



## EUROPEAN ASSESSMENT DOCUMENT

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# GULLY TOPS AND MANHOLE TOPS MADE OF THE POLYAMIDE (PA) FOR EXTERNAL VEHICULAR AND PEDESTRIAN AREAS

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This European Assessment Document (EAD) has been developed taking into account up-to-date technical and scientific knowledge at the time of issue and is published in accordance with the relevant provisions of Regulation (EU) No 305/2011 as a basis for the preparation and issuing of European Technical Assessments (ETA).

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## 1 SCOPE OF THE EAD

### 1.1 Description of the construction product

The EAD applies to the gully tops and manhole tops made of the polyamide (PA) with a clear opening up to and including 1000 mm for installation within external areas subjected to pedestrian and/or vehicular traffic. The gully tops and manhole tops can be the shape of circles, squares, rectangles or triangles. The gully tops and manhole tops are supplied as cover or grating.

The EAD applies to the manhole tops and gully tops of load classes A 15, B 125, C 250, D 400, E 600 and F 900 according to EN 124-1 and/or EN 1433 and/or with specified test load  $F_T$  (EN 124-1, Cl. 3.1.24), made of polyamide material (PA) using suitable controlled automatic processes that guarantee a single structure and that do not lead to multiple pieces bonded together.

Any element made of the polyamide (PA) can be used in combination with suitable elements of materials specified in EN 124-2, EN 124-3, EN 124-4, EN 124-5 or EN 124-6, complying with specified performance of the final product. Each element used is to be marked accordingly and performance specification of the combined product is restricted to the lowest level determined for any constituent element used.

The product made of polyamide (PA) is not fully covered by the EN 124-6 due to fact the polyamide is not specified in the scope of EN 124-6.

Concerning product packaging, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport, storage, maintenance, replacement and repair of the product as he considers necessary.

It is assumed that the product will be installed according to the manufacturer's instructions or (in absence of such instructions) according to the good practice of the building professionals.

In respect to EN 124-1, Cl. 5.1, this EAD is based on presumption that all materials used are compatible, e.g. detrimental, electro, chemical or galvanic corrosion are avoided.

Relevant manufacturer's stipulations having influence on the performance of the product covered by this European Assessment Document are to be considered for the determination of the performance and detailed in the ETA.

### 1.2 Information on the intended use(s) of the construction product

#### 1.2.1 Intended use(s)

The product is intended to be used for covering manholes, gullies, inspection chambers, top of drainage channels and/or other types of openings installed in areas subjected to pedestrian and/or vehicular traffic. The correct positioning of the product in this areas depends on its performance, mainly on its loadbearing capacity, usually in practice expressed as "load class". Basic classification of load classes, introduced in practice for the long time, is given in EN 124-1, Cl. 4.2 and/or EN 1433, Cl. 3.5, harmonized with Regulation (EU) No. 305/2011 (CPR).

The intended position of use of product in dependence to this classification is given in EN 124-1, Cl. 4.2 and in EN 1433, Cl. 5.

Assessment of the product according to this EAD in case of combination of the product with other parts according to respective part of EN 124 series and/or EN 1433 is based on the presumption that the product is combined correctly with elements of the corresponding performance.

Manhole tops and gully tops to be used in cold climate conditions with usual winter temperature lower than -20 °C require extended testing on impact resistance (see 2.2.7.1.4).

### 1.2.2 Working life/Durability

The assessment methods included or referred to in this EAD have been written based on the manufacturer's request to take into account a working life of the gully tops and manhole tops for the intended use of 25 years when installed in the works, provided that they are subject to appropriate installation. These provisions are based upon the current state of the art and the available knowledge and experience.

When assessing the product, the intended use as foreseen by the manufacturer is to be taken into account. The real working life may be, in normal use conditions, considerably longer without major degradation affecting the basic requirements for works. <sup>1)</sup>

The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by EOTA when drafting this EAD nor by the Technical Assessment Body issuing an ETA based on this EAD, but are regarded only as a means for expressing the expected economically reasonable working life of the product.

### 1.3 Specific terms used in this EAD

For the purposes of this document, the terms and definitions given in EN 124-1,-3,-5,-6, EN 1433 and EN 1253-4 apply.

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<sup>1)</sup> The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works is subject, as well as on the particular conditions of the design, execution, use and maintenance of that works. Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than referred to above.

## 2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

### 2.1 Essential characteristics of the product

Table 1 shows how the performance of gully tops and manhole tops is assessed in relation to the essential characteristics.

**Table 1: Essential characteristics of the product and methods and criteria for assessing the performance of the product in relation to those essential characteristics**

No.	Essential characteristic	Assessment method	Type of expression of product performance
Basic Works Requirement 2: Safety in case of fire			
1	<b>Reaction to fire</b>	2.2.1	Class
Basic Works Requirement 4: Safety and accessibility in use			
2	<b>Load bearing capacity</b>		
	• Load bearing capacity	2.2.2.1	Level
	• Permanent set	2.2.2.2	Level
3	<b>Securing of covers/gratings</b>		
	• Locking device	2.2.3.1	Description / Level
	• Mass per unit area	2.2.3.2	Description / Level
	• Other method	2.2.3.3	Description / Level
4	<b>Child safety</b>		
	• Locking accessory or securing feature or weight	2.2.4	Description
5	<b>Skid resistance</b>		
	• Skid resistance	2.2.5	Description / Level
6	<b>Functional performance</b>		
	• Vents in covers	2.2.6.1	Level
	• Clear opening of manhole tops for man entry	2.2.6.2	Level
	• Depth of insertion	2.2.6.3	Level
	• Clearance	2.2.6.4	Level
	• Total clearance	2.2.6.4.1	Level
	• Clearance around hinges	2.2.6.4.2	Level
	• Compatibility of seatings	2.2.6.5	Description / Level
	• Handling of covers and gratings	2.2.6.6	Description
	• Slot dimensions of gratings	2.2.6.7	Level / Description
	• Dirt pans and dirt bucket	2.2.6.8	Description
	• Positioning of covers and grating	2.2.6.9	Description
	• Flatness of manhole covers and grating	2.2.6.10	Level
	• Concaveness of gratings	2.2.6.11	Level

