



Installation Guide

Siphonic Roof Drainage System
Valid from 1 August 2014

**KNOW
HOW**
INSTALLED

Geberit Pluvia

Application Technique

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1 System

1.1 System overview

The Geberit Pluvia roof drainage system allows large roof areas to be drained with a few roof outlets and stacks.

In contrast to conventional roof drainage systems, the pipe system is completely filled with water in the case of Geberit Pluvia. As a result, a negative pressure occurs in the pipe system, which causes the rainwater to be quickly suctioned off the roof.

Due to the suction effect, Geberit Pluvia is many times more powerful than conventional roof drainage systems. Large roof areas can therefore be drained with a few stacks. This simplifies planning and reduces costs and construction time.

Geberit Pluvia can be used in uninsulated as well as in insulated roofs. Other types of roofs (e.g. green roofs) can also be drained with Geberit Pluvia.

Whether 1,000 m² or 100,000 m² – Geberit Pluvia is always the right system.

1.2 Function

1.2.1 Principle

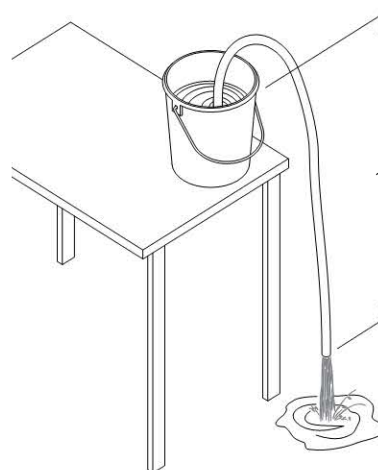


Figure 1: Functional principle Geberit Pluvia
h Height of the water column

As soon as water enters the hose from the raised bucket, a pressure difference results between the bucket and outlet due to the water column in the section h. This pressure difference leads to a negative pressure in the system. As a result, the water is suctioned from the receptacle into the hose.

This suction effect is technically used by Geberit Pluvia. When it rains heavily, the Pluvia pipe system completely fills with water. A closed water column results from the roof outlet to the transition to the conventional pipe system. The water accumulates on the roof up to a defined height. The pressure of the accumulated water causes the water column to move through the collector pipe. When the water column falls from the collector pipe into the stack, a negative pressure occurs in the pipe system. At the same time, a complete filling is achieved in the pipe system. As a result of the negative pressure, the rainwater is suctioned from the roof into the pipe system.

In order to attain a complete filling of the pipeline and thus the suction effect caused by the negative pressure, no air may enter the piping system. For this reason, the piping system must be precisely dimensioned.

The entrance of air is prevented by the design of the Pluvia roof outlets. They are equipped with a function disc that only allows the rainwater to flow in laterally and thus air-free.

1.2.2 Difference between Pluvia and conventional roof drainage systems

Behaviour in the case of light and heavy rain

In the case of light rain, Geberit Pluvia acts like a conventional roof drainage system. The piping system is only partially filled with rainwater (partial filling).

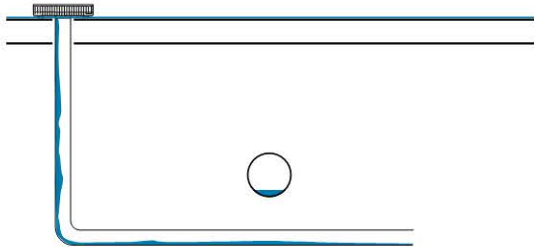


Figure 2: Conventional roof drainage system with light rain (partial filling)

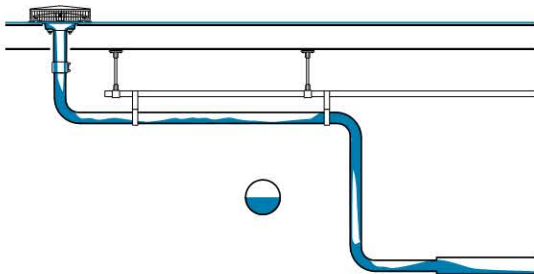


Figure 3: Geberit Pluvia with light rain (partial filling)

In the case of heavy rain, the conventional roof drainage system remains partially filled. Geberit Pluvia completely fills up with water (complete filling) due to the smaller pipe dimensions. The suction effect starts.

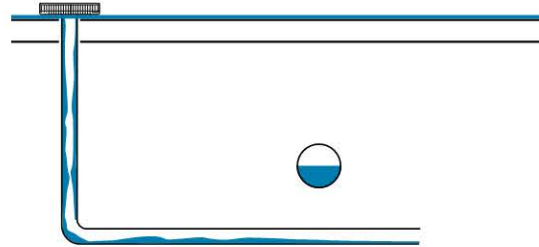


Figure 4: Conventional roof drainage system with heavy rain (still partial filling)

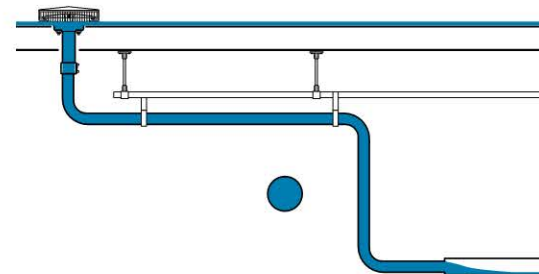
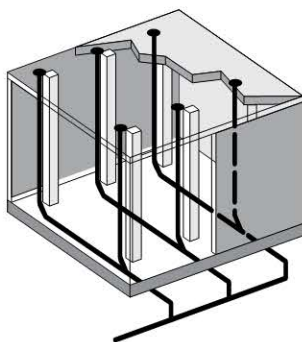


Figure 5: Geberit Pluvia with heavy rain (complete filling)

1.2.3 Advantages of Geberit Pluvia over conventional roof drainage systems

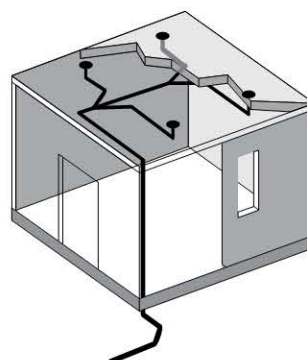
As a result of the complete filling of the piping system, the Geberit Pluvia roof drainage system has several advantages over a conventional roof drainage system.

Conventional roof drainage system



- Many roof outlets
- Pipe laying necessary on a slope
- Many stacks
- Complicated underground pipes
- Large pipe dimensions

Geberit Pluvia



- Fewer roof outlets due to the high drainage capacity per roof outlet
- Space savings
- Reduced construction effort
- Smaller pipe dimensions
- Self-cleaning of the pipes due to high flow speeds
- Architectonic freedom

1.3 System components

1.3.1 Overview

Geberit Pluvia consists of the following system components:

- Pluvia roof outlets
- Pluvia emergency overflows
- Geberit HDPE drainage system
- Geberit ProPlanner calculation software

The Pluvia roof outlets collect the rainwater that accumulates and prevent air from flowing into the piping system with the rainwater.

The Pluvia emergency overflows collect rainwater in addition to the roof outlets when the actual rainfall exceeds the drainage capacity of the roof drainage system.

The Geberit HDPE drainage system is suitable for the resulting negative pressure due to its product material and the welding joint.

In order for the piping system to be completely filled, it must be precisely dimensioned. The Pluvia module of the Geberit ProPlanner calculates the necessary parameters. Roof outlets and pipes are dimensioned in such a way that a complete filling of the piping system is ensured.

1.3.2 Pluvia roof outlets

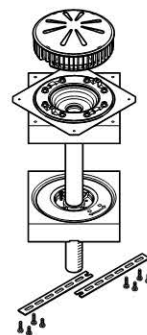


Figure 6: Pluvia roof outlet

The Pluvia roof outlets are available with different drainage capacities:

- Pluvia roof outlets with 14 l/s
- Pluvia roof outlets with 25 l/s
- Pluvia roof outlets with 45 l/s / 60 l/s / 100 l/s

With special accessories, Pluvia roof outlets can be used as separate emergency overflows, see "Pluvia emergency overflows" on page 8.

