This European Standard is not applicable to:

— rodding point covers according to EN 13598-1;

— gratings/covers as part of prefabricated drainage channels according to EN 1433;

— floor and roof gullies in buildings which are specified in EN 1253 (all parts);

— surface boxes.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 124-1:2015, *Gully tops and manhole tops for vehicular and pedestrian areas — Part 1: Definitions, classification, general principles of design, performance requirements and test methods*

EN 124-2:2015, *Gully tops and manhole tops for vehicular and pedestrian areas — Part 2: Gully tops and manhole tops made of cast iron*

EN 124-3:2015, *Gully tops and manhole tops for vehicular and pedestrian areas — Part 3: Gully tops and manhole tops made of steel or aluminium alloys*

EN 124-4:2015, *Gully tops and manhole tops for vehicular and pedestrian areas — Part 4: Gully tops and manhole tops made of steel reinforced concrete*

EN 124-5:2015, *Gully tops and manhole tops for vehicular and pedestrian areas — Part 5: Gully tops and manhole tops made of composite materials*

EN 513:1999, *Unplasticized polyvinylchloride (PVC-U) profiles for the fabrication of windows and doors — Determination of the resistance to artificial weathering*

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 12164:2011, *Copper and copper alloys — Rod for free machining purposes*

EN 12200-1, *Plastics rainwater piping systems for above ground external use — Unplasticized poly(vinyl chloride) (PVC-U) - Part 1: Specifications for pipes, fittings and the system*

EN 12666-1:2005+A1:2011, *Plastics piping systems for non-pressure underground drainage and sewerage — Polyethylene (PE) — Part 1: Specifications for pipes, fittings and the system*

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 13501-1:2007+A1:2009, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

EN 13598-1, *Plastics piping systems for non-pressure underground drainage and sewerage — Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) — Part 1: Specifications for ancillary fittings including shallow inspection chambers*

EN 13598-2, *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*

EN 13823, *Reaction to fire tests for building products — Building products excluding floorings exposed to the thermal attack by a single burning item*

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 16245-3, *Fibre-reinforced plastic composites — Declaration of raw material characteristics — Part 3: Specific requirements for fibre*

EN 20105-A02, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour (ISO 105-A02)*

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

EN ISO 1183-1, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pyknometer 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 3126, *Plastics piping systems — Plastics components — Determination of dimensions (ISO 3126)*

EN ISO 4892-1, *Plastics — Methods of exposure to laboratory light sources — Part 1: General guidance (ISO 4892-1)*

EN ISO 4892-2:2013, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps (ISO 4892-2:2013)*

EN ISO 4892-3, *Plastics — Methods of exposure to laboratory light sources — Part 3: Fluorescent UV lamps (ISO 4892-3)*

EN ISO 8256:2004, *Plastics — Determination of tensile-impact strength (ISO 8256:2004)*

EN ISO 9163, *Textile glass — Rovings — Manufacture of test specimens and determination of tensile strength of impregnated rovings (ISO 9163)*

ISO 178, *Plastics — Determination of flexural properties*

ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles*

ISO 1888, *Textile glass — Staple fibres or filaments — Determination of average diameter*

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 6964, *Polyolefin pipes and fittings — Determination of carbon black content by calcination and pyrolysis — Test method and basic specification*

ISO 15100, *Plastics — Reinforcement fibres — Chopped strands — Determination of bulk density*

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 124-1:2015 and the following apply.

3.1.1
own reprocessable material
material prepared from unused mouldings including trimmings from production that will be reprocessed in a manufacturer's plant after having been previously processed by the same manufacturer, by a process such as moulding or extrusion and for which the complete formulation is known

3.1.2
external reprocessable material
material comprising one of the following:

— material from rejected unused mouldings or trimmings there from, that will be reprocessed and that are originally processed by another manufacturer;

— material from the production of unused thermoplastic products other than manhole tops and gully tops, regardless of where they are manufactured

3.1.3
recycled material
material from used manhole tops and gully tops which have been cleaned and crushed or ground

3.1.4
virgin thermoplastics material
thermoplastics material in the form of pellets, granules or powder that have not been subjected to use or processing other than that required for their manufacture and to which no reprocessable or recyclable material has been added

3.1.5
reformulated material
recyclable or reprocessable material that has been reformulated, by additives and processing techniques, to meet an agreed specification

Note 1 to entry: Typically the additives used would be stabilizers, pigments, etc.; the reformulated material: homogeneous pellets, granules, powder, etc., with the produced batch having consistent physical properties.

