BS EN 1253-1:2015

BSI Standards Publication

Gullies for buildings

Part 1: Trapped floor gullies with a depth water seal of at least 50 mm

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National foreword

This British Standard is the UK implementation of EN 1253-1:2015. This document, together with BS EN 1253-2:2015, supersedes BS EN 1253-1:2003 and BS EN 1253-2:2003, which are withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/505, Wastewater engineering.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 78397 5

ICS 91.140.80

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 January 2015.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1253-1

January 2015

ICS 91.140.80

Supersedes EN 1253-1:2003, EN 1253-2:2003

English Version

Gullies for buildings - Part 1: Trapped floor gullies with a depth water seal of at least 50 mm

Avaloirs et siphons pour bâtiments - Partie 1 : Siphons de sol avec garde d'eau de 50 mm minimum

Abläufe für Gebäude - Teil 1: Bodenabläufe mit Geruchverschluss mit einer Geruchverschlusshöhe von mindestens 50 mm

This European Standard was approved by CEN on 22 November 2014.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 1253-1:2015) has been prepared by Technical Committee CEN/TC 165 “Waste water engineering”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2015 and conflicting national standards shall be withdrawn at the latest by July 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document, together with EN 1253-2:2015, supersedes EN 1253-1:2003 and EN 1253-2:2003.

This is the first part of EN 1253, a series of standards relating to floor gullies, roof drains and access covers for drainage systems inside buildings. The EN 1253 series under the main title *Gullies for buildings* will actually consist of the following parts:

— *Part 1: Trapped floor gullies with a depth water seal of at least 50 mm*;

— *Part 2: Roof drains and floor gullies without trap*;

— *Part 3: Evaluation of conformity*;

— *Part 4: Access covers*;

— *Part 5: Gullies with light liquids closure*.

Since the latest versions of EN 1253-1 and EN 1253-2, the most significant technical changes are the following:

a) reduction of scope on trapped floor gullies with a depth of water seal of at least 50 mm for use in gravity drainage systems;

b) more definitive description of products;

c) modification of terms and definitions;

d) precision in definition of places of installation;

e) consideration of liquid applied membranes as connecting components;

f) precision of test conditions for flow rate testing;

g) revision of loading test concerning test loads, loading speed as well as shape, size and point of impact of test blocks in dependence on different configuration of gratings;

h) revision of tightness tests for products for use with sheet floor coverings, membranes and liquid applied membranes.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard classifies floor gullies for use inside buildings, gives guidance for places of installation and specifies requirements for the construction, design, performance and marking of factory made gullies for buildings, irrespective of the material, for use in drainage systems requiring a trap with a depth of water seal of at least 50 mm (further: floor gullies).

Although normally used to convey domestic wastewater, these floor gullies may convey other wastewater, e.g. industrial wastewater, provided there is no risk of damage to components or of injury to health.

This European Standard does not apply to:

— linear drainage channels as specified in EN 1433,

— gully tops and manhole tops which are specified in EN 124,

— roof drains and floor gullies without trap as specified in EN 1253-2.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 124, *Gully tops and manhole tops for vehicular and pedestrian areas - Design requirements, type testing, marking, quality control*

EN 476, *General requirements for components used in drains and sewers*

EN 1253-3, *Gullies for buildings - Part 3: Evaluation of conformity*

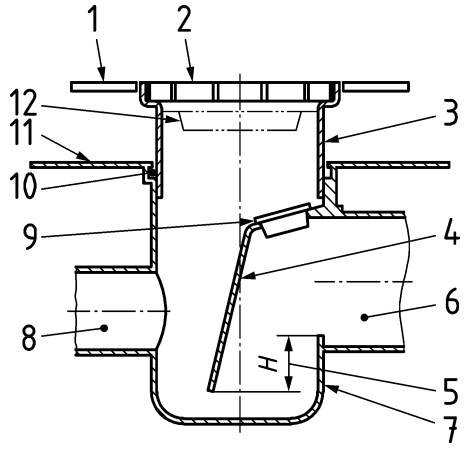
3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

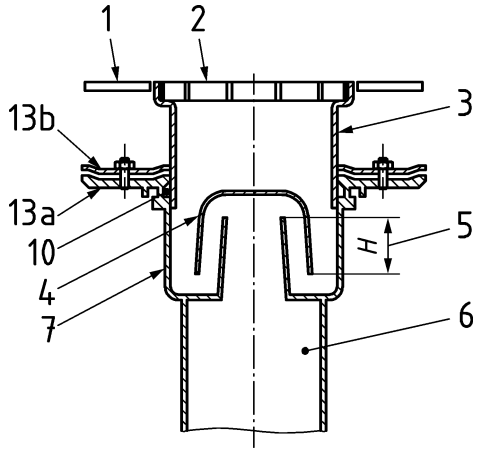
3.1
trapped floor gully
discharge fitting the top of which is a grating or cover capable of installation at ground or floor level, intended to receive wastewater either through apertures in the grating and/or from side inlets and/or channels joined to the body of the gully and to drain that wastewater through the outlet

Note 1 to entry: See Figure 1.

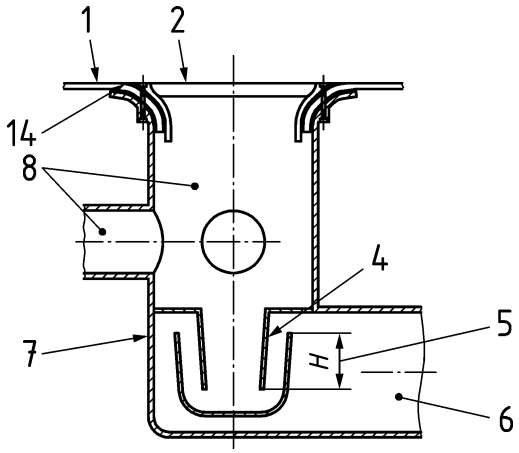
Note 2 to entry: In this European Standard, the term trapped “floor gully” includes linear products, such as channel drains.



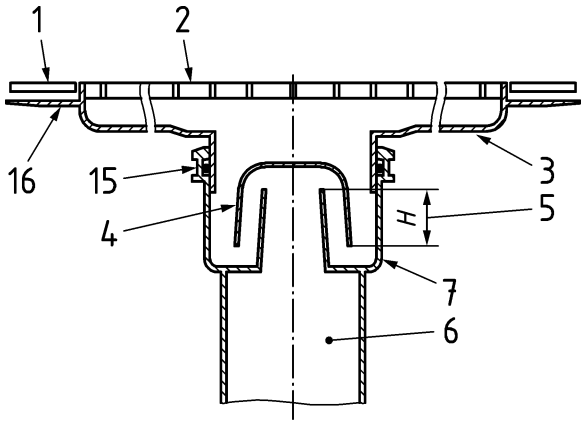
a) Floor gully with side inlets and flange for bonding membranes (example)



b) Floor gully with flange for clamping membranes (fixed and loose flange) (example)



c) Floor gully with side inlets and flange for clamping flexible flooring (e.g. PVC flooring) (example)



d) Channel drain with flange for bonding liquid applied membranes (example)