No.	Essential characteristic	Assessment method	Type of expression of product performance
	<ul style="list-style-type: none"> <li>Sealing features of manhole tops <ul style="list-style-type: none"> <li>Watertightness: type Wt</li> <li>Odourtightness: type Ot</li> <li>Backflow tightness: type Bt</li> </ul> </li> </ul>	2.2.6.12 2.2.6.12.1 2.2.6.12.2 2.2.6.12.3	Description Description Description
	<ul style="list-style-type: none"> <li>Frame bearing area</li> </ul>	2.2.6.13	Level
	<ul style="list-style-type: none"> <li>Frame depth</li> </ul>	2.2.6.14	Level
	<ul style="list-style-type: none"> <li>Opening angle of hinged covers/gratings</li> </ul>	2.2.6.15	Level
	<ul style="list-style-type: none"> <li>Appearance</li> </ul>	2.2.6.16	Description
	<ul style="list-style-type: none"> <li>Surface electrical resistance</li> </ul>	2.2.6.17	Level
<b>Basic Works Requirement 7: Sustainable use of natural resources</b>			
<b>7</b>	<b>Durability</b>		
	<ul style="list-style-type: none"> <li>Durability of load bearing capacity <ul style="list-style-type: none"> <li>Deflection under load</li> <li>Resistance to fatigue</li> <li>Creep resistance</li> <li>Impact resistance</li> <li>Effect of heating</li> <li>UV stability</li> <li>Hardness</li> <li>Water absorption</li> <li>Resistance to vehicle fuels</li> <li>Weathering resistance</li> </ul> </li> </ul>	2.2.7.1.1 2.2.7.1.2 2.2.7.1.3 2.2.7.1.4 2.2.7.1.5 2.2.7.1.6 2.2.7.1.7 2.2.7.1.8 2.2.7.1.9 2.2.7.1.10	Level Description / Level Level Level / Description Description Level Description / Level Level / Description Level / Description Level / Description
	<ul style="list-style-type: none"> <li>Durability of securing of covers/gratings within the frame <ul style="list-style-type: none"> <li>Securing of covers/gratings by mass per unit area</li> <li>Metallic fixing</li> </ul> </li> </ul>	2.2.7.2.1 2.2.7.2.2	Description / Level Description / Level
	<ul style="list-style-type: none"> <li>Durability of skid resistance</li> </ul>	2.2.7.3	Description / Level
	<ul style="list-style-type: none"> <li>Durability of the child safety characteristics</li> </ul>	2.2.7.4	Description

## 2.2 Methods and criteria for assessing the performance of the product in relation to essential characteristics of the product

All tests are to be performed at ambient temperature according to EN ISO 291, Cl. 7, but min. 10 °C, if relevant test procedure does not specify otherwise. Test specimens are to be conditioned in relevant environment for 24 hours before the test if relevant test procedure does not specify otherwise.

The gully tops and manhole tops according to this EAD are to be tested as complete unit in their intended position of use where cover/grating is correctly positioned within the frame in accordance with EN 124-1, Cl. 8.

The all tested specimens are to be visually inspected without magnification before the tests for presence of any defects according to 2.2.6.16, eventually caused by ageing, transport and/or storage.

### 2.2.1 Reaction to fire

The product is to be classified according to Commission Delegated Regulation (EU) No. 2016/364 and EN 13501-1.

The procedure of determination of reaction to fire of the gully tops and manhole tops made of polyamide is given in the EN 124-6, Cl. 5.2.1. Number of the test specimens is given in relevant test standards for determination of reaction to fire.

The class of reaction to fire according to Commission Delegated Regulation (EU) No. 2016/364 and EN 13501-1 of the product is given in the ETA.

## **2.2.2 Load bearing capacity**

Before tests manufacturer specifies to TAB presumed load class (EN 124-1, Cl. 7.2 and Tab. 4) or intended test load  $F_T$  (EN 124-1, Cl. 3.1.24) of product assessed.

### **2.2.2.1 Load bearing capacity**

The load bearing capacity of the gully tops and manhole tops made of PA is to be tested for corresponding test load  $F_T$  according to EN 124-1, Cl. 3.1.24, Cl. 8.3 and/or Cl. 7.2 and Tab. 4 on three test specimens.

The deflection under load during the test is to be monitored according to EN 124-6, Cl. 6.3 and Annex B for evaluation according to 2.2.7.1.1.

The TAB informs manufacturer about test result in relation to provision of EN 124-1, Cl. 7.2 and Tab. 4.

The load bearing capacity at failure of all tested specimens is given in the ETA.

Corresponding load class according to EN 124-1, Cl. 4.1 (or EN 1433, Tab. ZA.1 and Cl. 4) can be evaluated and given in the ETA, if manufacturer applies thus.

### **2.2.2.2 Permanent set**

The permanent set of the gully tops and manhole tops made of PA is to be tested according to EN 124-1, Cl. 8.2 and Annex A, and evaluated according to EN 124-1, Cl. 7.3, on three test specimens.