3.1.6
formulation
blend of raw materials including PVC–U resin and other components which is blended, using controlled processes, to produce a material suitable for producing PVC–U gully tops and/or manhole tops

3.1.7
master specification
document electronic or otherwise which gives clear details of the different components, including mixing ratios, which are blended to produce the formulation used to manufacture gully tops and/or manhole tops and gives sufficient details to enable the formulation to be blended on a regular and repeatable basis

3.2 Symbols and abbreviations

F_T	Test load
F_D	Deflection test load
P_b	Frame bearing pressure
PVC-U	Unplasticized poly(vinyl chloride)
PP	Polypropylene
PE	Polyethylene

4 Materials

4.1 General

Each component of manhole tops, gully tops and gratings complying with this European Standard shall be manufactured from one single material according to Table 1. Glass fibres shall not be added to PVC-U and PE materials. All materials shall be UV stabilized (see 4.3).

Guidance shall be given in the manufacturers installation guide how to avoid exposure to high temperatures by hot bitumen or asphalt.

Table 1 — Materials for thermoplastic manhole tops and gully tops

Material	Material requirements according to
Unplasticized poly(vinyl chloride) (PVC-U)	EN 1401–1, EN 13476–2, EN 13476–3, EN 13598–1, EN 13598–2, EN 12200–1
Polypropylene (PP)	EN 1852–1, EN 13476–2, EN 13476–3, EN 13598–1, EN 13598–2, EN 14758–1, EN 124–6:2015, Annex A
Polyethylene (PE)	EN 12666–1, EN 13476–2, EN 13476–3, EN 13598–1, EN 13598–2,

4.2 Combination of elements made of different materials

Any element made of the materials specified in 4.1 can be used in combination with elements of materials specified in EN 124-2, EN 124-3, EN 124-4 or EN 124-5. In such cases the manhole tops or gully tops shall comply with relevant design and performance and testing requirements as listed in Table 3.

In addition elements shall comply with the requirements for the material related EN 124-2, EN 124-3, EN 124-4 or EN 124-5 as applicable. Each element shall be marked accordingly. The load class to be declared for the combined product shall be restricted to the lower class determined for any constituent element according to the relevant part of EN 124 series.

EXAMPLE Where a cover is made of PVC-U, class B 125, and the frame is made of cast iron, class D 400, the manhole top or gully top is marked with EN 124–6 and the class to be declared for the combined product is the class of the cover according to EN 124–6.

4.3 UV stability (artificial weathering resistance)

4.3.1 General

UV stability is important to assess the durability of load bearing capacity. UV stability of the material shall be demonstrated according to Table 2.

UV resistant materials meeting either the requirements of 4.3.2 or 4.3.3 shall be deemed to comply with Table 2 without testing.

Table 2 — UV stability (artificial weathering resistance) of PP, PE and PVC-U material

Characteristic	Requirement	Parameter		Test method
Artificial ageing[a]	The change of colour shall not exceed stage 3 of the grey scale according to EN 20105-A02	Radiation energy	2,6 GJ/m^2	EN ISO 4892-2:2013 (Xenon test) Method A
		Cycling and temperature regime	EN 513:1999, Method 1	
		Specimen	Moulded raw material plaque or from finished products from the same formulation, according to EN ISO 4892-1	
		or [b]		
		Exposure time using UVA 351 lamp	1 600 h	EN ISO 4892-3 (QUV test)
		Irradiation	6 h at (50 ± 2) °C	
		Condensation	2 h at (50 ± 2) °C	
		Specimen	Moulded raw material plaque or from finished products from the same formulation, according to EN ISO 4892-1	
Tensile impact strength after artificial ageing[a]	σ_{fM} ≥ 50 % of the value before ageing	Test temperature	(23 ± 2) °C	Method A of EN ISO 8256:2004
		Test piece	Shall conform to EN ISO 8256	
		Number of specimen	5	

[a] Test specimen shall be from the same formulation used for the manufacture of the manhole tops or gully tops and machined, as appropriate, either from a moulded raw material plaque or from finished products. Products manufactured from a formulation meeting the requirements of 4.3.2 and 4.3.3 need not be subject to these requirements.

[b] In cases of dispute, the method of EN ISO 4892-2 (Xenon test) shall be used.

4.3.2 Carbon black requirements for UV resistant PE and PP

Black UV resistant PE, PP shall contain at least 2,0 % by weight of carbon black when determined by ISO 6964. The carbon black shall have an average (primary) particle size of 10 nm to 25 nm.

NOTE The percentage content and particle sizes for carbon black are appropriate to EN 12201–1.

4.3.3 Titanium dioxide requirements for UV resistant PVC-U

UV resistant PVC-U should contain at least 2 % by weight of rutile titanium dioxide.