Key

1	finished floor	10	weep hole
2	grating/cover	11	flange for bonding membranes
3	extension	12	sediment bucket
4	trap	13	connecting flange with counter flange
5	depth of water seal (H ≥ 50 mm)	a	fixed flange
6	outlet	b	loose flange
7	body	14	flange for clamping flexible flooring with a clamping ring
8	side inlet	15	seal
9	access for cleaning	16	flange for bonding liquid applied membrane

Figure 1 — Types of floor gullies

3.2
grating
removable component with apertures which permits the discharge of water

3.3
frame
support for a grating or cover which is connected to a body either directly or by means of a membrane clamping ring or an extension

3.4
cover
removable part of an access cover which covers the opening

3.5
body
part of a floor gully below or in the floor on which the grating/frame/extension is mounted, and to which the pipework is connected

3.6
extension
component used to adjust the height of a grating or cover above a body

3.7
joint
connection between the adjacent ends of two components including the means of sealing

3.8
membrane clamping ring
component used to clamp a membrane or a sheet floor covering to a body or extension

3.9
connecting flange
separate or an integral part of a body or of an extension which receives a membrane or sheet floor covering

3.10
external diameter
OD
mean external diameter of the pipe barrel at any cross section

3.11
internal diameter
ID
mean internal diameter of the pipe barrel at any cross section

3.12
trap
removable or integral part of the body which prevents, by means of water seal, the passage of foul air from the outlet to the inlet

3.13
depth of water seal
effective height of water in the trap (H) which prevents the passage of foul air

Note 1 to entry: See Figure 1.

3.14
domestic wastewater
water polluted by the human life, including water discharged from kitchens, laundry rooms, lavatories, bathrooms, toilets and similar facilities

[SOURCE: EN 16323:2014, 2.1.2.3]

3.15
industrial wastewater
wastewater discharge resulting from any industrial or commercial activity

[SOURCE: EN 16323:2014, 2.1.2.7]

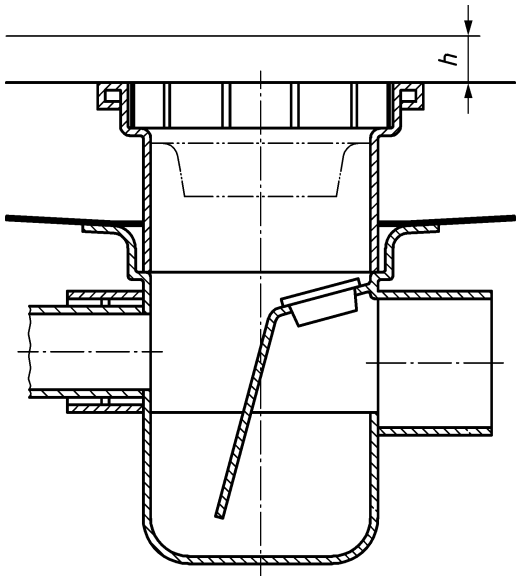
3.16
sheet floor covering
flexible watertight finished layer for floors affixed to the flange by bonding, welding and/or by means of a clamping ring

3.17
membrane
watertight and damp proof layer attached to the floor gully either in the floor or on the floor

3.18
head of water
depth h of a water line over the frame of the floor gully

Note 1 to entry: See Figure 2.

Note 2 to entry: For floor gullies without frame, the depth of water line is the lowest level over the finished floor.



Key
h head of water

Figure 2 — Head of water for floor gullies

3.19
outlet
male or female connection to the discharge pipe

3.20
nominal size
DN
numerical indication of size which is a convenient integer approximately equal to the internal diameter (DN/ID) or the external diameter (DN/OD) in millimetres

3.21
clear opening
CO
diameter of the largest circle that can be inscribed within the unsupported area of the grating

3.22
test load
specified load which a component is required to withstand

3.23
liquid applied waterproofing kit
particular combination of a defined set of components to be installed in liquid form for waterproofing by application and/or incorporation and/or joining of the components in accordance with particular design methods

Note 1 to entry: The liquid applied watertight kit is usually a paste-like composite material or a combination of separate materials that can be poured, spread or sprayed on the subsurface by brush, roller or similar suitable applicator.

4 Requirements

4.1 Design and construction

4.1.1 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 floor, 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 ground 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.

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

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

Floor gullies may be designed with or without side inlet.

Floor gullies shall be delivered with installation instructions.

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

4.1.2 Appearance

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

4.1.3 Apertures in gratings

Apertures can be holes or slots of any shape and may also be formed between grating and frame.

When measured in accordance with 5.1, the permissible aperture dimensions for gratings are given in Table 1.

Table 1 — Apertures in gratings

Class		Dimensions of apertures in gratings	
		Minimum width mm	Maximum width mm
H	1,5	4 [b]	15 (max. 8 mm in barefoot areas)
K	3	4 [b]	10 (max. 8 mm in barefoot areas)
L	15 [a]	4	15 (max. 8 mm in barefoot areas)
R	50 [a]	4	25 (max. 8 mm in barefoot areas)
M	125 [a]	4	25
N	250	4	25
P	400	4	25
[a] In commercially used premises, gratings may also be used with a maximum width of apertures up to 31 mm.			
[b] Apertures of less than 4 mm width are permitted and shall not form part of the hydraulic tests.			

4.1.4 Side inlets

There are two types of floor gully with side inlets as follows:

1) Type I: side inlets either partially or totally below the water level;

2) Type II: side inlets completely above the water level.

The positioning of side inlets shall be checked in accordance with 5.2.

4.1.5 Depth of water seal

Floor gullies for wastewater shall provide a minimum depth of water seal H of 50 mm and be tested in accordance with 5.3.1.

4.1.6 Resistance of water seal to pressure

When tested in accordance with 5.3.2, the applied pressure which just causes passage of air shall be > 400 Pa.

Floor gullies with water seals of a depth (H) ≥ 60 mm are deemed to satisfy this requirement.

4.2 Blockage prevention

4.2.1 Access for cleaning

Floor gullies should have provision for mechanical cleaning of the outlet pipe systems leading to and from the gully. 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 in a floor gully having a nominal outlet size of DN 110 or below, and not less than 50 mm in a gully of nominal outlet size DN 125 to DN 200.

Any opening provided for mechanical cleaning shall be tested in accordance with 5.4.1.

4.2.2 Self-cleansing capacity

The self-cleansing capacity of floor gullies which cannot be cleaned by removing the trap, or by an access for cleaning in accordance with 4.2.1, shall be tested in accordance with 5.4.2.

When tested in accordance with 5.4.2, the expelled volume of glass beads for each of the flow rates in the interval between 0,3 l/s and 0,6 l/s shall be greater than that indicated by the straight line between the two end points 0 % at 0,3 l/s and 50 % at 0,6 l/s. Expulsion of glass beads shall commence at a flow rate less than 0,3 l/s, and at least 50 % of the glass beads shall have been expelled at a flow rate of 0,6 l/s.

4.2.3 Anti-blockage

Floor gullies and their components shall not be liable to clogging. Floor gullies with gratings or covers removed shall be capable of accommodating the passage of a 8 mm diameter ball when tested in accordance with 5.4.3.