The TAB informs manufacturer about test result of the permanent set and its relation to values given in the EN 124-1, Tab. 5, for the corresponding presumed load class and clear opening.

The permanent set of all tested specimens is given in the ETA.

## **2.2.3 Securing of the cover/grating within the frame**

The method of securing of the gully tops and manhole tops made of PA within the frame is to be visually inspected and/or tested according EN 124-1, Cl. 8.4.6, and Annex E for the type(s) of securing according to EN 124-1, Cl. 6.6 a), b) or c), applied on the product.

Securing of the gully tops and manhole tops, made of PA, within the frame is to be evaluated according to EN 124-1, Cl. 6.6.

The securing method(s) and relevant details of evaluation (see 2.2.3.1 to 2.2.3.3) are given in the ETA.

### **2.2.3.1 Securing of the cover/grating - locking device**

Securing of the cover/grating by determination of pull-out force  $F_V$  [N] and corresponding vertical displacement  $h$  [mm] is to be determined by test according to EN 124-1, Cl. 8.4.6 and Annex E on three test specimens.

The tilt test according to EN 124-1, Annex D, on three test specimens is to be performed first. Then the test of maximum pull-out force  $F_V$  [N] and the corresponding vertical displacement  $h$  [mm] for products of presumed load classes C 250, D 400, E 600 and F 900 is to be performed according to EN 124-1, Annex E. The maximum pull-out force  $F_V$  [N] and the corresponding vertical displacement  $h$  [mm] for each tested specimen are to be recorded and evaluated according to EN 124-1, Annex E.



The TAB informs manufacturer about test results of the maximum pull-out force  $F_V$  and corresponding vertical displacement  $h$  [mm] and their relations to values given in the EN 124-1, Cl. E.2.3 and Cl. E.2.5 for the corresponding presumed load class of product.

The securing method "Securing feature" and the smallest value of the pull-out force  $F_V$  [N] and its corresponding vertical displacement  $h$  [mm] from all tested specimens are given in the ETA.

For gully tops and manhole tops made of PA of presumed load classes A 15 and B 125 only statement "Securing feature", if securing feature according to EN 124-1, Cl. 6.6, item a) is used, and description of this feature after visual inspection is to be given in the ETA.

### **2.2.3.2 Securing of the cover/grating - mass per unit area**

Securing of the cover/grating by determination of mass per unit area is to be performed after visual inspection by weighting of the product using scales with accuracy 1 % on three test specimens. The clear area is to be measured and calculated according to EN 124-1, Cl. 8.4.6.

The mass per unit area value is to be calculated according to EN 124-1, Cl. 8.4.6, for each tested specimen separately.

The securing method "Mass per unit area" and the minimal value of mass per unit area [kg/m<sup>2</sup>] from all tested specimens are given in the ETA.

### **2.2.3.3 Securing of the cover/grating – other method**

If other method of securing according to EN 124-1, Cl. 6.6, item c), for gully tops and manhole tops made of PA of presumed load classes A 15 and B 125 is used, securing method "Other method" and description of this securing method after visual inspection of product are given in the ETA.

## **2.2.4 Child safety**

The mode of child safety method according to EN 124-6, Cl. 5.2.5.5, is to be determined by visual inspection and/or by testing according to EN 124-1, Cl. 8.5 and Annex E and evaluated according to EN 124-1, Cl. 7.5 on three test specimens.

The mode of child safety method and achieved level as "Securing feature" (see 2.2.3.3) or "Locking accessory" (see 2.2.3.1) or "Weight" in kg (see 2.2.3.2) is given in the ETA.

## **2.2.5 Skid resistance**

The skid resistance and its mode are to be determined by appropriate test method according to EN 124-1, Cl. 7.4.1, on three test specimens, as follows:

- a) in case of defined raised patterns on upper surface of manhole tops and gully tops by measurement of their dimensions and position according to EN 124-1, Cl. 7.4.2.b
- b) in case of slot dimension in gratings by measurement of their dimensions according to EN 124-1, Cl. 7.4.3
- c) in case of frames or parts thereof with horizontal visible width exceeding 40 mm with defined raised patterns on upper surface by measurement of their dimensions and position according to EN 124-1, Cl. 7.4.2.b
- d) in case of other surface by testing according to EN 124-1, Cl. 8.4.13 and Annex C.

In cases according to item a) to c) manufacturer can ask for testing of skid resistance by test according to EN 124-1, Annex C, if nominal dimensions of relevant part allow to perform the test.

The TAB informs manufacturer on test results of skid resistance and their relation to provisions of EN 124-1, Cl. 7.4.

In case of frames or other parts thereof with horizontal visible width not exceeding 40 mm only their visual inspection and measurement of visible width with accuracy in mm are to be performed.

The mode of skid resistance achievement and achieved level of skid resistance for relevant part of product are given in the ETA, as follows:

- a) part of product, method “Raised patterns” in case of defined raised patterns on upper surface of manhole tops and gully tops and their measured dimensions and position
- b) part of product, method “Slot dimensions” in case of slot dimension in gratings and their measured dimensions
- c) part of product, method “Low width” in case of frames or parts thereof with nominal horizontal visible width not exceeding 40 mm
- d) part of product, method “Other surface” and USRV value determined according to EN 13036-4 (i. e. pendulum test value “PTV” according to EN 13036-4, Cl. 3.3) for all tested specimens in case of other surface.

## 2.2.6 Functional performance

### 2.2.6.1 Vents in covers

The vents in cover are to be determined according to EN 124-1, Cl. 8.4.1 and evaluated according to EN 124-1, Cl. 6.1, on three test specimens.

