TECHNICAL DOCUMENT

WATER

Sanitary Components

Technical document 076-05

Gullies with mechanical seal

Technical document 076-05 rev. 00
18/03/2020

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MODIFICATION HISTORY

Revision no.	Date	Modifications
00	**18/03/2020**	**Creation of the document.** **Editorial updating according to the structure in force as a result of the drafting of the Technical management appendix to the NF 076 reference system, rev.12.**

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FOREWORD

In the absence of specific information, the following tolerances apply to the parameters in this document:

- Flow rate and pressure: ± 2% of the defined value
- Temperature:
  - Cold Water: ± 2 °C on the defined value
  - Hot Water: ± 2 °C on the defined value
- Time: 10% of the defined value
- Other values: ± 2% of the defined value

All the measuring instruments used to perform the tests shall have a maximum tolerated deviation of ± 2% in relation to the measured value.

1 Field of application

This document specifies the requirements relating to the design and performance, and to the test methods applicable to gullies with mechanical seals (with or without residual water) used inside buildings, exclusively for bathrooms for individual use, to drain domestic wastewater as a result of personal hygiene.

It does not apply to shower outlets covered by Standard NF EN 274.

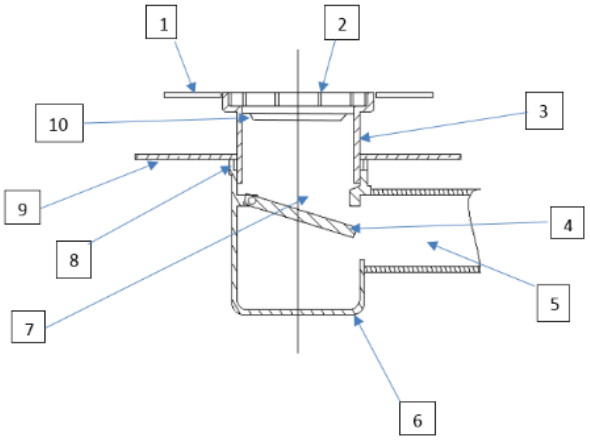
2 Definitions

2.1 Floor gully with mechanical seal

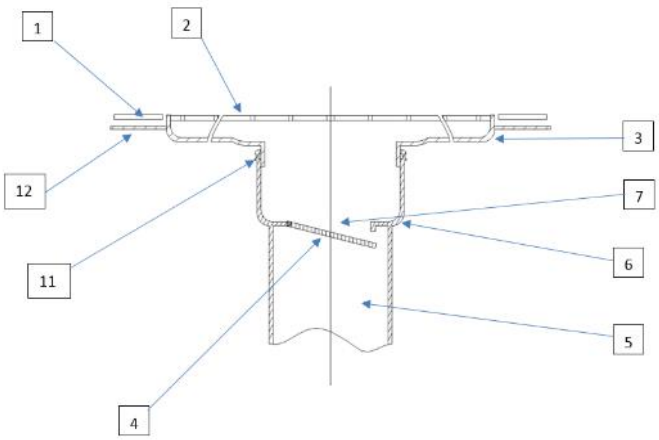
A water removal component, the upper part of which is a grating or a grating cover, fitted with a sealing flange, that can be installed at the level of the ground, floor or slab and designed to receive wastewater through the grating and drain this wastewater through the outlet. Sealing is achieved mechanically without needing water.

'Gutter' products are to be considered as floor gullies.

Siphon de sol



Caniveau de douche



Caption:

1: finished floor
2: grating/cover
3: extension
4: obturator
5: outlet
6: body
7: access for cleaning
8: weep hole
9: flange for bonding membranes
10: sediment bucket
11: seal
12: flange for bonding liquid applied membrane

2.2 Wastewater

Domestic wastewater excluding water from toilets and urinals.

2.3 Gully partition

Removable part of the body preventing contaminated air travelling from the outlet to the gully inlet by a mechanical sealing system.

2.4 Clear opening

Diameter of the largest circle that can fit into the unsupported area of the grating.

2.5 Maximum flow capacity (see Figure 13)

The maximum flow capacity of the gully is equal to the point at which the gradient of the flow curve changes as a function of the water depth.

3 Requirements

3.1 Design and construction

3.1.1 General

Floor gullies shall be capable of being connected to the pipework system covered by relevant European Standards, and, when installed in accordance with the manufacturer's instructions, shall form an integral part of the building. There shall be no movement possible between the body and the slab, which would impair the functioning of the installed gully.

In areas where pressure testing of the pipe system is necessary floor gullies for use in the floor shall enable such test to be performed.

The upper surfaces of frame and grating shall be flush. When in position, it shall not be possible for gratings and covers to be dislodged from the frame, but they shall be easy to be released for e.g. maintenance and cleaning.

Gullies shall be prevented, by design features such as fixings or weights, from uncontrolled floating or becoming displaced.

Gullies and their components shall be resistant to normal actions of mechanical and thermal character.

Gullies may be designed with or without side inlet.

Gullies shall be delivered with installation instructions.

All pipe assemblies to and from the floor gully shall be designed to be watertight in accordance Standard EN 476.

3.1.2 Appearance

Internal and external surfaces shall be free from sharp edges and imperfections, which could impair functioning of the gully or create a risk of injury.

3.1.3 Apertures in the gratings

The apertures can be holes or slots of any shape and can also be formed between the grating and the frame.

When measured in accordance with § 4.1, the permissible aperture dimensions for gratings are given in Table 1.

Table 1: Apertures in the gratings

Class		Dimensions of apertures in gratings	
		Minimum width mm	Maximum width mm
K 3	Gullies with gratings	4 [a]	8
	Gullies with slots	Width: 3 Length: 300	Width: 5 Length: unlimited
[a] Apertures less than 4 mm wide are permitted and shall not form part of the hydraulic tests.			

3.1.4 Resistance of the seal to pressure

When the test is performed in accordance with § 4.2, the sealing system shall remain in place.

3.2 Blockage prevention

3.2.1 Access for cleaning

Gullies and gutters shall be fitted with devices allowing the mechanical cleaning of the inlet and outlet pipes. When an opening with an airtight and watertight cover or plug is provided, the clear diameter of such opening shall not be less than 32 mm.

Any opening provided for mechanical cleaning shall be tested in accordance with § 4.3.1.

3.2.2 Removing the sealing system

It shall be possible to remove the gully sealing system in one piece without needing specific tools.

3.3 Installation location

3.3.1 General

The following paragraphs give guidelines to choose the class of gully required according to the installation location. The choice of the appropriate class is the responsibility of the specifier.

Class K 3: Areas without vehicular traffic, such as dwellings, commercial and some public buildings.

3.4 Materials

Materials shall withstand a maximum intermittent wastewater temperature of 95°C.