4.3 Places of installation

4.3.1 General

A guide for selecting the class of a floor gully appropriate to the place of installation is given below. The selection of the appropriate class is the responsibility of the specifier.

a) Class H 1,5: Areas where no load is expected.

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

c) Class L 15: Areas with light vehicular traffic, such as in commercially used premises and public areas.

d) Class R 50: Areas with vehicular traffic, such as in commercially used premises and factories.

e) Class M 125: Areas with vehicular traffic, such as car parks, factories and workshops.

f) Class N 250: Heavy duty industrial areas subject to forklift traffic, such as food processing areas, chemical or process plants.

g) Class P 400: Extra-heavy duty applications including food processing areas, chemical or process plants, where gullies are subjected to industrial forklift trucks and/or where heavy vehicles are manoeuvring.

Classes E 600 and F 900 gully tops conforming to EN 124 may be used for all areas subject to special stresses such as exhibition halls, market halls, factory sheds and aircraft hangars.

4.3.2 Exceptions

Non-load bearing gratings for places of installation which are not accessible to vehicles and pedestrians (protected by suitable masonry surroundings) and which are not covered by the places of installation listed above nor by EN 124 shall at least conform to the test requirements given in 5.6 for class H 1,5.

4.4 Materials

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

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

Floor gullies made of materials which are not inherently corrosion-resistant shall be protected by corrosion prevention treatment.

For industrial wastewater applications, the chemical compatibility and exposure to continuous elevated temperatures of materials with the transported fluids should be determined separately between the specifier and the manufacturer.

4.5 Thermal behaviour of floor gullies

Floor gullies shall be classified as follows:

— Class A: Application in any place of installation;

— Class B: Application restricted to bathrooms in private dwellings only for DN 32 to DN 75.

When tested in accordance with 5.5, floor gullies and their components shall show no deformation or change in the components' surface structure which could affect their fitness for use.

4.6 Tightness

4.6.1 Odour-tightness

When tested in accordance with 5.8.1, the pressure shall not drop below 180 Pa over a period of 15 min.

4.6.2 Watertightness of bodies

No leaks shall occur when tested in accordance with 5.8.2.

4.6.3 Watertightness of extensions

Where the situation dictates tightness between extension and body, the joint between the extension and the body shall be watertight when tested in accordance with 5.8.2.

4.7 Mechanical strength

4.7.1 Loading strength

Floor gullies and/or gratings are classified by loading strength, when tested in accordance with 5.6, into the following classes: H 1,5, K 3, L 15, R 50, M 125, N 250, P 400.

Floor gullies not accessible to either vehicular or foot traffic are not classified.

4.7.2 Clamping ring

When tested in accordance with 5.7.2, the clamping ring shall not change its position and shall not show any damage that impairs function after testing.

4.7.3 Additional requirements according to the installation

4.7.3.1 Extensions for gullies for use with sheet floor coverings

Floor gullies with extensions which are intended for non-imbedded use where deformations between floor gully and extension may occur shall be tested in accordance with 5.7.1 and shall afterwards comply with the requirement of 4.6.2.

4.7.3.2 Floor gullies for use with a membrane

Floor 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		
Bitumen covering				
— bonded	—	—	100	—
— clamped	70	60	—	—
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 surface	—	—	30	—

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

For floor gullies where a clamping ring without weepholes is used, the connection of a flange shall be tight when tested in accordance with 5.8.3.

4.7.3.3 Floor gullies for use with a sheet floor covering

Floor 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 with a membrane clamping ring and shall be watertight when tested in accordance with 5.8.3.

4.7.3.4 Floor gullies with factory fixed skirt membrane

When tested in accordance with 5.7.3, there shall be no peeling at ≤ 100 N.

4.7.3.5 Floor gullies for use with liquid applied membranes

Floor gullies for use with liquid applied membranes 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 5.8.3 after thermal cycling test in accordance with 5.5.2 has been concluded.

4.8 Flow rates

4.8.1 Water through the grating

When tested in accordance with 5.9.1, floor gullies shall be capable of discharging at flow rates given in Table 3.

In addition to the requirements 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. Alternatively, a flow rate curve could be used.

Table 3 — Minimum flow rates for floor gullies

Nominal size of outlet [a]		**Floor gullies** (q_{grate})	
DN/OD	**DN/ID**	**Minimum flow rate** l/s	**Head of water** h mm
32		0,4	20
	30	0,4	
40		0,6	
	40	0,6	
50		0,8	
	50	0,8	
63		0,8	
75		0,8	
	70	0,8	
	75	0,8	
90		0,8	
100		1,4	
	100	1,4	
110		1,4	
125		2,8	
	125	2,8	
	150	4,0	
160		4,0	

[a] All dimensions not mentioned in this table shall be tested with the next higher dimension.

Where any floor gully without side inlets 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.

4.8.2 Water through the grating and side inlets

When tested in accordance with 5.9.2, floor gullies shall be capable of discharging at flow rates q given below.

a) Floor gullies up to DN 63 with one or more side inlets:

   1) q_{grate} see Table 3;

   2) q_{side} ≥ 0,8 l/s;

   3) q_{side} = 0,8 l/s and q_{grate} ≥ 0,3 l/s (h = 20 mm);

b) floor gullies equal to or greater than DN 70 with one or more side inlets:

   1) q_{grate} see Table 3;

   2) q_{side} ≥ 0,8 l/s (each side);

   3) q_{side} and q_{grate} = 0,8 l/s + 0,6 l/s (h = 20 mm);

   4) q_{side1} and q_{side2} = 0,8 l/s + 0,3 l/s.

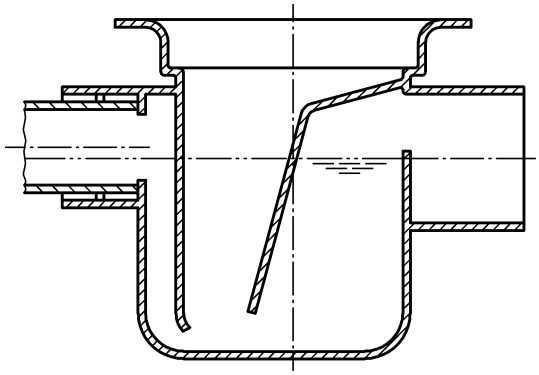
5 Test methods

5.1 Dimensions of apertures in gratings

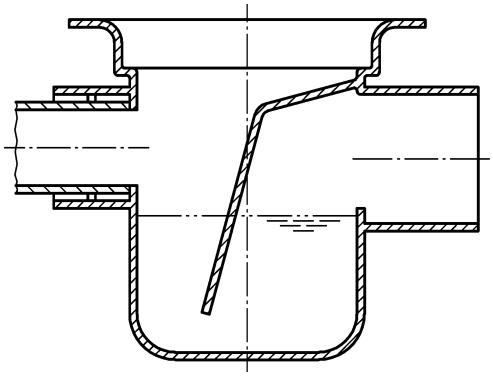
By means of suitable measuring instruments or balls of suitable sizes in accordance with Table 1, check that the dimensions of the apertures comply with the minimum and maximum dimensions specified in 4.1.3.

