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Gully tops and manhole tops for vehicular and pedestrian areas — Specification — Part 5: Gully tops and manhole tops made of composite materials

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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 607-5 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 124-5:2015 Gully tops and manhole tops for vehicular and pedestrian areas — Part 5: Gully tops and manhole tops made of composite materials

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 5: Gully tops and manhole tops made of composite materials

1 Scope

This Draft Rwanda Standard specifies requirements, sampling and test methods for gully tops and manhole tops made of composite materials 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, B 125, C 250 and D 400.

This Standard does not apply to:

— manhole tops and gully tops manufactured by means of hand lay-up method;

— gratings/covers as part of prefabricated drainage channels;

— floor and roof gullies in buildings; and

— surface boxes.

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

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.

ASTM D2583-25, *Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor*,

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 607-6, *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)*

RS ISO 868, Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness)

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

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

ISO 62, *Plastics — Determination of water absorption*

ISO 175, *Plastics — Methods of test for the determination of the effects of immersion in liquid chemicals*

ISO 527-2, *Plastics - Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics*

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

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

ISO 1268-7, *Fibre-reinforced plastics — Methods of producing test plates — Part 7: Resin transfer moulding*

ISO 1268-8, *Fibre-reinforced plastics — Methods of producing test plates — Part 8: Compression moulding of SMC and BMC*

ISO 2878, *Rubber, vulcanized or thermoplastic — Antistatic and conductive products — Determination of electrical resistance*

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

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

composite material

complex material, in which two or more constituent materials (with significantly different physical or chemical properties), are combined to produce structural or functional properties not present in any individual component

4 Materials

4.1 General

Composite materials for making gully tops and manhole tops shall consist of a reinforcing fibre encapsulated within a thermoset matrix resin and shall be moulded as a single structure. They shall be produced by using suitably controlled automatic processes that produce a single structure and that do not contain multiple pieces bonded together.

The reinforcing fibre shall be an E-, ECR-, R- or S-Type glass or carbon fibre. The use of aramid fibres is not permitted. The matrix resin shall be based on a polyester, methacrylate, vinylester, epoxy, phenolic or polyurethane resin system. Hybrid resin systems that contain a blend of resins are permitted. Only materials certified as UV resistant shall be used.

The inclusion of metal components that contribute to the structural performance of the manhole top shall not be permitted.

The addition of materials that can be incorporated within and are part of the moulding process shall be permitted. These may include materials to improve surface properties such as surface resistivity or skid resistance. Components such as metal key and lifting housing can be incorporated within the composite structure and shall not be part of the structural design.

Manhole tops and gully tops shall not be machined, drilled, cut, ground after manufacturing.

NOTE Neither the matrix resin nor the fibres are specified in Standards. Compliance with the performance of the materials is ensured by fulfilling the requirements of the tests according to Clause 4 and Clause 5.

Any element made of the materials specified in 4.2 can be used in combination with elements of materials specified in DRS 607-2, DRS 607-3, DRS 607-4 or DRS 607-6. In such cases the manhole tops or gully tops shall comply with the relevant design, performance and testing requirements as listed in Table 3.

In addition, elements shall comply with the requirements for the material related DRS 607-2, DRS 607-3, DRS 607-4 or DRS 607-6, as applicable. Each element shall be marked accordingly. The 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 607series.

EXAMPLE Where a cover is made of composite materials, class C 250, and the frame is made of steel, class D 400, the manhole top or gully top is marked with DRS 607–5 and the class to be declared for the combined product is the class of the cover according to DRS 607–5.

4.2 Types of composite materials

4.2.1 General

Depending on the production process, the composite materials shall be distinguished in composite material C1, composite material C2 or composite material C3. The formulation of matrix resin and design of the fibre architecture shall be determined by the manufacturer of the manhole top or gully top.

4.2.2 Composite material C1

Composite material C1 shall consist of long continuous fibres that are constructed in order to optimize the fibre reinforcement within a given macro structure. The macro structure can be both two and three dimensional and can contain non-structural formers to aid construction of the three-dimensional elements of the structure. The composite shall have a typical fibre volume fraction of 40 % to 60 % and mechanical performance values, for example tensile strength, shall be highly directional. The matrix resin shall not contain fillers.

4.2.3 Composite material C2

Composite material C2 shall be solid and moulded as a single monolithic product, consisting of long fibres within a matrix resin having a degree of fibre alignment within the structure. The composite solid element shall have a typical fibre weight fraction of 30 % to 60 %. The matrix resin shall not contain fillers.