Materials shall withstand the stresses likely to occur during installation and operation.

Gullies shall be made of corrosion-resistant materials.

3.5 Thermal behaviour of gullies

When tested in accordance with § 4.3.4, gullies and their components shall show no visible deformation or change in the components' surface appearance that could affect their fitness for use.

3.6 Leaktightness

3.6.1 Odour tightness

When the test is performed in accordance with § 4.6.1, the pressure shall not drop below 180 Pa over a period of 15 min.

3.6.2 Watertightness of gully bodies

No leaks shall occur when tested in accordance with § 4.6.2.

3.6.3 Watertightness of upstands

Where the situation dictates tightness between upstand and body, the joint between the upstand and the body shall be watertight when tested in accordance with § 4.6.2.

3.7 Mechanical strength

3.7.1 Loading strength

Gullies and/or gratings are classified by loading strength, when tested in accordance with § 4.4, according to the following class: K 3.

3.7.2 Ring or clamping flange

When the test is performed in accordance with § 4.5.2, the clamping ring shall not change its position and shall not show any damage that impairs function after testing.

3.7.3 Additional requirements depending on installation

3.7.3.1 Upstands for gullies used with a flexible plastic floor covering

Gullies with upstands intended for non-embedded use where deformations between floor gully and upstand may occur shall be tested in accordance with § 4.5.1 and shall satisfy the requirements in § 4.6.2.

3.7.3.2 Gullies for use with a membrane

Gullies for use with a membrane shall be fitted with a connecting flange in accordance with Table 2.

Table 2: Connecting flanges

Type of seal in flange area	Minimum effective flange width mm			
	Connecting flange with counter-flange		Flange for bonding	Flange for welding
	Fixed [a]	Loose		
Membranes manufactured from plastics or elastomers with or without wearing surfaces				
– attached with adhesive	—	—	30	—
– clamped	50	40	—	—
– welded on membrane	—	—	—	50
Liquid applied membranes with or without wearing surfaces	—	—	30	—

[a] This value also applies to gullies fitted with a membrane at the manufacturer's works.

For floor gullies where a clamping ring without weepholes is used, the connection of the flange shall be leak tight when tested in accordance with § 4.6.3.

3.7.3.3 Gullies for use with a flexible plastic floor covering

Gullies for use in floor constructions where the floor covering is a watertight synthetic material such as PVC shall be fitted with a sealing flange in accordance with Table 2 and/or a membrane clamping ring and shall be watertight when tested in accordance with § 4.6.3.

3.7.3.4 Gullies with membrane fitted and assembled at the factory

When tested in accordance with § 4.5.3, there shall be no peeling of the membrane at ≤ 100 N.

3.7.3.5 Gullies for use with a Liquid Applied System (LAS)

Gullies for use with an LAS, with or without wearing surface, shall be fitted with a flange for bonding in accordance with Table 2 and shall be watertight when tested in accordance with § 4.5.3, after thermal cycling testing in accordance with § 4.3.4.2.

3.8 Flow rates

3.8.1 Flow through the grating

When tested in accordance with § 4.7.1, gullies shall be capable of discharging at flow rates given in Table 3.

In addition to the requirements set out in Table 3, the manufacturer shall supply the flow rate at a head of water of 10 mm in the technical document for each reference of product. A flow rate curve can also be used.

Table 3: Minimum flow rates for gullies

Nominal size of outlet[a]		Floor gullies ($q_{grating}$)	
DN/OD	DN/ID	Minimal flow l/s	Head of water *h* mm
40		0.6	20
	40	0.6	
50		0.8	
	50	0.8	
[a] All dimensions not mentioned in this table shall be tested with the next higher dimension.			

Where any floor gully is used to receive the discharge from a single shower head, the minimum flow rate shall be 0.4 l/s. Such products shall be marked specifically.

4 Test methods

4.1 Dimensions of apertures in gratings

By means of suitable measuring instruments or balls of suitable sizes in accordance with Table 1, check that the dimensions of the apertures comply with the minimum and maximum dimensions specified in § 4.1.3.

4.2 Resistance of the seal to pressure

a) Connect the gully's outlet to the test apparatus illustrated in Figure 1 and fill the gully with mains water.

b) Close the flap and slowly apply negative pressure using the by-pass valves until the sealing device opens. Record the pressure.

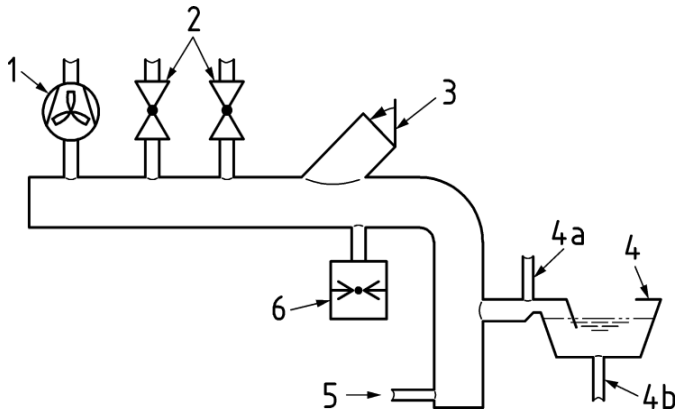
c) Open the flap and fill the gully with water again. Repeat step b).

Record the pressure at which the sealing device opens.

d) Open the flap and fill the gully with water again.

e) With the flap closed, apply constant positive pressure of 400 (-0/+40) Pa to the gully outlet for at least 15 minutes.

Check that the pressure does not drop below 90% of the initial value and that the sealing system remains in place.



Caption

1 pump
2 by-pass valves
3 by-pass valves
4 floor gully
4a pressure recorder connection
4b water level recorder connection
5 drain cock
6 pressure measuring device (manometer)

Figure 1: Typical test apparatus to determine the sealing device's resistance to pressure

4.3 Blockage prevention

4.3.1 Access for cleaning

Remove and refit the parts of the gully that are designed for cleaning access to the floor gully itself and/or to the pipework to which it is connected. Measure and check compliance with the requirements in § 3.2.1.

4.3.2 Anti-blockage

Pass a non-metallic ball with a diameter of 8 mm through the gully, from which the grating/grating cover has been removed, from the inlet to the outlet, merely by tilting the gully in appropriate directions and with no other force applied to the ball.

4.3.3 Clogging test

4.3.3.1 General

The expected mechanical performance shall be the same after the test as before the test. i.e. The mechanical seal shall not be blocked or get jammed in a particular position and shall retain the same hydraulic and leak tightness characteristics before and after the test.

After the test, the gully shall not display any signs of damage likely to impair its operation.

4.3.3.2 Test solution

The test solution is produced in accordance with Table 4.

