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Gully tops and manhole tops for vehicular and pedestrian areas — Specification — Part 2: Gully tops and manhole tops made of cast iron

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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 607-2 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 (s):

1) BS EN 124-2 Gully tops and manhole tops for vehicular and pedestrian areas — Part 2: Gully tops and manhole tops made of cast iron

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 or aluminium alloys;*

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

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

— *Part 6: Gully tops and manhole tops made of polypropylene (PP), polyethylene (PE) or unplasticized (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

Eastern hope Ltd

King Lion Rwanda Investment Ltd

OBOR TECHNOLOGY(RWANDA) LTD

Rwanda Engineering and Manufacturing Corporation (REMCO)

Rwanda Inspectorate, Competition and Consumer Protection (RICA)

S & H Industries Ltd (Rwanda)

TKAE Ltd

Rwanda Standards Board (RSB) – Secretariat

Gully tops and manhole tops for vehicular and pedestrian areas — Specification — Part 2: Gully tops and manhole tops made of cast iron

1 Scope

This Draft Rwanda Standard specifies requirements, sampling and test methods for gully tops and manhole tops made of cast iron 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 A15, B 125, C 250, D 400, E 600 and F 900.

This Standard is not applicable to:

- cover fillings installed on site such as concrete and paving blocks;
- concave gratings for class D 400 installed in carriageways of roads or hard shoulders and concave gratings for classes F 900 and E 600;
- gratings/covers as part of prefabricated drainage channels;
- floor and roof gullies in buildings; and
- surface boxes.

NOTE This draft standard is not applicable in isolation but only in combination with DRS 607-1 and gives guidance for combinations of covers/grating made of cast iron with frames according to DRS 607-3, DRS 607-4, DRS 607-5 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.

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 607-3, 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

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 polyvinyl chloride) (PVC-U)

RS ISO, 22965-2, Concrete — Part 2: Specification of constituent materials, production of concrete and compliance of concrete

RS ISO 185, Grey cast irons — Classification

ISO 1083, Spheroidal graphite cast irons — Classification

3 Terms and definitions

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

4 Materials

4.1 General

Manhole tops and gully tops made of cast iron shall be made from the materials listed below:

a) flake graphite cast iron according to RS ISO 185,
b) spheroidal graphite cast iron according to RS ISO 1083,
c) one of the materials a) and b) combined with concrete with a minimum compressive strength class of B35.

Any element made of the materials specified in 4.1 a) to c) can be used in combination with elements of materials specified in DRS 607-3, DRS 607-4, DRS 607-5 or DRS 607-6. In such cases the manhole tops or gully tops shall comply with the relevant design and performance and testing requirements as listed in Table 1.

In addition, elements shall comply with the requirements for the material related to DRS 607-3, DRS 607-4, DRS 607-5 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 607 series.

EXAMPLE Where a cover is made of cast iron, class D 400, and the frame is made of PVC-U, class B 125, the manhole top or gully top is marked with DRS 607-2, and the class to be declared for the combined product is the class of the frame according to DRS 607-6.

4.2 Coating materials

Manhole tops and gully tops made of cast iron can be supplied uncoated or coated. Coating materials shall comply with the environmental and/or toxicological regulations at the place of intended use.

NOTE In general, coatings are for aesthetic purposes only and are not regarded as a corrosion protection system. The specifier or client may require a more durable coating if appropriate.

4.3 Cover fillings

In the case of covers placed on the market in filled condition the filling shall consist of either:

a) Concrete with a minimum compressive strength class of B35 according to RS ISO 22965-2 at least suitable for use in "cyclic wet and dry" conditions, or
b) Other material complying with the intended use/place of installation expectations and with appropriate relevant Standards at least suitable for use in "cyclic wet and dry" conditions.

5 Requirements

5.1 Design and performance requirements

Manhole tops and gully tops made of materials according to 4.1 shall comply with the relevant design and performance and testing requirements in accordance with DRS 607-1as listed in Table 1.