5.2 Position of side inlets

Close the side inlet(s) and fill the trap with water. Check whether the lowest connecting point of side inlet(s) is above the water level (see Figure 3).



a) Type I floor gully



b) Type II floor gully

Figure 3 — Testing the position of side inlets

5.3 Water seal

5.3.1 Depth of water seal

Measure the difference between the water level when the water seal is entirely full and the lowest point of trap.

5.3.2 Resistance of water seal to pressure

Mount the floor gully in a test arrangement as illustrated in Figure 4, and fill the trap with water. Close the flap and set a pressure of −400 Pa by means of the bypass valves. Open the flap and fill the trap with water.

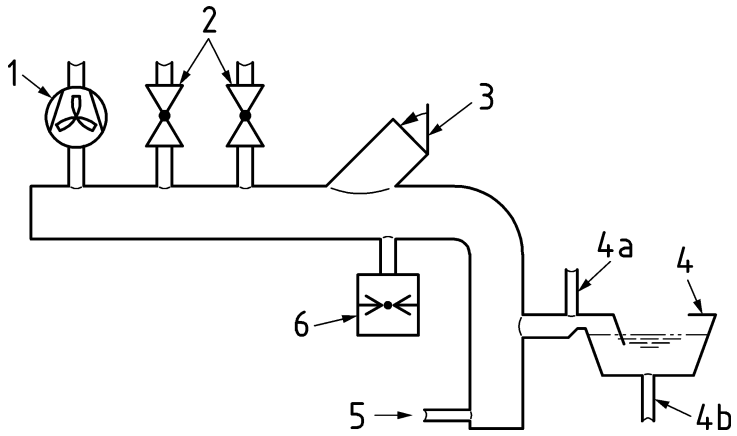
Close the flap and slowly open after about 5 s. Repeat this procedure until the trap no longer loses water, but no more than 5 times.

Remove 8 mm of water height; this corresponds to the reduction in the depth of water seal due to evaporation over a period of disuse.

Subject the trap on the outlet side to a positive pressure such that flow of air just occurs. Record the pressure.

With the flap closed, set the desired negative pressure with the bypass valves, and read the manometer. The sensors in the trap are connected to the recording device. When the flap is closed rapidly, the desired vacuum pressure is established immediately.

By reversing the fan and securing the flap in the closed position, the arrangement can be used also for the measurement of the resistance to positive pressure.



Key

1 fan
2 bypass valves
3 flap
4 water seal
4a connection to pressure recorder
4b connection to water level recorder
5 drain cock
6 pressure measuring device (manometer)

Figure 4 — Typical test arrangement for determining the resistance of water seals to pressure

5.4 Blockage prevention

5.4.1 Access for cleaning

Demount and remount those parts of the floor gully which are designed for cleaning access to the floor gully itself and/or to the pipework to which it is connected. Measure and check for compliance with the requirements of 4.2.1.

5.4.2 Self-cleansing capacity

Supply cold water at (15 ± 10) °C at a rate of 0,2 l/s, 0,3 l/s, 0,4 l/s and 0,6 l/s to the test box.

At each of the water flow rates, supply the floor gully, with grating/cover removed, with 200 cm^3 of glass beads of (5 ± 0,5) mm diameter and a density of 2,5 g/cm^3 to 3,0 g/cm^3. Supply the beads at a steady and uniform rate for 30 s. Continue the flow of water for a further 30 s. Measure, in cm^3, the volume of glass beads that has passed through the floor gully. Conduct the test three times at each discharge rate. The average of the three results shall be taken.

5.4.3 Anti-blockage

Pass a ball of $8^{0}_{-0,5}$ mm diameter through the floor gully, with the grating/cover removed, from the inlet to the outlet merely by tilting the floor gully in the appropriate directions, no other force being applied to the ball.

5.5 Thermal behaviour

5.5.1 Temperature cycling

Mount the floor gully in accordance with Figure 5. Connect a suitable pipe to the outlet of the floor gully (the outlet shall be open all the time). When different versions of the same components exist, the test shall be done for the most unfavourable of their combinations.

Admit water through the grating or, if this is not possible, through the side 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 1 500 times (100 h) for class A products and 360 times (24 h) for class B products.

Check to ensure that there is no deformation or change in surface texture of any component which would impair the fitness for use.

This test does not apply to floor gullies made exclusively of metallic materials.

5.5.2 Additional test for floor gullies for use with sheet floor coverings and liquid applied membranes

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

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

Cover the entire internal surface of the box with sheet floor covering of the thickness which the floor gully manufacturer states is the thickness for which the floor gully is designed. If the floor gully is designed for a number of different thicknesses of sheet floor covering, it may be necessary to carry out several tests. When applying the covering the instructions of the sheet floor covering manufacturer are to be followed.

A moisture indicator is fitted to the bottom of the box at the opening where the floor gully is placed.

Admit water to the floor gully via the floor covering and grating as shown in Figure 5.

Supply 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 ± 0,05) l/s of cold water at (15 ± 10) °C for (60 ± 2) s;

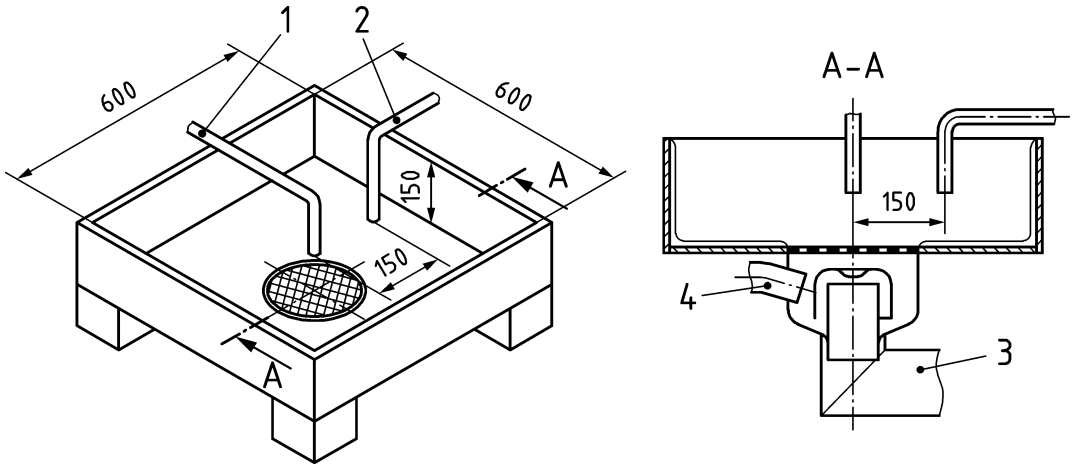
4) pause for (60 ± 2) s.

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 floor gully shall be connected to a pipe of 1 m length of the same DN as the outlet, laid at a gradient of (1,5 ± 0,1) % to the horizontal.