Pluvia roof outlets 14 L

The Pluvia roof outlets 14 L are prefabricated roof outlets for connection to a particular type of roof sealing:

- with contact seam for gutters
- with contact sheet for bitumen and clamp flange
- with fastening flange for roof foil

Prefabricated roof outlets

Prefabricated roof outlets are available in the following versions:

- With base unit for gutters
- With fastening flange for roof foils
- With contact sheet for bitumen roof sealing

The prefabricated roof outlets consist of the following components:

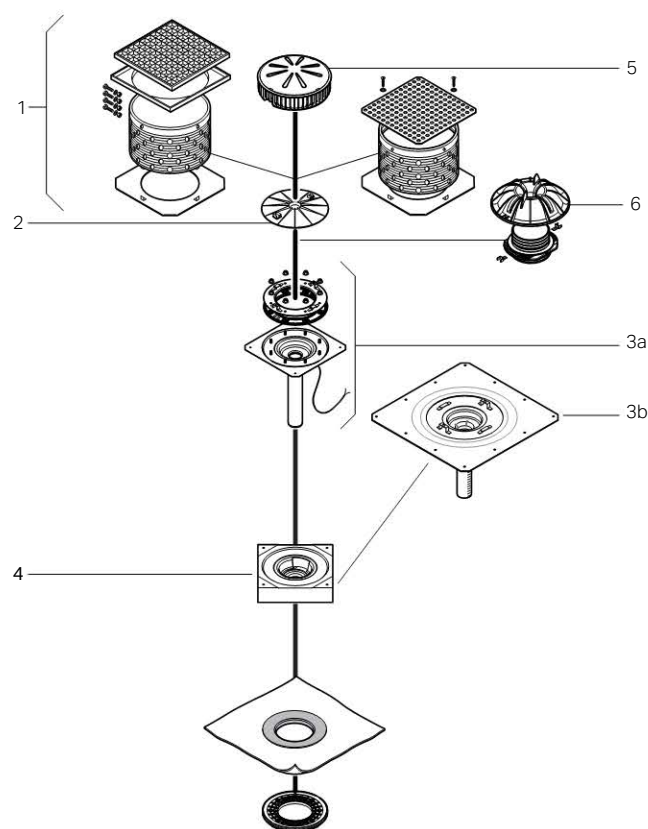


Figure 7: Overview of all usable components of the prefabricated Pluvia roof outlets 14 L

Item no.	Base modules	Accessories
1		<ul style="list-style-type: none"> • Retrofit set, suitable for parking decks • Retrofit set, suitable for promenade decks
2	Function disc	
3a	Base unit with fastening flange	
3b	Base unit with contact sheet	
4	Anti-condensation insulation	
5	Outlet grating	
6		Emergency overflow set

In the case of a special roof structure (e.g. weight-bearing roofs), accessories are necessary.

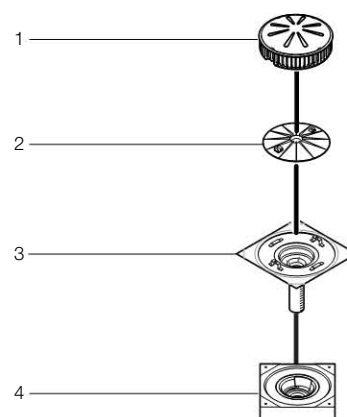


Figure 8: Components Pluvia roof outlet 14 L for gutters

- 1 Outlet grating
- 2 Function disc
- 3 Base units for gutters
- 4 Anti-condensation insulation

Pluvia roof outlets 25 L

The roof outlets 25 L are prefabricated roof outlets for connection to a particular type of roof sealing.

- With contact seam for gutters
- With contact sheet for bitumen roof sealing
- With fastening flange for roof foil

They consist of the following components:

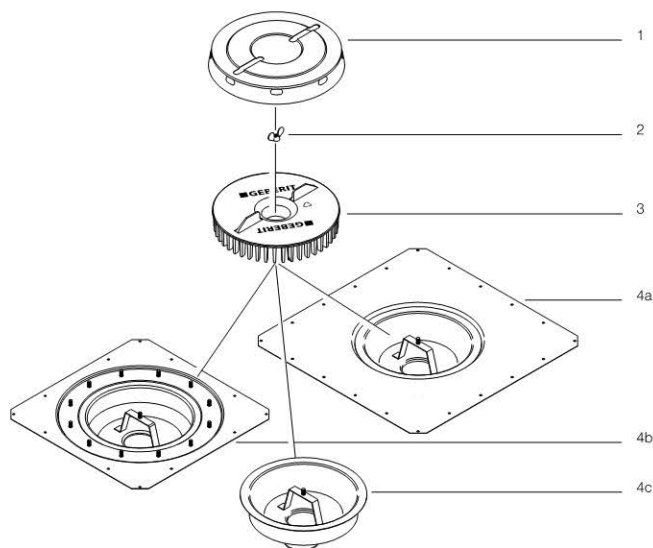


Figure 9: Components of the Pluvia roof outlets 25 L

- 1 Protection cover
- 2 Wing nut
- 3 Outlet grating with integrated function disc
- 4a Base unit with contact sheet
- 4b Base unit with fastening flange
- 4c Base unit with contact seam for gutters

The roof outlets 25 L can be combined with the roof outlets 14 L in a mixed installation.

Pluvia roof outlets 45 L / 60 L / 100 L

The roof outlets 45 L / 60 L / 100 L are prefabricated roof outlets for connection to a particular type of roof sealing:

- With contact seam for gutters
- With contact sheet for bitumen roof sealing

They consist of the following components:

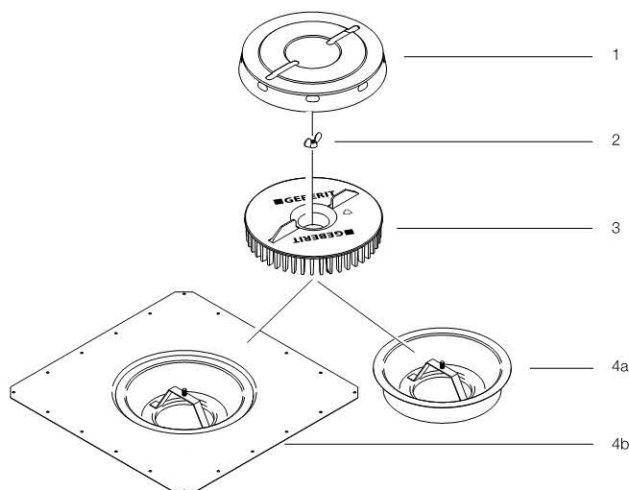


Figure 10: Components of the Pluvia roof outlets 45 L / 60 L / 100 L

- 1 Protection cover
- 2 Wing nut
- 3 Outlet grating with integrated function disc
- 4a Base unit with contact sheet
- 4b Base unit with contact seam for gutters

The 45 L / 60 L / 100 L roof outlets can not be used in the same gutter section as the 14 L and the 25 L outlets because of their different heads of water.

1.3.3 Pluvia emergency overflows

The Pluvia emergency overflows consist of:

- Pluvia roof outlet
- Pluvia emergency overflow set

The roof outlet is combined with the corresponding emergency overflow set.

The emergency overflow set is available in two versions:

- Pluvia emergency overflow set for roof outlets 14 L
- Pluvia emergency overflow set for roof outlets 25 L

Pluvia emergency overflow set 14 L

Components

The Pluvia emergency overflow set 14 L consists of the following components:

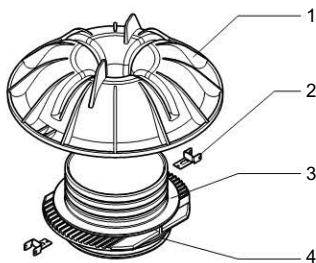


Figure 11: Components of the Pluvia emergency overflow set 14 L

- 1 Operating hood
- 2 Mounting clip, depending on the product material of the roof outlet (plastic or metal)
- 3 Overflow section
- 4 Lip seal

Function

The water is transported away through the roof outlet 14 L to a head of water of max. 50 mm through the roof drainage system. When the head of water exceeds 50 mm, the emergency overflow goes into action. Together, the roof drainage and emergency overflow system attain their maximum outflow of 24 l/s at a 65 mm head of water. The water level on the roof temporarily decreases to 30 mm and fluctuates between 50 mm and 65 mm.

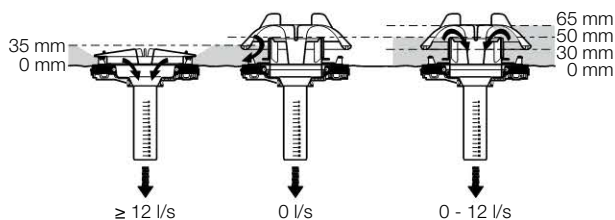


Figure 12: Functional principle of Pluvia emergency overflow 14 L

Pluvia emergency overflow set 25 L

Components

The Pluvia emergency overflow set 25 L consists of the following components:

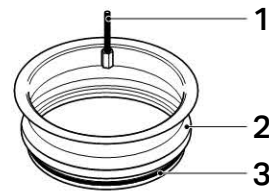


Figure 13: Components of the Pluvia emergency overflow set 25 L

- 1 Fastening material
- 2 Overflow section
- 3 Round cord ring

Function

The water is transported away through the roof outlet 25 L to a head of water of max. 50 mm through the roof drainage system. When the head of water exceeds 50 mm, the emergency overflow goes into action. Together, the roof drainage and emergency overflow system attain their maximum outflow of 50 l/s at a 100 mm head of water. The water level on the roof temporarily decreases to 50 mm and fluctuates between 50 mm and 100 mm.