4.2.4 Composite material C3

Composite material C3 is typically known as fibre reinforced moulding compound. This material consists of a matrix resin, particulate fillers and short reinforcing fibre. The formulation of matrix resin, particulate fillers and fibre combinations shall be determined by the manufacturer of the manhole top or gully top.

4.3 Requirements for composite materials

4.3.1 General

The composite materials shall be tested for the properties listed below prior to the introduction of the product to the market. These tests shall be repeated if the composition of the raw materials or the raw material itself is changed.

4.3.2 Hardness

The mean hardness shall be equal to or greater than 35 Barcol(mean) or 46 shore D.

NOTE for testing ASTM D2583-25 is recommended.

For composite materials C1 and C2, samples shall be cut from an area of the manhole top that does not contain additional surface material.

For Composite C3 material samples shall either be cut from an area of the manhole top that does not contain additional surface material or prepared according to ISO 1268-7 or ISO 1268-8.

4.3.3 Water absorption

When tested in accordance with ISO 62, Method 1, the water absorption of manhole tops or gully tops shall be less than 0,3 %.

At the end of the test the manhole top or gully top shall meet the requirements of permanent set specified in DRS 607-1, Table 5, and of the test load according DRS 607-1, Table 4. There shall be no visible evidence of cracking after the test.

Differently from ISO 62, Method 1, weighing of the samples before and after immersion in water shall be done at the nearest ± 1 g.

4.3.4 Resistance to vehicle fuels

A complete manhole top or gully top shall be conditioned according to ISO 175 in either (60 % volume toluene, 40 % volume n-heptane) or diesel at (23 ± 2) °C for (168 ± 2) h. When compared with the original properties the change in mass shall be not more than 0,5 %.

At the end of the conditioning the manhole top or gully top shall meet the requirements of permanent set specified in DRS 607-1, Table 5, and of the test load according DRS 607-1, Table 4. There shall be no visible evidence of cracking after the test.

Weighing of the samples before and after conditioning in fuel shall be done at the nearest ± 1 g.

4.3.5 Surface resistivity

In the event that safety considerations require that a manhole top or gully top is capable of dispersing a static electrical charge the value of surface resistivity shall be less than 1 × 108 Ohms.

The test shall be carried out according to ISO 2878 where the outer surface of a manhole top shall be tested at a point which provides a flat surface of sufficient surface area to accommodate the electrodes to two areas in accordance with ISO 2878.

NOTE A typical application is the forecourt of a refuelling station.

4.3.6 Weathering resistance

Manhole tops and gully tops shall be resistant to artificial weathering. This shall be ensured by testing specimens with the dimensions (50 ± 3) mm wide, (6 ± 1) mm thick and (150 ± 20) mm long made of pure resin from the same formulation used for the manufacturing of the manhole top or gully top in accordance with Table 1 or Table 2. After the test, the variation of the tensile modulus measured according to ISO 527-2 shall be no more than 50 %.

If there is no test of pure resin available, the complete manhole top or gully top shall be tested in accordance with Table 1 or Table 2. The requirements of permanent set specified in DRS 607-1, Table 5, and of the test load in accordance with DRS 607-1, Table 4, shall be achieved.

In case of dispute the Xenon test of the pure resin according to Table 2 shall be applied.

Table 1 — Artificial weathering resistance (QUV)

Parameter		Test method
Exposure time using UVA 351 lamp	Radiation energy 1 600 h	RS ISO 4892-3 (QUV test)

Irradiation	6 h at (50 ± 2) °C
Condensation	2 h at (40 ± 2) °C

Table 2 — Artificial weathering resistance with Xenon arc lamps

Parameter		Test method
Exposure time using xenon-arc lamps with daylight filters	Radiation energy 2,6 GJ/m^2	RS ISO 4892-2 - (Xenon-arc lamps) Method A
Exposure period	102 minutes dry 18 minutes water spray	

5 Requirements

5.1 Design and performance requirements

Manhole tops and gully tops made of composite materials C1, C2 and C3 shall conform to the relevant design and performance and testing requirements in accordance with DRS 607-1 as listed in Table 3.