The TAB informs manufacturer about test result and its relation to the minimum vent area and dimensions of vents in cover according to EN 124-1, Tab. 1 and Tab. 2.

The area of vents in cover for all tested specimens is given in the ETA.

### 2.2.6.2 Clear opening of manhole tops for man entry

The clear opening (CO) of manhole tops for man entry is to be tested according to EN 124-1, Cl. 8.4.2 and evaluated according to EN 124-1, Cl. 6.2, on three test specimens.

The TAB informs manufacturer about test result and its relation to the provision of EN 124-1, Cl. 6.2.

The dimensions of the clear opening for all tested specimens are given in the ETA.

### 2.2.6.3 Depth of insertion

The depth of insertion ( $A$ ) is to be tested according to EN 124-1, Cl. 8.4.3 and evaluated according to EN 124-1, Cl. 6.3, on three test specimens.

This test is not required for presumed load classes A 15, B 125 and C 250.

For gully tops and manhole tops of presumed load classes D 400, E 600 and F 900 with the exception of those secured according to EN 124-6, Cl. 6.6 a), the TAB informs manufacturer about test result and its relation to the provision of EN 124-1, Cl. 6.3.

The depth of insertion  $A$  [mm] for all tested specimens is given in the ETA.

### 2.2.6.4 Clearance

#### 2.2.6.4.1 Total clearance

The clearance ( $a$ ) is to be tested and total clearance  $\Sigma a$  is to be calculated according to EN 124-1, Cl. 8.4.4 and evaluated according to EN 124-1, Cl. 6.4, on three test specimens.

The TAB informs manufacturer about test result and its relation to the provision on limit displacement between separate parts of gully tops and manhole tops according to the EN 124-1, Cl. 6.4.1.

The total clearance  $\Sigma a$  [mm] of all tested specimens is given in the ETA.

#### 2.2.6.4.2 Clearance around hinges

The clearance around hinges is to be tested according to EN 124-1, Cl. 8.4.4 and evaluated according to EN 124-1, Cl. 6.4, on three test specimens.

The TAB informs manufacturer about test result and its relation to provision of EN 124-1, Cl. 6.4.2.

The clearance around hinges of all tested specimens is given in the ETA.

#### 2.2.6.5 **Compatibility of seatings**

The compatibility of seatings is to be determined by visual inspection of mode as quietness in use and stable behaviour are ensured on three test specimens.

Additionally for gully tops and manhole tops of presumed load classes D 400, E 600 and F 900 the test of maximum increase in the vertical distance  $\Delta h_k$  [mm] according to EN 124-1, Cl. 8.4.5 and Annex D is to be performed on three test specimens. Evaluation of test is to be performed according to EN 124-1, Cl. 6.5.

The TAB informs manufacturer about test result and its relation to provision of EN 124-1, Cl. 6.5.

The test according to EN 124-1, Annex D, is not required for presumed load classes A 15, B 125 and C 250.

The description of mode as ensured quietness in use and stable behaviour and maximum increase in the vertical distance  $\Delta h_k$  [mm] are given in the ETA.

#### 2.2.6.6 **Handling of covers and gratings**

The handling of covers and gratings is to be tested according to EN 124-1, Cl. 8.4.7 and evaluated according to EN 124-1, Cl. 6.7, on three test specimens.

The TAB informs manufacturer about test result and its relation to provision of EN 124-1, Cl. 8.4.7.

The description of handling of covers and gratings of all test specimens is given in the ETA.

#### 2.2.6.7 **Slot dimensions of gratings**

The waterway area and slot dimensions of gratings are to be tested according to EN 124-1, Cl. 8.4.8 and evaluated according to EN 124-1, Cl. 6.8, on three test specimens.

The TAB informs manufacturer about these matters:

- test result of waterway area and its relation to provision of EN 124-1, Cl. 6.8.1
- test result of slot dimensions and its relation to provision of EN 124-1, Cl. 6.8.2 and Tab. 3.

The waterway area of all test specimens and description of orientation of slot dimensions are given in the ETA.

#### 2.2.6.8 **Dirt pans and dirt buckets**

When dirt pans and dirt buckets are specified by manufacturer, they are to be tested according to EN 124-1, Cl. 8.4.9 and evaluated according to EN 124-1, Cl. 6.9, on three test specimens.

The TAB informs manufacturer about test result and its relation to provision of EN 124-1, Cl. 6.9.

Description of the way to ensure, that drainage and ventilation can continue when the dirt pan or bucket is full, is given in the ETA.

#### 2.2.6.9 **Positioning of covers and gratings**

The positioning of covers and gratings is to be determined by visual inspection according to EN 124-1, Cl. 8.4.10 and evaluated according to EN 124-1, Cl. 6.10, on three test specimens.

The TAB informs manufacturer about test result and its relation to provision of EN 124-1, Cl. 6.10.

Description of the positioning of covers and gratings in the frame is given in the ETA.

#### **2.2.6.10 Flatness of manhole covers and gratings**

The flatness of manhole covers and gratings is to be tested according to EN 124-1, Cl. 8.4.11 and evaluated according to EN 124-1, Cl. 6.11, on three test specimens.

This test is not required for presumed load classes A 15, B 125 and C 250.

The TAB informs manufacturer about test result and its relation to provision of EN 124-1, Cl. 6.11.

The flatness of manhole covers and gratings of all tested specimens is given in the ETA.

#### **2.2.6.11 Concaveness of gratings**

The concaveness is to be tested only for the gratings according to EN 124-1, Cl. 8.4.12 and evaluated according to EN 124-1, Cl. 6.12, on three test specimens.

