BS EN 124-6:2015

BSI Standards Publication

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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National foreword

This British Standard is the UK implementation of EN 124-6:2015. Together with BS EN 124-1:2015, BS EN 124-2:2015, BS EN 124-3:2015, BS EN 124-4:2015 and BS EN 124-5:2015, it supersedes BS EN 124:1994 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee B/505, Wastewater engineering, to Subcommittee B/505/4, "Manhole Covers, Surface Boxes And Other Road Fittings".

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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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)

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)

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

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of an identical text or by endorsement, at the latest by December 2015 and conflicting national standards shall be withdrawn at the latest by March 2017.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

— in other parts of the surface the depths of cracks and delamination shall not exceed 30 % of the wall thickness at that point. Blisters shall not exceed a length of 10 times the wall thickness.

5.2.3 Deflection under load

Deflection under load is a method to assess the durability of load bearing capacity for products which can be submitted to periods of loading in the place of use. The deflection under load test is not required for manhole tops and gully tops class A 15 and manhole tops and gully tops class B 125 with clear opening less than or equal to 500 mm.

When tested the complete manhole top and gully top in accordance with 6.3 and when subject to F_D = 1/3 F_T, the maximum deflection under load shall be declared as mm per mm of clear opening but not greater than *CO*/100 for class B 125 covers.

After application of the deflection under load as described in Annex B, manhole tops and gully tops shall satisfy the permanent set requirements in EN 124-1:2015, 7.3 at 2/3 F_T.

5.2.4 Impact resistance

Depending on the temperature in the place of use impact resistance shall be tested to assess the durability of load bearing capacity for products and to ensure that the manhole tops and gully tops do not suffer from low temperature embrittlement.

When tested in accordance with 6.4, PE, PP, and PVC-U manhole tops and gully tops shall comply with Table 5 and shall not show visible evidence of cracking when viewed without magnification.

Manhole tops and gully tops made of PE, PP and PVC-U according to this standard are suitable for use at temperatures higher than −20 °C. If gully tops and manhole tops are intended for uses in cold climate conditions they shall be subjected to an impact test at −20 °C according to Table 5.

5.2.5 Durability

5.2.5.1 General

The materials PP, PE and PVC-U in accordance with Clause 4 including the UV stability are materials of known and stable performance within the scope of this standard. The durability of gully tops and manhole tops made of PP, PE and PVC-U will depend upon design features and exposure conditions (see 4.3). The prescribed framework of requirements and test methods for the mandated performance characteristics according to Clause 5 will reflect the durability of manhole tops and gully tops.

5.2.5.2 Durability of load bearing capacity

Durability of load bearing capacity against mechanical failure is ensured by meeting the requirements of EN 124-1:2015, 7.2 and 7.3 and EN 124-6:2015, 4.1, 4.3, 5.2.2, 5.2.3 and 5.2.4. Products of classes A 15 and B 125 with clear opening less than or equal to 500 mm are deemed to satisfy deflection under load requirements according to 5.2.3 without testing. The proportion between test load and maximum load to be expected in service and in conjunction with the stable behaviour of the material specified in 4.1 covers all effects which may influence the durability of the load bearing capacity.

5.2.5.3 Durability of securing of covers/gratings within the frame

Durability of securing of covers/gratings in the frame against unintended lifting is ensured by using materials with proven resistance against corrosion in compliance with 4.4.

5.2.5.4 Durability of skid resistance

Durability of skid resistance against loss of grip is ensured by meeting the requirements of EN 124-1:2015, 7.4, in conjunction with the stable resistance of the material itself against loss of grip.

5.2.5.5 Durability of the child safety characteristics

Durability of the child safety characteristics concerning the resistance of manhole tops and gully tops against the removal by children is ensured by re-inspecting the locking accessory or the securing feature, as appropriate, is still functional after testing the securing in accordance with EN 124-1:2015, 8.4.6.

5.2.6 Dangerous substances

National regulations on dangerous substances may require verification and declaration on release, and sometimes content, when construction products covered by this standard are placed on those markets. In the absence of European harmonized test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

6 Testing

6.1 General

Gully tops and manhole tops according to this standard shall be tested as complete units in their intended position of use where cover/grating is suitably positioned within the frame in accordance with EN 124-1:2015, Clause 8, as listed in Table 3. In addition all manhole tops and gully tops made of PP, PE and PVC-U shall be tested according to 6.3 and 6.4 and manhole tops and gully tops made of PVC-U shall be tested according to 6.2. All tested products shall be visually inspected without magnification.

6.2 Effect of heating

Covers, gratings or frames shall be tested in accordance with Table 4.

Table 4 — Effect of heating

Characteristic	Material	Requirements acc to clause	Parameter		Test method
Effect of heating[a]	PVC-U	5.2.2	Test temperature	(150 ± 2) °C	EN ISO 580: 2005, Method A
			Heating time: Thickness of sample ≤ 10 mm Thickness of sample > 10 mm	 30 min 60 min	
[a] Large test pieces may be cut to fit the oven.					

6.3 Deflection under load

Deflection under load shall be tested in accordance with Annex B.

6.4 Impact resistance

Complete manhole tops and gully tops shall be tested. The test specimen shall be supported during the test, in such a way that represents the intended installation on site.

NOTE It is not always feasible to include bedding mortar (for instance around the outside flange).

The test conditions shall be in accordance with Table 5.

Table 5 — Impact resistance

Characteristic	Requirements	Test parameters		Test method
Impact resistance	No visible evidence of cracking	Test/conditioning temperature	(0 ± 3) °C or	ISO 3127
		Test/conditioning temperature	(−20 ± 3) °C[a]	
		Type of striker	d90 according to ISO 3127	
		Mass of striker for		
		Class A 15	(1 ± 0,05) kg	
		Class B 125	(3,75 ± 0,05) kg	
		Height of striker		
		Class A 15	2,0 m	
		Class B 125	2,0 m	
		Radius of striker; R_s	50 mm	

[a] Cold climate conditions: Products tested at –20 °C shall be marked with a snow flake symbol.

The following apparatus shall be available for the test:

— a guided rail impact tower similar to that described in ISO 3127;

— an impact nose consisting of a 50 mm wide cylinder with a radius of (50 ± 1) mm. The total mass of the nose and carrier assembly shall be in accordance with Table 5;

— a chill unit capable of holding (–20 ± 3) °C.

Set up the apparatus and support to ensure minimum time elapses from removal of test specimen from chill unit to testing. The longitudinal axis of the impact nose shall be aligned at right angles to the surface of installation of the manhole top or gully top.