Table 3 — Design, performance and testing requirements of characteristics specified in DRS 607-1 for manhole tops and gully tops made of composite materials

Characteristic	Requirements according to DRS 607-1, Clause	Testing according to DRS 607-1, Clause	Relevant for class			
			A 15	B 125	C 250	D 400 [a]
Related to the design						
Vents in covers	7.1	9.4.1	x	x	x	x
Clear opening of manhole tops for man entry	7.2	9.4.2	x	x	x	x
Depth of insertion	7.3	9.4.3	–	–	–	x
Clearance	7.4	9.4.4	x	x	x	x
Appearance	8.1	Visual inspection	x	x	x	x
Compatibility of seatings	7.5	9.4.5	–	–	–	x
Handling of covers and gratings	7.7	9.4.7	x	x	x	x
Slot dimensions of gratings	7.8	9.4.8	x	x	x	x
Dirt pans and dirt buckets	7.9	9.4.9	x	x	x	x
Positioning of covers and gratings	7.10	9.4.10	x	x	x	x

Characteristic	Requirements according to DRS 607-1, Clause	Testing according to DRS 607-1, Clause	Relevant for class			
			A 15	B 125	C 250	D 400 [a]
Flatness of manhole covers and gratings	7.11	9.4.11	–	–	–	x
Concaveness of gratings	7.12	9.4.12	x	x	x	x
Surface conditions	7.13	9.4.13	x	x	x	x
Manhole tops with sealing feature	7.14	Visual inspection of presence of anchors	x	x	x	x
Frame bearing area	7.15	9.4.14	x	x	x	x
Frame depth	7.16	9.4.15	–	–	–	x
Opening angle of hinged covers/gratings	7.17	9.4.16	x	x	x	x
Related to the performance						
Load bearing capacity	8.2	9.3	x	x	x	x
Permanent set	8.3	9.2	x	x	x	x
Securing of the cover/grating within the frame	7.6 a) or c)	9.4.6	x	x	x	x
Skid resistance	8.4	9.4.13	x	x	x	x
Child safety	8.5	9.5	x	x	x	x
x To be applied.						
a For manhole tops only.						

5.2 Material specific characteristics for gully tops and manhole tops made of composite materials

5.2.1 Reinforcement

The dimensions, position, spacing and jointing of the reinforcement and foam, if applicable, shall be in accordance with the design.

5.2.2 Deflection under load

When tested the complete composite manhole top and gully top in accordance with 6.2 and when subject to F_D = 1/3 F_T, the maximum deflection under load shall be ≤ *CO*/360 for covers to be filled with brittle materials other than concrete. For covers to be filled with concrete, the maximum deflection under load shall be ≤ *CO*/250. For all other covers according to this standard, the maximum deflection under load shall be declared as mm per mm of clear opening (mm/*CO*).

The load deflection curve shall be smooth and progressive without sudden deviations up to the test load.

NOTE During the load testing of composite materials in particular during the first application of load, the composite will make audible cracking noises. These sounds are caused by errant fibres within the structure breaking and do not represent failure of the structure. Cracking noises disappear when further test loads are applied.

5.2.3 Resistance to fatigue

Upon completion of the test according to 6.3, the manhole top or gully top shall meet the requirements of permanent set specified in DRS 607-1, 8.3, and of the test load according DRS 607-1, 8.2. There shall be no visible evidence of cracking after the test without magnification.

5.2.4 Creep resistance

When tested according to 6.4 the creep resistance of a manhole top or gully top shall meet the requirements for permanent set specified in DRS 607-1, 8.3.

5.2.5 Impact resistance

After carrying out the low temperature impact test according to 6.5 there shall be neither visible cracking nor delamination when viewed without magnification at the impacted cover.

5.2.6 Effect of heating

When tested according to 6.6 there shall be no visible defects, blistering, cracks or delamination at the test sample.

5.2.7 Reaction to fire

5.2.7.1 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.

5.2.7.2 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/m2 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

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.

5.2.8 Durability

5.2.8.1 General

The basic durability of manhole tops and gully tops made of composite materials C1, C2 and C3 is ensured through compliance with Clause 4, Clause 5 and DRS 607-1, Clause 7.

5.2.8.2 Durability of load bearing capacity

Durability of load bearing capacity of manhole tops and gully tops made of composite shall be determined by:

— ensuring that after passing the fatigue test regime in accordance with 6.3, the manhole top or gully top shall withstand the test load according to DRS 607-1, 8.2, when tested in accordance with DRS 607-1,9.3;

— ensuring that after having performed the water absorption test in accordance with 4.3.3, the manhole top or gully top shall withstand the test load according to DRS 607-1, 8.2, when tested in accordance with DRS 607-1,9.3;

— ensuring that after having performed the resistance to vehicle fuel test, according to 4.3.4, the manhole top or gully top shall withstand the test load according to DRS 607-1, 8.2, when tested in accordance with DRS 607-1, 9.3.