Table 1 — Design, performance and testing requirements in accordance with DRS 607-1 for gully tops and manhole tops made of cast iron

Characteristic	Requirements acc. to DRS 607-1, Clause	Testing acc. to DRS 607-1, Clause	Relevant for class					
			A 15	B 125	C 250	D 400	E 600	F 900
Related to the design								
Vents in covers	7.1	9.4.1	x	x	x	x	x	x
Clear opening of manhole tops for man entry	7.2	9.4.2	x	x	x	x	x	x
Depth of insertion	7.3	9.4.3	-	-	-	x	x	x
Clearance	7.4	9.4.4	x	x	x	x	x	x
Compatibility of seatings	7.5	9.4.5	-	-	-	x	x	x
Handling of covers and gratings	7.7	9.4.7	x	x	x	x	x	x
Slot dimensions of gratings	7.8	9.4.8	x	x	x	x	x	x
Dirt pans and dirt buckets	7.9	9.4.9	x	x	x	x	x	x
Positioning of covers and gratings	7.10	9.4.10	x	x	x	x	x	x
Flatness of manhole covers and gratings	7.11	9.4.11	-	-	-	x	x	x
Concaveness of gratings	7.12	9.4.12	x	x	x	x	x	x
Surface conditions	7.13	9.4.13	x	x	x	x	x	x
Manhole tops with sealing features	7.14	Visual inspection of presence of anchors	x	x	x	x	x	x
Frame bearing area	7.15	9.4.14	x	x	x	x	x	x
Frame depth	7.16	9.4.15	-	-	-	x	x	x
Opening angle of hinged covers/gratings	7.17	9.4.16	x	x	x	x	x	x
Appearance	8.1	Visual inspection	x	x	x	x	x	x
Related to the performance								
Load bearing capacity	8.2	9.3	x	x	x	x	x	x
Permanent set	8.3	9.2	x	x	x	x	x	x

Securing **of** the cover/ grating within the frame	7.6	9.4.6	x	x	x	x	x	x
Skid resistance	8.4	9.4.13	x	x	x	x	x	x
Child safer,	8.5	9.5	x	x	x	x	x	x
X To be applied								

5.2 Covers with fillings

When tested in accordance with DRS 607-1, Clause 9, covers placed on the market filled with concrete or other filling materials and covers designed to be filled subsequently and placed on the market unfilled shall comply with the requirements in accordance with Clause 4 and Clause 5.

Covers placed on the market unfilled and designed to be filled subsequently shall be filled in accordance with the manufacturer's instructions for filling. The manufacturer's instructions shall be supplied with the product and shall include all information for the filling procedure.

Filling materials used after the manhole top or gully top with an unfilled cover has been placed on the market, are subject to selection by the specifier or client. Their performance in service and their durability should be controlled to comply with the intended use/place of installation expectations, and with appropriate relevant Standards.

5.3 Material-specific characteristics for gully tops and manhole tops made of cast iron

5.3.1 Reaction to fire

Where use of manhole tops and gully tops in accordance with this standard is subject to national regulatory requirements on reaction to fire, their reaction to fire performance shall be declared. Manhole tops and gully tops made of cast iron are classified as Class A 1.

NOTE 1 Cast iron, as homogeneously distributed materials for these products (whether in combination with concrete or not), is considered as material of known and stable performance with respect to the reaction to fire performance as it does not consist of any organic material and consequently does not contribute to fire. Under these conditions, it can be considered as Class AI material.

NOTE 2 The class of reaction to fire performance of manhole tops and gully tops made of cast iron is regarded as the class for the constituent material (i.e., cast iron).

Conversely, where the use of manhole tops and gully tops is not subject to national regulatory requirements on reaction to fire, either the Class A 1 (see above) or "No Performance Determined" (NPD) may be declared.

NOTE 3 Where the compatibility of seatings is achieved by the use of cushioning inserts, only a negligible area of the cushioning insert material would be exposed to fire, considering the end use situation. There is no relevance in relation to the reaction to fire performance and embedded cushioning inserts would not be able to ignite or to propagate fire there. Their contribution to fire spread is not of concern, nor is an influence expected on the fire behaviour of the neighbouring material and the contribution to fire propagation is negligible. Considering these aspects, separate testing and classification of cushioning inserts is not necessary.

5.3.2 Durability

5.3.2.1 General

Cast iron as defined in 4.1 is a stable and durable material with a sufficient corrosion resistance with respect to their application within the scope of this standard. No further material tests are required for material durability.

The durability of gully tops and manhole tops manufactured from cast iron will depend upon design features and exposure conditions (see DRS 607-1, 6.1). The materials specified in Clause 4 and the prescribed framework of requirements and test methods for the mandated performance characteristics according to Clause 5 will also reflect the durability of manhole tops and gully tops.