Table 4 — Test solution

Component	CAS number	Concentration (Cm) mg/l
Lactic acid	50-21-5	100
Shredded oakum fibres: 50% short fibres (15 ± 5) mm 50% long fibres (100 ± 5) mm	a and b	50
Sodium dodecyl sulphate	151-21-3	50
Glycerol	56-81-5	200
Sodium hydrogen carbonate	144-55-8	70
Sodium sulphate	7757-82-6	50
[a] Oakum (hemp, cellulose, etc.) [b] The fibres must have a diameter of between 0.05 and 0.10 mm (exactly like a human hair)		

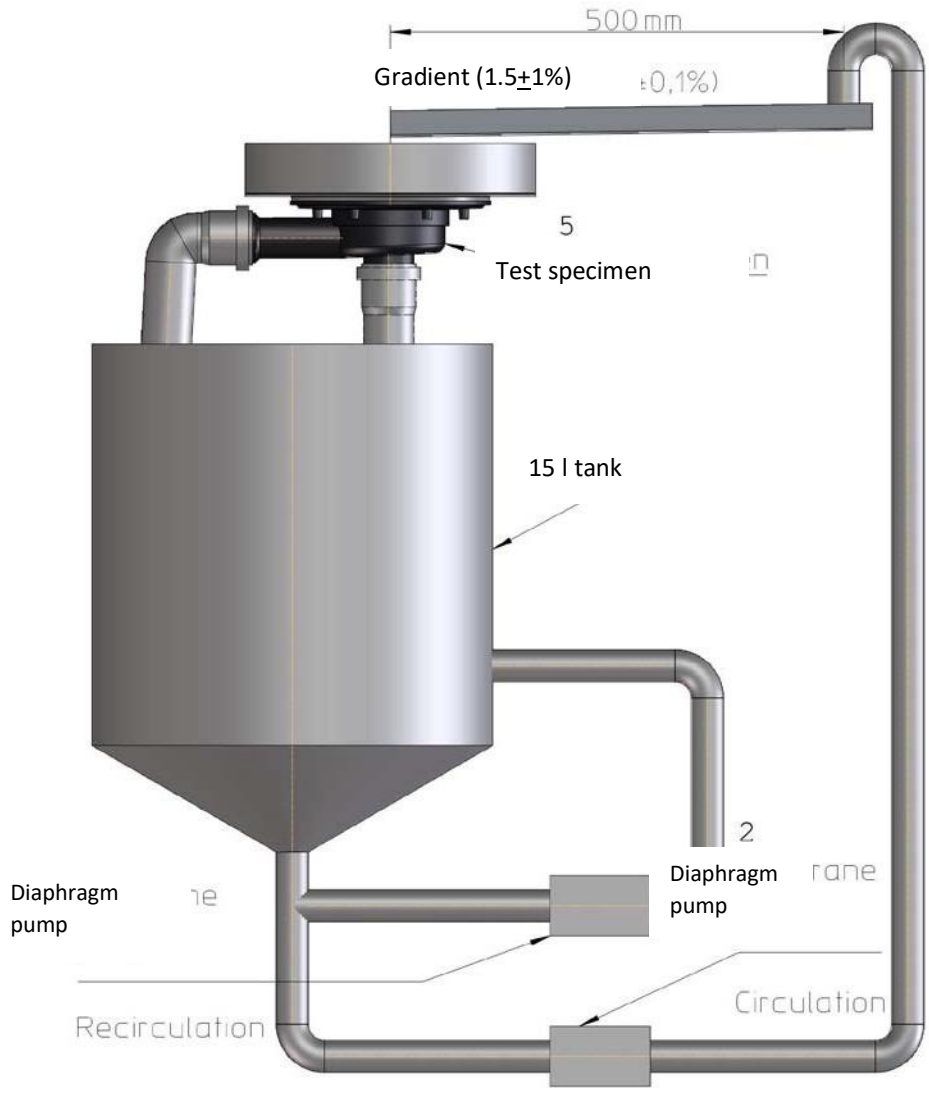
The test solution must be prepared using water with the following characteristics:

- PH between 6.5 and 7.5
- Hardness of 25 to 32 °f
- Total volume of the solution: 12 l

NOTE 1: Drinking water compliant with the above-mentioned characteristics can be used.

4.3.3.3 Test apparatus

The test apparatus must comply with Figure 2 below.



Keywords:

1 tank, the form of which avoids sedimentation, filled with test solution
2 pump that does not affect the test solution, e.g. diaphragm pump or screw pump
3 pump with controllable flow rate that does not affect the test solution, e.g. diaphragm pump or screw pump
4 sloping channel
5 test specimen with horizontal/vertical outlet

Figure 2: Typical test apparatus to test the anti-blockage function of gullies

4.3.3.4 Operating procedure

The test shall be performed over 14 days, installing the gully according to the manufacturer's specifications and removing the grating and filter.