The TAB informs manufacturer about test result and its relation to provision of EN 124-1, Cl. 6.12.

The concaveness of gratings of all tested specimens is given in the ETA.

#### **2.2.6.12 Sealing features of manhole tops**

Tightness of manhole tops to agents, in sense of EN 124-1, Cl. 6.14, specified as described below, is to be tested in accordance with following provisions for given type of tightness.

The type of tightness of product, the mode of its achieving determined by visual inspection and the result of test of all tested specimens are given in the ETA.

Note: If any different type or level of tightness is required, e.g. for toxic and/or explosive gases, the test and assessment methods are to be set separately.

##### **2.2.6.12.1 Watertightness: Type Wt**

The watertightness of Wt type is to be tested and evaluated according to EN 1253-4, Cl. 6.5.2 and 7.3.1 on three test specimens.

##### **2.2.6.12.2 Odourtightness: Type Ot**

The odourtightness of Ot type is to be tested and evaluated according to EN 1253-4, Cl. 6.5.3 and 7.3.2 on three test specimens.

##### **2.2.6.12.3 Backflow tightness: Type Bt**

The backflow tightness of Bt type is to be tested and evaluated according to EN 1253-4, Cl. 6.5.4 and 7.3.3 on three test specimens.

#### **2.2.6.13 Frame bearing area**

The frame bearing area is to be determined according to EN 124-1, Cl. 8.4.14 and the frame bearing pressure is to be calculated according to EN 124-1, Cl. 6.15. The calculation is to be performed for nominal dimensions of the manhole top and/or cover and/or grating and of frame for presumed load class of the whole product.

The TAB informs manufacturer about calculation result and its relation to provision of EN 124-1, Cl. 6.15.

The calculated value of frame bearing pressure  $P_b$  [N/mm<sup>2</sup>] is given in the ETA.

#### **2.2.6.14 Frame depth**

The frame depth is to be tested according to EN 124-1, Cl. 8.4.15 and evaluated according to EN 124-1, Cl. 6.16 on three test specimens.

The TAB informs manufacturer about test result and its relation to provision of EN 124-1, Cl. 6.16.

The frame depth for all tested specimens is given in the ETA.

#### **2.2.6.15 Opening angle of hinged covers/gratings**

The opening angle of hinged covers/gratings is to be tested according to EN 124-1, Cl. 8.4.16 and evaluated according to EN 124-1, Cl. 6.17 on three test specimens.

The TAB informs manufacturer about test result and its relation to provision of EN 124-1, Cl. 6.17.

The opening angle of hinged covers/gratings of all tested specimens is given in the ETA.

#### **2.2.6.16 Appearance**

The appearance is to be tested and evaluated visually according to EN 124-1, Cl. 7.1, on three test specimens at least.

Following defects are to be recorded with their position, dimensions and frequency on product:

- cracks or delamination
- discontinuities and overwraps in material
- visible bubbles in material
- intrusions of different materials
- shape deformation
- differences in partial cross sections due to overwhelming and/or missing material
- uncured or insufficiently cured (soft) material
- sharp edges and protrusions
- other visible defects, which might impair fitness for use of product.

The TAB informs manufacturer about test result.

The description of appearance and type and frequency of detected defects (if any) of all tested specimens is given in the ETA.

#### **2.2.6.17 Surface electrical resistance**

The surface electrical resistance is to be tested according to ISO 2878 and evaluated according to EN 124-5, Cl. 4.3.5 on one test specimen at least.

The TAB informs manufacturer about test result and its relation to provision of EN 124-5, Cl. 4.3.5.

The surface electrical resistance for tested specimen(s) is given in the ETA.

### **2.2.7 Durability**

#### **2.2.7.1 Durability of load bearing capacity**

##### **2.2.7.1.1 Deflection under load**

The deflection under load is to be tested according to EN 124-6, Cl. 5.2.3, 6.3 and Annex B, on three test specimens.

The test of deflection under load is not required for manhole tops and gully tops of presumed load class A 15 of all clear openings and for manhole tops and gully tops of presumed load class B 125 with clear opening less than or equal to 500 mm.

The TAB informs manufacturer about test result and its relation to provision of EN 124-1, Cl. 5.2.3 for presumed load class B 125 with clear opening higher than 500 mm and for higher presumed load classes of all clear openings.

The deflection under load of all tested specimens is given in the ETA.

### 2.2.7.1.2 Resistance to fatigue

The resistance to fatigue is to be tested according to EN 124-5, Cl. 6.3, for test load and number of cycles according to Tab. 2 and evaluated according to EN 124-5, Cl. 5.2.3, on one test specimen, consisting of complete manhole top or gully top, not previously subjected to load test. The test is not required for class A 15.

**Table 2: Number of cycles for fatigue test**

Presumed load class	Number of cycles	Cyclic fatigue test load $F_F$ [kN]	Load application rate [kN/s]	Monitored criterion
A 15	test is not required			Visible evidence of cracking
B 125	10 000	43	$7 \pm 2$	
C 250	100 000	92	$42 \pm 14$	
D 400	100 000	136	$70 \pm 20$	
E 600	100 000	216	$70 \pm 20$	
F 900	100 000	324	$70 \pm 20$	

Upon completion of the test of resistance to fatigue the test of permanent set according to 2.2.2.2 and the test of load bearing capacity according to 2.2.2.1 are to be performed on the test specimen used.

The TAB will inform manufacturer about test result and its relation to provisions of EN 124-1, Cl. 7.3, and EN 124-1, Cl. 7.2

The description of result of test of the resistance to fatigue, the permanent set after test of resistance to fatigue and the load bearing capacity after test of resistance to fatigue for tested specimen(s) are given in the ETA.