Condition the test specimen at test temperature for 4 h. Remove and place on support, impact test from a height of 2,0 m from the impact point within 30 s.

Impact test shall be carried out at 7 equally spaced points, at least 4 to be around the periphery. The impact nose shall be directed at those areas that would normally be “exposed” when installed. Return the test specimen to the chill unit for between 10 min and 15 min to recondition if the completion of the 7 impacts exceeds 120 s.

After carrying out the low temperature impact test the impacted cover shall meet the requirements of 5.2.4. Only those areas of surfaces normally exposed after installation shall be examined without magnification when ascertaining the test result.

7 Assessment and verification of constancy of performance — AVCP

7.1 General

The compliance of gully tops and manhole tops with the requirements of this standard and with the performances declared by the manufacturer in the DoP shall be demonstrated by:

— determination of the product type on the basis of type testing;

— factory production control by the manufacturer, including product assessment.

The manufacturer shall always retain the overall control and shall have the necessary means to take responsibility for the conformity of the product with its declared performance(s).

7.2 Type testing

7.2.1 General

All performances related to characteristics included in this standard shall be determined when the manufacturer intends to declare the respective performances unless the standard gives provisions for declaring them without performing tests (e.g. use of previously existing data, and conventionally accepted performance).

Assessment previously performed in accordance with the provisions of this standard, may be taken into account provided that they were made to the same or a more rigorous test method, under the same AVCP system on the same product or products of similar design, construction and functionality, such that the results are applicable to the product in question.

NOTE 1 Same AVCP system means testing by an independent third party, when relevant, under the responsibility of a notified product certification body, when relevant.

For the purposes of assessment, the manufacturer's products may be grouped into families, where it is considered that the results for one or more characteristics from any one product within the family are representative for the same characteristics for all products within that same family.

NOTE 2 Products can be grouped in different families for different characteristics.

Reference to the assessment method standards should be made to allow the selection of a suitable representative sample.

In addition, the determination of the product type shall be performed for all characteristics included in the standard for which the manufacturer declares the performance:

— at the beginning of the production of a new or modified gully top and manhole top (unless a member of the same product range); or

— at the beginning of a new or modified method of production (where this can affect the stated properties); or

— they shall be repeated for the appropriate characteristic(s), whenever a change occurs in the gully top or manhole top design, in the raw material or in the supplier of the components, or in the method of production (subject to the definition of a family), which would affect significantly one or more of the characteristics.

Where components are used whose characteristics have already been determined, by the component manufacturer, on the basis of assessment methods of other product standards, these characteristics need not be re-assessed. The specifications of these components shall be documented.

Products bearing regulatory marking in accordance with appropriate harmonized European specifications may be presumed to have the performances declared in the DoP, although this does not replace the responsibility on the manhole tops and gully tops manufacturer to ensure that the manhole tops and gully tops as a whole are correctly manufactured and its component products have the declared performance values.

7.2.2 Test samples, testing and compliance criteria

Each gully top or manhole top made of PE, PP or PVC-U representative of normal production shall be chosen at random and shall be tested according to Table 6, to prove that they meet the appropriate requirements.

The number of samples of gully tops and manhole tops to be tested/assessed shall be in accordance with Table 6. Characteristics for which the performance is to be declared are written in **bold** letters.

Table 6 — Number of samples to be tested and compliance criteria

Characteristic	Requirement	Assessment method	No. of samples[a]	Compliance criteria in accordance with
for the declared performance:				
Reaction to fire	5.2.1	Not tested	–	NPD
		EN 124–6:2015, 5.2.1.2	3	EN 124–6:2015, 5.2.1
Frame bearing area	5.1	EN 124–1:2015, 8.4.14	3	EN 124–1:2015, 6.15, calculated value $P_b \leq 7{,}5$ N/mm^2
Load bearing capacity	5.1	EN 124–1:2015, 8.3	3	EN 124–1:2015, 7.2, test load for the declared class
Permanent set	5.1	EN 124–1:2015, 8.2	3	EN 124–1:2015, 7.3, permissible value for the declared class,
Securing of the cover/grating within the frame	5.1	EN 124–1:2015, 8.4.6	3	EN 124–1:2015, 6.6 a), declared method
Child safety	5.1	EN 124–1:2015, 8.5	3	EN 124–1:2015, 7.5, declared method
Skid resistance of				
a) covers with				
— Raised pattern	5.1	EN 124–1:2015, 8.4.13 b)	3	EN 124–1:2015, 7.4.2 b), declared as “raised pattern” for the specified raised pattern
— Other surface		EN 124–1:2015, 8.4.13 c)	3	EN 124–1:2015, 7.4.2 c), for the calculated and declared value of USRV
b) Gratings	5.1	EN 124–1:2015, 8.4.13 b)	3	EN 124–1:2015, 7.4.3, declared as “raised pattern” for the specified raised pattern or “slots” for the measured slot dimensions
c) Frames with max. horizontal visible width of: — ≤ 40 mm or — > 40 mm	5.1	EN 124–1:2015, 7.4.4	3	EN 124–1:2015, 7.4.4, measured acc. to the requirement clause and expressed as: — “NPD” for ≤ 40 mm or — method or value for > 40 mm
Durability of:				
— load bearing capacity[b] against mechanical failure	5.2.5	EN 124–1:2015, 8.2 EN 124–1:2015, 8.3 EN 124–6:2015, 4.1, 4.3, 6.2, 6.3, 6.4	3	EN 124–1:2015, 7.2 EN 124–1:2015, 7.3 EN 124–6:2015, 4.1, 4.3, 5.2.2, 5.2.3, 5.2.4 Declared as “Pass” according to the material used and the test method applied
— securing[c] against unintended	5.2.5	EN 124–1:2015, 8.4.6 EN 124–6:2015, 4.4	3	EN 124–1:2015, 6.6, declared as “Pass” according to the material used