5.2.8.3 5.2.8.3 Durability of securing of cover/grating within the frame

Durability of covers/gratings in the frame against unintended lifting shall be determined by ensuring that after passing the fatigue test, according to 6.3, the manhole top or gully top shall be re-tested according to DRS 607-1, 9.4.6.

5.2.8.4 Durability of skid resistance

Where required, the durability of skid resistance of manhole tops and gully tops made of composite shall be determined according to DRS 607-1, 9.4.13, and the result declared.

5.2.8.5 Durability of effectiveness of child safety characteristics

Where required, the durability of the child safety characteristics for manhole tops and gully tops made of composite shall be determined by ensuring that after the passing the fatigue test regime, according to 6.3, and

after testing the securing in accordance with DRS 607-1, 9.4.6, the resistance of manhole tops and gully tops against the removal by children is ensured by re-inspecting if the weight or the locking accessory or the securing feature, as appropriate, is still functional.

5.2.9 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 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 DRS 607-1, Clause 9, as listed in Table 3. In addition, manhole tops and gully tops made of composites shall be tested according to 6.2 to 6.6. All tested products shall be visually inspected without magnification.

6.2 Deflection under load

A complete manhole top or gully top as would be supplied to the end user that has not previously been subjected to a load test shall be tested for deflection under load in accordance with Annex A and applying a test load F_D = 1/3 F_T.

6.3 Resistance to fatigue

Complete manhole tops or gully tops that have not previously been subjected to a load test shall be tested in accordance with the test equipment described in DRS 607-1, Annex A, with the test load and the number of cycles given in Table 4. A suitable apparatus which is capable of receiving the manhole top and applying a cyclic load to the geometric centre of the manhole top or gully top shall be used for the test. The test block shall be in accordance with DRS 607-1, Annex A.

The cyclic fatigue test load FF shall be applied at the appropriate rate and upon reaching the test load it shall be immediately released at the same rate before starting immediately the following cycle.

Table 4 — Number of cycles for fatigue test

Class	Number of cycles	Cyclic fatigue test load F_F kN	Load application rate kN/s
B 125	10 000	43	7 ± 2
C 250	100 000	92	42 ± 14
D 400 [a]	100 000 500 000	136 120	70 ± 20 60 ± 20

[a] Test conditions for class D 400 can be used either or. They both refer to the same stress level. The conditions are selected by the manufacturer.

6.4 Creep resistance

A test equipment according to DRS 607-1, Annex A, shall be used. A load shall be applied to a manhole top that has not previously been subjected to any prior form of load test, to the permanent set load specified in DRS 607-1, 8.2, for a period of (60+01) minutes. A recover for (5+00,5) minutes after complete removal of the load shall be allowed. The measurement shall be taken in accordance with DRS 607-1, Annex A.

This test is not required to class A 15.

6.5 Impact resistance

Depending on the temperature in the place of use, impact resistance shall be tested in accordance with Table 5 to ensure that the manhole tops and gully tops do not suffer from low temperature embrittlement.

A complete manhole top, as would be supplied to the end user that has not previously been subjected to a load test, shall be used as test specimen and shall be conditioned at (60 ± 3) °C for 30 d. A cooling under ambient conditions for a minimum of 2 h and then a condition at test temperature according to Table 5 for a minimum of 4 h shall be performed. A mass according to Table 5 shall be dropped with a (50 ± 1) mm diameter hemispherical end from a height of (2 000 ± 10) mm onto the flat surface of the manhole top.

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 (e.g., around the outside flange).

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.

Table 5 — Impact resistance

Characteristic	Requirements	Test parameters		Test method
Impact resistance	not 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
— class C 250	(4,5 ± 0,05) kg
— class D 400	(7,5 ± 0,05) kg
Height of striker	
— class A 15 — class B 125 — class C 250 — class D 400	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.

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.

6.6 Effect of heating

Condition a manhole top that has been subjected to impact resistance test according to 6.5 in an oven that has been preheated to a temperature of (150 ± 5) °C. Run the test for (60+05) min commencing timing as the oven reaches the test temperature and on completion of test period remove manhole top and allow cooling to ambient temperature. The test sample shall be examined with proper light 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 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).