5.3.2.2 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. 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 Clause 4 covers all effects which could influence the durability of the load bearing capacity.

5.3.2.3 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 and passing the test according to DRS 607-1, 9.4.6.

5.3.2.4 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.

5.3.2.5 Durability of effectiveness of 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 weight or 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.

5.3.2.6 Dangerous substances

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

6 Testing

Gully tops and manhole tops according to this standard shall be tested as complete units in the position of their intended use where the cover/grating is suitably positioned within the frame in accordance with DRS 607-1, Clause 9, as listed in Table 1.

Gully tops and manhole tops consisting of covers with fillings or covers designed to be filled subsequently, shall be tested as follows:

a) Covers placed on the market filled with concrete or other filling materials shall be tested in filled condition.
b) Covers placed on the market unfilled shall be tested without filling.

All tested products shall be visually inspected without magnification.

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 the 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 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 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 to be tested/assessed shall be in accordance with Table 2. Characteristics for which the performance is to be declared are written in bold letters.

Table 2 — Number of samples to be tested and compliance criteria

Characteristic	**Requirement**	**Assessment method**	**No of samples**	**Compliance criteria in accordance with**
for the declared performance:				
Reaction to fire	5.3.1	Classified without testing (CWT)	-	DRS 607-2, 5.3.1, Class A1
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, declared method and either weight in kg or value F_V in kN and appropriate h in mm, as applicable

Characteristic	Requirement	Assessment method	No of samples	Compliance criteria inaccordance with
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				
- concrete surface	5.1	DRS 607-1, 9.4.13 a)	3	DRS 607-1, 8.4.2 a), declared as "concrete surface" for the material used
- raised pattern		DRS 607-1, 9.4.13 b)	3	DRS 607-1, 8.4.2 b), declared as "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	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
c) Frames with max. horizontal visible width of: - ≤40 mm, or - -> 40 mm	5.1	DRS 607-1, 9.4.13	3	DRS 607-1, 8.4.4, determined acc. to the requirement clause and expressed as - "NPD" for ≤ 40 mm or - method or value for > 40 mm
Durability of:				
- load bearing capacity[b] against mechanical failure	5.3.2	DRS 607-1, 9.2 DRS 607-1, 9.3	3	DRS 607-2, 5.1, DRS 607-1 8.2 and 8.3, declared as "Pass" according to the material used and the test method applied
- securing[c] against unintended lifting	5.3.2	DRS 607-1, 9.4.6	3	DRS 607-1,7.6, declared as "Pass" according to the material used and the test method applied
- skid resistance against loss of grip	5.3.2	DRS 607-1, 9.4.13	3	DRS 607-1, 8.4, declared as "Pass" for the declared method and the material used and for USRV measured value declared
- effectiveness of child safety characteristics	5.3.2	DRS 607-1, 9.5	3	DRS 607-1, 8.5, 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 ofman-hole tops for man	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	5.1	DRS 607-1, 9.4.5	3	DRS 607-1, 7.5

Characteristic	Requirement	Assessment method	No of samples	Compliance criteria in accordance with
of seatings				
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
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
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.				
13 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 can influence the durability of the load bearing capacity.				
Ensured by using materials with proven resistance against corrosion and passing the test according to DRS 607-1, 9.4.6.				

7.2.3 Test reports

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

7.2.4 Shared other party results

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

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

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

— Ensures that the product has the same characteristics relevant for performance as the one that has been subjected to the determination of the product type, and that there are no significant differences with regard to production facilities and the production control process compared to that used for the product that was subjected to the determination of the product type; and
— Keeps available a copy of the determination of the product type report that also contains the information needed for verifying that the product is manufactured according to the same design and with raw materials, constituents and manufacturing methods of the same kind.

7.3 Factory production control (FPC)

7.3.1 General

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

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

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

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

7.3.2 Requirements

7.3.2.1 General

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

The responsibility, authority and the relationship between personnel that manages, performs or verifies work affecting product constancy, shall be defined. This applies in particular to personnel that need to initiate actions

preventing product non-constancies from occurring, actions in case of non-constancies and to identify and register product constancy problems.

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

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

— Identify procedures to demonstrate constancy of performance of the product at appropriate stages;
— Identify and record any instance of non-constancy;
— Identify procedures to correct instances of non-constancy.