Characteristic	Requirement	Assessment method	No. of samples[a]	Compliance criteria in accordance with
lifting				
— skid resistance against loss of grip	5.2.5	EN 124–1:2015, 8.4.13 b) EN 124–1:2015, 8.4.13 c)	3	EN 124–1:2015, 7.4.2, declared as “Pass” for the declared method and the material used. For USRV measured value declared
— effectiveness of child safety characteristics	5.2.5	EN 124–1:2015, 8.4.6	3	EN 124–1:2015, 6.6, declared as “Pass” according to the material used and the method declared.
for the design:				
Vents in covers	5.1	EN 124–1:2015, 8.4.1	3	EN 124–1:2015, 6.1
Clear opening of manhole tops for man entry	5.1	EN 124–1:2015, 8.4.2	3	EN 124–1:2015, 6.2
Clearance	5.1	EN 124–1:2015, 8.4.4	3	EN 124–1:2015, 6.4
Compatibility of seatings	5.1	EN 124–1:2015, 8.4.5	3	EN 124–1:2015, 6.5
Handling of covers and gratings	5.1	EN 124–1:2015, 8.4.7	3	EN 124–1:2015, 6.7
Slot dimensions of gratings	5.1	EN 124–1:2015, 8.4.8	3	EN 124–1:2015, 6.8
Positioning of covers and gratings	5.1	EN 124–1:2015, 8.4.10	3	EN 124–1:2015, 6.10
Flatness of manhole covers and gratings	5.1	EN 124–1:2015, 8.4.11	3	EN 124–1:2015, 6.11
Concaveness of gratings	5.1	EN 124–1:2015, 8.4.12	3	EN 124–1:2015, 6.12
Manhole tops with sealing features	5.1	Visual inspection of presence of anchors	3	EN 124–1:2015, 7.14
Appearance	5.1	Visual inspection	3	EN 124–1:2015, 7.1

[a] If one of the 3 samples fails, the specific test can be repeated with 5 new samples. All the 5 samples shall pass the test.

[b] The proportion between the test load for the declared class and the maximum load to be expected in service in conjunction with the stable behaviour of the material specified in Clause 4 covers all effects which may influence the durability of the load bearing capacity.

[c] Ensured by using materials with proven resistance against corrosion in compliance with 4.4.

7.2.3 Test reports

The results of the determination of the product type shall be documented in test reports. All test reports shall be retained by the manufacturer for at least 10 years after the last date of production of the gully top or manhole top to which they relate.

7.2.4 Shared other party results

A manufacturer may use the results of the product type determination obtained by someone else (e.g. by another manufacturer, as a common service to manufacturers, or by a product developer), to justify his own declaration of performance regarding a product that is manufactured according to the same design (e.g. dimensions) and with raw materials, constituents and manufacturing methods of the same kind, provided that:

— the results are known to be valid for products with the same essential characteristics relevant for the product performance;

— in addition to any information essential for confirming that the product has such same performances related to specific essential characteristics, the other party who has carried out the determination of the product type concerned or has had it carried out, has expressly accepted to transmit to the manufacturer the results and the test report to be used for the latter's product type determination, as well as information regarding production facilities and the production control process that can be taken into account for FPC;

— the manufacturer using other party results accepts to remain responsible for the product having the declared performances and he also:

  — ensures that the product has the same characteristics relevant for performance as the one that has been subjected to the determination of the product type, and that there are no significant differences with regard to production facilities and the production control process compared to that used for the product that was subjected to the determination of the product type; and

  — keeps available a copy of the determination of the product type report that also contains the information needed for verifying that the product is manufactured according to the same design and with raw materials, constituents and manufacturing methods of the same kind.

7.3 Factory production control (FPC)

7.3.1 General

The manufacturer shall establish, document and maintain an FPC system to ensure that the products placed on the market comply with the declared performance of the essential characteristics.

The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming materials or components, equipment, the production process and the product.

All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures.

This factory production control system documentation shall ensure a common understanding of the evaluation of the constancy of performance and enable the achievement of the required product performances and the effective operation of the production control system to be checked. Factory production control therefore brings together operational techniques and all measures allowing maintenance and control of the compliance of the product with the declared performances of the essential characteristics.

7.3.2 Requirements

7.3.2.1 General

The manufacturer is responsible for organizing the effective implementation of the FPC system in line with the content of this product standard. Tasks and responsibilities in the production control organization shall be documented and this documentation shall be kept up-to-date.

The responsibility, authority and the relationship between personnel that manages, performs or verifies work affecting product constancy, shall be defined. This applies in particular to personnel that need to initiate actions preventing product non-constancies from occurring, actions in case of non-constancies and to identify and register product constancy problems.

Personnel performing work affecting the constancy of performance of the product shall be competent on the basis of appropriate education, training, skills and experience for which records shall be maintained.

In each factory the manufacturer may delegate the action to a person having the necessary authority to:

— identify procedures to demonstrate constancy of performance of the product at appropriate stages;

— identify and record any instance of non-constancy;

— identify procedures to correct instances of non-constancy.

The manufacturer shall draw up and keep up-to-date documents defining the factory production control. The manufacturer's documentation and procedures should be appropriate to the product and manufacturing process. The FPC system should achieve an appropriate level of confidence in the constancy of performance of the product. This involves:

a) the preparation of documented procedures and instructions relating to factory production control operations, in accordance with the requirements of the technical specification to which reference is made;

b) the effective implementation of these procedures and instructions;

c) the recording of these operations and their results;

d) the use of these results to correct any deviations, repair the effects of such deviations, treat any resulting instances of non-conformity and, if necessary, revise the FPC to rectify the cause of non-constancy of performance.

Where subcontracting takes place, the manufacturer shall retain the overall control of the product and ensure that he receives all the information that is necessary to fulfil his responsibilities according to this European Standard.

If the manufacturer has part of the product designed, manufactured, assembled, packed, processed and/or labelled by subcontracting, the FPC of the subcontractor may be taken into account, where appropriate for the product in question.

The manufacturer who subcontracts all of his activities may in no circumstances pass the above responsibilities on to a subcontractor.

NOTE Manufacturers having an FPC system, which complies with EN ISO 9001 standard and which addresses the provisions of the present European standard are considered as satisfying the FPC requirements of the Regulation (EU) No. 305/2011.

7.3.2.2 Equipment

7.3.2.2.1 Testing

All weighing, measuring and testing equipment shall be calibrated and regularly inspected according to documented procedures, frequencies and criteria.

7.3.2.2.2 Manufacturing

All equipment used in the manufacturing process shall be regularly inspected and maintained to ensure use, wear or failure does not cause inconsistency in the manufacturing process. Inspections and maintenance shall be carried out and recorded in accordance with the manufacturer’s written procedures and the records retained for the period defined in the manufacturer's FPC procedures.

7.3.2.3 Raw materials and components

The specifications of all incoming raw materials and components shall be documented, as shall the inspection scheme for ensuring their compliance. In case supplied kit components are used, the constancy of

performance system of the component shall be that given in the appropriate harmonized technical specification for that component.