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, classified without further testing (CWFT) 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 those same characteristics for all products within the 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 may 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 the 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.

7.2.2 Test samples, testing and compliance criteria

The number of samples of gully tops and manhole tops made of composite materials 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
for the declared performance:				
Reaction to fire	5.2.7	Not tested	-	NPD
		DRS 607–5, 5.2.7.2	3	DRS 607–5, 5.2.7
Frame bearing area	5.1	DRS 607–1, 9.4.14	3	DRS 607–1, 7.15, calculated value $P_b \leq 7{,}5$ N/mm^2
Load bearing capacity	5.1	DRS 607–1, 9.3	3	DRS 607–1, 8.2, test load for the declared class
Permanent set	5.1	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	5.1	DRS 607–1, 9.4.6	3	DRS 607–1, 7.6, a) or c) declared method and value Fv in kN and appropriate h in mm, as applicable
Child safety	5.1	DRS 607–1, 9.5	3	DRS 607–1, 8.5, declared method or weight
Skid resistance of				
a) Covers with				
— raised pattern	5.1	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	5.1	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	5.1	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

Characteristic	Requirement	Assessment method	No. of Samples[a]	Compliance criteria
c) Frames with max. horizontal visible width of: —≥80 mm or — > 40 mm	5.1	DRS 607–1, 8.4.4	3	DRS 607–1, 8.4.2 a), 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 against fatigue	5.2.8.2	DRS 607–5, 6.3 and DRS 607–1, 9.3	1	DRS 607–5, 5.2.8.2, declared as "Pass"
— load bearing capacity against water absorption	5.2.8.2	DRS 607–5, 4.3.3, DRS 607 –1, 9.3	1	
— load bearing capacity against exposure to vehicle fuels	5.2.8.2	DRS 607–5, 4.3.4 and DRS 607–1, 9.3	1	
— cover securing method against fatigue	5.2.8.3	DRS 607 –5, 6.3 and DRS 607 –1, 9.4.6	1	DRS 607 –5, 5.2.8.3, declared as "Pass"
— skid resistance against loss of grip	5.2.8.4	DRS 607 –1, 9.4.13, b) and c)	3	DRS 607 –5, 5.2.8.4, declared as "Pass"
— effectiveness of child safety characteristics	5.2.8.5	DRS 607 –5, 6.3	3	DRS 607–1, 7.6, declared as "Pass" according to the material used and the method declared.
for the design:				
Vents in covers	5.1	DRS 607 –1, 9.4.1	3	DRS 607 –1, 7.1
Clear opening of manhole tops for man entry	5.1	DRS 607 –1, 9.4.2	3	DRS 607 –1, 7.2
Depth of insertion	5.1	DRS 607 –1, 9.4.3	3	DRS 607 –1, 7.3
Clearance	5.1	DRS 607 –1, 9.4.4	3	DRS 607 –1, 7.4
Compatibility of seatings	5.1	DRS 607 –1, 9.4.5	3	DRS 607 –1, 7.5
Handling of covers and gratings	5.1	DRS 607 –1, 9.4.7	3	DRS 607 –1, 7.7
Slot dimensions of gratings	5.1	DRS 607 –1, 9.4.8	3	DRS 607 –1, 7.8
Dirt pans and dirt buckets	5.1	DRS 607 –1, 9.4.9	3	DRS 607 –1, 7.9
Positioning of covers and gratings	5.1	DRS 607 –1, 9.4.10	3	DRS 607 –1, 7.10

Characteristic	Requirement	Assessment method	No. of Samples[a]	Compliance criteria
Flatness of manhole covers and gratings	5.1	DRS 607 –1, 9.4.11	3	DRS 607 –1, 7.11
Concaveness of gratings	5.1	DRS 607 –1, 9.4.12	3	DRS 607 –1, 7.12
Surface conditions	5.1	DRS 607–1, 9.4.13	3	DRS 607–1, 7.13
Manhole tops with sealing feature	5.1	Visual inspection of presence of anchors	3	DRS 607–1, 7.14
Frame depth	5.1	DRS 607 –1, 9.4.15	3	DRS 607–1, 7.16
Opening angle of hinged covers/gratings	5.1	DRS 607–1, 9.4.16	3	DRS 607–1, 7.17
Appearance	5.1	Visual inspection	3	DRS 607 –1, 8.1
Deflection under load	5.2.2	DRS 607–5, 6.2	3	DRS 607–5, 5.2.2
[a] If one of the samples fails, the specific test can be repeated with 5 new samples. All the 5 samples shall pass the test.				