Dimensions in millimetres



Key

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

Figure 5 — Test box for temperature cycling and for testing floor gullies for use with sheet floor coverings

5.6 Loading test

5.6.1 Test loads and permanent set

The values for test loads and loading speed given in Table 4 shall be applied.

Table 4 — 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
L 15	15	1,0
R 50	50	
M 125	125	5,0
N 250	250	
P 400	400	

The resulting permanent set f shall not exceed the values given in Table 5.

Table 5 — Maximum permanent set

Clear opening CO mm	**Permanent set** f mm
$CO \leq 250$	≤ 1,0
$250 < CO \leq 500$	$\leq 0{,}004 \cdot CO$
$CO > 500$	≤ 2,0

5.6.2 Testing machine

The testing machine, preferably an hydraulic press, shall be capable of applying a load of at least 25 % greater than the test loads and maintaining the test load wihin a tolerance of ± 3 %.

The dimensions of the bed of the testing machine shall be greater than the bearing area of the unit to be tested.

5.6.3 Test blocks

The shape and dimensions shall be selected in accordance with Table 6.

Table 6 — Shape, size and positioning of test blocks (Figures 6 to 9)

Clear opening CO mm	**Shape and size of test block** mm		**Minimum unsupported distance** Δ mm
	Round diameter D	**Rectangular width** W × **length** L	
$25 < CO \leq 50$ [a]	20 ± 0,5	(20 ± 0,5) x (90 ± 0,5)	2,5
$50 < CO \leq 90$	40 ± 0,5	(40 ± 0,5) x (110 ± 1,0)	5
$90 < CO \leq 140$	75 ± 0,5	(75 ± 0,5) x (120 ± 1,0)	7,5
$140 < CO \leq 200$	110 ± 1,0	(110 ± 1,0) x (180 ± 1,0)	15
$200 < CO \leq 300$	150 ± 1,0	(150 ± 1,0) x (250 ± 1,0)	25
$300 < CO$	250 ± 1,0	(250 ± 1,0) x (400 ± 1,0)	25

[a] For $CO < 25$, the load testing is not required.

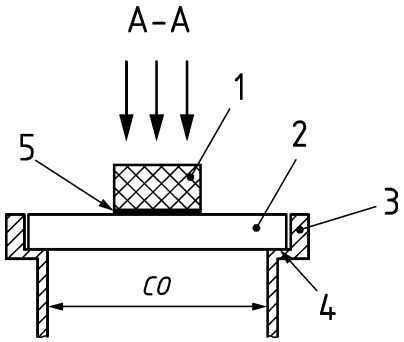
The size of the test block is related to the clear opening and the minimum unsupported distance. It may never exceed the periphery of the grating. In case of conflict the smaller referring test block shall be applied. The shape of the test block is related to the shape of the grating:

— 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 of Table 6;

— for rectangular shaped gratings, a rectangular shaped test block shall be applied in accordance with the clear opening of Table 6;

— for rectangular shaped test blocks, the vertical corner radius shall be 3 mm;

— for irregular supported gratings, a test block shall be applied which allows a minimum unsupported distance in accordance with Table 6.

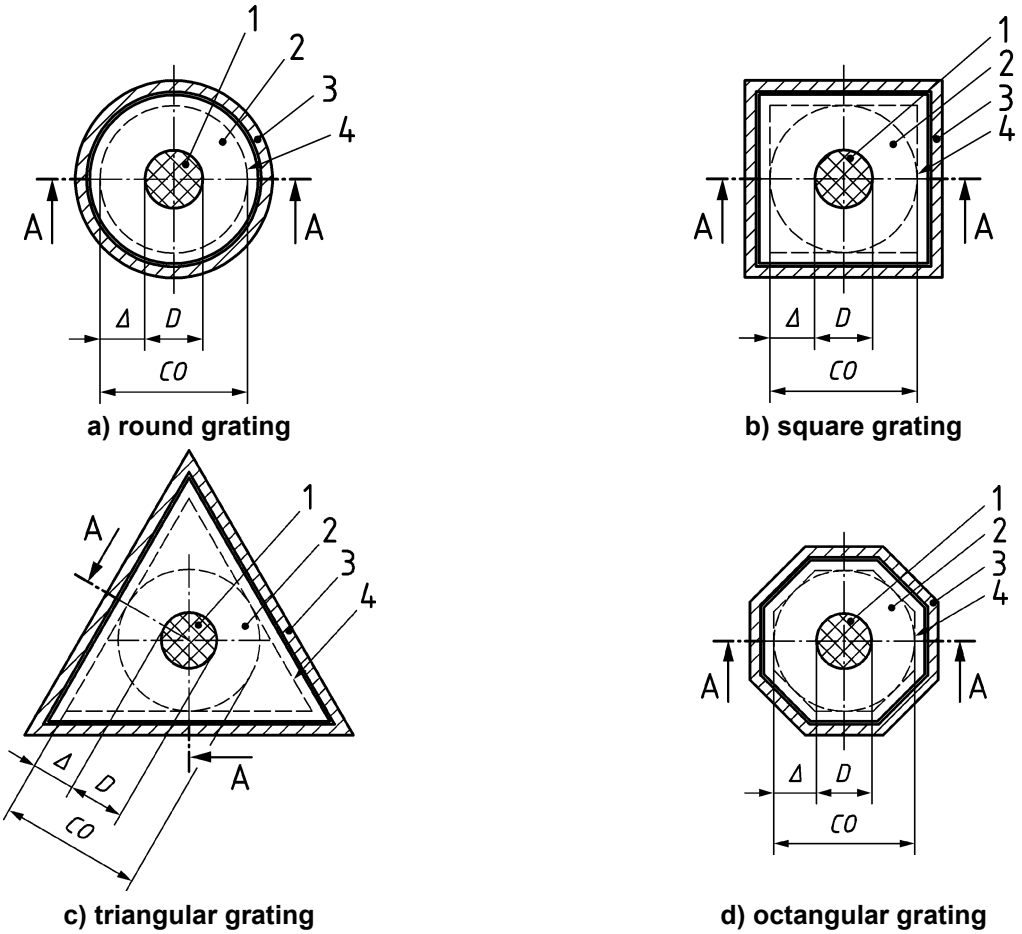


Key

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

Figure 6 — 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 6.