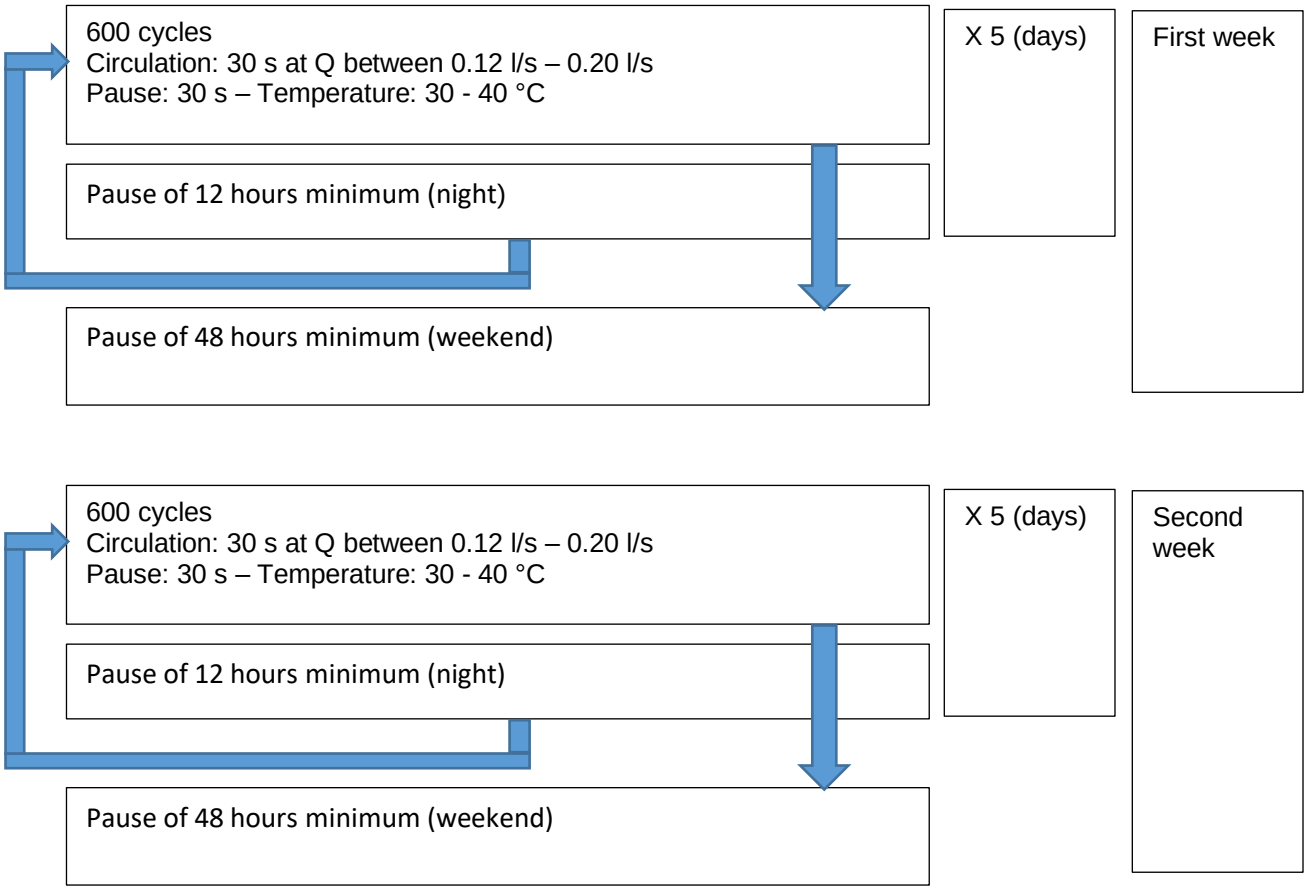


Figure 3: Illustration of the test method

4.3.3.5 Parameters of the test method above

The ambient temperature of the solution shall be between 30°C and 40°C.

Adjust the flow rate from 0.12 l/s to 0.20 l/s during the flow phases.

4.3.3.6 Requirements

After the test described in § 4.3.3.4, a functional check shall be performed on the gully without cleaning according to the following sequence:

- Carry out the pressure resistance test according to § 4.2. Compliance with the requirements specified in § 3.1.4 is required.
- Carry out the odour tightness according to § 4.6.1. Compliance with the requirements specified in § 3.6.1 is required.
- Carry out the flow rate test described in § 4.7. Compliance with the requirements specified in § 4.7.3 is required.

4.3.4 Thermal behaviour

4.3.4.1 Temperature cycling

Mount the gully in accordance with Figure 4. Connect a suitable pipe to the outlet of the gully (the outlet shall be open at all times). If there are different versions of the same components, the test shall be carried out on the most unfavourable combination.

Pour water through the grating, or if this is not possible, through the side water inlet(s) as follows:

1. (0.5 ± 0.05) l/s of hot water at (93 ± 2) °C for (60 ± 2) s;
2. Pause for (60 ± 2) s;
3. (0.5 ± 0.05) l/s of cold water at (15 ± 10) °C for (60 ± 2) s;
4. Pause for (60 ± 2) s.

Repeat this cycle 360 times (24 h).
This test does not apply to gullies exclusively composed of metallic materials.

4.3.4.2 Additional test for gullies used with flexible plastic floor coverings and LAS systems (Liquid Applied Systems)

This additional test shall be applied to gullies intended for installation in floors where the floor covering is a watertight material. The floor covering may be connected to the gully by bonding, a combination of bonding and a clamping ring, or by a clamping ring alone.

Install the gully in the test box in accordance with the manufacturer's instructions.

Cover the entire surface of the inside of the box with the flexible plastic floor covering, the thickness of which is that recommended by the gully manufacturer. It may be necessary to perform several tests if the gully is designed for different flexible plastic floor covering thicknesses. When fitting the flexible plastic floor covering, follow the floor covering manufacturer's instructions.

Fit a moisture indicator to the bottom of the box at the opening where the gully is installed.
Feed the gully with water, having it flow over the flexible plastic floor covering then through the grating, as shown in Figure 4.
Pour the water as follows:

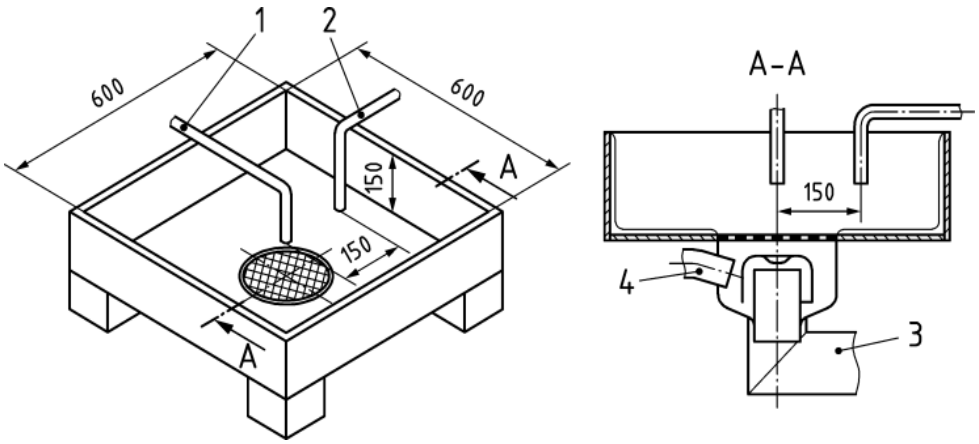
1. (0.5 ± 0.05) l/s of hot water at (60 ± 2) °C for (60 ± 2) s;
2. Pause for (60 ± 2) s;
3. (0.5 ± 0 of cold water at (15 ± 10) °C for (60 ± 2) s;
4. Pause for (60 ± 2) s.

Repeat this cycle 1,500 times (100 h).

During the test the outlet of the floor gully shall be closed when water is being supplied, and open during pauses. Water will back up by approximately 80 mm in the box.

The outlet of the gully shall be connected to a pipe of 1000 mm length of the same DN as the outlet, laid at a gradient of (1.5 ± 0.1)%.

Dimensions in millimetres



Caption

1 hot and cold water supply for testing the gully
2 hot and cold water supply for testing the flexible plastic floor covering connection
3 outlet
4 side water inlet

Figure 4: Test box for temperature cycling and for testing gullies used with flexible plastic floor covering

4.4 Load resistance test

4.4.1 Test loads and permanent set

The values for test loads and loading speed given in Table 5 shall be applied.