For the characteristics shown in Table 6 additional tests shall be carried out on samples and sequences as given in Table 7.

Table 7 — Characteristics and test sequence

Test sequence	Characteristic	Requirement according to	Test according to	Test sample	No. of samples
1st sample	Hardness	DRS 607 –5, 4.3.2	ISO 868 using type D durometer.	Coupon	1
2nd sample	Water absorption	DRS 607 –5, 4.3.3	ISO 62, Method 1	New manhole top or gully top	1
	— Permanent set	DRS 607 –1, 8.2	DRS 607 –1, Annex A	Same product	
	— Load test	DRS 607 –1, 8.3	DRS 607 –1, Annex B	Same product	
3rd sample	Resistance to vehicle fuels	DRS 607 –5, 4.3.4	ISO 175	New manhole top or gully top	1
	— Permanent set	DRS 607 –1, 8.2	DRS 607 –1, Annex A	Same product	
	— Load test	DRS 607 –1, 8.3	DRS 607 –1, Annex B	Same product	
4th sample	Deflection under load 1/3 of test load	DRS 607 –5, 5.2.2	DRS 607 –5, Annex A	New manhole top or gully top	3
	— Permanent set	DRS 607 –1, 8.2	DRS 607 –1, Annex A	Same product	

Test sequence	Characteristic	Requirement according to	Test according to	Test sample	No. of samples
	— Load test	DRS 607 –1, 8.3	DRS 607 –1, Annex B	Same product	
5th sample	Fatigue	DRS 607 –5, 5.2.3	DRS 607 –5, 6.3	New manhole top or gully top	1
	— Permanent set	DRS 607 –1, 8.2	DRS 607 –1, Annex A	Same product	
	— Load test	DRS 607 –1, 8.3	DRS 607 –1, Annex B	Same product	
6th sample	Creep	DRS 607 –5, 5.2.4	DRS 607 –5, 6.4	New manhole top or gully top	1
	— Permanent set	DRS 607 –1, 8.2	DRS 607 –1, Annex A	Same product	
7th sample	Impact	DRS 607 –5, 5.2.5	DRS 607 –5, 5.2.5	New manhole top or gully top	1
	— Effect of heating	DRS 607 –5, 5.2.6	DRS 607 –5, 5.2.6	Same product	
8th sample	Weathering resistance	DRS 607 –5, 4.3.6	DRS 607 –5, 4.3.6	New manhole top or gully top	1
The following tests are optional but to be carried out if requested as material performance tests.					
9th sample	Surface resistivity	DRS 607 –5, 4.3.5	ISO 2878	New manhole top or gully top	1

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.

The formulation applicable to a specific manhole top or gully top that has been submitted to the notified body, shall be recorded by the manufacturer and shall become part of a quality control system.

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 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.

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 Clause 4, 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.

The following raw materials shall be checked at every delivery for compliance with the manufacturer's specification and in accordance with Table 8:

For composite materials C1 and C2:

— reinforcement quantity, quality and positioning;

— temperature of the mould;

— foam positioning, if applicable; — resin injection time and pressure;

— trimming of flash.

For composite materials C3:

— composites pressing conditions (temperature, pressure and time);

— trimming of flash.

Table 8 — Material delivery inspection

Aspect of inspection	Requirement	Frequency of inspection	Conformity criteria	Document retention period
Receiving inspection of composite materials C1 and C2				
Constituent materials	4.1, 4.2.2 and 4.2.3	every delivery	Supplier's document in accordance with manufacturer's design, material and process instructions for each product	5 years
Receiving inspection of composite materials C3				
Constituent materials	4.1 and 4.2.4	every delivery	Supplier's document in accordance with manufacturer's design, material and process instructions for each product	5 years

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 9 in bold letters, are maintained. The characteristics and the means of control shall be given in Table 9:

Table 9 — Product testing of finished products

Characteristic	Requirement	Assessment method	Minimum frequency of inspection	Document retention period
for the declared performance:				
Reaction to fire	5.2.7	DRS 607 –5, 5.2.7, or NPD	–	10 years
Frame bearing area	5.1	Calculation acc. to DRS 607 –1, 9.4.14	1:5 000 [a]	10 years
Load bearing capacity	5.1	DRS 607 –1, 9.3	1:5 000 [a]	10 years
Permanent set	5.1	DRS 607 –1, 9.2	1:5 000 [a]	10 years
Securing of the cover/grating within the frame	5.1	DRS 607 –1, 9.4.6	1:5 000 [a]	10 years