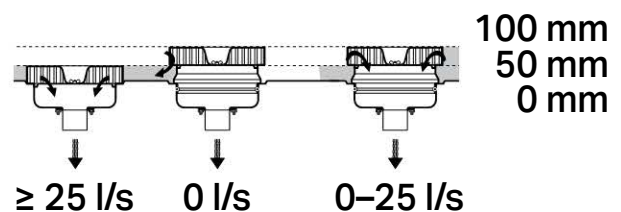


Figure 14: Functional principle of Pluvia emergency overflow 25 L

1.3.4 Geberit HDPE drainage system

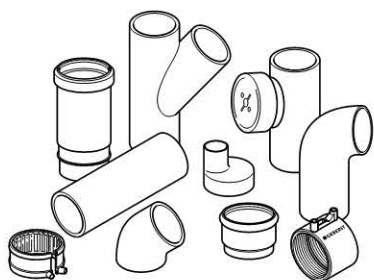


Figure 15: Geberit HDPE drainage system

Geberit HDPE comprises:

- Pipes \varnothing 40–315 mm
- Fittings
- Joints (electrofusion sleeve couplings, electrofusion couplings with integrated thermal fuses)
- Adapters for other piping systems

Pipes and fittings from Geberit HDPE can be connected to each other by various methods, such as electrofusion welding, or butt welding, or mechanical connection.

The material characteristics of Geberit HDPE make it possible to prefabricate the pipe layouts so that they can be mounted on site as they are. In this way, sections can be prefabricated in a safe, clean environment. The prefabrication makes it possible to mount Geberit Pluvia more safely and more easily. This saves product material and working time, which minimises the installation costs.

Due to the increased flow speed and the resulting negative pressure, not all components of Geberit HDPE are suitable for roof drainage systems with Pluvia roof outlets. The following table provides an overview.

Table 1: Geberit HDPE pipes and fittings

















Designation		Geberit Pluvia
Pipe		✓ In the case of pipe dimensions \varnothing 200 mm and larger, reinforced/SDR26 pipes must be used for negative pressures of over 450 mbar
Bend 45°		✓
Bend 90°		✓ Only as connection bend on the roof outlet
Bend 90° with narrow radius		✗
Connection bend 88 1/2°		✗
Y-branch 45°		✓
Branch fitting 88 1/2°		✓ Only with stacks
Branchball		✗
Reducer		✓
Connection bend and straight connector		✗ For creating waste fittings

Table 2: Connection types

Designation		Geberit Pluvia
Welding joints:		
Butt welding		✓
Electrofusion welding		✓
Flange connection:		
Flange connection		X
Push-in connection:		
Expansion socket, vertical		X Not recommended by Geberit and therefore no system warranty.
Expansion socket, horizontal		X Not recommended by Geberit and therefore no system warranty.
Ring seal socket		X Push-in connections with ring seal socket are not allowed for connecting fittings and pipe sections within the Pluvia system.



Geberit assumes the warranty if Geberit HDPE is used.

1.3.5 Geberit ProPlanner calculation software

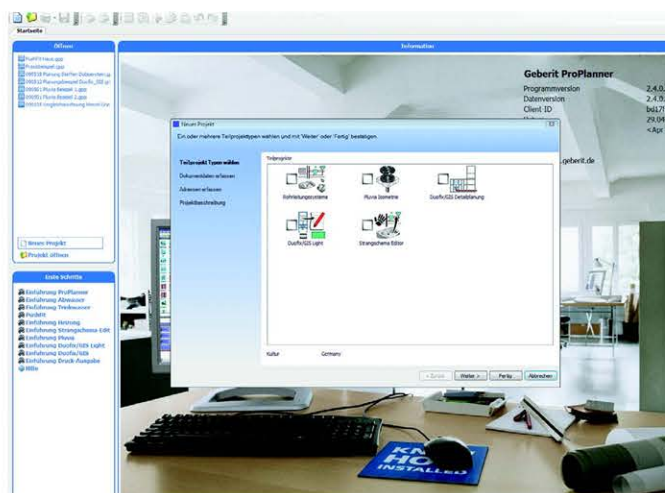


Figure 16: Geberit ProPlanner calculation software

Geberit ProPlanner creates:

- Isometric drawings
- Hydraulic calculations
- Material lists including fastening elements
- Cost calculations with tender documents ready for shipment

The capacity of Geberit Pluvia is at an optimum when the piping system fills quickly and all piping sections empty evenly. The piping system therefore has to be precisely dimensioned.

The dimensioning depends on the rainfall, the size of the roof area, the roof structure and the pipe layout.

With Geberit ProPlanner, even complex roof projects can be easily calculated.

1.4 Application range of the Pluvia roof outlets













Geberit sales engineers are trained to provide comprehensive support for the design of Geberit Pluvia installations world-wide. The siphonic roof drainage system is widely used in the residential, industrial and commercial sector for all roofs larger than 100 m² (1000 sq.ft.), including flat roofs, shed-type or normal pitch roofs, but also dome-shaped and arched roofs with various curvatures.

Application:

- Factories
- Warehouses
- Shopping centres
- Airports
- Hotels
- Sports centres
- Residential buildings
- Car parks
- Rainwater harvesting systems
- Entertainment centres

1.4.1 Pluvia roof outlets 14 L

Table 3: Application ranges of Pluvia roof outlets 14 L, prefabricated













		359.003  Roof foils	358.010  Bitumen	359.636  Gutters	Accessories
Solid roof					
Uninsulated		x ¹⁾	x ¹⁾	x	
Uninsulated, outlet in structure		x ¹⁾	x ¹⁾	x	HDPE bend 90°
Uninsulated, suitable for promenade decks	 	x ¹⁾	x ¹⁾	x	
Uninsulated, suitable for parking decks	 	x ¹⁾	x ¹⁾	x	359.635 
Insulated		✓	✓	x	
Gutters					
Gutter		x	x	✓	

¹⁾ only for use in regions without danger of frost

✓ suitable
x not suitable

1.4.2 Pluvia roof outlets 25 L
















Table 4: Application ranges of Pluvia roof outlets 25 L

		359.023  Fastening flange Roof foils	359.506  Contact sheet Bitumen	359.519  Contact seam Gutters
Solid roof				
Uninsulated		✓	✓	✗
Insulated		✓	✓	✗
Uninsulated, suitable for promenade decks	 	✓	✓	✗
Uninsulated, suitable for parking decks	 	✓	✓	✗
Lightweight roof				
Uninsulated		✓	✓	✗
Insulated		✓	✓	✗
Gutter				
Gutter		✗	✗	✓

✓ suitable
✗ not suitable

1.4.3 Pluvia roof outlets 45 L / 60 L / 100 L

Table 5: Application ranges of Pluvia roof outlets 45 L / 60 L / 100 L

		359.538 45 L	359.539 60 L	359.540 100 L	359.528 45 L	359.536 60 L	359.537 100 L
							
		Universal contact sheet			Contact seam for gutters		
Solid roof							
Uninsulated		✓	✓	✓	X	X	X
Insulated		✓	✓	✓	X	X	X
Uninsulated, suitable for promenade decks	 	✓	✓	✓	X	X	X
Uninsulated, suitable for parking decks	 	✓	✓	✓	X	X	X
Lightweight roof							
Uninsulated		✓	✓	✓	X	X	X
Insulated		✓	✓	✓	X	X	X
Gutter							
Gutter		X	X	X	✓	✓	✓

✓ suitable
X not suitable

2 Planning

2.1 Roof structure

The most important roof types for large roof areas are the flat roof and sawteeth roof with box gutters.

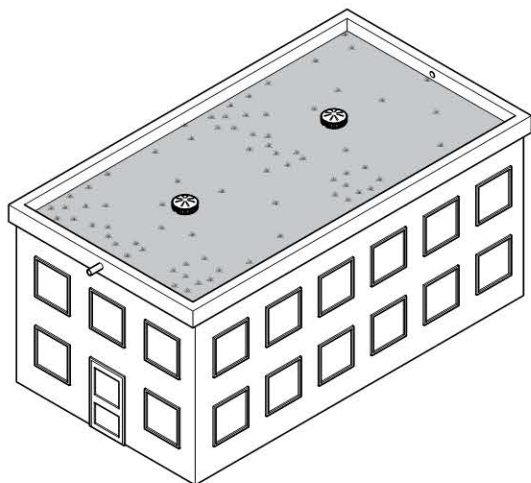


Figure 17: Flat roof

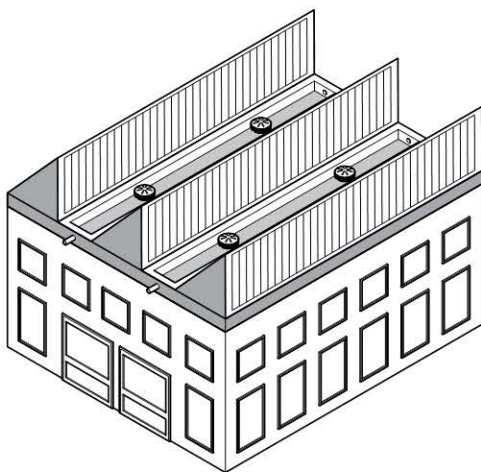


Figure 18: Sawteeth roof with box gutter

There are different versions for both roof types, e.g.:

- Uninsulated roof
- Insulated roof
- Suitable for promenade or parking decks
- Green roof

The following sections list basic rules that must be observed when planning roofs and show typical examples of roof structures with Geberit Pluvia.