Table 5: Test loads and loading speed

Class		Test load *P* kN	Loading speed kN/s
H	1.5	1.5	0.1
K	3	3	0.2

The resulting permanent set *f* shall not exceed the values given in Table 6.

Table 6: Maximum permanent set

Clear opening *CO* mm	Permanent set *f* mm
CP ≤ 250	≤ 1.0
250 < *CO* ≤ 500	≤ 0.004. *CO*

4.4.2 Test apparatus

The test apparatus, preferably a hydraulic press, shall be capable of applying a load at least 25% greater than the test loads and maintaining the test load within a tolerance ± 3%.
The dimensions of the bed of the testing machine shall be greater than the bearing area of the unit to be tested.

4.4.3 Test blocks

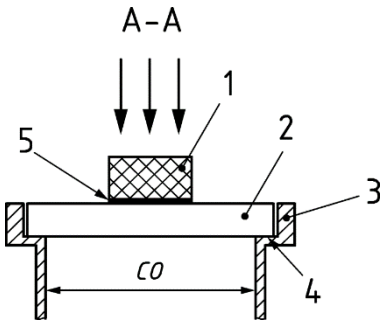
The dimensions and shape of the test blocks shall be compliant with Table 7.

Table 7: Shape, size and positioning of test blocks (Figures 5 to 8)

Clear opening *CO* mm	Shape and size of test block mm		Minimum unsupported distance *Δ* mm
	Diameter *D*	Rectangular Width *W* × length *L*	
25 < *CO* ≤ 50 [a]	20 ± 0.5	(20 ± 0.5) × (90 ± 0.5)	2.5
50 < *CO* ≤ 90	40 ± 0.5	(40 ± 0.5) × (110 ± 1.0)	5
90 < *CO* ≤ 140	75 ± 0.5	(75 ± 0.5) × (120 ± 1.0)	7.5
140 < *CO* ≤ 200	110 ± 1.0	(110 ± 1.0) × (180 ± 1.0)	15
200 < *CO* ≤ 300	150 ± 1.0	(150 ± 1.0) × (250 ± 1.0)	25
300 < *CO*	250 ± 1.0	(250 ± 1.0) × (400 ± 1.0)	25
[a] Load testing is not required for CO ≤ 25.			

The size of the test block is related to the clear opening and the minimum unsupported distance. It shall never exceed the periphery of the grating. In case of conflict the smaller referring test block shall be applied. The shape of the test block is related to the shape of the grating:

- For round and polygonal shaped gratings, e.g. round, triangular or square gratings, a round test block shall be applied in accordance with the clear opening in Table 7;
- For rectangular shaped gratings, a rectangular shaped test block shall be applied in accordance with the clear opening in Table 7;
- For rectangular shaped test blocks, the vertical corner radius shall be 3 mm;
- For irregular supported gratings, a test block shall be applied that allows a minimum unsupported distance in accordance with Table 7.

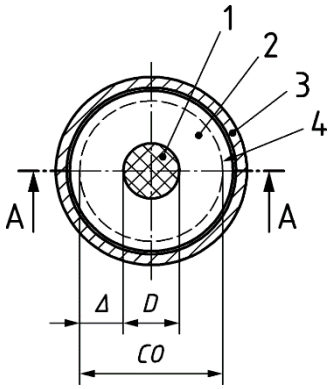


Caption

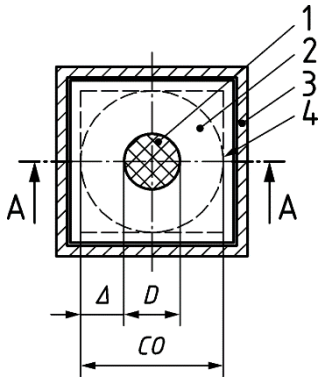
1 test block
2 grating
3 frame
4 support
5 intermediate layer
CO = clear opening

Figure 5: Test block applied on grating

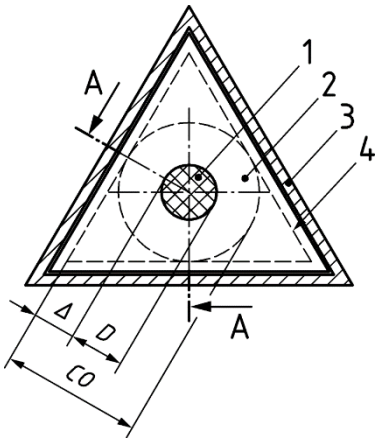
The test block shall be applied in a central position. In no case, the unsupported distance between the test block and the supported points of the grating shall exceed the values given in Table 7.



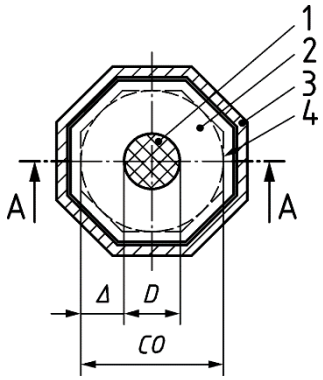
a) round grating



b) square grating



c) triangular grating

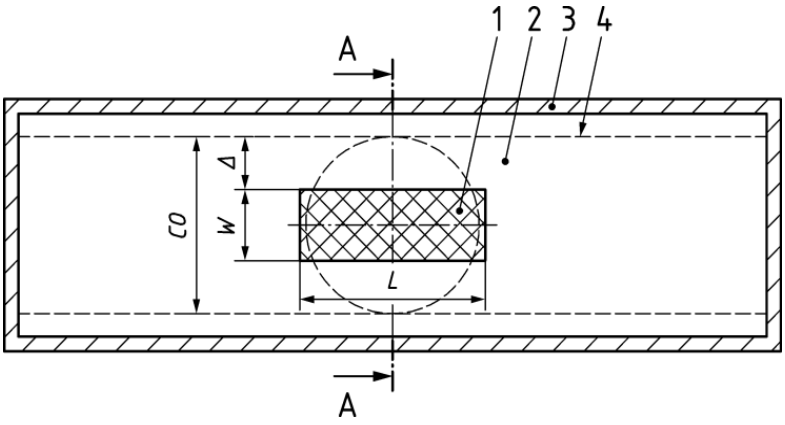


d) octagonal grating

Caption

1 test block
2 grating
3 frame
4 support
Δ minimum unsupported distance
D diameter of test block
CO = *clear opening*