4.4 Metallic fixing

The material used for any metallic fixing shall be resistant to corrosion. Corrosion resistance shall be ensured either by e.g. hot dip galvanizing of steel (see EN 124-3:2015, 4.2), the use of stainless steel (see ISO 3506-1 and ISO 3506-2, EN 124-3:2015, 4.3) or copper alloys (see EN 12164:2011, Table 2).

5 Requirements

5.1 Design and performance requirements

Manhole tops, gully tops and gratings made of materials according to 4.1 shall comply with the relevant design, performance and testing requirements in accordance with EN 124-1 as listed in Table 3.

Table 3 — Design, performance and testing requirements, in accordance with EN 124–1 for gully tops and manhole tops made of PP, PE or PVC-U

Characteristic	Requirements according to EN 124–1:2015, Clause	Testing according to EN 124–1:2015, Clause	Class A 15	Class B 125
Related to the design				
Vents in covers	6.1	8.4.1	x	x
Clear opening of manhole tops for man entry	6.2	8.4.2	x	x
Clearance	6.4	8.4.4	x	x
Handling of covers and gratings	6.7	8.4.7	x	x
Slot dimensions of gratings	6.8	8.4.8	x	x
Positioning of covers and gratings	6.10	8.4.10	x	x
Flatness	6.11	8.4.11	x	x
Concaveness of gratings	6.12	8.4.12	x	x
Surface conditions	6.13	8.4.13	x	x
Manhole tops with sealing feature	6.14	Visual inspection of presence of anchors	x	x
Frame bearing area	6.15	8.4.14	x	x
Opening angle of hinged covers/gratings	6.17	8.4.16	x	x
Appearance	7.1	Visual inspection	x	x
Related to the performance				
Load bearing capacity	7.2	8.3	x	x
Permanent set	7.3	8.2	x	x
Securing of the cover/grating within the frame	6.6 a)	-	x	x
Skid resistance	7.4	8.4.13	x	x
Child safety	7.5	8.5	x	X
x To be applied.				

5.2 Material specific characteristics for gully tops and manhole tops made of PE, PP, and PVC-U

5.2.1 Reaction to fire

5.2.1.1 General

Where use of manhole tops or gully tops in accordance with this standard is subject to national regulatory requirements on reaction to fire, their reaction to fire performance shall be considered as that of its components (i.e. material approach). Conversely, where the use of such a unit is not subject to national regulatory requirements on reaction to fire, either the class, determined according to the result of testing, or NPD may be declared.

5.2.1.2 Units classified according to test results

Manhole tops and gully tops shall be classified on the basis of their main elements (cover and frame), meaning regardless of other components (their cushioning inserts or coating).

For the purpose of the reaction to fire performance of the unit each of its constituent materials shall be classified according to EN 13501-1 and only the lowest class of such materials shall be declared. The class of an individual constituent material shall be obtained as the result of the test method(s), relevant to this class, and as specified in the standards referred to in EN 13501-1.

NOTE 1 A constituent material of the unit is considered as one which has a significant effect on the reaction to fire performance of such a unit. According to the definitions given in EN 13501-1, this can be in the case of:

— a homogeneous unit, its material; or

— a non-homogeneous unit, its substantial component (i.e. a material that constitutes a significant part of such unit). A layer with a mass per unit area ≥ 1,0 kg/m^2 or a thickness ≥ 1,0 mm is considered to be a substantial component.

Test specimen used for the test methods applicable for this classification shall be prepared according to EN 13501-1 and to the relevant standards referred therein. In addition with regard to the SBI test according to EN 13823, when applied, the test specimen used for the test methods, applicable for the classification, shall be prepared according to EN 13501-1 and the relevant standards referred therein.

NOTE 2 In most cases class E is considered to be sufficient as a minimum regulatory requirement for the reaction to fire performance of the constituent material(s) of units used in trafficked areas outside buildings.

5.2.2 Effect of heating

Effect of heating is a method for evaluation of the production process which has an indirect effect on durability of load bearing capacity.

Covers, gratings or frames made of PVC-U shall be tested in accordance with Table 4. After the required heating time, the shelf with the test specimen shall be removed and cooled down to ambient temperature, the test specimen shall comply with the following requirements when evaluated visually without magnification:

— within a radius of 15 times the wall thickness around the injection point(s) the depth of cracks, delamination or blisters shall not exceed 50 % of the wall thickness at that point;

— within a radius of 10 times the wall thickness from the diaphragm zone the depth of cracks, delamination or blisters shall not exceed 50 % of the wall thickness at that point;

— within a radius of 10 times the wall thickness from the ring gate the length of cracks, running through the overall thickness of the wall shall not exceed 50 % of the wall thickness at that point;

— the weld line shall not have opened more than 50 % of the wall thickness at that line;