2.1.1 Basic rules

Roofs suitable for promenade or parking decks

In the case of roofs suitable for promenade or parking decks, plastic-bonded plates are to be used. If plates or coverings containing cement are used, the roof outlets must be protected against caking by a 1 x 1 m gravel bed (gravel fraction 16–32 mm).

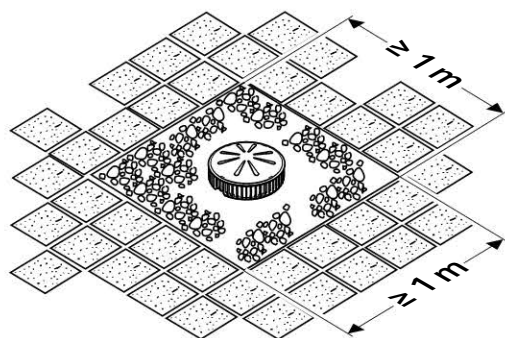


Figure 19: Gravel bed 1 x 1 m

In the case of promenade decks, a delayed start of Geberit Pluvia due to the flagging in the gravel bed must be taken into account (see "Determination of the rainwater outflow" on page 29).

In the case of parking decks, terraces etc. with a great deal of foot traffic, the use of Geberit Pluvia must be clarified with Geberit due to the risk of dirt.

2.1.2 Solid roof



The following roof structures are unbinding examples.

Uninsulated

With roof foil

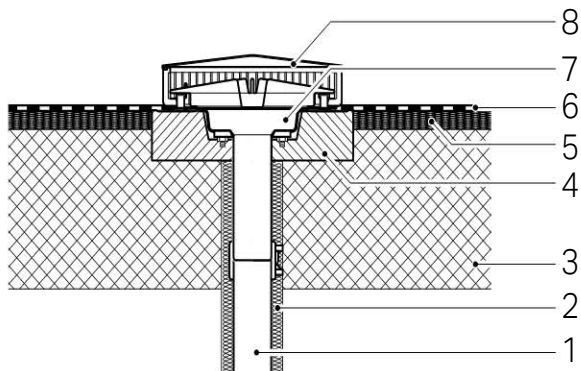


Figure 20: Solid roof construction, uninsulated, with roof foil

- 1 Connection pipe with non-positive connection
- 2 Anti-condensation insulation (not included)
- 3 Concrete ceiling
- 4 Pluvia anti-condensation insulation
- 5 Slope cover / screed
- 6 Roof foil
- 7 Pluvia roof outlet
- 8 Pluvia outlet grating with function disc

With bitumen roof foil, suitable for promenade decks

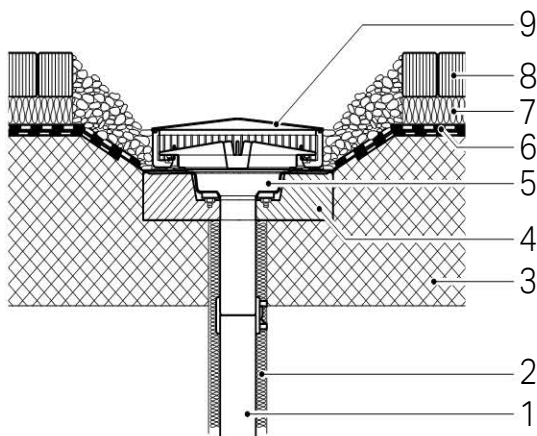


Figure 21: Solid roof construction, uninsulated, with bitumen roof foil, suitable for promenade decks

- 1 Connection pipe with non-positive connection
- 2 Anti-condensation insulation (not included)
- 3 Concrete ceiling
- 4 Pluvia anti-condensation insulation
- 5 Pluvia roof outlet
- 6 Bitumen roof foil (at least two layers)
- 7 Thermal insulation
- 8 Flagstones with gravel bed in the area of the roof outlet
- 9 Pluvia outlet grating with function disc

With bitumen roof foil, suitable for parking decks

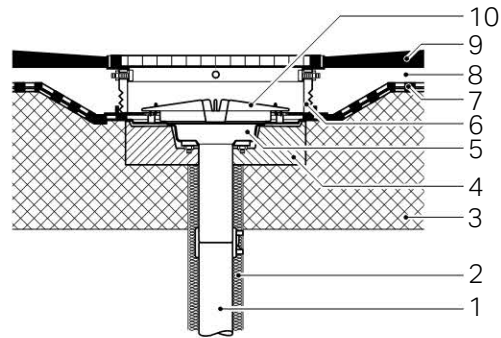


Figure 22: Solid roof construction, uninsulated, with bitumen roof foil, suitable for parking decks

- 1 Connection pipe with non-positive connection
- 2 Anti-condensation insulation (not included)
- 3 Concrete ceiling
- 4 Pluvia anti-condensation insulation
- 5 Pluvia roof outlet
- 6 Pluvia retrofit set, suitable for parking decks
- 7 Bitumen roof foil (at least two layers)
- 8 Bitumen covering
- 9 Asphalt covering
- 10 Pluvia outlet grating with function disc

Insulated

With roof foil

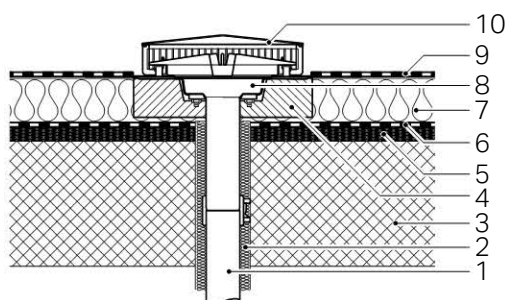


Figure 23: Solid roof construction, insulated, with roof foil

- 1 Connection pipe with non-positive connection
- 2 Anti-condensation insulation (not included)
- 3 Concrete ceiling
- 4 Pluvia anti-condensation insulation
- 5 Slope cover / screed
- 6 Vapour barrier
- 7 Thermal insulation
- 8 Pluvia roof outlet
- 9 Roof foil
- 10 Pluvia outlet grating with function disc

Pipe layout through the vapour barrier must be solved by the roofer on site.

With bitumen roof foil

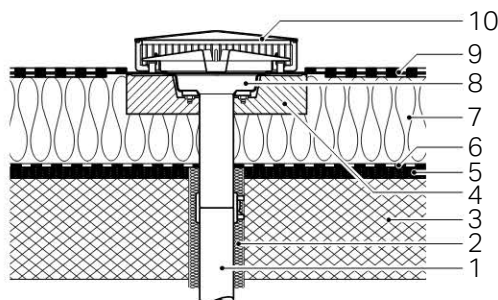


Figure 24: Solid roof construction, insulated, with bitumen roof foil

- 1 Connection pipe with non-positive connection
- 2 Anti-condensation insulation (not included)
- 3 Concrete ceiling
- 4 Pluvia anti-condensation insulation
- 5 Slope cover / screed
- 6 Vapour barrier
- 7 Thermal insulation
- 8 Pluvia roof outlet
- 9 Bitumen roof foil (at least two layers)
- 10 Pluvia outlet grating with function disc

Pipe layout through the vapour barrier must be solved by the roofer on site.

2.1.3 Lightweight roof

Uninsulated

With roof foil

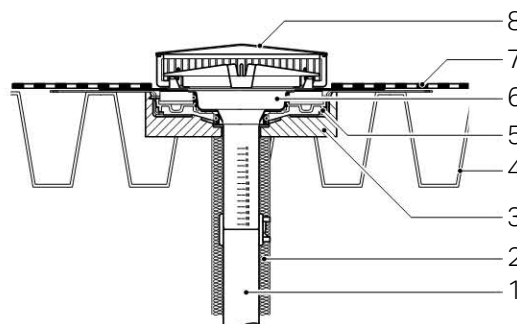


Figure 25: Lightweight roof construction, uninsulated, with roof foil

- 1 Connection pipe with non-positive connection
- 2 Anti-condensation insulation (not included)
- 3 Pluvia anti-condensation insulation
- 4 Lightweight roof
- 5 Pluvia installation sheet
- 6 Pluvia roof outlet
- 7 Roof foil
- 8 Pluvia outlet grating with function disc

With bitumen roof foil

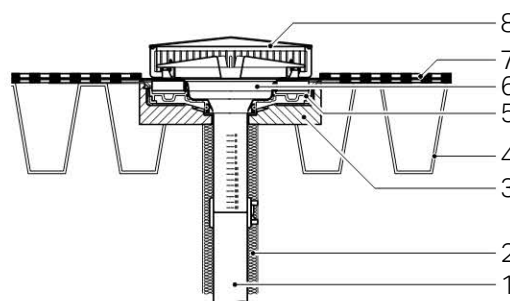


Figure 26: Lightweight roof construction, uninsulated, with bitumen roof foil

- 1 Connection pipe with non-positive connection
- 2 Anti-condensation insulation (not included)
- 3 Pluvia anti-condensation insulation
- 4 Lightweight roof
- 5 Pluvia installation sheet
- 6 Pluvia roof outlet
- 7 Bitumen roof foil (at least two layers)
- 8 Pluvia outlet grating with function disc

Insulated

With roof foil

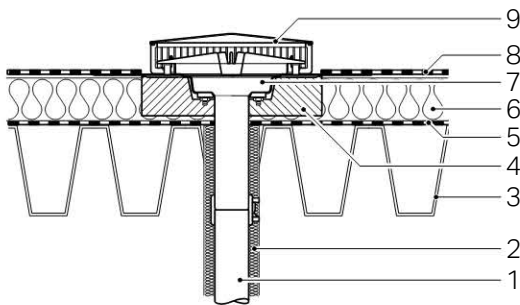


Figure 27: Lightweight roof construction, insulated, with roof foil

- 1 Connection pipe with non-positive connection
- 2 Anti-condensation insulation (not included)
- 3 Lightweight roof
- 4 Pluvia anti-condensation insulation
- 5 Vapour barrier
- 6 Thermal insulation
- 7 Pluvia roof outlet
- 8 Roof foil
- 9 Pluvia outlet grating with function disc

Pipe layout through the vapour barrier must be solved by the roofer on site.