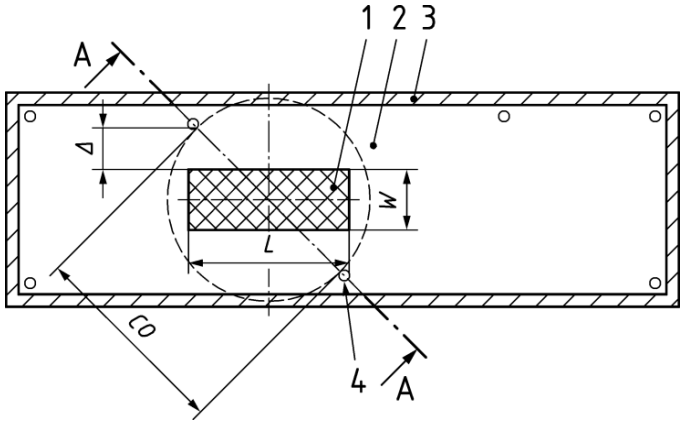
Figure 6: Top view of round test block applied on gratings



Caption

1	test block	*Δ*	minimum unsupported distance
2	grating	CO =	clear opening
3	frame	*W*	test block width
4	support	*L*	test block length

Figure 7: Top view of rectangular test block applied on grating with regular support



Caption

1	test block	*Δ*	minimum unsupported distance
2	grating	CO =	clear opening
3	frame	*W*	test block width
4	support	*L*	test block length

Figure 8: Top view of rectangular test block applied on grating with irregular support (for the clear opening, chose the longest length between 2 supports, representing the most unfavourable case)

An intermediate layer of a thin coating of gypsum, cardboard, rubber or similar shall be applied between the grating or cover and the test block. The bottom edges of the test block shall be rounded with a radius ≤ 3 mm. When testing gratings or covers with a non-flat surface, the contact face of the test block shall be shaped to match the grating or cover.

4.4.4 Procedure

The testing of gratings and covers shall be carried out either on the grating or in a suitable test frame, in accordance with the manufacturer's installation instructions, which shall be placed on the bed of the testing machine so that it lies flush on it. Any irregularities shall be suitably compensated for.

If the components can be combined in different ways, the test shall be done for the most unfavourable combination.

Before the load is applied, locate the geometric centre of the cover or grating and ensure this point has a smooth surface. Then take a datum reading at this point measured to an accuracy of ± 0.1 mm.

For gratings or covers made of non-ductile cast iron, or of this material in combination with concrete, the load shall be steadily increased with the prescribed load and loading speed in accordance with Table 5. Check that no visible crack or fracture has occurred. For gratings or covers made of ductile cast iron, steel, non-ferrous materials, plastics materials or these materials in combination with concrete, the load shall be steadily increased with a loading speed in accordance with Table 5 up to 2/3 of the test load. The load on the test specimen is then released. This procedure shall be carried out five times. After 1 hour, take a new reading at the geometric centre of the cover or grating.

The permanent set shall then be determined as the difference between the two readings and the set shall not exceed the values given in Table 6. The loading shall then be steadily increased with the loading speed and test load in accordance with Table 5 and maintained for 5 min. Check that no visible crack or fracture has occurred.

4.5 Mechanical strength

4.5.1 Upstands for gullies and gutters for use in suspended floors

Conduct the test in the case of non-embedded floor gullies only.

Where different versions of gully or upstand have the same interconnection, only one version shall be tested.

If both side and vertical outlet versions exist, only the vertical outlet version shall be tested.

Fit the upstand on the gully and attach the upstand to the wall.

In accordance with Figure 9, attach a metal pipe (preferably stainless steel) of the same diameter as that of the gully outlet.

Apply a vertical force of 100 N perpendicular to the axis of the pipe at a distance of 1.0 m from the flange.

Conduct the test three times, each time with a duration of 60 s, using the same floor gully.

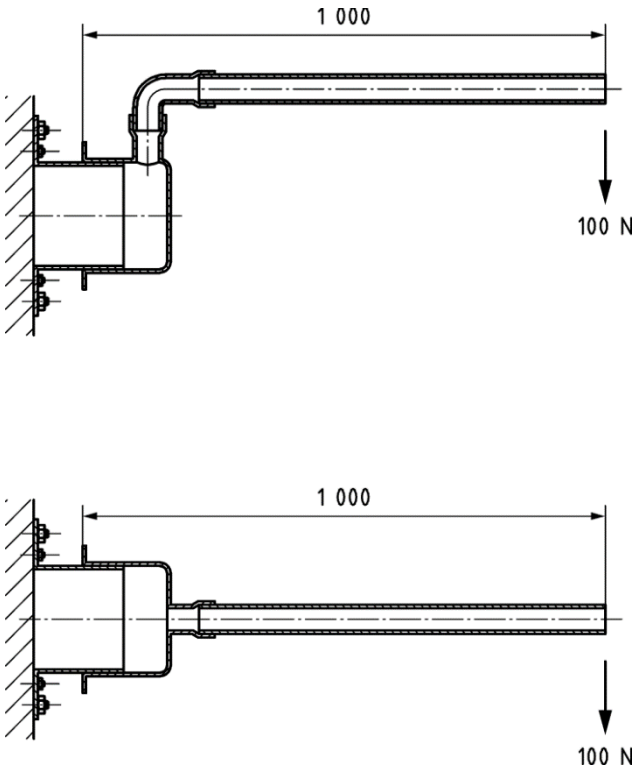


Figure 9: Test apparatus for upstands

4.5.2 Membrane clamping ring or flange

Fit the membrane clamping ring or flange to the body in accordance with the manufacturer's instructions. Apply a vertical force of 400 N to the underside of the ring such that the ring is pulled away from the body.

Perform the test at the three most unfavourable points and determine if the ring is dislodged.

4.5.3 Gullies with membrane fitted and assembled at the factory

Cut a 50 mm wide strip specimen from the body including the membrane and subject it to tensile force at a rate of (50 ± 10) mm/min.

When using clamping rings or flanges, two cuts 50 mm apart shall be made in the membrane in the clamping area before positioning the ring or flange. After fitting the clamping ring or flange, both cuts shall be extended to the outer edge of the membrane.

Clamp the test specimen cut from the body or the entire body in the lower jaw of the test apparatus such that a strip of the membrane 100 mm long can be attached to the upper jaw. Perform the test in a peel direction approximately perpendicular to the upper surface of the body.

Check whether any peeling occurs when a peeling force of a maximum of 100 N is applied.

4.6 Leak tightness

4.6.1 Odour tightness

Before performing the test, remove and refit the gully. Check that all the parts are correctly fitted.

Use the test apparatus in Figure 10, or similar.

Ensure that the temperatures of the gully, the water in the water seal and the laboratory do not vary by more than ± 2°C during the test.