Child safety	5.1	DRS 607 –1, 9.5	1:5 000 [a]	10 years
Skid resistance	5.1	DRS 607 –1, 9.4.13	1:5 000 [a]	10 years
Durability of load bearing capacity against:				
— fatigue	5.2.8.2	DRS 607 –5, 6.3 and DRS 607 –1, 9.3	1:5 000 [c]	10 years
— water absorption	5.2.8.2	DRS 607 –5, 4.3.3 and DRS 607 –1, 9.3	1:5 000 [a]	10 years
— resistance to vehicle fuels	5.2.8.2	DRS 607 –5, 4.3.4 and DRS 607 –1, 9.3	1:5 000 [a]	10 years
Durability of cover securing method against:				
— fatigue	5.2.8.3	DRS 607 –5, 6.3 and DRS 607 –1, 9.4.6	1:5 000 [c]	10 years
Durability of effectiveness of child safety characteristics against:				
— fatigue	5.2.8.5	DRS 607 –5, 6.3	1:5 000 [c]	10 years
Durability of skid resistance against				
— loss of grip	5.2.8.4	DRS 607 –1, 9.4.13 b), and c)	1:5 000 [a]	10 years
for the design:				
Vents in covers	5.1	DRS 607 –1, 9.4.1 Visual inspection	Every cover	5 years
Clear opening of manhole tops for man entry	5.1	DRS 607 –1, 9.4.2 Measurement	1:5 000 [a, b]	5 years
Depth of insertion	5.1	DRS 607 –1, 9.4.3 Measurement	1:5 000 [a, b]	5 years
Clearance	5.1	DRS 607 –1, 9.4.4 Measurement	1:5 000 [a, b]	5 years
Compatibility of seatings	5.1	DRS 607 –1, 9.4.5 Measurement	1:5 000 [a, b]	5 years
Handling of covers and gratings	5.1	DRS 607 –1,9.4.7	1:5 000 [a, b]	5 years
Slot dimensions of gratings	5.1	DRS 607–1, 9.4.8 Measurement	1:5 000 [a, b]	5 years
Dirt pans and dirt buckets	5.1	DRS 607–1:2015, 9.4.9	1:5 000 [a, b]	5 years
Positioning of covers and gratings	5.1	DRS 607–1, 9.4.10	1:5 000 [a, b]	5 years

Flatness of manhole covers and gratings	5.1	DRS 607–1, 9.4.11	1:5 000 [a, b]	5 years
Concaveness of gratings	5.1	DRS 607–1, 9.4.12	1:5 000 [a, b]	5 years
Manhole tops with sealing feature	5.1	Visual inspection	1:5 000 [a, b]	5 years
Frame depth	5.1	DRS 607–1, 9.4.15 Measurement	1:5 000 [a, b]	5 years
Opening angle of hinged covers/gratings	5.1	DRS 607–1, 9.4.16	1:5 000 [a, b]	5 years
Appearance	5.1	Visual inspection	1:5 000 [a]	5 years
Marking	9	Visual inspection	Every product	5 years
Deflection under load	5.2.2	DRS 607–5, 6.2	1:5 000 [c]	5 years

[a] At least every 6 months.
[b] At every modification of mould or design.
[c] At least every 2 years.

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 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 nonconformities 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 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 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 specification has been verified.

All locations where final assembly or at least final testing 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 6 times per year. Surveillance of the FPC can be reduced to a minimum of twice per year, if no irregularity occurred during 3 consecutive years.

Surveillance of the FPC previously performed in accordance with the provisions of this standard, shall 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 Standard shall consist of:

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

b) Standard number (DRS 607-5);

c) load class (see 5.1);

d) material (Composite material C1, Composite material C2 or Composite material C3);

e) code related to the number of the parts of DRS 607series 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
5/5	DRS 607 –5	DRS 607 –5
5/2	DRS 607 –5	DRS 607–2
5/3	DRS 607 –5	DRS 607 –3
5/4	DRS 607–5	DRS 607–4
5/6	DRS 607–5	DRS 607–6

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

g) securing method:

1) securing feature (F);

2) other methods (O);

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 and the material for which the cover meets the requirements of the relevant standard.

