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

ICS 93.080.30

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Rwanda Standards Board

P.O Box 7099 Kigali-Rwanda

KK 15 Rd, 49

Tel. +250 788303492

Toll Free: 3250

E-mail: info@rsb.gov.rw

Website: www.rsb.gov.rw

ePortal: www.portal.rsb.gov.rw

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Foreword

Rwanda Standards are prepared by Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the WTO/TBT agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

DRS 607-6 was prepared by Technical Committee RSB/TC 47, *Steel, aluminium and related products.*

In the preparation of this standard, reference was made to the following standard:

1) BS EN 124-6:2015 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).

The assistance derived from the above source is hereby acknowledged with thanks.

DRS 607 consists of the following parts, under the general title *Gully tops and manhole tops for vehicular and pedestrian areas — Specification*:

— *Part 1: Classification, general design and performance requirements;*

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

— *Part 3: Gully tops and manhole tops made of steel, 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).*

Committee membership

The following organizations were represented on the Technical Committee on *Steel, aluminium and related products* (RSB/TC 47) in the preparation of this standard.

All City Rwanda Ltd

Asante Steel ® Ltd

CFAO Mobility Rwanda Limited

OBOR TECHNOLOGY(RWANDA) LTD

Rwanda Engineering and Manufacturing Corporation (REMCO)

Rwanda Inspectorate, Competition and Consumer Protection (RICA)

TKAE Ltd

Rwanda Standards Board (RSB) – Secretariat

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

1 Scope

This Draft Rwanda Standard specifies requirements, sampling and test methods for manhole tops and gully tops made of Polypropylene, Polyethylene or unplasticized poly (vinyl chloride) by a moulding or extrusion process, with a clear opening up to and including 1 000 mm.

It is applicable to manhole tops and gully tops for use in areas subjected to pedestrian and/or vehicular traffic of class A 15 and B 125.

This Standard does not apply to:

— rodding point covers;

— gratings/covers as part of prefabricated drainage channels;

— floor and roof gullies in; and

— surface boxes.

NOTE This Part 6 of DRS 607 is not applicable in isolation, but only in combination with DRS 607-1 and gives guidance for combinations of covers/grating made of PP, PE or PVC–U with frames according to DRS 607-2, DRS 607 -3, DRS 607 -4 and DRS 607 -5.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

DRS 607-1, *Gully tops and manhole tops for vehicular and pedestrian areas — Part 1: Definitions, classification, general principles of design, performance requirements and test methods*

DRS 607-2, *Gully tops and manhole tops for vehicular and pedestrian areas — Part 2: Gully tops and manhole tops made of cast iron*

DRS 607-3, *Gully tops and manhole tops for vehicular and pedestrian areas — Part 3: Gully tops and manhole tops made of steel or aluminium alloys*

DRS 607-4, *Gully tops and manhole tops for vehicular and pedestrian areas — Part 4: Gully tops and manhole tops made of steel reinforced concrete*

DRS 607-5, *Gully tops and manhole tops for vehicular and pedestrian areas — Part 5: Gully tops and manhole tops made of composite materials*

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

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

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

ISO 21138-1, *Plastics piping systems for non-pressure underground drainage and sewerage — Structured-wall piping systems of unplasticized poly (vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) Part 1: Material specification and performance criteria for pipes, fittings and systems*

ISO 21138-2, *Plastics piping systems for non-pressure underground drainage and sewerage — Structured-wall piping systems of unplasticized poly (vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) — Part 2: Specifications for pipes and fittings with smooth internal and external surface and the system, Type A*

ISO 21138-3, *Plastics piping systems for non-pressure underground drainage and sewerage — Structured-wall piping systems of unplasticized poly (vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) — Part 3: Specifications for pipes and fittings with smooth internal and profiled external surface and the system, Type B*

RS 547, *Fire classification of construction products and building elements — Classification using data from reaction to fire tests*

ISO 13272, *Plastics piping systems for non-pressure underground drainage and sewerage — Unplasticized poly (vinyl chloride) (PVC-U), polypropylene (PP), polypropylene with mineral modifiers (PP-MD) and polyethylene (PE) — Specifications for manholes and inspection chambers in traffic areas and underground installations.*

RS 540, *Reaction to fire tests for building products — Building products excluding floorings exposed to the thermal attack by a single burning item*

D578/D578M-23, *Standard Specification for Glass Fiber Strands*

RS ISO 105-A03, *Textiles — Tests for colour fastness Part A03: Grey scale for assessing staining*

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

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

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

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

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

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

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

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

RS ISO 8256, *Plastics — Determination of tensile-impact strength*

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

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*

RS ISO 3506-1, *Mechanical properties of corrosion-resistant stainless steel fasteners — Part 1: Bolts, screws and studs*

RS 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 and definitions

For the purposes of this document, the terms and definitions given in DRS 607-1 and the following apply.