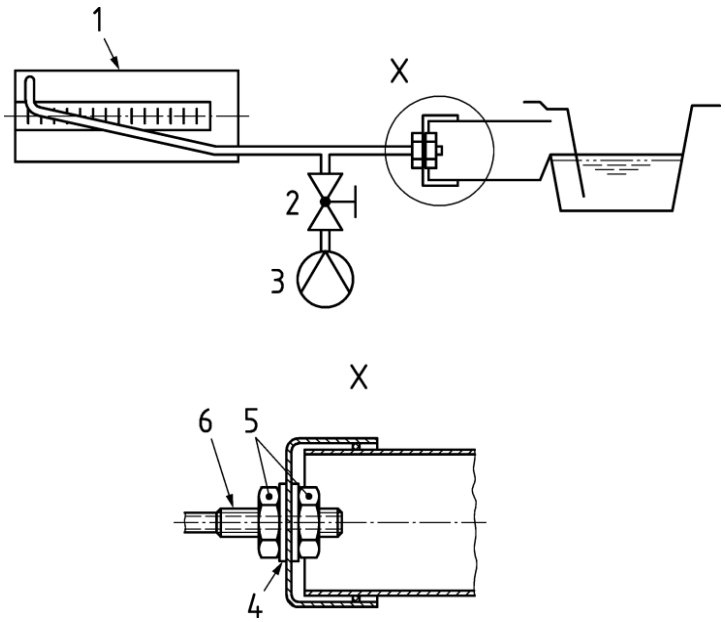
Connect the gully to an airtight pipe with a volume of approximately 2.0 l.

Fill the gully with water. Apply a positive pressure of 200 Pa through the gully outlet. When the pressure is stable, close valve 2.

Stop the test if the pressure has not stabilised within 2 minutes (test failed).

After 15 minutes, check whether a leak tightness problem has caused a pressure drop (which shall not exceed 20 Pa).

Apply the air pressure by means of a manual pump or similar device. The connection between the end of the outlet, the pump and the pipe shall be as short as possible, and the internal volume reduced as shown in Figure 10. Use an inclined-tube manometer, a U-tube manometer or similar device to measure the pressure.



Caption

1 inclined-tube manometer
2 valve
3 air supply
4 seal and washers
5 nuts
6 threaded end of the pipe

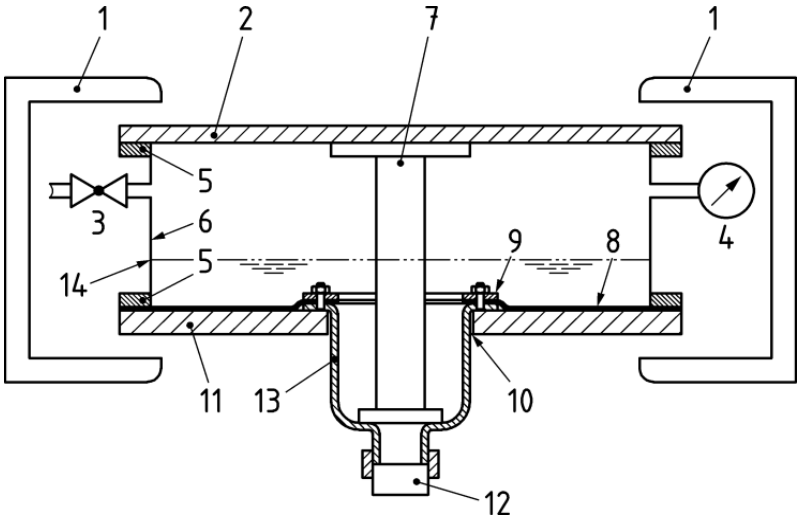
Figure 10: Test apparatus for odour tightness (example)

4.6.2 Watertightness of gully bodies and upstands

Hydrostatic pressure of 0 kPa to 10 kPa shall be applied to the gully assembly with the outlet sealed. The test shall be deemed to have been passed if, for the duration of 15 min, no water leaks through the body walls, welds or joints.

4.6.3 Gullies used with flexible plastic floor covering, membranes or liquid applied systems (LAS)

The test box and vacuum box used to create negative pressure are illustrated in Figure 11.



Caption

1 appliance for bracing/pressing the items 2, 5, 6, 8, 10
2 transparent cover (e.g. methyl methacrylate)
3 connecting branch for stop valve(s) to apply the pressure/vacuum
4 connecting branch for the pressure measuring device
5 seal
6 side wall of the test box
7 support preventing the specimen from lifting up during the pressure test
8 membrane/liquid applied membrane
9 upstand or gully connecting flange
10 moisture detector
11 mounting plate
12 sealed specimen outlet
13 body
14 water level

Figure 11: Vacuum box (example)

Install the gully at the bottom of the test box in accordance with the manufacturer's instructions and seal the outlet.

Cover the entire inner surface of the test box with flexible plastic floor covering or a membrane as shown in Figure 11. If the gully is designed for a number of different thicknesses of flexible plastic floor covering or membrane, tests shall be performed on the greatest and smallest thicknesses. When fitting the flexible plastic floor covering, the instructions from the manufacturer of the covering or membrane shall be followed. For systems with two connecting flanges and clamping flanges of identical construction, only one of the two possibilities needs to be tested.

The frame, composed of the four lateral sides of the test box, is placed on the bottom plate so as to make a leak-tight connection with it. The resulting box is filled with cold water up to a water level of 100 mm above the sealing level. To avoid vertical movement of the floor gully, it may be necessary to insert a support leading to the cover of the test box (see Figure 11).

Once the test box is hermetically sealed with the transparent cover, pressure of − 10 kPa shall be established inside the box. The test apparatus shall be observed for 10 minutes to check if bubbles appear, maintaining the pressure at − 10 kPa.

If no bubbles are visible after 10 minutes, stop applying the vacuum. After 24 hours at atmospheric pressure, the gully shall be inspected underneath and inside the vacuum box. If there are no leaks, the gully is deemed to be watertight.

If continuous bubbles form, the test shall be stopped and deemed to have failed.

4.7 Flow rates

4.7.1 Flow through the grating

The gully shall be assembled so that it is watertight, ensuring the water can only flow through the grating, as illustrated in Figure 12.

The flow rate is obtained from the maximum possible inflow at a depth *h* and shall be constant for at least 10 minutes in accordance with the requirements in § 3.8.1.

4.7.2 Test apparatus

The test apparatus shall comply with Figure 12.

The tank may be circular or square. Its diameter or length shall be at least 1.0 m.

The gully shall be positioned horizontally in the centre of the tank of water with the grating/frame in the horizontal plane.

The water supply shall be via the anti-vortex inlet (see Figure 12).

The measuring point for the water depth measuring point can be via a communicating tube (measuring tube: see element 3 in Figure 12) or equivalent.