EXAMPLE 1 Designation of a manhole top according to DRS 607 –5, load class (C 250), cover and frame made of

Composite C1 (C1) (5/5), with a clear opening CO 400 mm (400), other securing method (O), skid resistance (RP)

Manhole Top DRS 607 –5 — C 250 – C1 – 5/5 – 400 – O – RP

EXAMPLE 2 Designation of a manhole top according to DRS 607 –5, load class (A 15), consisting of a combination of a cover made from Composite C2 according to DRS 607-5, with a frame made of steel according to DRS 607 –3 (5/3), with a clear opening CO 600 mm (600), securing feature (F), skid resistance (USRV 40)

Manhole Top DRS 607 –5 — A 15 – C2 – 5/3 – 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 Standard shall be marked as follows:

a) number of this Standard, i.e., DRS 607-5:2025;

b) appropriate class (e.g., B 125);

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

d) factory of manufacture which may be in code;

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

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

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

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

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

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 b) shall always be on the upper side of cover/grating.

Where regulatory marking provisions 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)

Test of deflection under load

A.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.

A.2 Deflection test load, F_D

A 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 each class for all clear openings.

A.3 Apparatus

A.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 A 15 to D 400. 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.

A.3.2 Test blocks

The dimensions and shape of test blocks shall be as shown in DRS 607-1, Table A.1.

A.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 %.

A.4 Procedure

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

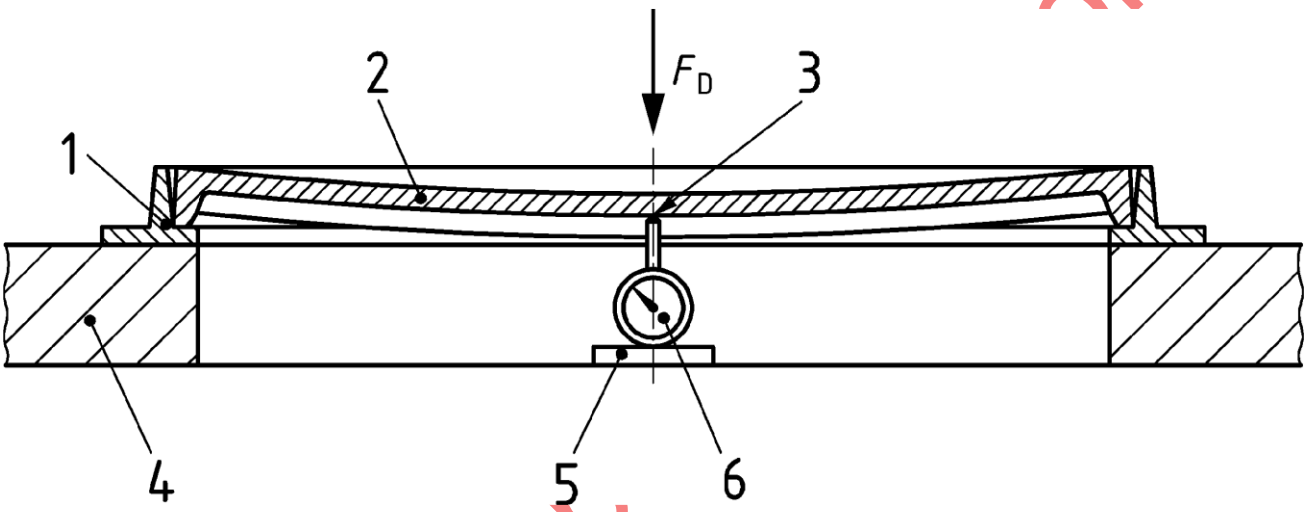
The test sample shall be placed on the test machine bed. The test sample shall be supported on the bed of the test machine in such a way as to ensure that when the cover or grating is deflected under the test load, it shall remain unsupported, and not in contact with the bed of the test machine. The 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 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 A.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 centres
4 bed of testing machine
5 measuring device support
6 measuring device F_D deflection test load

Figure A.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 second. The deflection measurement device(s) shall be read again within the next 10 s. The load shall then be released.

A.4.2 Subclause (level 2)

A paragraph.

A.4.3 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 A.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 triangular covers or gratings, the test block shall be positioned in the geometric centre, as shown in DRS 607-1, Figure A.3.

A.5 Observations and reporting

Record 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 1253 (all parts), *Gullies for buildings*

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

[3] ISO 6603-1:2000, *Plastics - Determination of puncture impact behaviour of rigid plastics — Part 1: Non-instrumented impact testing*

[4] ISO 9001, *Quality management systems — Requirements*

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