### 2.2.7.1.3 Creep resistance

The creep resistance for products of presumed load classes B 125, C 250, D 400, E 600 and F 900 is to be tested according to EN 124-5, Cl. 6.4 and evaluated according to EN 124-5, Cl. 5.2.4, on one test specimens at least.

The test is not required for presumed load class A 15.

The TAB informs manufacturer about test result and its relation to provision of EN 124-5, Cl. 6.4.

The creep resistance for tested specimen(s) is given in the ETA.

### 2.2.7.1.4 Impact resistance

The impact resistance is to be tested according to EN 124-5, Cl. 6.5 and evaluated according to EN 124-5, Cl. 5.2.5. The test is to be performed on one new test specimen at least for each temperature tested.

The product is to be tested for impact resistance at test/conditioning temperature(s) according to Tab. 3. Test in temperature  $(-20 \pm 3) ^\circ\text{C}$  is determined only for manhole tops and gully tops intended for use in cold climate conditions (i.e. at temperatures lower than  $-20 ^\circ\text{C}$ , see EN 124-6, Cl. 5.4.2).

**Table 3: Impact resistance**

Test parameters			Test method	Monitored criterion
Test / conditioning temperature		$(0 \pm 3) ^\circ\text{C}$	ISO 3127	Visible evidence of cracking
		$(-20 \pm 3) ^\circ\text{C}$		
Type of striker	d90 according to ISO 3127			
Radius of striker $R_s$	50 mm			
Presumed load class	Mass of striker	Height of striker		
A 15	$(1 \pm 0,05) \text{ kg}$	2,0 m		

Test parameters			Test method	Monitored criterion
B 125	(3,75±0,05) kg	2,0 m		
C 250	(4,5±0,05) kg	2,0 m		
D 400	(7,5±0,05) kg	2,0 m		
E 600	(7,5±0,05) kg	3,0 m		
F 900	(7,5±0,05) kg	4,0 m		

The TAB informs manufacturer about test result of impact resistance in relation to presence of monitored damage according to Tab. 3.

The test temperature according to Tab. 1 and test result of the impact resistance of tested specimen(s) are given in the ETA.

#### 2.2.7.1.5 Effect of heating

The effect of heating is to be tested according to EN 124-6, Cl. 6.2 and evaluated according to EN 124-6, Cl. 5.2.2 on one test specimen at least.

The TAB informs manufacturer about test result of effect of heating and its relation to EN 124-6, Cl. 5.2.2.

The description of result of test of effect of heating of tested specimen(s) is given in the ETA.

#### 2.2.7.1.6 UV stability

Resistance to UV radiation of manhole tops and gully tops is to be tested according to EN 124-6, Cl. 4.3.1 on one test sample, consisting of 10 test pieces of type 4 prepared according to EN ISO 8256, Cl. 6.1 and Fig. 1 from the same formulation used for manufacturing of the manhole tops or gully tops and machined, as appropriate, either from a moulded raw material plaque or from finished product according to manufacturer's selection. The test sample is to be split into two test specimens consisting of five test pieces each.

One test specimen is to be subjected to artificial ageing procedure according to EN ISO 4892-2, Method A, for radiation energy and cycling and temperature regime given for this method in EN 124-6, Tab. 2.

Second test specimen is to be deposited at standard atmosphere 23/50, class 1, according to EN ISO 291, Cl. 5 and Cl. 6, until ageing of the first one is not finished.

Immediately after finish of artificial ageing of the first test specimen, the tensile-impact strength  $\sigma_{TM}$  \*) according to EN ISO 8256, Method A, on both test specimens is to be determined and results recorded separately.

Note: \*) By the tensile-impact strength  $\sigma_{TM}$  according to EN 124-6, Cl. 4.3.1 and Tab. 2 and given in this EAD, the tensile-impact strength  $a_{IU}$  according to EN ISO 8256, Cl. 9.2 is mentioned.

Average value of tensile-impact strength  $\sigma_{TM}$  for test specimens without and after conditioning is to be calculated separately.

The TAB informs manufacturer about test result of the tensile-impact strength  $\sigma_{TM}$  without and after conditioning and its relation to provisions of EN 124-6, Cl. 4.3.1 and Tab. 2.

The result of test of the UV stability as tensile-impact strength  $\sigma_{TM}$  without and after conditioning for tested specimens is given in the ETA.

#### 2.2.7.1.7 Hardness

##### Products made of PA6 (i.e. without glass fibres)

The Shore D hardness is to be tested and evaluated according to EN ISO 868 on one specimen cut from an area of the product that does not contain additional surface material.

The type of material (PA6) and average value of the Shore D hardness of tested specimen is given in the ETA.

#### Products made of PA66 (i.e. with glass fibres)

The Barcoal hardness is to be tested and evaluated according to EN 59 on one specimen cut from an area of the product that does not contain additional surface material.

The type of material (PA66) and average value of the Barcoal hardness of tested specimen is given in the ETA.

##### 2.2.7.1.8 Water absorption

The test of water absorption is to be performed according to EN 124-5, Cl. 4.3.3 on one test specimen, consisting of the whole product (i.e. manhole top or gully top). The test procedure and evaluation of test according to EN ISO 62, Method 1, is to be used.

The TAB informs manufacturer about test result of the water absorption of product and its relation to provision of EN 124-5, Cl. 4.3.3.

Immediately after finish weighting of wet test specimen according to EN ISO 62 the visual inspection according to 2.2.6.16 and the test of permanent set according to 2.2.2.2 and the test of load bearing capacity according to 2.2.2.1 are to be performed.