3.1

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.

3.2

technical 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

4 Symbols and abbreviated terms

F_T Test load

F_D Deflection test load

P_b Frame bearing pressure

PVC-U Unplasticized poly (vinyl chloride)

PP Polypropylene

PE Polyethylene

5 Materials

5.1 General

Each component of manhole tops, gully tops and made of PP, PE, or PVC-U 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)	ISO 21138–1, ISO 21138–2, ISO 21138–3, ISO 13272, ISO 4435–1
Polypropylene (PP)	ISO 8773, ISO 21138–2, ISO 21138–3, ISO 13272, DRS 607 –6, Annex A
Polyethylene (PE)	ISO 8772, ISO 21138–2, ISO 21138–3, ISO 13272,

5.2 Combination of elements made of different materials

Any element made of the materials specified in 5.1 can be used in combination with elements of materials specified in DRS 607 -2, DRS 607 -3, DRS 607-4 or DRS 607 -5. In such cases the manhole tops or gully tops shall comply with relevant design and performance and testing requirements as listed in Table 4.

In addition, elements shall comply with the requirements for the material related DRS 607 -2, DRS 607 -3, DRS 607 -4 or DRS 607 -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 DRS 607 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 DRS 607 –6 and the class to be declared for the combined product is the class of the cover according to DRS 607 –6.

5.3 UV stability (artificial weathering resistance)

5.3.1 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 5.3.2 or 5.3.3 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 RS ISO 105-A03	Radiation energy	2,6 GJ/m^2	ISO 4892-2:2013 (Xenon test) Method A
		Cycling and temperature regime	ISO 4892-2, Method A	
		Specimen	Moulded raw material plaque or from finished products from the same formulation, according to ISO 4892-1	
		or [b]		
		Exposure time using UVA 351 lamp	1 600 h	ISO 4892-3 (QUV test)
		Irradiation	6 hours at (50 ± 2) °C	
		Condensation	2 hours at (50 ± 2) °C	
		Specimen	Moulded raw material plaque or from finished products from the same formulation, according to 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 RS ISO 8256
		Test piece	Shall conform to RS ISO 8256	
		Number of specimens	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.

5.3.2 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.

5.3.3 Titanium dioxide requirements for UV resistant PVC-U

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

5.4 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 DRS 607 -3, 4.2), the use of stainless steel (see RS ISO 3506-1 and RS ISO 3506-2, DRS 607 -3, 4.3) or copper alloys as listed in Table 3.

Table 3 list of corrosion resistant low alloyed copper alloys and their chemical composition.

Material designation		**Composition** % (mass fraction)											**Density**[a] g/cm^3	**Electrical conductivity**[a, b]	
Symbol	Number	Element	Cu	Be	Co	Fe	Ni	P	Pb	S	Te	Others total	approx.	MS/m approx.	% IACS approx.
CuBe2Pb	CW102C	min.	Rem.	1,8	—	—	—	—	0,2	—	—	—	8,3	15	26
		max.	—	2,0	0,3	0,2	0,3	—	0,6	—	—	0,5			
CuPb1P	CW113C	min.	Rem.	—	—	—	—	0,003	0,7	—	—	—	8,9	50	86
		max.	—	—	—	—	—	0,012	1,5	—	—	0,1			
CuSP	CW114C	min.	Rem.	—	—	—	—	0,003	—	0,2	—	—	8,9	50	86
		max.	—	—	—	—	—	0,012	—	0,7	—	0,1			
CuTeP	CW118C	min.	Rem.	—	—	—	—	0,003	—	—	0,4	—	8,9	50	86
		max.	—	—	—	—	—	0,012	—	—	0,7	0,1			

[a] For information only.

[b] Only for solution heat treated and precipitation hardened material conditions, where applicable.