a) round grating

b) square grating

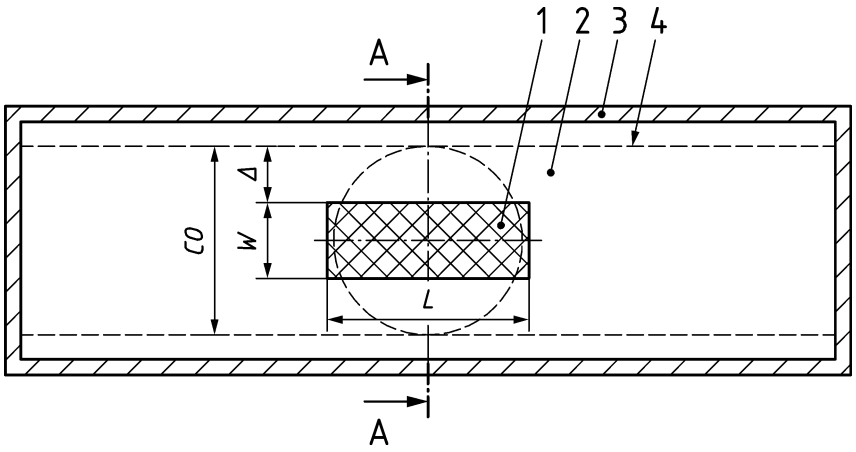
c) triangular grating

d) octangular grating

Key

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

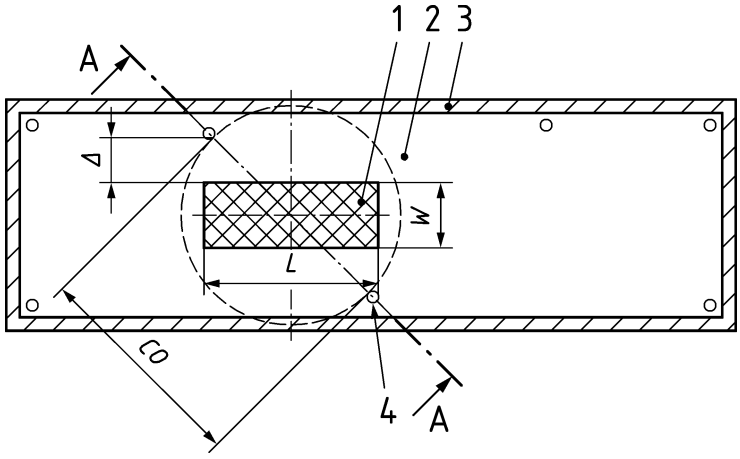
Figure 7 — Top view on round test block applied on gratings



Key

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

Figure 8 — Top view on rectangular test block applied on grating with regular support



Key

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

Figure 9 — Top view on rectangular test block applied on grating with irregular support

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. 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.

5.6.4 Procedure

The testing of gratings and covers shall be carried out either in the grid 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 4. 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 4 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 h, 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 5. The loading shall then be steadily increased with the loading speed and test load in accordance with Table 4 and maintained for 5 min. Check that no visible crack or fracture has occurred.

Testing shall be carried out at ambient temperature of (23 ± 2) °C on three gratings/covers, each of which shall meet the requirements.

5.7 Mechanical strength

5.7.1 Extensions for floor gullies for use in suspended floors

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

Where different versions of gullies and extensions 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.

Mount the extension on the floor gully and fix the extension to the wall.

Attach a metallic pipe (preferably stainless steel) of the same diameter as that of the floor gully outlet in accordance with Figure 10.

Apply a force of 100 N to the pipe at a distance of 1,0 m from the flange, in a vertical direction with respect to the axis of the pipe.

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

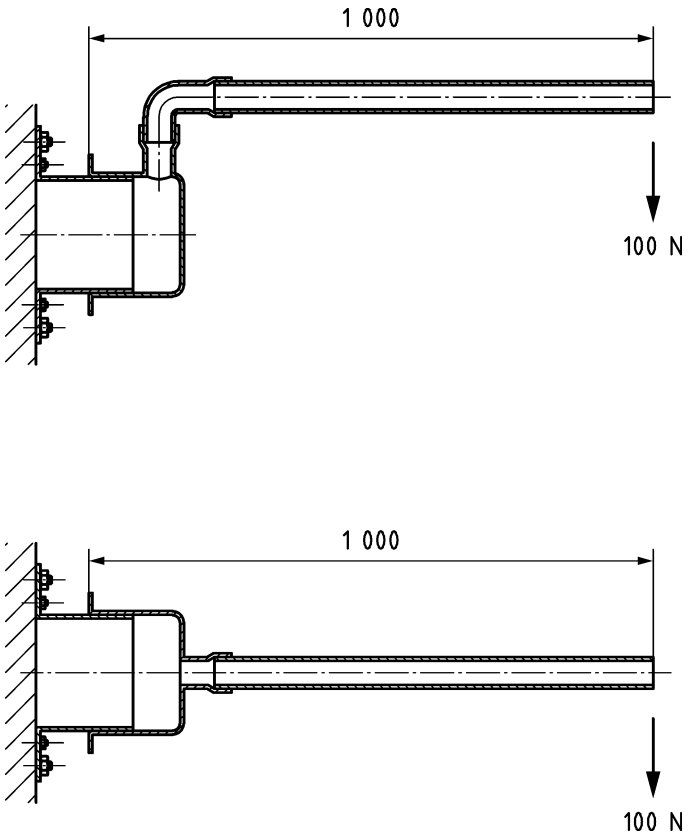


Figure 10 — Test arrangement for extensions

5.7.2 Membrane clamping ring

Connect the clamping ring 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.

5.7.3 Floor gullies with factory fixed skirt membranes

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

When using clamping rings, two cuts 50 mm apart shall be made in the sealing sheet in the clamping area before positioning the ring. After positioning the clamping ring, both cuts shall be extended to the outer edge of the sealing sheet.

Clamp the test specimen cut from the body or the entire body in the lower jaw of the testing machine such that a strip of the sealing sheeting, 100 mm in length, can be attached to the upper jaw. Conduct the test with the peeling direction approximately at right angle to the top of the body.

Check whether peeling occurs when applying a peeling force of up to 100 N.

5.8 Tightness

5.8.1 Odour-tightness

Before conducting the test, dismantle and then reassemble the floor gully. Check that all parts are correctly fitted.

Use the same or a similar test arrangement as shown in Figure 11.

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

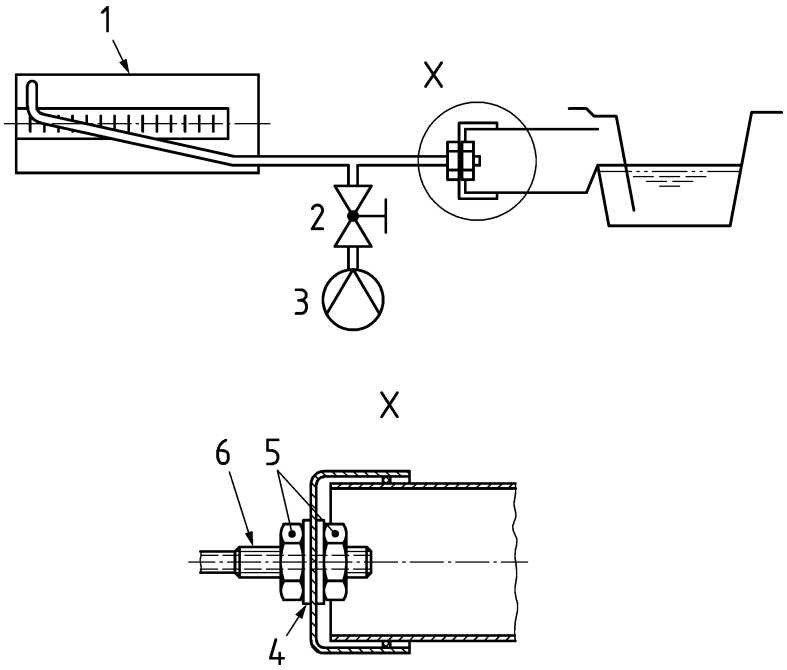
Connect the floor gully to an airtight pipe arrangement with a volume of approximately 2,0 l.