7.3.2.4 Traceability and marking

Individual products shall be identifiable and traceable with regard to their production origin. The manufacturer shall have written procedures ensuring that processes related to affixing traceability codes and/or markings are inspected regularly.

7.3.2.5 Controls during manufacturing process

The manufacturer shall plan and carry out production under controlled conditions.

For components used for the assembly of manhole tops and gully tops, such as cushioning inserts, bolts etc. not specified in this standard and coating materials, the supplier's documentation shall be checked at every delivery for compliance with the manufacturer's specification. The documents shall be retained for a period of 10 years.

For all materials in accordance with 4.1, used for the manufacturing process of manhole tops and gully tops, specified in this standard the supplier's documentation shall be checked at every delivery for compliance with the manufacturer's specification.

NOTE For deliveries from suppliers having an established quality management system, the frequency of inspection can be reduced at the discretion of the manufacturer.

Raw materials used for manufacturing process of manhole tops and gully tops made of PP, PE and PVC-U shall be inspected according to Table 7.

Table 7 — Material delivery inspection

Aspect of inspection	Method of inspection	Frequency of inspection	Document retention period
All incoming raw materials and components	Inspection of certificate of supplier	Every delivery	1 year
Raw material	Visually	Every delivery	1 year

For manhole tops and gully tops made of PP, PE and PVC-U the consistency of process parameters is controlled by Batch Release Tests which are performed in regular time intervals according to Table 8.

Table 8 — Batch Release Test (BRT)

Characteristic	Requirements	Test method	Frequency	Document retention period
Flatness	5.1	EN ISO 3126	Every start up	10 years
Marking	Clause 9	Visual	Every start up	10 years
Dimensions	Acc. to drawing or specification	EN ISO 3126	Every start up and once per shift	10 years
Appearance	5.1	Visual	Every start up and once per shift	-
Impact resistance	5.2.4	6.4	Every start up	10 years
Effect of heating	5.2.2	6.2	Every start up	10 years

Table 9 — Process Verification Test (PVT)

Characteristic	Requirements	Test method	Frequency	Document retention period
Load bearing capacity [a]	5.1	EN 124–1:2015, 8.3	Once per year	10 years
[a] Including ancillaries like a circular ring.				

7.3.2.6 Product testing and evaluation

The manufacturer shall establish procedures to ensure that the stated values of the characteristics for which he declares the performance given in Table 6 are maintained. This is achieved by Batch Released Test (BRT) and Process Verification Test (PVT) which shall be performed according to Table 8 and Table 9.

7.3.2.7 Non-complying products

The manufacturer shall have written procedures which specify how non-complying products shall be dealt with. Any such events shall be recorded as they occur and these records shall be kept for the period defined in the manufacturer's written procedures.

Where the product fails to satisfy the acceptance criteria, the provisions for non-complying products shall apply, the necessary corrective action(s) shall immediately be taken and the products or batches not complying shall be isolated and properly identified.

Once the fault has been corrected, the test or verification in question shall be repeated.

The results of controls and tests shall be properly recorded. The product description, date of manufacture, test method adopted, test results and acceptance criteria shall be entered in the records under the signature of the person responsible for the control/test.

With regard to any control result not meeting the requirements of this European Standard, the corrective measures taken to rectify the situation (e.g. a further test carried out, modification of manufacturing process, throwing away or putting right of product) shall be indicated in the records.

7.3.2.8 Corrective action

The manufacturer shall have documented procedures that instigate action to eliminate the cause of non-conformities in order to prevent recurrence.

7.3.2.9 Handling, storage and packaging

The manufacturer shall have procedures providing methods of product handling and shall provide suitable storage areas preventing damage or deterioration.

7.3.3 Product specific requirements

The FPC system shall address this European Standard and ensure that the products placed on the market comply with the declaration of performance.

The FPC system shall include a product specific FPC, which identifies procedures to demonstrate compliance of the product at appropriate stages, i.e.:

a) the controls and tests to be carried out prior to and/or during manufacture according to a frequency laid down in the FPC test plan;

and/or

b) the verifications and tests to be carried out on finished products according to a frequency laid down in the FPC test plan.

If the manufacturer uses only finished products, the operations under b) shall lead to an equivalent level of compliance of the product as if FPC had been carried out during the production.

If the manufacturer carries out parts of the production himself, the operations under b) may be reduced and partly replaced by operations under a). Generally, the more parts of the production that are carried out by the manufacturer, the more operations under b) may be replaced by operations under a).

In any case the operation shall lead to an equivalent level of compliance of the product as if FPC had been carried out during the production.

NOTE Depending on the specific case, it can be necessary to carry out the operations referred to under a) and b), only the operations under a) or only those under b).

The operations under a) refer to the intermediate states of the product as on manufacturing machines and their adjustment, and measuring equipment etc. These controls and tests and their frequency shall be chosen based on product type and composition, the manufacturing process and its complexity, the sensitivity of product features to variations in manufacturing parameters, etc.

The manufacturer shall establish and maintain records that provide evidence that the production has been sampled and tested. These records shall show clearly whether the production has satisfied the defined acceptance criteria and shall be available for at least three years.

7.3.4 Initial inspection of factory and of FPC

Initial inspection of factory and of FPC shall be carried out when the production process has been finalized and in operation. The factory and FPC documentation shall be assessed to verify that the requirements of 7.3.2 and 7.3.3 are fulfilled.

During the inspection it shall be verified:

a) that all resources necessary for the achievement of the product characteristics included in this European Standard are in place and correctly implemented; and

b) that the FPC-procedures in accordance with the FPC documentation are followed in practice; and

c) that the product complies with the product type samples, for which compliance of the product performance to the DoP has been verified.

All locations where final assembly of the relevant product is performed shall be assessed to verify that the above conditions a) to c) are in place and implemented. If the FPC system covers more than one product, production line or production process, and it is verified that the general requirements are fulfilled when assessing one product, production line or production process, then the assessment of the general requirements does not need to be repeated when assessing the FPC for another product, production line or production process.

All assessments and their results shall be documented in the initial inspection report.

7.3.5 Continuous surveillance of FPC

Surveillance of the FPC shall be undertaken once per year. Surveillance of the FPC can be more frequent if necessary, depending on the observation during the continuous surveillance of the FPC and risk analysis.

NOTE Surveillance of the FPC previously performed in accordance with the provisions of this standard, may be taken into account provided that they were made to the same or a more rigorous test method, under the same AVCP system on

the same product or products of similar design, construction and functionality, such that the results are applicable to the product in question.