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

a) The preparation of documented procedures and instructions relating to factory production control operations, in accordance with the requirements of the technical specification to which reference is made;
b) The effective implementation of these procedures and instructions;
c) The recording of these operations and their results;
d) The use of these results to correct any deviations, repair the effects of such deviations, treat any resulting instances of non-conformity and, if necessary, revise the FPC to rectify the cause of non-constancy of performance.

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

7.3.2.2.3 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.

7.3.2.2.4 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.

7.3.2.2.5 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.

Raw materials used for the manufacturing process of manhole tops and gully tops made of cast iron shall be inspected according to Table 3.

Table 2 — Material delivery inspection

Aspect of inspection	Method of inspection	Minimum frequency of inspection	Document retention period
Raw material storage area			
— Iron ore	Cert supplier [3]	Every delivery	1 year
— Pig iron	Cert supplier [a]	Every delivery	1 year
— Scrap iron/steel (3rd party)	Cert supplier [a]	Every delivery	1 year
— Scrap returns (1st party)	IQC [b]	Every delivery	1 year
— Additives	Refer to the order	Every delivery	1 year
Energy for melting:			
— Electricity	-	-	-
- Gas	Cert supplier [3]	Regularly/when changed	1 year

— Coke	Cert supplier [a]	Every delivery	1 year
Others:			
— New Sand for moulds/cores	Cert supplier [a] and sieve analysis	Every delivery	1 year
— Recycled sand for moulds/cores	IQC [b]	Regularly	1 year

[a] Certificate of the supplier:
— deliveries from suppliers having a certified quality insurance system shall be subject to random control;
— deliveries from suppliers having no certified quality insurance system shall be subject to a systematic control for each delivery.
[b] IQC – Internal Quality Control.

The following relevant process parameters shall be controlled, measured and documented in accordance with Table 4 and the manufacturer's process instructions:

— Pouring temperature of melt in the ladle/furnace;
— Mechanical properties according to RS ISO 185 or ISO 1083 as applicable;
— Sand for moulds and core.

Commented [ES1]: NEED TOBE ADDOPTED

Table 3 — Process control

Aspect of inspection	**Method of inspection**	**Minimum frequency ofinspection**	**Document retention period**
Moulding sand characteristics	Lab	Once a shift	1 year
Ductile iron additives	Weigh/measure	Each treatment ladle	1 year
Tempof melting the casting ladle/furnace	Visual/pyrometer	According to IQC – Internal Quality Control	1 year
Composition of metal/analysis:			
— casting ladle	Lab	Each treatment or each furnace or each ladle	5 years
— continuous casting	Lab	According to IQC – Internal Quality Control	5 years
Mould control	Visually	According to IQC – Internal Quality Control	-
Casting operation	Visually	According to IQC – InternalQuality Control	-
Standing time of each pouring ladle	Visually	According to IQC – InternalQuality Control	-
Mechanical properties:			
Cast iron: according RS ISO 185 and ISO 1083: — tensile strength — elongation % — nodularity	RS ISO 185, 7.2 or ISO 1083, 9.1	RS ISO 185, 8.3.2 or ISO 1083, 8.2.2	5 years
Other materials	As per materials standard	As per materials standard	5 years

Commented [ES2]: CLAUSE TO BE CHECKED

Commented [ES3]: CHECK CLAUSE

7.3.2.3 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 5 in bold letters are maintained. The characteristics and the means of control shall be as given in Table 5.

Table 4 — Product testing of finished products

Characteristic	Requirement	Assessment method	Minimum frequency of inspection (Units)	Document retention period
for the declared performance:				
Reaction to fire	5.3.1	Classified without testing	–	–
Frame bearing area	5.1	Calculation acc. DRS 607-1, 9.4.14	to 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	5.3.2	DRS 607-1, 9.2 DRS 607-1, 9.3	1:5 000 [a]	10 years
— securing	5.3.2	DRS 607-1, 9.4.6	1:5 000 [a]	10 years
— skid resistance	5.3.2	DRS 607-1, 9.4.13	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 [ab]	5 years
Depth of insertion	5.1	DRS 607-1, 9.4.3 Measurement	1:5 000 [ab]	5 years
Clearance	5.1	DRS 607-1, 9.4.4 Measurement	1:5 000 [ab]	5 years
Compatibility of seatings	5.1	DRS 607-1, 9.4.5 Measurement	1:5 000 [ab]	5 years
Handling of covers and gratings	5.1	DRS 607-1,9.4.7	1:5 000 [ab]	5 years
Slot dimensions of gratings	5.1	DRS 607-1, 9.4.8 Measurement	1:5 000 [ab]	5 years
Dirt pans and dirt buckets	5.1	DRS 607-1, 9.4.9	1:5 000 [ab]	5 years
Positioning of covers and gratings	5.1	DRS 607-1, 9.4.10	1:5 000 [ab]	5 years
Flatness of manhole covers and gratings	5.1	DRS 607-1, 9.4.11	1:5 000 [ab]	5 years