6 Requirements

6.1 Design and performance requirements

Manhole tops, gully tops and gratings made of materials according to 5.1 shall comply with the relevant design, performance and testing requirements in accordance with DRS 607-1 as listed in Table 4.

Table 4 — Design, performance and testing requirements, in accordance with DRS 607 –1 for gully tops and manhole tops made of PP, PE or PVC-U

Characteristic	**Requirements according to** DRS 607-1, **Clause**	**Testing according to** DRS 607-1, **Clause**	**Class A 15**	**Class B 125**
Related to the design				
Vents in covers	7.1	9.4.1	x	x
Clear opening of manhole tops for man entry	7.2	9.4.2	x	x
Clearance	7.4	9.4.4	x	x
Handling of covers and gratings	7.7	9.4.7	x	x
Slot dimensions of gratings	7.8	9.4.8	x	x
Positioning of covers and gratings	7.10	9.4.10	x	x
Flatness	7.11	9.4.11	x	x
Concaveness of gratings	7.12	9.4.12	x	x

Surface conditions	7.13	9.4.13	x	x
Manhole tops with sealing feature	7.14	Visual inspection of presence of anchors	x	x
Frame bearing area	7.15	9.4.14	x	x
Opening angle of hinged covers/gratings	7.17	9.4.16	x	x
Appearance	8.1	Visual inspection	x	x
Related to the performance				
Load bearing capacity	8.2	9.3	x	x
Permanent set	8.3	9.2	x	x
Securing of the cover/grating within the frame	7.6 a)	9.4.6	x	x
Skid resistance	8.4	9.4.13	x	x
Child safety	8.5	9.5	x	X
x To be applied.				

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

6.2.1 Reaction to fire

6.2.1.1 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.

6.2.1.2 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 RS 547 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 RS 547.

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 RS 547, 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 RS 547 and to the relevant standards referred therein. In addition, with regard to the SBI test according to RS 540, when applied, the test specimen used for the test methods, applicable for the classification, shall be prepared according to RS 547 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.

6.2.2 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 5. 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.

6.2.3 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 7.3 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 DRS 607 -1, 8.3 at 2/3 F_T.

6.2.4 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 7.4, PE, PP, and PVC-U manhole tops and gully tops shall comply with Table 6 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 6.

6.2.5 Durability

6.2.5.1 General

The materials PP, PE and PVC-U in accordance with Clause 5 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 5.3). The prescribed framework of requirements and test methods for the mandated performance characteristics according to Clause 7 will reflect the durability of manhole tops and gully tops.

6.2.5.2 Durability of load bearing capacity

Durability of load bearing capacity against mechanical failure is ensured by meeting the requirements of DRS 607-1,8.2 and 8.3 and DRS 607 -6, 5.1, 5.3,6.2.2, 6.2.3 and 6.2.4. 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 5.1 covers all effects which may influence the durability of the load bearing capacity.

6.2.5.3 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 5.4.

6.2.5.4 Durability of skid resistance

Durability of skid resistance against loss of grip is ensured by meeting the requirements of DRS 607 -1, 8.4, in conjunction with the stable resistance of the material itself against loss of grip.

6.2.5.5 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 DRS 607 -1, 9.4.6.

6.2.6 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 harmonized test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

7 Testing

7.1 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 DRS 607 -1, Clause 8, as listed in Table 4. In addition, all manhole tops and gully tops made of PP, PE and PVC-U shall be tested according to 7.3 and 7.4 and manhole tops and gully tops made of PVC-U shall be tested according to 7.2. All tested products shall be visually inspected without magnification.

7.2 Effect of heating

Covers, gratings or frames shall be tested in accordance with Table 5.

Table 5 — Effect of heating

Characteristic	Material	Requirements acc to clause	Parameter		Test method
Effect of heating[a]	PVC-U	6.2.2	Test temperature	(150 ± 2) °C	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.

7.3 Deflection under load

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

7.4 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 6.

Table 6 — 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 6;

— 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 seconds.

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.

8 Assessment and verification of constancy of performance — AVCP

8.1 General

The compliance of gully tops and manhole tops with the requirements of this standard and with the performances declared by the manufacturer in specifications 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).

8.2 Type testing

8.2.1 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 specifications may be presumed to have the performances declared in their specifications, 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.

8.2.2 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 7, 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 7. Characteristics for which the performance is to be declared are written in bold letters.