The surveillance of the FPC shall include a review of the FPC test plan(s) and production processes(s) for each product to determine if any changes have been made since the last assessment or surveillance. The significance of any changes shall be assessed.

Checks shall be made to ensure that the test plans are still correctly implemented and that the production equipment is still correctly maintained and calibrated at appropriate time intervals.

The records of tests and measurement made during the production process and to finished products shall be reviewed to ensure that the values obtained still correspond with those values for the samples submitted to the determination of the product type and that the correct actions have been taken for non-compliant products.

7.3.6 Procedure for modifications

If modifications are made to the product, production process or FPC system that could affect any of the product characteristics declared according to this standard, then all the characteristics for which the manufacturer declares performance, which may be affected by the modification, shall be subject to the determination of the product type, as described in 7.2.1.

Where relevant, a re-assessment of the factory and of the FPC system shall be performed for those aspects, which may be affected by the modification.

All assessments and their results shall be documented in a report.

8 Designation

Where required for specification and documentation purposes, product designation in accordance with this European Standard shall consist of:

a) name of product (manhole top or gully top);

b) European Standard number (EN 124-6);

c) load class (see 5.1), e.g. A 15 or B 125;

d) code for material PP, PE or PVC-U;

e) code related to the number of the parts of EN 124 series to which the cover and the frame complies according to Table 10;

Table 10 — Designation according to the material of frame and cover/grating

Designation	Cover/grating in accordance with	Frame in accordance with
6/6	EN 124–6	EN 124–6
6/2	EN 124–6	EN 124–2
6/3	EN 124–6	EN 124–3
6/4	EN 124–6	EN 124–4
6/5	EN 124–6	EN 124–5

f) clear opening (CO in mm), e.g. 400 indicates CO of 400 mm;

g) securing method:

   1) securing feature (F);

h) skid resistance:

   1) defined raised pattern (RP);

   2) measured value of USRV (e.g. 40).

Manhole tops and gully tops consisting of a combination of elements in accordance with EN 124-2, EN 124-3, EN 124-4, EN 124-5 and EN 124-6 shall be designated with the number of the standard for which the cover meets the requirements of the relevant standard.

EXAMPLE 1 Designation of a manhole top according to EN 124–6, load class A 15 (A 15), cover and frame made of PP (6/6) with a clear opening CO 400 mm (400), securing feature (F), skid resistance (RP)

Manhole Top EN 124–6 — A 15 – PP – 6/6 – 400 – F – RP

EXAMPLE 2 Designation of a manhole top according to EN 124–6, load class B 125 (B 125), consisting of a combination of a cover made from PE according to EN 124–6 with a frame made from cast iron according to EN 124–2 (6/2), with a clear opening CO 600 mm (600), securing feature (F), skid resistance (USRV 40)

Manhole Top EN 124–6 — B 125 – PE – 6/2 – 600 – F – 40

NOTE The designation provides a standardized pattern of designation from which a rapid and unequivocal description of an item is communicated.

9 Marking

Gratings, covers and frames of manhole tops and gully tops according to this European Standard shall be marked as follows:

a) number of this European Standard, EN 124-6;

b) type of Polymer (PVC-U, PP or PE);

c) appropriate class (e.g. A 15);

d) name and/or identification mark of the manufacturer;

e) factory of manufacture which may be in code;

f) date or week and year of manufacture (coded or not coded);

g) snow flake symbol (*) when tested at −20 °C;

In addition gratings, covers and frames of manhole tops and gully tops according to this European Standard can be marked with:

h) additional markings relating to the intended application of the user;

i) product identification (name and/or catalogue number).

Markings a) to g) of covers, gratings and frames shall be clear, permanent and an integral part of it. These markings shall not be applied by riveting, bolting, chemical adhesives or weldings.

All markings shall, where possible, be visible on the upper side (visible from the trafficked area) after the unit is installed. If this is not possible they may be placed on the underside of each element.

Markings a) and c) shall always be on the upper side of cover/grating.

Where regulatory marking provisions (see ZA.3) require information on some or all items listed in this clause, the provisions of this clause concerning those common items are deemed to be met and the information needs not be repeated for the purpose of this clause.

Annex A
(normative)

Characteristics of glass fibres used for reinforcement of PP polymer

Glass fibres used for reinforcement of PP polymer shall fulfil the requirements in accordance with EN 16245-3:2013 and Table A.1.

Table A.1 — Specification of glass fibres used for reinforcement of PP

Characteristics	Value/Unit	Method
Type of glass fibres	Chopped fibres	EN 16245–3
Length of glass fibres	3 mm to 4 mm	ISO 1888
Diameter of glass fibres	5 µm to 24 µm	ISO 1888
Coating	Chemical coating to ensure resin compatibility to materials listed in Table 1	EN 16245–3
Density	2,45 g/cm^3 to 2,58 g/cm^3	ISO 15100
E-Modulus	70 to 90 GPa	EN ISO 9163
Elongation at break	< 5 %	EN ISO 9163

NOTE Information on typical properties of PP filled with glass fibres are given in Table A.2.

Table A.2 — Typical properties for PP filled with 30 % glass fibres

Property	Value / Unit	Method
Density	1,14 g/cm^3	EN ISO 1183-1, EN ISO 1183-2
Melt volume flow rate (230 °C / 2,16 kg) (230 °C / 5kg	 1,00 cm^3/10 min 5,00 cm^3/10 min	EN ISO 1133-1
Tensile Modulus (Secant)	26 500 MPa	ISO 527-1
Flexural Modulus (Secant)	5 500 MPa	ISO 178

Annex B
(normative)

Test of deflection under load

B.1 Test samples

Gully tops and manhole tops shall be tested as complete units in their condition of service. Units tested shall be new units that have not been subjected to any other load tests, and shall be randomly selected.

B.2 Deflection test load, F_D

A deflection test load F_D = 1/3 F_T of the test load shown in EN 124-1:2015, 7.2, Table 4, shall be applied for manhole tops and gully tops, class B 125, with a clear opening above 500 mm.

B.3 Apparatus

B.3.1 Testing machine

The testing machine, preferably a hydraulic test press, shall be capable of applying a load at least 25 % greater than the respective test load for classes B 125. A tolerance of ± 3 % of the test load shall be maintained. Except for multiple units, the dimensions of the bed of the testing machine shall be greater than the bearing area of the unit to be tested.