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

Interrupt the test, if the pressure has not stabilized within 2 min (test failed).

Verify leakage as the decrease in static pressure after 15 min.

Air pressure is applied by means of a handpump or similar device. The connection between the outlet end, the pump and the tube, shall be as short as possible and the internal volume reduced as shown in Figure 11. For pressure measurement an incline tube manometer, U-tube manometer or similar is used.



Key

1	incline tube manometer	4	seal and washers
2	valve	5	nuts
3	pump	6	threaded end of tube

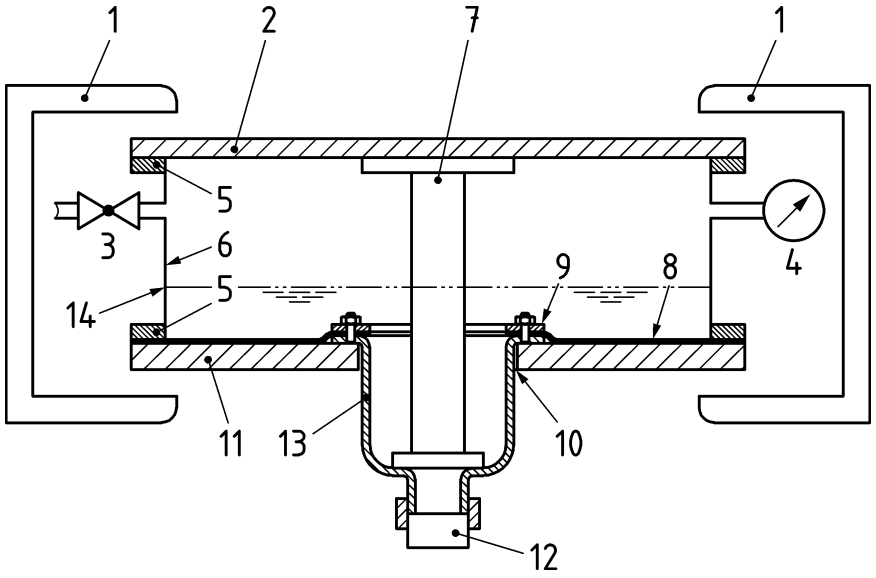
Figure 11 — Test arrangement for odour-tightness (example)

5.8.2 Watertightness for bodies and extensions

The floor gully assembly with the outlet closed and all side inlets sealed, shall be subjected to a hydrostatic pressure beginning from 0 kPa and up to 10 kPa. 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.

5.8.3 Floor gully for use with sheet floor coverings, membranes or liquid applied membranes

The test box and the vacuum box for creating the negative pressure are shown in Figure 12.



Key

1	appliance for bracing/pressing the items 2, 5, 6, 8, 10	8	membrane/liquid applied waterproofing kit
2	cover of transparent material (e.g. methyl-methacrylate)	9	connecting flange of extension/gully
3	connecting branch for stop valve(s) for applying the pressure/vacuum	10	moisture detector
4	connecting branch for pressure measuring device	11	mounting plate
5	seal	12	closed outlet of test piece
6	side wall of test box	13	body
7	support to avoid the lifting of test piece during vacuum test	14	water level

Figure 12 — Vacuum box (example)

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

Cover the entire internal bottom surface of the test box in accordance with Figure 12 with sheet floor covering or a membrane. If the floor gully is designed for a number of different thicknesses of sheet floor covering or membranes, tests for greatest and smallest thicknesses shall be carried out. When installing the sheet floor covering, the instructions provided by the sheet floor or membrane manufacturer shall be followed. In the case of systems with two sealing levels and connecting flanges with identical construction, only one of the two flanges needs to be tested.

The frame, consisting of the four side walls of the test box, is placed onto the bottom plate such that a tight connection to the bottom plate is established. 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 12).

After the test box has been closed in a tight manner with the transparent cover, a pressure of −10 kPa shall be established inside the box. For the duration of 10 min the test arrangement shall be observed for the formation of bubbles keeping the pressure at −10 kPa.

If no visible bubbles are detected after 10 min, the vacuum shall be released. After 24 h under atmospheric pressure, the floor gully shall be inspected underneath and inside the vacuum box. If there is no leakage, the floor gully is considered as watertight.

If continuously bubbles occur, the test shall be interrupted and considered as failed.

5.9 Flow rates

5.9.1 Water through the grating

The test shall be performed in a tank in accordance with 5.9.3. The floor gully shall be assembled such that it is watertight and that water can be discharged only via the grating as shown in Figure 13.

The flow rate is obtained from the maximum possible inflow at a head of water h and shall be constant over a period of 10 min in accordance with the requirements specified in 4.8.1.

5.9.2 Water through the grating and side inlets

The flow of water through the side inlet (q_{side}) is conveyed (viewed in the direction of flow) via an (88 ± 2)° bend and a pipe at least 200 mm long, both of the same dimension as the side inlet. The least favourable side inlet for the flow of water shall be determined. Inflow through a cutout in the grating is considered to be a side inlet, and the least favourable position of the grating shall be noted.

The flow rate shall be measured with an accuracy of ± 2 %. Water is supplied as a combination of water through the grating and through other side inlets, if fitted, as set out in 4.8.2.

The maximum flow rate of water through a side inlet (q_{side}) is determined as the flow rate which causes water to rise just above the grating. The smallest flow rate can be admitted through the least favourable placed side inlet.

The flow rate which can be supplied to the test box when the head of water above the point when the water starts flowing into the gully is 20 mm together with water through the least favourable side inlet (0,8 l/s) is the maximum water flow rate through the grating (q_{grate}).

5.9.3 Test arrangement

The test arrangement shall be in accordance with Figure 13 a) or Figure 13 b).

The tank may be round or square. Its diameter or length shall be at least 1,0 m.

The floor gully shall be installed horizontal centrally in the water tank with grating/frame in the horizontal plane.

Water supply shall be via the anti-vortex inlet (see Figure 13 a) and Figure 13 b)).

The measuring point for the head of water can be via a communicating tube (measuring tube, see Item 3 in Figure 13 a) or Figure 13 b)) or equivalent.