The TAB informs manufacturer about test result of the permanent set and load bearing capacity after water absorption and its relation to provisions of EN 124-1, Table 4, and EN 124-5, Cl. 4.3.3.

The results of test of the water absorption and of tests of permanent set and of load bearing capacity after water absorption for tested specimen(s) are given in the ETA.

##### 2.2.7.1.9 Resistance to vehicle fuels

The test of the resistance to vehicle fuels is to be performed on one test specimen according to EN 124-5, Cl. 4.3.4 with conditioning in diesel for  $(168 \pm 2)$  h. The change of mass of product is to be determined according to EN ISO 175.

The TAB informs manufacturer about test result of the change of mass of product and its relation to provision of EN 124-5, Cl. 4.3.4.

Immediately after conditioning of test specimen according to EN ISO 175 and its finish weighting visual inspection according to 2.2.6.16 and the test of permanent set according to 2.2.2.2 and the test of load bearing capacity according to 2.2.2.1 are to be performed.

The TAB informs manufacturer about test results of the permanent set and load bearing capacity after conditioning in vehicle fuels and their relation to provisions of EN 124-5, Cl. 4.3.4.

The results of test of the change of mass of product after immersion in vehicle fuel and of tests of permanent set and of load bearing capacity after immersion in vehicle fuel of tested specimen(s) are given in the ETA.

##### 2.2.7.1.10 Weathering resistance

One specimen consisting of complete manhole top or gully top is to be tested in accordance with EN 124-5, Cl. 4.3.6 with artificial ageing according to EN ISO 4892-2, Method A, with exposure parameters, time and period given in EN 124-5, Table 2.

Immediately after finish of artificial ageing of test specimen the visual inspection of test specimen according to 2.2.6.16 and the test of permanent set according to 2.2.2.2 and the test of load bearing capacity according to 2.2.2.1 are to be performed.

The TAB informs manufacturer about result of visual inspection and test results of the tests of permanent set and of load bearing capacity after artificial ageing and their relations to provisions of EN 124-5, Cl. 4.3.6.



The description of test specimen, the permanent set and the load bearing capacity after artificial ageing for determining of weathering resistance of complete manhole top or gully top of tested specimen(s) are given in the ETA.

### **2.2.7.2 Durability of securing of covers/gratings within the frame**

#### **2.2.7.2.1 Securing of covers/gratings by mass per unit area**

If securing of covers/gratings by mass per unit area in the frame (see 2.2.3.2) is used, the durability of securing is to be determined as given in 2.2.3.2.

The method “Durability of securing provided by mass per unit area” and the smallest pull-out force  $F_v$  and its corresponding vertical displacement  $h$  [mm] from all tested specimens are given in the ETA.

#### **2.2.7.2.2 Metallic fixing**

If metallic fixing of securing of covers/gratings in the frame is used, the method “Durability of securing provided by metallic fixing” and information about the type of metallic fixing, material and thickness of its coating (if relevant) as described below, are given in the ETA.

If standardized parts of securing of covers/gratings in the frame are used (e.g. screws or bolts), their type and standardized specification are given in the ETA.

If non-standardized parts of metallic fixing for securing of covers/gratings in the frame are used (e.g. holders, fasteners, grips etc.), their type, material and thickness of coating (if relevant) are to be determined and tested as given below in accordance with EN 124-6, Cl. 4.4.

#### **Hot dip zinc coating**

The test is to be performed according to EN ISO 2178, Cl. 4.3, on 3 test specimens at least and evaluated according to Cl. 7.2.

The part of product and the average value of thickness of its hot-dip-zinc coating of steel is given in the ETA.

#### **Aluminium fixing**

The type of aluminium alloy according to EN 1706, EN 1676 and/or EN 573-3 of metallic fixing, if used, with presumed load class of manhole tops and gully tops, to which the metallic fixing is determined, is given in the ETA.

#### **Stainless steel**

The type of stainless steel according to EN 10088-1 used for metallic fixing, if used, is given in the ETA.

### **2.2.7.3 Durability of skid resistance**

The durability of skid resistance is to be determined according to EN 124-6, Cl. 5.2.5.4, on three test specimens.

The description and/or result of test of durability of skid resistance of all tested specimens are given in the ETA.

### **2.2.7.4 Durability of child safety characteristics**

The durability of effectiveness the child safety characteristics is to be determined according to EN 124-6, Cl. 5.2.5.5, on three test specimens.

The description of the durability of child safety characteristics for all tested specimens is given in the ETA.

### 3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

#### 3.1 System(s) of assessment and verification of constancy of performance to be applied

For the products covered by this EAD the applicable European legal act is Decision 1997/464/EC as amended by Decision 2004/663/EC.

The AVPC system is: **1**

In addition, with regard to reaction to fire for products covered by this EAD the applicable European legal act is Decision 1997/464/EC as amended by 2004/663/EC.

The AVPC systems are: **1, 3, 4**

#### 3.2 Tasks of the manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of the product in the procedure of assessment and verification of constancy of performance are laid down in Table 4.