B.3.2 Test blocks

The dimensions and shape of test blocks shall be as shown in EN 124-1:2015, Table A.1.

B.3.3 Deflection measurement device(s)

The deflection measurement device(s) shall have a measurement range of at least 10 mm with a resolution of at least 0,01 mm and have a maximum overall accuracy of ± 5 %.

B.4 Procedure

B.4.1 Procedure for testing rectangular and circular covers/gratings

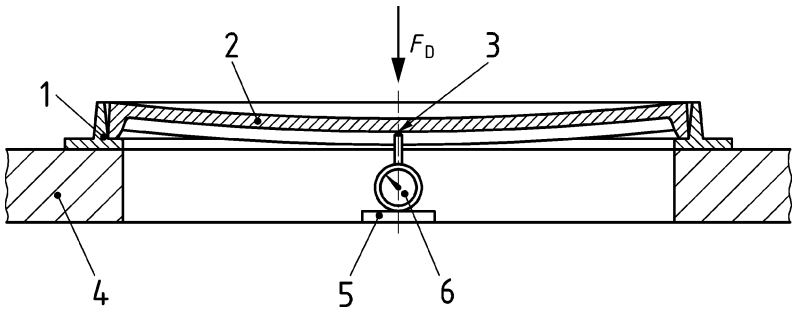
The test sample shall be placed on the test machine bed. The test sample shall be supported on the bed of the test machine in such a way as to ensure that when the cover or grating is deflected under the test load, it shall remain unsupported, and not in contact with the bed of the test machine. The cover or grating of the test sample shall rest normally in its frame.

The test block shall be placed on the geometric centre of the cover/grating of with its vertical axis perpendicular to the surface (e.g. see EN 124-1:2015, Figure A.1).

The test load shall be uniformly distributed over the whole surface of the test block and any irregularities compensated for by means of an appropriate intermediate layer, e.g. softwood, fibre board, felt or similar material positioned between the cover or the grating and the test block. The dimensions of this intermediate layer shall not be larger than those of the test block.

When testing gully tops or manhole tops with a non-flat surface, the contact face of the test block shall be shaped to match the grating or cover. Patterns as defined in EN 124-1:2015, 7.4, and small deviations from a flat surface do not require a shaped contact face of the test block.

Measurement of deflection shall be made on the underside of the gully grating or manhole cover as shown in Figure B.1 in the same place as the applied test load. The deflection measurement device(s) shall be positioned within ± 5 % of the geometrical centre of the clear opening of the cover or grating.



Key

1 frame

2 cover or grating

3 geometric centre

4 bed of testing machine

5 measuring device support

6 measuring device

F_D deflection test load

Figure B.1 — Measurement of deflection under load

A conditioning load of maximum 1/3 of F_D shall be applied to bed the system in, and may be held for no more than 5 s and subsequently fully released. After the conditioning load is released and before F_D is applied, the deflection measurement device(s) shall be set such that it is in contact with the underside of the manhole top or gully top and (a) reference reading(s) shall be taken.

The load F_D shall be applied at a rate of 1 kN/s to 5 kN/s up to 1/3 F_T and maintained for 30 s. The deflection measurement device(s) shall be read again within the next 10 s. The load shall then be released.

B.4.2 Procedure for testing multiple and triangular covers/gratings

In the case of multiple manhole tops or gully tops, each individual unit and each intermediate structural element shall be tested in accordance with the procedure in B.4.1. The location of the test blocks and the deflection measurement device(s) shall be in accordance with EN 124-1:2015, Figure A.1 and Figure A.2. In the case of double or multiple triangular covers and gratings, the test block shall be placed centrally on the diagonal edge between covers, as shown in EN 124-1:2015, Figure A.3.

B.4.3 Observations and reporting

Records shall be made of all deflection gauge readings, and the differences between the “reference readings” and the equivalent “readings under load” shall be determined. A comparison shall be made between these differences and the requirements of this standard, and a report prepared accordingly.

Annex ZA
(informative)

Clauses of this European Standard addressing the provisions of the EU Construction Products Regulation

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under Mandate M/118 “Wastewater engineering products”, as amended, given to CEN by the European Commission and the European Free Trade Association.

If this European Standard is cited in the Official Journal of the European Union (OJEU), the clauses of this standard, shown in this annex, are considered to meet the provisions of the relevant mandate, under the Regulation (EU) No. 305/2011.

This annex deals with the CE marking of gully tops and manhole tops made of polypropylene (PP), polyethylene (PE) or unplasticized poly(vinyl chloride) (PVC-U) intended for the uses indicated in Table ZA.1 and shows the relevant clauses applicable.

This annex has the same scope as in Clause 1 of this standard related to the aspects covered by the mandate and is defined by Table ZA.1.

Table ZA.1 — Relevant clauses for product gully tops and manhole tops made of PP, PE or PVC-U

Construction products: Gully tops and manhole tops made of polypropylene (PP), polyethylene (PE) or unplasticized poly(vinyl chloride) (PVC-U) **Intended uses:** For covering of openings of gullies, manholes and inspection chambers in areas which can only be used by pedestrians and pedal cyclists (class A 15) and footways, pedestrian areas and comparable areas, car parks or car parking decks (class B 125)			
Essential characteristics	**Clauses in this and other European Standards related to essential characteristics**	**Regulatory classes**	**Notes**
Reaction to fire	EN 124–6:2015, 5.2.1	B to E	the lowest class of the relevant constituent materials declared (acc. to EN 13501–1) based on the results of the relevant test method(s)
Load bearing capacity, as:			
— frame bearing area	EN 124–1:2015, 6.15	–	calculation of frame bearing pressure (in N/mm^2) according to the requirement clause and expressed as $P_b \leq 7{,}5\ N/mm^2$
— load bearing capacity	EN 124–1:2015, 7.2	–	tested acc. to EN 124–1:2015, 8.3, against the declared load-bearing class and expressed as test load for the declared class
— permanent set	EN 124–1:2015, 7.3	–	tested acc. to EN 124–1:2015, 8.2, and maximum permissible value declared for the load-bearing class and the clear opening as given for the product type