Table 7 — 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	6.2.1	Not tested	–	NPD
		DRS 607-6, 6.2.1.2	3	DRS 607-6, 6.2.1
Frame bearing area	6.1	DRS 607-1, 9.4.14	3	DRS 607-1,7.15, calculatedvalue $P_b \leq 7{,}5$ N/mm^2
Load bearingcapacity	6.1	DRS 607-1, 9.3	3	DRS 607-1, 8.2, test load forthe declared class
Permanent set	6.1	DRS 607-1, 9.2	3	DRS 607-1, 8.3, permissible value for the declared class,
Securing of the cover/grating within the frame	6.1	DRS 607-1, 9.4.6	3	DRS 607-1, 7.6 a), declared method

Characteristic	Requirement	Assessment method	No. of samples[a]	Compliance criteria in accordance with
Child safety	6.1	DRS 607-1, 9.5	3	DRS 607-1, 8.5, declared method
Skid resistance of				
a) covers with				
— Raised pattern	6.1	DRS 607-1, 9.4.13 b)	3	DRS 607-1, 8.4.2 b), declared as “raised pattern” for the specified raised pattern
— Other surface		DRS 607-1, 9.4.13 c)	3	DRS 607-1, 8.4.2 c), for the calculated and declared value of USRV
b) Gratings	6.1	DRS 607-1, 9.4.13 b)	3	DRS 607-1, 8.4.3, 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	6.1	DRS 607-1,9 .4.4	3	DRS 607-1, 8.4.4, 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	6.2.5	DRS 607-1, 9.2 DRS 607-1, 9.3 DRS 607-6, 7.1, 7.3, 7.2, 7.3, 7.4	3	DRS 607-1, 8.2 DRS 607-1, 8.3 DRS 607-6, 5.3, 6.1, 6.2.2, 6.2.3, 6.2.4 Declared as “Pass” according to the material used and the test method applied
— securing[c] against unintended lifting	6.2.5	DRS 607-1, 9.4.6 DRS 607-6, 5.4	3	DRS 607-1, 7.6, declared as “Pass” according to the material used
— skid resistanceagainst loss ofgrip	6.2.5	DRS 607-1, 9.4.13 b) DRS 607-1, 9.4.13 c)	3	DRS 607-1, 8.4.2, declared as “Pass” for the declared method and the material used. For USRV measured value declared
— effectiveness ofchild safety characteristics	6.2.5	DRS 607-1, 9.4.6	3	DRS 607-1, 7.6, declared as “Pass” according to the material used and the method declared.
for the design:				
Vents in covers	6.1	DRS 607-1, 9.4.1	3	DRS 607-1, 7.1
Clear opening of manhole tops forman entry	6.1	DRS 607-1, 9.4.2	3	DRS 607-1, 7.2
Clearance	6.1	DRS 607-1, 9.4.4	3	DRS 607-1, 7.4
Compatibility ofseatings	6.1	DRS 607-1, 9.4.5	3	DRS 607-1, 7.5

Characteristic	Requirement	Assessment method	No. of samples[a]	Compliance criteria in accordance with
Handling of coversand gratings	6.1	DRS 607-1, 9.4.7	3	DRS 607-1, 7.7
Slot dimensions ofgratings	6.1	DRS 607-1, 9.4.8	3	DRS 607-1, 7.8
Positioning of coversand gratings	6.1	DRS 607-1, 9.4.10	3	DRS 607-1, 7.10
Flatness of manholecovers and gratings	6.1	DRS 607-1, 9.4.11	3	DRS 607-1, 7.11
Concaveness ofgratings	6.1	DRS 607-1, 9.4.12	3	DRS 607-1, 7.12
Manhole tops withsealing features	6.1	Visual inspection of presence of anchors	3	DRS 607-1, 7.14
Appearance	6.1	Visual inspection	3	DRS 607-1, 8.1

[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.

8.2.3 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.

8.2.4 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.

8.3 Factory production control (FPC)

8.3.1 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.

8.3.2 Requirements

8.3.2.1 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 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.

8.3.2.2 Equipment

8.3.2.2.1 Testing

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

8.3.2.2.2 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.

8.3.2.3 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.

8.3.2.4 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.

8.3.2.5 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 8.

Table 8 — 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 9.