With bitumen roof foil

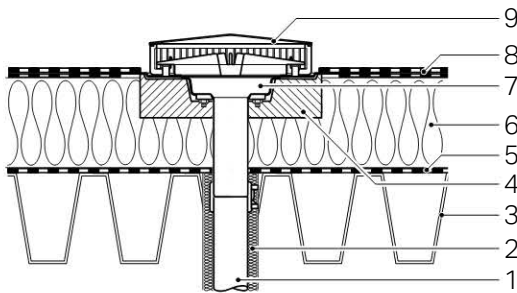


Figure 28: Lightweight roof construction, insulated, with bitumen roof foil

- 1 Connection pipe with non-positive connection
- 2 Anti-condensation insulation (not included)
- 3 Lightweight roof
- 4 Pluvia anti-condensation insulation
- 5 Vapour barrier
- 6 Thermal insulation
- 7 Pluvia roof outlet
- 8 Bitumen roof foil (at least two layers)
- 9 Pluvia outlet grating with function disc

Pipe layout through the vapour barrier must be solved by the roofer on site.

2.1.4 Gutter

Gutters have special requirements for planning and installation. Layout and hydraulic certification must be provided by an architect or hydraulic engineer.

The connection material of the roof outlets should be selected so that no galvanic corrosion occurs.

The use of an on-site trace heater should be checked and adapted to the country-specific circumstances.

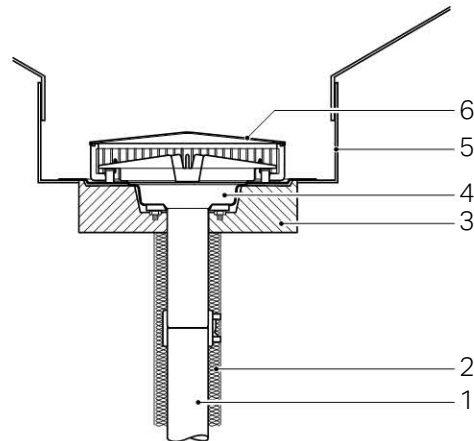


Figure 29: Gutter construction

- 1 Connection pipe with non-positive connection
- 2 Anti-condensation insulation (not included)
- 3 Pluvia anti-condensation insulation
- 4 Pluvia roof outlet
- 5 Gutter
- 6 Pluvia outlet grating with function disc

2.1.5 Green roofs

Flat roofs of new buildings and refurbished old buildings are being increasingly greened.

Green roofing yields ecological and structural advantages such as:

- Protection of the sealing (UV protection and mechanical protection)
- High water retention
- Increased acoustic insulation
- Dust binding

The layer structure of a green roofing retains precipitation. This retention basically depends on the thickness of the applied substrate layer. The thicker it is, the higher the retention.

From a drainage and vegetation point of view, one differentiates between intensive and extensive green roofing.

The layer thickness and the height of the plant growth are the essential differences.

Extensive green roofings are vegetation forms created closely to nature that basically maintain themselves and develop further on their own. Plants are used that are specially adapted to the extreme local conditions with a great ability for regeneration. The largely closed, extensive vegetation groups are made of mosses, succulents, herbs and grasses.

Extensive green roofings with low surface loads and low layer thicknesses allow the economic greening of large-surface roofs. Extensively greened roofs are designed without water retention.

Intensive green roofings include shrubs, woody plants as well as lawns and, in individual cases, even trees. In regard to the possibilities of use and design variety, they are comparable to ground-based green spaces if equipped accordingly. The used plants are more or less demanding in regard to layer structure and regular water and nutrient supply and thus must be cared for regularly.

Intensively greened roofs can be designed with or without water retention.

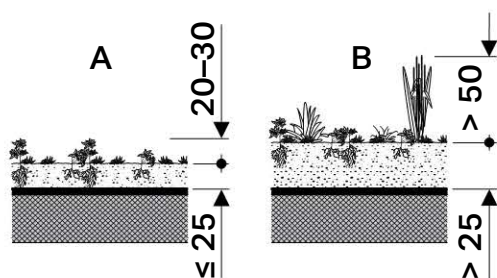


Figure 30: Comparison of extensive green roofing (A) and intensive green roofing (B)

For both types of green roofing, the layer structure generally consists of:

- Protective layer against mechanical damage and root growth through the roof sealing.
- Drainage layer
- Filter layer
- Vegetation layer



A 500 mm wide zone must be kept free from vegetation around the Pluvia roof outlet (e.g. with a gravel bed).

Extensively greened roof

- Capacity factor $C = 0.7$ to 0.4
- Humus layer height ≤ 250 mm
- Height of the plant growth up to approx. 200 mm

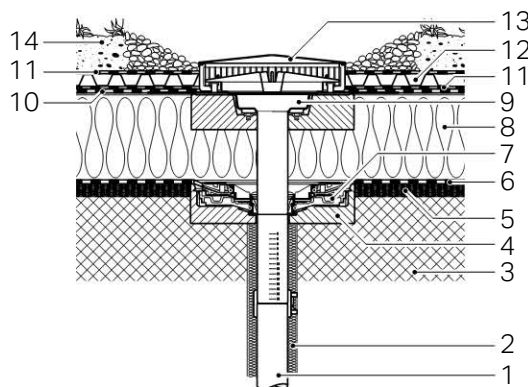


Figure 31: Structure of an extensively greened roof

- 1 Connection pipe with non-positive connection
- 2 Anti-condensation insulation (not included)
- 3 Concrete ceiling
- 4 Pluvia anti-condensation insulation
- 5 Slope cover / screed (optional)
- 6 Vapour barrier
- 7 Pluvia vapour barrier connection
- 8 Thermal insulation
- 9 Pluvia roof outlet
- 10 Roof foil
- 11 Filter mat / separating layer
- 12 Drainage
- 13 Pluvia outlet grating with function disc
- 14 Extensive green roofing with gravel bed in the area of the roof outlet

Intensively greened roof

- Capacity factor $C = 0.3$ to 0.1
- Humus layer height > 250 mm
- Height of the plant growth from 500 mm to approx. 10 m

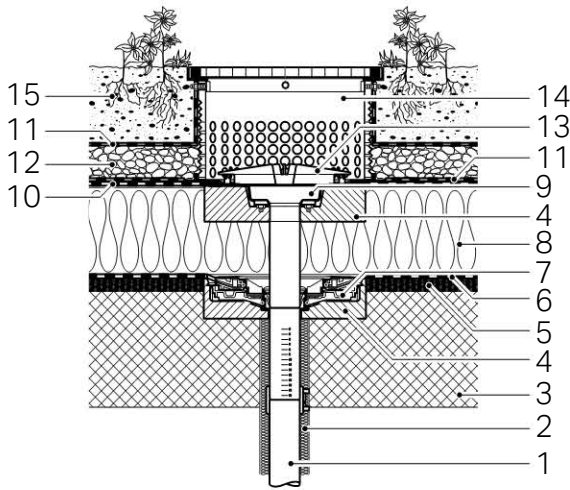


Figure 32: Structure of an intensively greened roof

- 1 Concrete ceiling
- 2 Slope cover / screed (optional)
- 3 Connection pipe with non-positive connection
- 4 Anti-condensation insulation (not included)
- 5 Pluvia anti-condensation insulation
- 6 Pluvia vapour barrier connection
- 7 Vapour barrier
- 8 Thermal insulation
- 9 Pluvia roof outlet
- 10 Roof foil
- 11 Filter mat / separating layer
- 12 Gravel layer
- 13 Pluvia outlet grating with function disc
- 14 Pluvia retrofit set, suitable for parking decks
- 15 Intensive greening