**Table 4 Control plan for the manufacturer; cornerstones**

No	Subject/type of control (product, raw/constituent material, component - indicating characteristic concerned)	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Factory production control (FPC)</b> [including testing of samples taken at the factory in accordance with a prescribed test plan]					
1	Reaction to fire	2.2.1	Control plan	1	at modification of product process or material used
2	Load bearing capacity		Control plan	3	1 / year
	• Load bearing capacity	2.2.2.1			
	• Permanent set	2.2.2.3			
3	Securing of covers/gratings		Control plan	3	1 / 5 years
	• Locking device	2.2.3.1			
	• Mass per unit area	2.2.3.2			
	• Other method	2.2.3.3			
4	Child safety • Locking accessory • Securing feature • Weight	2.2.4	Control plan	3	1 / 5 years
5	Skid resistance		Control plan	3	1 / 5 years
	• Skid resistance	2.2.5			
6	Functional performance		Control plan	3	visual inspection of every product
	• Vents in covers	2.2.6.1			
	• Clear opening of manhole tops for man entry	2.2.6.2			
	• Depth of insertion	2.2.6.3			
	• Clearance • Total clearance • Clearance around hinges	2.2.6.4.1 2.2.6.4.2			
	• Compatibility of seatings	2.2.6.5			
	• Handling of covers and grating	2.2.6.6	Control plan		

No	Subject/type of control ( <i>product, raw/constituent material, component - indicating characteristic concerned</i> )	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
	• Slot dimensions of gratings	2.2.6.7	Control plan	1	1 / year
	• Dirt pans and dirt buckets	2.2.6.8	Control plan		
	• Positioning of cover and gratings	2.2.6.9	Control plan		
	• Flatness of manhole covers and gratings	2.2.6.10	Control plan		
	• Concaveness of gratings	2.2.6.11	Control plan		
	• Sealing features of manhole tops • Watertightness: type Wt • Odourtightness: type Ot • Backflow tightness: type Bt	2.2.6.12.1 2.2.6.12.2 2.2.6.12.3	Control plan		
	• Frame bearing area	2.2.6.13	Control plan		
	• Frame depth	2.2.6.14	Control plan		
	• Opening angle of hinged covers/ gratings	2.2.6.15	Control plan		
	• Appearance	2.2.6.16	Control plan		
	• Surface electrical resistance	2.2.6.17	Control plan		
7	<b>Durability</b>				
	• Durability of load bearing capacity • Deflection under load • Resistance to fatigue • Creep resistance • Impact resistance • Effect of heating • UV stability • Hardness • Water absorption • Resistance to vehicle fuels • Weathering resistance	2.2.7.1.1 2.2.7.1.2 2.2.7.1.3 2.2.7.1.4 2.2.7.1.5 2.2.7.1.6 2.2.7.1.7 2.2.7.1.8 2.2.7.1.9 2.2.7.1.10	Control plan	1	1 / year 1 / 5 years 1 / 5 years 1 / 5 years 1 / 5 years 1 / 5 years 1 / year 1 / year 1 / 5 years 1 / 5 years
	• Durability of securing of covers/gratings within frame • Securing of covers/gratings by mass per unit area • Metallic fixing	2.2.7.2.1 2.2.7.2.2	Control plan	3	1 / 5 years 1 / year
	• Durability of skid resistance	2.2.7.3	Control plan	3	1 / 5 years
	• Durability of the child safety characteristic	2.2.7.4	Control plan	3	1 / 5 years

### 3.3 Tasks of the notified body

The cornerstones of the actions to be undertaken by the notified body in the procedure of assessment and verification of constancy of performance for product under AVCP system 1 are laid down in Table 5.

**Table 5 Control plan for the notified body; cornerstones**

Subject/type of control ( <i>product, raw/constituent material, component - indicating characteristic concerned</i> )	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Initial inspection of the manufacturing plant and of factory production control</b>				
Initial inspection of the manufacturing plant and of factory production control carried out by the manufacturer regarding the constancy of performance related to the product.	As defined in the EAD	MTF*	As defined in the EAD	When starting the production
<b>Continuous surveillance, assessment and evaluation of factory production control</b>				
Continuous surveillance, assessment and evaluation of the factory production control carried out by the manufacturer regarding the constancy of performance related to the product.	As defined in the EAD	MTF*	As defined in the EAD	once per year
*Manufacturer's technical file				

## 4 REFERENCE DOCUMENTS

As far as no edition date is given in the list of standards thereafter, the standard in its current version at the time of issuing the European Technical Assessment, is of relevance.

Commission Delegated Regulation (EU) No. 2016/364 of 1 July 2015 on the classification of the reaction to fire performance of construction products pursuant to Regulation (EU) No. 305/2011 of the European Parliament and of the Council

EN 59 Glass reinforced plastics - Determination of indentation hardness by means of a Barcol hardness tester

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

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

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

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

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

EN 124-6 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)

EN 573-3 Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 3: Chemical composition and form of products

EN 1253-4 Gullies for buildings – Part 4: Access covers

EN 1386 Aluminium and aluminium alloys - Tread plate - Specifications

EN 1433 Drainage channels for vehicular and pedestrian areas – Classification, design and testing requirements, marking and evaluation of conformity

EN 1676 Aluminium and aluminium alloys - Alloyed ingots for remelting - Specifications

EN 1706 Aluminium and aluminium alloys - Castings - Chemical composition and mechanical properties

EN 10088-1 Stainless steels - Part 1: List of stainless steels

EN 13036-4 Road and airfield surface characteristics – Test methods – Part 4: Method for measurement of slip/skid resistance of a surface: The pendulum test

EN 13501-1 Fire classification of construction products and building elements - Part 1: Classification using test data from reaction to fire tests

EN ISO 62 Plastics - Determination of water absorption

EN ISO 175 Plastics - Methods of test for the determination of the effects of immersion in liquid chemicals

EN ISO 291 Plastics – Standard atmospheres for conditioning and testing

EN ISO 868 Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness)

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

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

EN ISO 8256 Plastics - Determination of tensile-impact strength

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