Table 9 — Batch Release Test (BRT)

Characteristic	Requirements	Test method	Frequency	Document retention period
Flatness	6.1	ISO 3126	Every start up	10 years
Marking	Clause 10	Visual	Every start up	10 years
Dimensions	Acc. to drawing or specification	ISO 3126	Every start up and once per shift	10 years
Appearance	6.1	Visual	Every start up and once per shift	-
Impact resistance	6.2.4	7.4	Every start up	10 years
Effect of heating	6.2.2	7.2	Every start up	10 years

Table 10 — Process Verification Test (PVT)

Characteristic	Requirements	Test method	Frequency	Document retention period
Load bearing capacity [a]	6.1	DRS 607 –1, 9.3	Once per year	10 years
[a] Including ancillaries like a circular ring.				

8.3.2.6 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 7 are maintained. This is achieved by Batch Released Test (BRT) and Process Verification Test (PVT) which shall be performed according to Table 9 and Table 10.

8.3.2.7 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 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.

8.3.2.8 Corrective action

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

8.3.2.9 Handling, storage and packaging

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

8.3.3 Product specific requirements

The FPC system shall address this 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.

8.3.4 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 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 specifications 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.

8.3.5 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.

8.3.6 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.

9 Designation

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

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

b) Standard number (DRS 607 -6);

c) load class (see 6.1), 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 DRS 607 series to which the cover and the frame complies according to Table 11;

Table 11 — Designation according to the material of frame and cover/grating

Designation	Cover/grating in accordance with	Frame in accordance with
6/6	DRS 607 –6	DRS 607 –6
6/2	DRS 607 –6	DRS 607 –2
6/3	DRS 607 –6	DRS 607 –3
6/4	DRS 607 –6	DRS 607 –4
6/5	DRS 607 –6	DRS 607 –5

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

g) securing method:

1) securing feature (F);

h) 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 DRS 607 -2, DRS 607 -3, DRS 607 -4, DRS 607 -5 and DRS 607 -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 DRS 607–6, 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 DRS 607 –6 — A 15 – PP – 6/6 – 400 – F – RP

EXAMPLE 2 Designation of a manhole top according to DRS 607 –6, load class B 125 (B 125), consisting of a combination of a cover made from PE according to DRS 607 –6 with a frame made from cast iron according to DRS 607 –2 (6/2), with a clear opening CO 600 mm (600), securing feature (F), skid resistance (USRV 40)

Manhole Top DRS 607 –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.

10 Markings

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

a) number of this Standard, DRS 607 -6:2025;

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 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.

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 ASTM D578 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/ strands	ASTM D578
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	
Density	2,45 g/cm^3 to 2,58 g/cm^3	ISO 15100
E-Modulus	70 to 90 GPa	ISO 9163
Elongation at break	< 5 %	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	ISO 1183-1, 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	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 B.2 Deflection test load, F_D

A deflection test load F_D = 1/3 F_T of the test load shown in DRS 607 -1, 8.2, 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 DRS 607 -1, 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

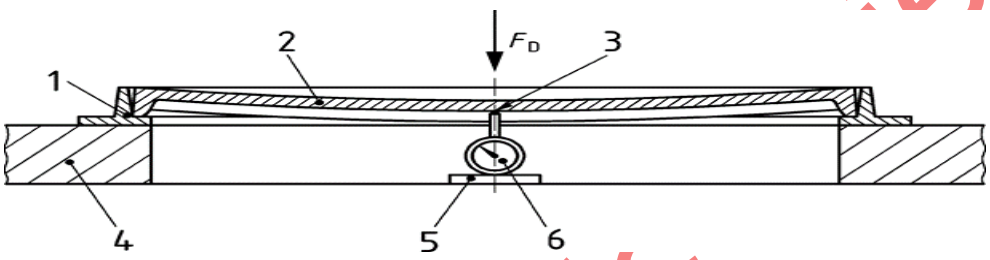
The test sample shall be placed on the test machine bed. The test sample shall be supported on the bed of the test machine in such a way as to ensure that when the cover or grating is deflected under the test load, it shall remain unsupported, and not in contact with the bed of the test machine. The 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 DRS 607 -1, 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 DRS 607-1, 8.4, 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 seconds 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 seconds. The deflection measurement device(s) shall be read again within the next 10 seconds. 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 DRS 607-1, 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 DRS 607-1, 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.

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] ISO 9001, *Quality management systems — Requirements*

Price based on 26 pages