Planning notices

- The capacity factor must be adhered to
- Green roofs with a Pluvia roof drainage system must always be designed with a drainage layer
- Any percolating and surface water that accumulates can lead to contamination of the roof outlets and pipelines; a filter mat must be used
- Roof outlets must be freely accessible for maintenance work even after the roof has been greened; use manholes with removable covers
- In order to exclude scaling and caking in roof outlets and pipelines, the amount of easily soluble carbonates in the used substrates and bulky material must not exceed 6 g/L.
- A 500 mm wide zone must be kept free from vegetation around the Pluvia roof outlet (e.g. with a gravel bed)
- With the Pluvia roof drainage system, greened roof areas must not be drained together with roof areas without green roofing through a common discharge pipe

2.2 Roof outlets

2.2.1 Basic rules

- A minimum distance of 1 m must be maintained between the roof outlet and parapets etc.
- The possible roof loads of lightweight roofs must be checked
- Regardless of the size of the roof area, an emergency overflow set must be present
- An anchor point must be provided on the building structure to fasten the branch discharge pipe of the roof outlet
- Per roof area, at least two roof outlets or one roof outlet and one emergency overflow must be provided
- Roof outlets 45 L / 60 L / 100 L are only for use in regions with extremely high amounts of precipitation. In most countries, it is sufficient to use the roof outlets 14 L or 25 L

2.2.2 Arrangement of the roof outlets

The following rules must be observed when arranging the Pluvia roof outlets:

- Roof outlets must be distributed as practically and evenly as possible
- Arrange roof outlets at the lowest point of a roof area
- The maximum distance between two roof outlets on the same drainage line must not exceed 20 m
- To prevent the function of the roof outlets from being impaired, they must be positioned at least 1 m away from walls, parapets etc.

Flat roofs with parapet

In the case of flat roofs with parapets, terraces etc., rainwater can accumulate. For this reason, at least two Pluvia roof outlets must be planned for each partial roof or terrace area.

This makes it possible for water to flow from roof outlet to roof outlet or from Pluvia roof outlet to emergency overflow.

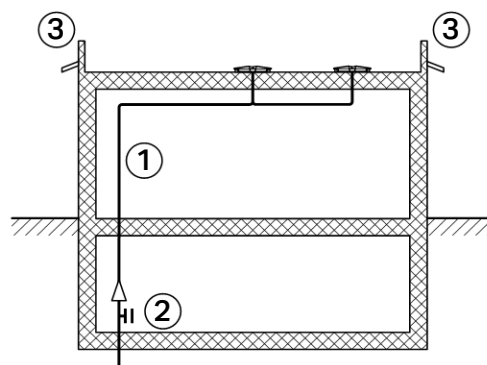


Figure 33: Roof outlets and pipe layout for flat roofs with parapet

- 1 Pluvia roof outlet and syphonic pipeline
- 2 Partially filled conventional pipeline
- 3 Emergency overflows

Box gutters

It is generally possible to use the Pluvia system for draining gutters. However, there are special requirements for planning and installation. Box gutters shall be dimensioned by the hydraulic consultant.

In the case of box gutters, at least two Pluvia roof outlets and one emergency overflow must be provided.

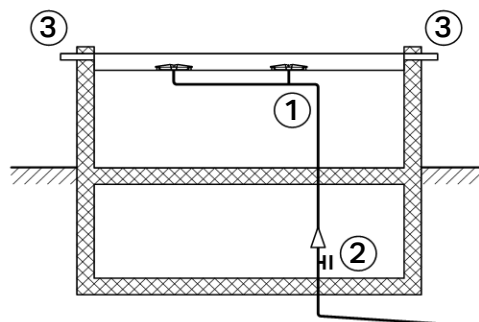


Figure 34: Roof outlets and pipe layout with box gutters

- 1 Pluvia roof outlet and syphonic pipeline
- 2 Partially filled conventional pipeline
- 3 Emergency overflows

The following basic rules must be observed when using Geberit Pluvia in gutters:

- Maximum distance of the roof outlets: 20 m
- Minimum width of the gutter: 350 mm
- Use only in gutters with a flat base

2.3 Pipe layout

2.3.1 Basic rules

- The maximum negative pressure in the piping system is:
 - \varnothing 40–160 = -800 mbar
 - \varnothing 200–315 = -450 mbar
 - \varnothing 200–315 HDPE pipes SDR26 = -800 mbar
- For this reason only electrofusion welds and butt-welds are allowed for the Geberit Pluvia system
- For practical planning, the length of a horizontal section must not exceed a maximum value

The maximum length is defined as follows:

$$l_{\max} = 10 \cdot h$$

l_{\max} : Maximum length of a horizontal pipe section

h : Height of fall between roof outlet and transition to conventional drainage system

- Horizontal pipelines must be laid without slopes
- Foreign water, e.g. condensation, must not be channelled into the Pluvia roof drainage system

2.3.2 Separate pipe layout

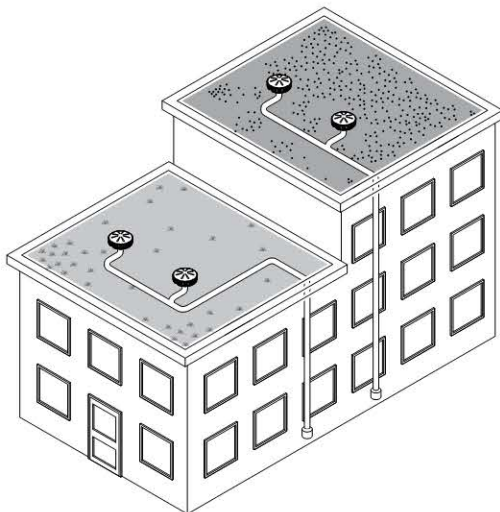


Figure 35: Separate pipe layout

Roof areas must be drained separately in the case of:

- Different capacity factors
- Areas > 5,000 m²
- Height difference > 4 m

Two roof areas with a height difference up to 4 m from each other can be drained together if the risk of overflow from the upper roof to the lower roof can be excluded.

2.3.3 Connections and reducers

Connection of the Pluvia roof outlets

The Pluvia roof outlets can be directly connected to the piping system with a 90° bend.

Pluvia roof outlets can also be connected with a reducer or an expander.

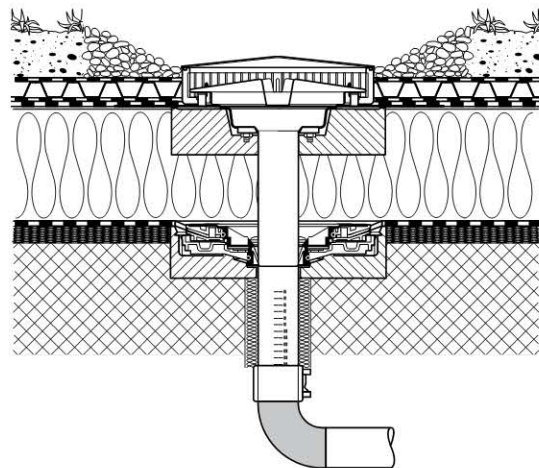


Figure 36: Connection of the Pluvia roof outlet with a 90° bend

All following 90° changes in direction in the Pluvia piping system may only be made with two 45° bends.

If the Pluvia roof outlet is connected to the piping system with a reducer, the following minimum dimensions must be observed:

- Pluvia roof outlets 14 L can be reduced to maximum \varnothing 40 mm
- Pluvia roof outlets 25 L can be reduced to maximum \varnothing 75 mm

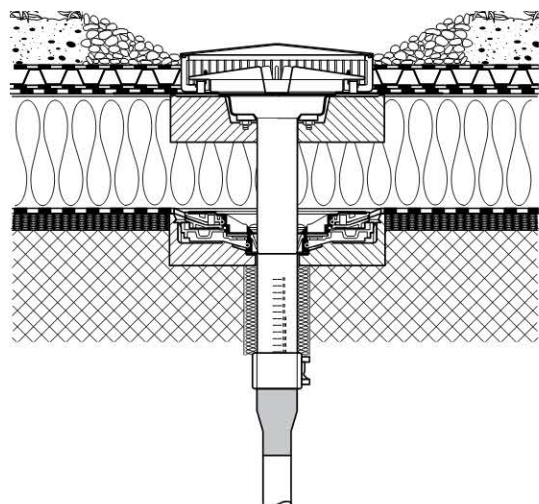


Figure 37: Connection of the Pluvia roof outlet with a reducer

If the Pluvia roof outlet is connected to the piping system with an expander, the following maximum dimensions must be observed:

- Pluvia roof outlets 14 L can be expanded to maximum \varnothing 75 mm
- Pluvia roof outlets 25 L can be expanded to maximum \varnothing 110 mm

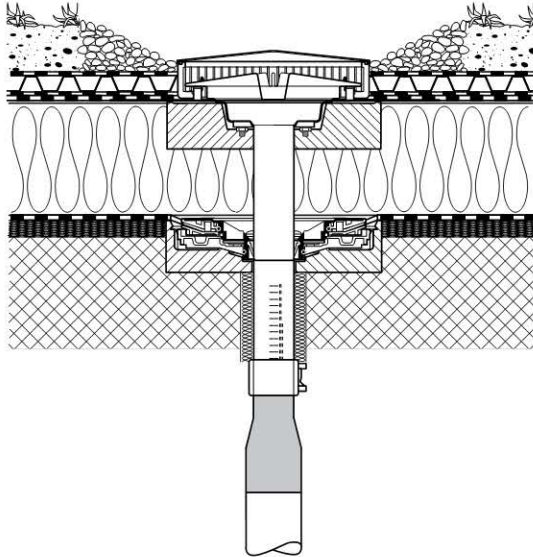


Figure 38: Connection of the Pluvia roof outlet with an expander

Reducers

For Pluvia eccentric reducers are preferred.