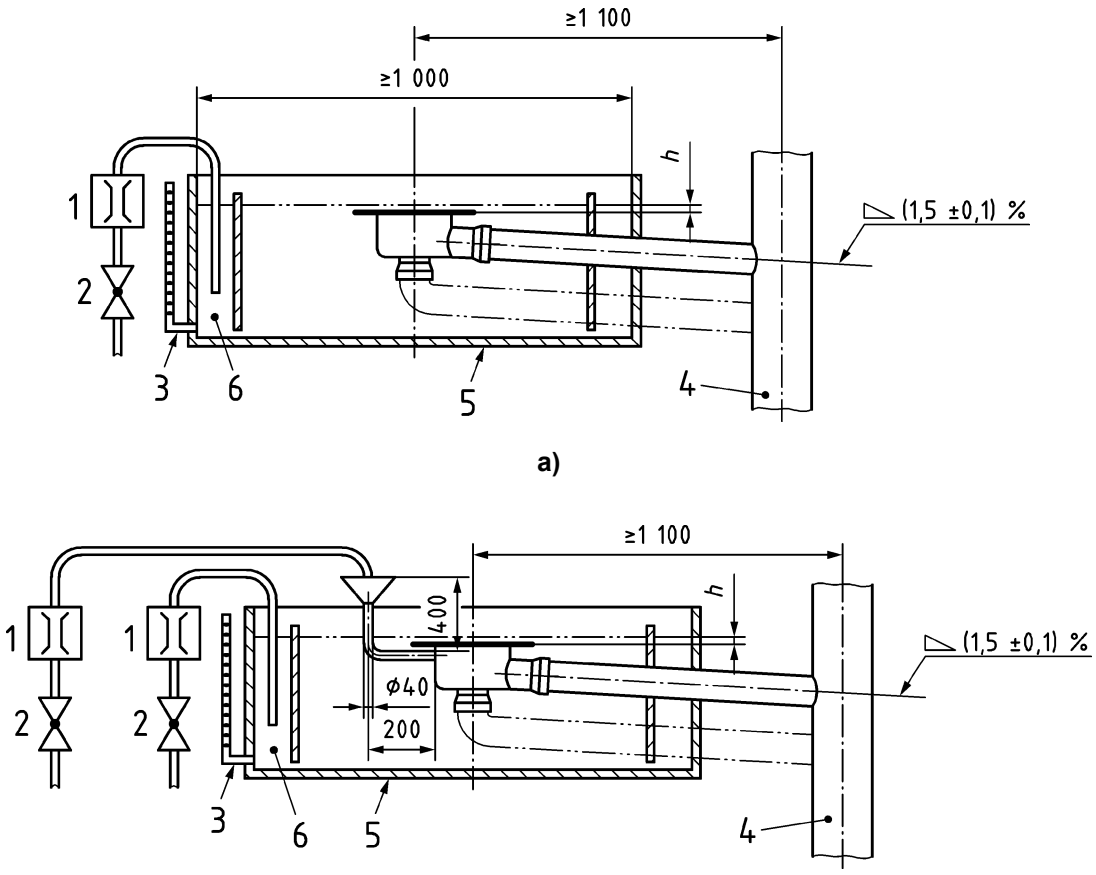
In the case of floor gullies with a loose or adjustable extension, the lowest installation case shall be selected.

The upper edge of the grating frame or grating in the absence of a frame shall constitute the zero point for measuring the accumulation height of the water when flow commences into the floor gully.

The nominal size of the discharge pipe shall correspond to the nominal size of the outlet of the floor gully.

The outlet of the floor gully shall be connected to a pipe of 1 m length of the same DN as the outlet, laid at a gradient of (1,5 ± 0,1) % to the horizontal. Where necessary, a bend of (88 ± 2)° shall be used to connect the outlet of the floor gully to the pipe. The pipe shall be connected to a vented vertical pipe of DN 100.

Dimensions in millimetres



Key

a) floor gully without side inlet

b) floor gully with side inlet

1 flow meter

2 regulating valve

3 measuring tube for head of water

4 vertical stack at outlets with waste sockets up to DN 100 in DN 100, at bigger outlets to be effected in the nominal diameter of the outlet

5 water tank (round or square)

6 anti-vortex inlet

h head of water

Figure 13 — Test arrangement for measuring flow rates of floor gullies

6 Allocation and sequence of tests

The allocation and sequence for the tests of floor gullies are given in Annex A.

7 Marking

Floor gullies and their components shall bear the following clear and durable markings, for example, cast on, by engraving, painting, stamping or labelling (including electronic recognition labelling) as indicated in Table 7:

a) EN 1253-1;

b) name and/or mark of the manufacturer;

c) period of manufacture (coded or not);

d) identification of independent certification body, where applicable;

e) identification of DN (OD or ID);

f) side inlet position (I or II);

g) thermal behaviour product class (A or B);

h) load class;

i) specific flow rate.

Table 7 — Location of marking of floor gullies

Items [d]	**Body**	**Grating**	**Components**	**Packaging / installation instruction**
EN 1253-1	X	X [a]	X [a]	X
Name and/or mark of manufacturer	X	—	—	X
Period of manufacture	—	—	X [a]	—
Load class	—	X [b]	—	X
DN	X [a]	—	—	X
Side inlet position	X	—	—	X
Thermal behaviour product class	X	—	—	X
Flow rate 0,4 l/s (coded or not) [c]	X	—	—	X

[a] If possible.

[b] For the classes H and K the marking is optional.

[c] Only for condition as specified in 4.8.1.

[d] Further marking may be added (e.g. for the application). The marking shall be visible where possible, after the unit has been installed.

If the application of the marking would be detrimental to the production and/or functioning of the product, the marking shall be included on the packaging.

8 Evaluation of conformity

The evaluation of conformity shall be provided as given in EN 1253-3.

Annex A
(normative)

Sequence of the tests

Where applicable, the tests mentioned below shall be carried out in the sequence specified, and each test shall be carried out on the same test specimen.

Floor gullies:

5.4.1 — 5.8.2 — 5.5 — 5.8.2 — 5.4.1 — 5.8.1 — 5.7.2 — 5.7.1 / 5.7.3

Floor gullies for sheet floor coverings, membranes or liquid applied membranes:

5.4.1 — 5.8.1 — 5.7.2 — 5.8.3 — 5.5 — 5.4.1 — 5.8.1 — 5.7.2 — 5.8.3

Extensions:

5.7.1 — 5.8.2

If the test sequence is interrupted, testing shall restart from the beginning.

Annex B
(informative)

A-deviation

A-deviation: National deviation due to regulations, the alteration of which is for the time being outside the competence of the CEN member.

This European Standard does not fall under any Directive of the EU. In the relevant CEN countries this A-deviation is valid instead of the provisions of the European Standard until it has been removed.

With regard to this European Standard, the national A-deviation has been requested by Denmark with reference to the following national regulation:

Danish Building Regulation BR 2010

(published by the National Building and Housing Agency)

Clauses

4.7.1 Loading strength

According to Danish Building Regulation DS 432, 2.3.10, gratings, used in areas where it is a requirement that rats shall not be allowed to pass through floor gullies, shall be fastened with screws or in some other way. Gratings and materials from which they are made shall not be destroyed or penetrated by rats and shall pass the following test.

The floor gully shall be placed as prescribed in 5.6.4. The grating shall be loaded in the centre or at the inner edge with a force of 20 N acting perpendicular to the surface and in the opposite direction in which the grating is mounted.

The grating shall not loose firm contact to the body in any situation.

4.1.4 Side inlets

According to Danish Building Regulations BR 10 and DS 432, only Type II floor gullies are permitted.

Bibliography

EN 1253-2, *Gullies for buildings - Part 2: Roof drains and floor gullies without trap*

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

EN 16323:2014, *Glossary of wastewater engineering terms*

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