Securing of covers as:			
— securing by securing feature	EN 124–1:2015, 6.6 a)	–	"securing feature" is to be declared after visible inspection
Child safety, as:			
— securing feature or — locking accessory	EN 124–1:2015, 8.5	–	visible inspection and declared as "securing feature" or "locking accessory"
Skid resistance of:			
a) Covers with:			
— raised pattern	EN 124–1:2015, 7.4.2 b)	–	visible inspection of raised pattern measured according to the requirement clause and expressed as "raised pattern"
— other surfaces	EN 124–1:2015, 7.4.2 c)	–	skid resistance value measured acc. to EN 124–1:2015, Annex C, and USRV declared
b) Gratings:	EN 124–1:2015, 7.4.3	–	measured and declared as "raised pattern" for the specified raised pattern or "slots" for the measured slot dimensions
c) Frames with max. horizontal visible width of: — ≤ 40 mm or — > 40 mm	EN 124–1:2015, 7.4.4	–	EN 124–1:2015, 7.4.4, determined acc. to the requirement clause and expressed as — "NPD" for ≤ 40 mm or — method or value for > 40 mm
Durability of:			
— **load bearing capacity** against mechanical failure	EN 124–6:2015, 5.2.5	–	expressed as "Pass" for the material and the test method applied
— **securing** against mechanical failure	EN 124–6:2015, 5.2.5	–	expressed as "Pass" for the material and the test method applied
— **skid resistance against** loss of grip	EN 124–6:2015, 5.2.5	–	expressed as "Pass" for the "raised pattern" or the declared value of USRV, if applicable
— effectiveness of **child safety**	EN 124–6:2015, 5.2.5.5	–	Expressed as "Pass" after visual inspection of the performance in accordance with EN 124–1:2015, 6.6
Dangerous substances	EN 124–6: 2015, 5.2.6	–	see 5.2.6

The declaration of the product performance related to certain essential characteristics is not required in those Member States (MS) where there are no regulatory requirements on these essential characteristics for the intended use of the product.

In this case, manufacturers placing their products on the market of these MS are not obliged to determine nor declare the performance of their products with regard to these essential characteristics and the option "No performance determined" (NPD) in the information accompanying the CE marking and in the declaration of performance (see ZA.3) may be used for those essential characteristics.

ZA.2 Procedures for AVCP of gully tops and manhole tops made of PP, PE or PVC-U)

ZA.2.1 Systems of AVCP

The AVCP systems of gully tops and manhole tops indicated in Table ZA.1 established by EC Decision 97/464/EC of 1997-06-27 (see OJEU L 198 of 1997-07-25), as amended by 2004/663/EC of 2004-09-20 (see OJEU L 302 of 2004-09-29), is shown in Table ZA.2 for the indicated intended use(s) and relevant level(s) or class(es) of performance.

Table ZA.2 — Systems of AVCP

Product	Intended use	Level(s) or class(es) of performance	AVCP systems
Manhole tops and gully tops	For use in vehicular and pedestrian areas	No regulatory classes-	1
	For use(s) when subject to regulations on reaction to fire	A1*, A2*, B*, C* ——— A1**, A2**, B**, C**, D, E ——— (A1 to E)***, F	1 ——— 3 ——— 4
System 1: See Regulation (EU) No. 305/2011 (CPR) Annex V, 1.2 System 3: See Regulation (EU) No. 305/2011 (CPR) Annex V, 1.4 System 4: See Regulation (EU) No. 305/2011 (CPR) Annex V, 1.5			
* Products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material). ** Products/materials not covered by footnote (*). *** Products/materials that do not require to be tested for reaction to fire (e.g. products/materials of class A1 according to the Decision 96/603/EC, as amended).			

The AVCP of the gully tops and manhole tops made of PP, PE or PVC-U in Table ZA.1 shall be according to the AVCP procedures indicated in Table ZA.3 resulting from application of the clauses of this or other European Standard indicated therein. The content of tasks of the notified body shall be limited to those essential characteristics as provided for, if any, in Annex III of the relevant mandate and to those that the manufacturer intends to declare.

Table ZA.3 — Assignment of AVCP tasks for gully tops and manhole tops made of polypropylene (PP), polyethylene (PE) or unplasticized poly(vinyl chloride) (PVC-U) under system 1, system 3 and system 4

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	— Parameters related to essential characteristics of Table ZA.1 relevant for the intended use for which performance is declared (except for reaction to fire). — Reaction to fire only relevant for use(s) when subject to regulations on reaction to fire (for classes B*, C*, D, E or F), if applicable.	7.3.1, 7.3.2, 7.3.3, 7.3.5, 7.3.6
	Further testing of samples taken at the factory according to the prescribed test plan	— Essential characteristics of Table ZA.1 relevant for the intended use for which performance is declared (except for reaction to fire). — Reaction to fire only relevant for use(s) when subject to regulations on reaction to fire (for classes B*, C*), if applicable	7.3.4
Tasks for the notified certification body	Determination of the product-type on the basis of type testing (based on sampling carried out by the manufacturer), type calculation, tabulated values or descriptive documentation of the product	— Parameters related to essential characteristics of Table ZA.1 relevant for the intended use for which performance is declared (except for reaction to fire). — Reaction to fire only relevant for use(s) when subject to regulations on reaction to fire (for classes B*, C*, D, E), if applicable.	7.2
	Initial inspection of manufacturing plant and of FPC	— Parameters related to essential characteristics of Table ZA.1, relevant for the intended use which is declared. Documentation of the FPC (except for reaction to fire). — Reaction to fire only relevant for use(s) when subject to regulations on reaction to fire (for classes B*, C*), if applicable.	7.3.4
	Continuous surveillance, assessment and evaluation of FPC	— Parameters related to essential characteristics of Table ZA.1, relevant for the intended use which is declared. Documentation of FPC (except for reaction to fire). — Reaction to fire only relevant for use(s) when subject to regulations on reaction to fire (for classes B*, C*).	7.3.5
* Products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material).			

ZA.2.2 Declaration of performance (DoP)

ZA.2.2.1 General

The manufacturer draws up the DoP and affixes the CE marking on the basis of the different AVCP systems set out in Annex V of the Regulation (EU) No. 305/2011:

— the factory production control and further testing of samples taken at the factory according to the prescribed test plan, carried out by the manufacturer; and

— the certificate of constancy of performance issued by the notified product certification body on the basis of determination of the product type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product; initial inspection of the manufacturing plant and of factory production control and continuous surveillance, assessment and evaluation of factory production control.

ZA.2.2.2 Content

The model of the DoP is provided in Annex III of the Regulation (EU) No. 305/2011. According to this Regulation, the DoP shall contain, in particular, the following information:

— the reference of the product-type for which the declaration of performance has been drawn up;

— the AVCP system or systems of the construction product, as set out in Annex V of the CPR;

— the reference number and date of issue of the harmonized standard which has been used for the assessment of each essential characteristic;

— where applicable, the reference number of the Specific Technical Documentation used and the requirements with which the manufacturer claims the product complies.