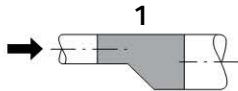


Figure 39: Eccentric reducer
1 Eccentric reducer

2.3.4 Transition from Geberit Pluvia to conventional roof drainage system

The Pluvia roof drainage system ends at a defined point. From this point on, the piping system must be conventionally dimensioned.

This point is also the transition from the roof drainage system with complete filling (Geberit Pluvia) to the roof drainage system with partial filling (conventional roof drainage system). For this purpose, it is necessary to expand the piping system. The expansion is achieved using a reducer.

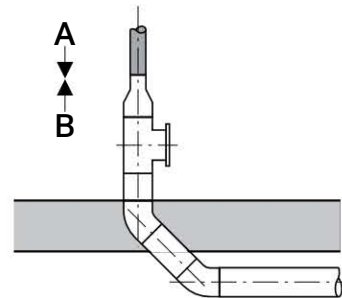


Figure 40: Expansion using a reducer

- A Geberit Pluvia (complete filling)
- B Conventional roof drainage system (partial filling)

Expansion through release into a manhole is also possible when the inlet and outlet are opposite of each other.

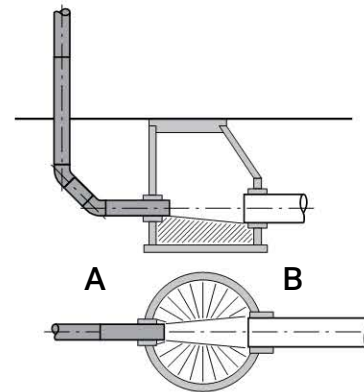


Figure 41: Expansion through release into a manhole

- A Geberit Pluvia (complete filling)
- B Conventional roof drainage system (partial filling)

If the transition to the conventional drainage system is located after the manhole, the Pluvia pipeline must be closed in the manhole. Geberit Pluvia pipelines must be continuous. They must not be interrupted (e.g. by a manhole).

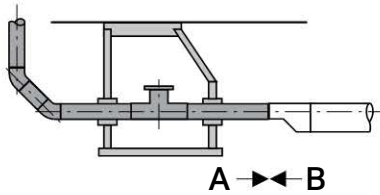


Figure 42: Expansion after a manhole, allowed
 A Geberit Pluvia (complete filling)
 B Conventional roof drainage system (partial filling)

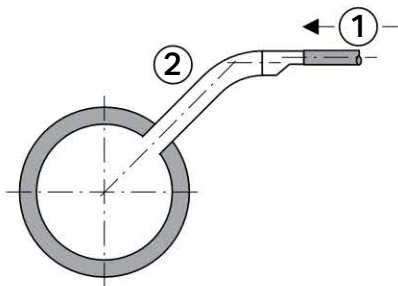


Figure 43: Expansion up to before the sewage system
 1 Pluvia roof drainage
 2 Conventional drainage of at least 2 m length as a transition section before the sewage system

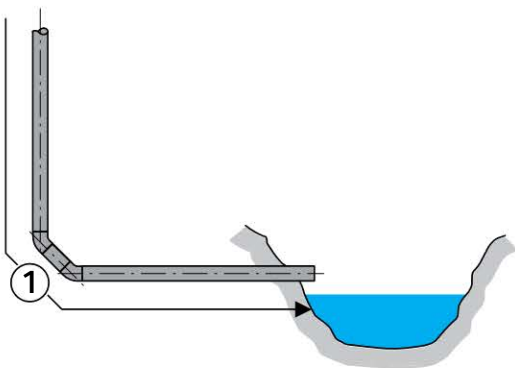


Figure 44: Expansion up to the receiving waters
 1 Pluvia roof drainage

i For dimensioning the pipeline, the country-specific standards and regulations must be taken into account for the transition to a conventional drainage system.

2.3.5 Protection against hail damage

In areas subject to hailstorms, Geberit recommends protecting the Pluvia roof outlet.

Flat roof construction

On-site solution with grating, hole size approx. 8 x 20 mm, in the area of the roof outlet.

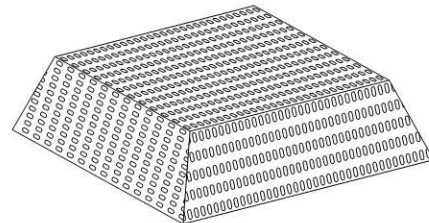


Figure 45: Grating for Pluvia roof outlet

Box gutter construction

On-site solution with grating, hole size approx. 8 x 20 mm, over the entire length of the gutter including the roof outlet.

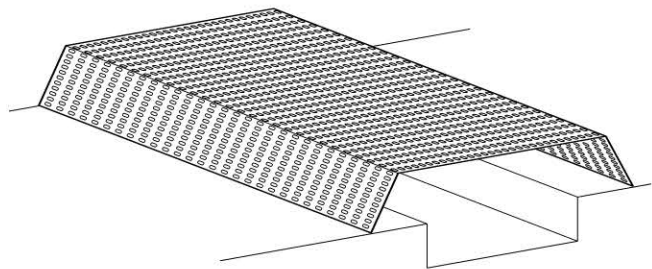


Figure 46: Grating for gutter

2.3.6 Acoustic insulation

As a result of the high flow speed in the piping system, the sound pressure level of Geberit Pluvia is higher than with conventional roof drainage systems.

In buildings without acoustic insulation requirements, Geberit Pluvia can be used without restrictions.

In buildings with acoustic insulation requirements, an acoustically optimised pipe layout is achieved by:

- Preventing sound transmission to the building structure (acoustic insulation)
- Optimum placement of roof outlets and pipelines

To prevent the transmission of solid-borne sound, acoustic insulation must be provided at the contact points of the building structure and the piping system.

To prevent the spreading of airborne sound, installation in acoustically optimised installation ducts and/or insulation with lagging is possible.

2.4 Pipe fixation

2.4.1 Thermally caused change in length

Materials expand when the temperature increases. When the temperature decreases, materials shrink. The degree of expansion or shrinkage varies according to the product material. Thermal expansion and shrinkage are indicated by the coefficient of linear expansion α [mm/m·K].

The coefficient of linear expansion α for Geberit HDPE is 0.2 mm/m·K.

A temperature differential $\Delta T = 50^\circ\text{C}$ with Geberit HDPE causes a linear expansion of 10 mm per meter of piping.

A temperature differential $\Delta T = 30^\circ\text{C}$ causes a linear shrinkage of 6 mm per meter of piping.

Example:

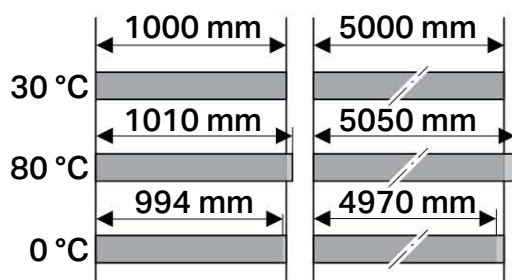


Figure 47: Example of Geberit HDPE change in length

The change in length of Δl of Geberit HDPE can be determined in the following diagram:

Example:

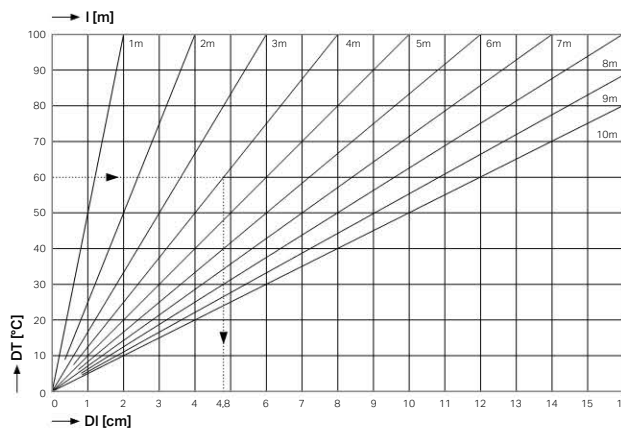


Figure 48: Determining the change in length of Δl for Geberit HDPE using the diagram

Δl Change in length

ΔT Temperature differential

l Pipe length

2.4.2 Fastening possibilities

The thermally caused change in length of the piping system must be controlled by the pipe fixation with anchor points and sliding points.

Anchor points counteract the forces of the thermally caused change in length and thereby control the linear expansion of the pipeline in a defined direction.

Sliding points prevent the pipe from veering to the side during thermally caused changes in length and support the weight of the water-filled pipeline.