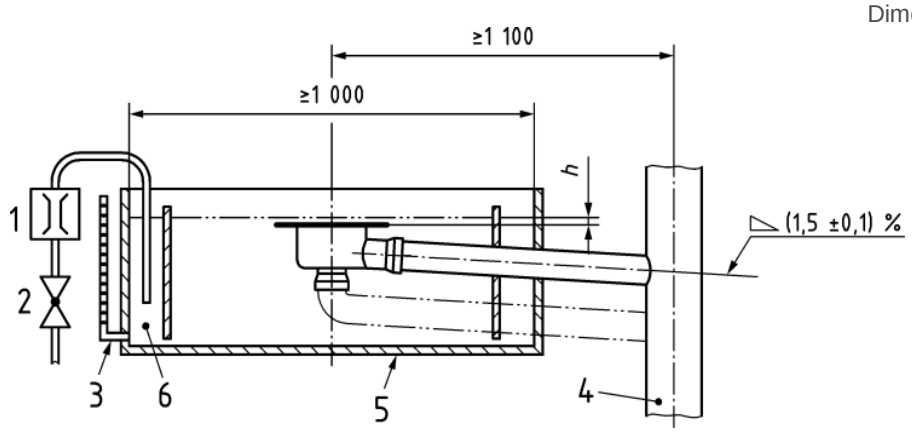
For a gully with a loose or adjustable upstand, the lowest installation position shall be used.

The upper edge of the frame, or of the grating if there is no frame, shall constitute the zero point for measuring the accumulation depth of the water when flow commences into the gully.

The nominal diameter of the discharge pipe shall correspond to that of the gully outlet.

The gully outlet shall be connected to a pipe 1 m long of the same DN as that of the outlet, laid with a gradient of (1.5 ± 0.1)%. If necessary, a bend of (88 ± 2) ° shall be used to connect the gully outlet to the pipe. The pipe shall be connected to a DN 100 vertical vent pipe.

Dimensions in millimetres



Caption

1 flow meter
2 regulating valve
3 tube to measure the water depth
4 vertical section of DN 100 pipe for the wastewater outlets with a DN less than or equal to 100, and of DN equal to that of the outlet if DN greater than 100
5 water tank (circular or square)
6 anti-vortex inlet
h water depth

Figure 12: Test apparatus for measuring flow rates of gullies without side water inlet

4.7.3 Requirements demanded

The gully is deemed to be compliant if the following two conditions are satisfied.

- The maximum flow capacity (see Figure 13 below) shall be ≥ 0.5 l/s at 10 mm head.
- The flow at 20 mm head is compliant with the specifications in Table 3 of § 3.8 of this document.

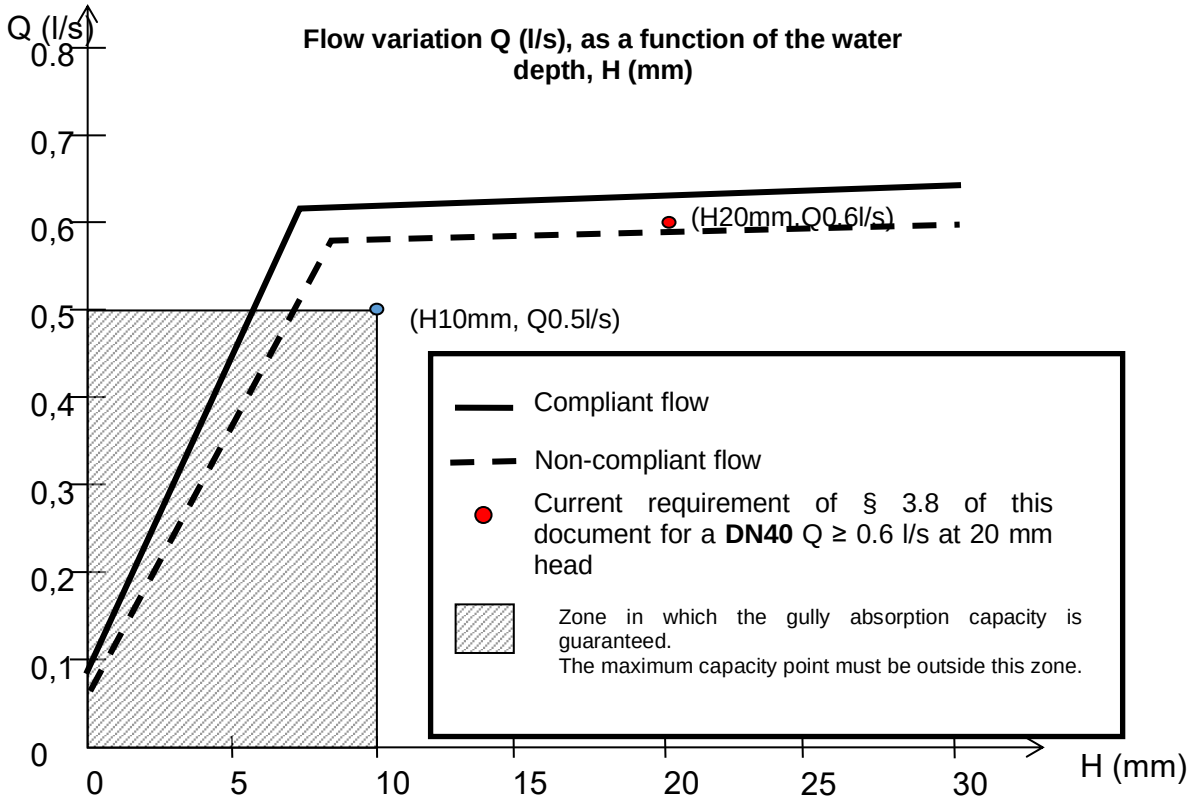


Figure 13: Maximum flow capacity

5 Marking

Gullies and their components shall bear clear and durable markings as shown in Table 8. This marking is affixed by casting, engraving, stamping, etc. and shall be visible after the products are installed.

6 Technical documentation and packaging

Each pack shall:

- Specify the following information at least in the language of the country where the product is distributed. Access to this information may be electronic. In this case, the link giving direct access to this information (QR code, electronic address, etc.) must be stated on the packaging.
  - Usage location: bathroom for individual use
  - Resistance class
  - Evacuation flow
  - Gully outlet and pipe diameter
  - Pipe connection method (glued, screwed, etc.)
  - Overall dimensions of the gully for the opening to be left in the slab
  - Maintenance instructions
  - List of incompatible cleaning products
  - List of mobile parts to be removed for cleaning
- Contain installation and assembly instructions that shall be understandable and complete and that shall mention the recommended gradient for the discharge pipe and the method of achieving the seal.

Table 8: Marking

Marking measures	Body	Grating	Packaging/Installation instructions
Manufacturer's name and/or mark	X	—	X
Date of manufacture	X	—	—
Load class	X	X	X
DN (nominal diameter)	X	—	X
Thermal behaviour class	X	—	X
Flow rate of 0.4 l/s (*)	X	—	X

(*) in compliance with § 3.8