The DoP shall in addition contain:

a) the intended use or uses for the construction product, in accordance with the applicable harmonized technical specification;

b) the list of essential characteristics, as determined in the harmonized technical specification for the declared intended use or uses;

c) the performance of at least one of the essential characteristics of the construction product, relevant for the declared intended use or uses;

d) where applicable, the performance of the construction product, by levels or classes, or in a description, if necessary based on a calculation in relation to its essential characteristics determined in accordance with the Commission determination regarding those essential characteristics for which the manufacturer shall declare the performance of the product when it is placed on the market or the Commission determination regarding threshold levels for the performance in relation to the essential characteristics to be declared;

e) the performance of those essential characteristics of the construction product which are related to the intended use or uses, taking into consideration the provisions in relation to the intended use or uses where the manufacturer intends the product to be made available on the market;

f) for the listed essential characteristics for which no performance is declared, the letters “NPD” (No Performance Determined).

Regarding the supply of the DoP, Article 7 of the Regulation (EU) No. 305/2011 applies.

The information referred to in Article 31 or, as the case may be, in Article 33 of Regulation (EC) No. 1907/2006, (REACH) shall be provided together with the DoP.

ZA.2.2.3 Example of DoP

The following gives an example of a filled-in DoP for a manhole top made of polypropylene (PP).

DECLARATION OF PERFORMANCE
No. 00001 – CPR – 2015/05/12

1. Unique identification code of the product-type:

Manhole Top EN 124-6 — A 15 – PP – 6/6 – 400 – F – RP

2. Intended use or uses:

For covering of openings of inspection chambers in areas subjected to pedestrian traffic

3. Manufacturer:

AnyCo SA, PO Box 21
B-1050 Brussels, Belgium
Tel.:+32987654321
Fax: +32123456789
e-mail: anyco.sa@provider.be

4. Authorized representative:

Anyone Ltd
Flower Str. 24
West Hamfordshire
UK-589645 United Kingdom
Tel. +44987654321
Fax: +44123456789
e-mail: mailto:anyone.ltd@provider.uk

5. System of AVCP:

System 1 for the intended use under item 2

6. Harmonized standard: **EN 124-6**

Notified product certification body (name) No. 5678, performed the determination of the product-type on the basis of type testing, the initial inspection of the manufacturing plant and of factory production control and the continuous surveillance, assessment and evaluation of factory production control under system 1 and issued the certificate of constancy of performance of the product.

7. Declared performance

Essential characteristics	**Performance**	**Harmonized technical specification**
Reaction to fire	E	EN 124–6: 2015
Load-bearing capacity, as:		
— frame bearing area	$P_b \leq 7{,}5$ N/mm^2	

— load-bearing capacity	15 kN	
— permanent set	≤ 2 mm	
Securing of covers	Securing feature	
Child safety	Locking accessory	
Skid resistance	Raised pattern	
Durability of load bearing capacity against		
— mechanical failure	Pass	
Durability of securing, against		
— unintended lifting	Pass	
Durability of skid resistance, against:		
— loss of grip	Pass	
Durability of effectiveness of child safety	Pass	
Dangerous substances	NPD	

8. Appropriate Technical Documentation and/or Specific Technical Documentation, if appropriate (see Articles 36 to 38 of Regulation (EU) No. 305/2011)

- not appropriate -

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued in accordance with regulation (EU) No. 305/2011 under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

(name) ……

at (place) ……..…… on (date of issue) ……

(signature) ……

ZA.3 CE marking and labelling

The CE marking symbol shall be in accordance with the general principles set out in Article 30 of Regulation (EC) No. 765/2008 and shall be affixed visibly, legibly and indelibly

— to the manhole top or gully top.

The CE marking and the **accompanying** information shall be placed on a label attached to it, or on the packaging or on the accompanying documents.

The CE marking shall be followed by:

a) the last two digits of the year in which it was first affixed;

b) the name and the registered address of the manufacturer, or the identifying mark allowing identification of the name and address of the manufacturer easily and without any ambiguity;

c) the unique identification code of the product-type;

d) the reference number of the declaration of performance (see example of DOP);

e) the level or class of the performance declared;

f) the dated reference to the harmonized technical specification applied;

g) the identification number of the notified body;

h) the intended use as laid down in the harmonized technical specification applied.

The CE marking shall be affixed before the construction product is placed on the market. It may be followed by a pictogram or any other mark notably indicating a special risk or use.

Figure ZA.1, gives an example of such complete CE marking given in the commercial documents, accompanying gully top or manhole top.

CE 01234	*"CE" marking consisting of the "CE"- symbol* *Identification number of the notified certification body*
AnyCo Ltd **15** **No. 00001 – CPR – 2015/05/12**	*Name and registered address or identifying mark of the manufacturer* *Last two digits of the year in which the marking was first affixed* *Reference number of the DoP*
EN 124-6:2015 **Manhole top A 15 – PP – 6/6 – 400 – F – RP** for use in areas for pedestrian traffic	*Number of the European Standard, and the year of its publication* *Unique identification code of the product type* *Intended use of the product as laid down in the European Standard applied*
Reaction to fire	E
Load-bearing capacity, as:	
— frame bearing area	$P_b \leq 7{,}5$ N/mm^2
— load-bearing capacity	15 kN
— permanent set	≤ 2 mm
Securing of covers as	Securing feature
Child safety	Locking accessory
Skid resistance	Raised pattern
Durability of load bearing capacity against:	
— mechanical failure	Pass
Durability of securing against	
— unintended lifting	Pass
Durability of skid resistance against:	
— loss of grip	Pass
Dangerous substances	NPD

Levels or classes of the performance

Figure ZA.1 — Example for CE marking given in the commercial documents, accompanying manhole top, class A 15, made of PP, secured by a securing feature

Bibliography

[1] EN 607, *Eaves gutters and fittings made of PVC-U — Definitions, requirements and testing*

[2] EN 1253 (all parts), *Gullies for buildings*

[3] EN 1433, *Drainage channels for vehicular and pedestrian areas — Classification, design and testing requirements, marking and evaluation of conformity*

[4] EN 12201-1, *Plastics piping systems for water supply, and for drainage and sewerage under pressure — Polyethylene (PE) — Part 1: General*

[5] EN ISO 9001, *Quality management systems — Requirements (ISO 9001)*

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