Characteristic	Requirement	Assessment method	Minimum frequency of inspection (Units)	Document retention period
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 angleof 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	Clause 9	Visual inspection	Every product	5 years

[a] At least every 6 months.

[b] At every modification of patterns.

7.3.2.4 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.

7.3.2.5 Corrective action

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

7.3.2.6 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 Specifications 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 once per year. 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 607-2);
c) Load class ;
d) Code related to the number of the parts of DRS 607 series to which the cover and the frame complies according to Table 6;

Table 5 — Designation according to the material of frame and cover/grating

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

e) Clear opening (CO in mm), e.g., 600 indicates CO = 600 mm;
f) Securing method:
   1) securing feature (F);
   2) mass per unit area (W);
   3) other methods (0);
g) skid resistance:
   1) concrete (CR);
   2) defined raised pattern (RP);
   3) measured value of USRV (e.g., 40);
h) covers placed on the market unfilled (U) (if applicable);

Manhole tops and gully tops consisting of a combination of elements in accordance with DRS 607-2, DRS 607-3, DRS 607-2, 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 607-2, class D 400, cover and frame made of cast iron according to DRS 607-2 (2/2), with a clear opening CO 600 mm (600), other securing method (0), skid resistance (RP)

Manhole Top DRS 607-2 — D 400 – 2/2 – 600 – 0 – RP

EXAMPLE 2 Designation of a manhole top according to DRS 607-2, class A 15, consisting of a combination of a cover made from cast iron according to DRS 607-2 with a frame made from PP according to DRS 607-6 (2/6), with a clear opening CO 400 mm (400), securing feature (F), skid resistance (USRV 40).

Manhole Top DRS 607-2—A15-2/6-400–F---40

EXAMPLE 3 Designation of a manhole top according to DRS 607-2, class D 400, cover made of cast iron according to DRS 607-2, cover filled with concrete and frame made of concrete in accordance with DRS 607-4 (2/4), with a clear opening CO 600 mm (600), securing method mass per unit area (W), skid resistance covered by the concrete surface (CR),

Manhole Top DRS 607-2 — D 400 –2/4 – 600 – W – CR –

EXAMPLE 4 Designation of a gully top according to DRS 607-2, class C 250, cover and frame made of cast iron according to DRS 607-2 (2/2), cover filled with concrete, with a clear opening CO 550 mm (550), securing method mass per unit area (W), skid resistance covered by the raise pattern (RP)

Gully Top DRS 607-2 — C 250 –2/2 – 550 – W – RP

EXAMPLE 5 Designation of a manhole top according to DRS 607-2, class B 125, cover and frame made of cast iron according to DRS 607-2 (2/2), with a clear opening CO 600 mm (600), securing method securing feature (F), placed on the market with unfilled cover (U)

Manhole Top DRS 607-2 — B 125 – 2/2 – 600 – F- U

NOTE 1 In case of covers placed on the market unfilled, the no performance declared (NPD) option is used for skid resistance (see ZA.1).

NOTE 2 The designation provides a standardized pattern of designation from which a rapid and unequivocal description of an item is communicated.

9 Marking

Covers, gratings and frames of manhole tops and gully tops in accordance with this Standard shall be marked as follows:

a) Number of this Standard DRS 607-2;
b) Appropriate class (e.g. D 400);
c) Name and/or identification mark of the manufacturer;
d) Factory of manufacture which may be in code;
e) Month 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 by the user;
g) Product identification (name and/or catalogue number);
h) Nominal mass in kilograms (kg).

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, chemical adhesives or welding.

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.

Price based on 20 pages