Geberit Pluvia can be fastened as follows:

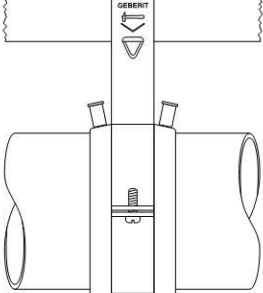
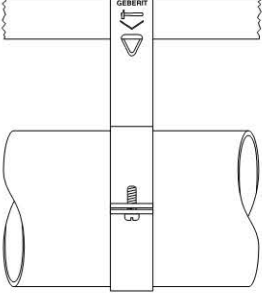
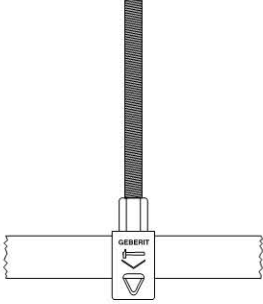
- Horizontal fastening with a rail fastening system
- Horizontal and vertical fastening with rigid mounting

With fastening using a rail fastening system, the thermally caused change in length is accommodated by the support rail.

2.4.3 Rail fastening system $\varnothing 40$ to $\varnothing 200$ mm

In the case of horizontal fastening with a rail fastening system, anchor and sliding points are created as follows:

Table 6: Configuration of anchor and sliding points with a rail fastening system

Anchor point	Sliding point	Suspension
Pluvia pipe bracket with electrofusion tape	Pluvia pipe bracket	
		

The suspension is additionally used as the connection to the building structure. This ensures a flexible attachment of the fastening points.

Distances must be observed when planning and installing anchor and sliding points.

Anchor points must be attached:

- At the beginning and end of each pipe run and at each change in direction
- At each branch fitting (both main pipe and branching pipe)
- At each reducer, on the side with the larger dimension
- On straight partial sections after every 5 m

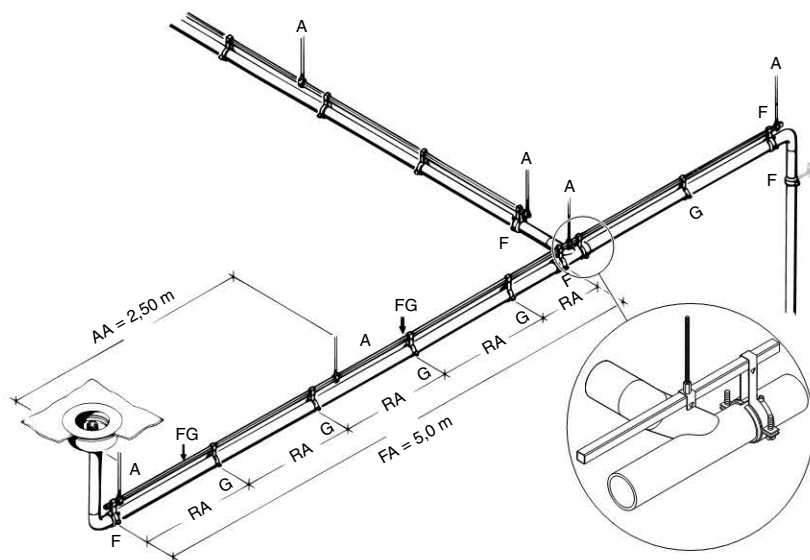


Figure 49: Fastening distances for a rail fastening system

A Suspension (threaded socket M10)

F Anchor point

G Sliding point

AA Distance of the suspensions

RA Distance between pipe brackets

FA Distance of the anchor points

FG Weight of the syphonic system on the suspension

Table 7: Recommended distances between pipe brackets with a rail fastening system

Pipe dimension ø [mm]	RA [m]	FG with A ¹⁾ [N]
40	0.8	70
50	0.8	88
56	0.8	107
63	0.8	124
75	0.8	156
90	0.8	203
110	1.1	279
125	1.2	348
160	1.6	550
200	2.0	850
250	1.7	1260
315	1.7	2000

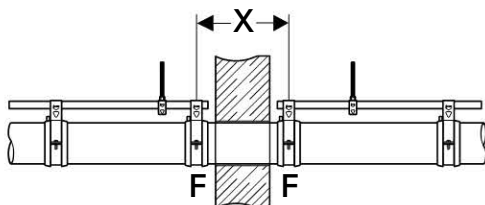
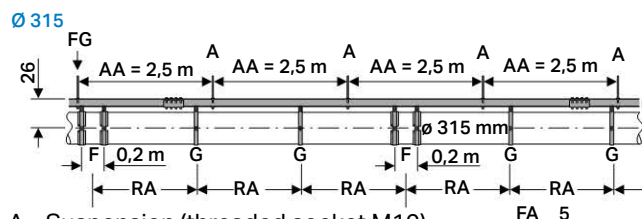
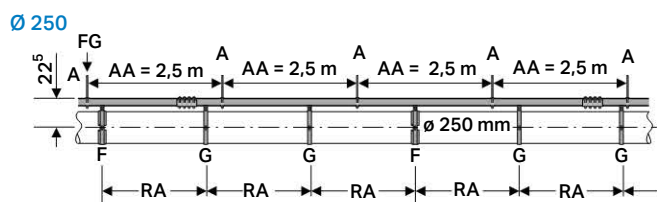
¹⁾ With fastening material

Figure 50: Application with single interruption of a rail system

Tabelle 8: Distance between pipe brackets

Pipe d	Max. pipe bracket spacing x
< ø 75 mm	0.8 m
> ø 90 mm	10 x d

2.4.4 Rail fastening system ø 250 to ø 315 mm



- A Suspension (threaded socket M10)
 F Anchor point
 G Sliding point
 AA Distance of the suspensions
 RA Distance between pipe brackets
 FA Distance of the anchor points

FG Weight of the syphonic system on the suspension

Tabelle 9: Distances of the fastenings to be attached

Pipe ø [mm]	RA [m]	FG with AA = 2.5 m [N]
250	1.7	1320
315	1.7	2060



- For fastening to the building structure, the required materials (screws, dowels, console brackets etc.) must be clarified by the builders
- Installed branch fittings must be secured with an anchor point
- In the case of pipes without branch fittings, an anchor point must be installed every 5 m

In the case of pipelines ø 315 mm, all anchor points must be created with 2 pipe brackets with electrofusion tape. The distance between the two pipe brackets is 0.2 m.

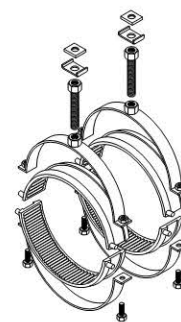


Figure 51: Pluvia pipe bracket with coupling M16 and electrofusion tape

For the transition from ø 200 mm to ø 250 mm or ø 315 mm, the support rails cannot be connected to each other, since their distance from the pipe centre differs by 10 mm.

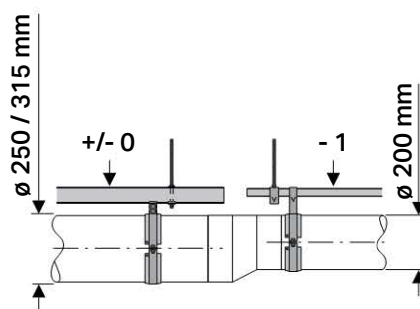


Figure 52: Non-connectable support rails

2.4.5 Rigid mounting

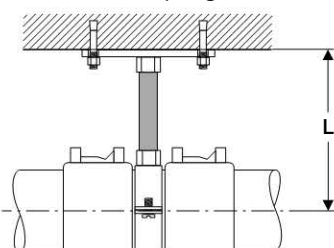
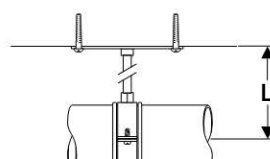
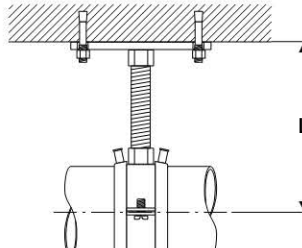
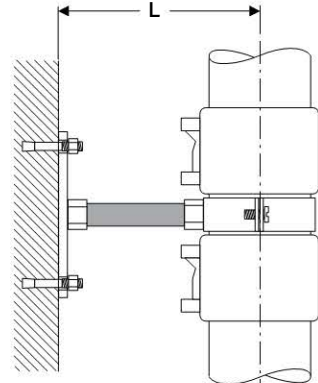
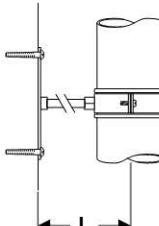
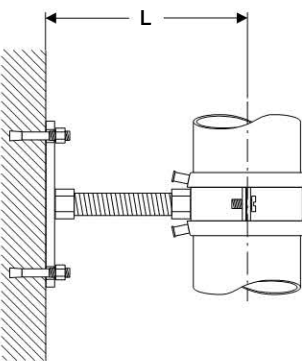
Pipe layout through rigid fastening

- Use for horizontal and vertical pipes
- Recommended up to $\varnothing = 125$ mm
- Expansion forces that result from thermally caused changes in length are transferred to the building structure
- Specific force transmission is accommodated at the anchor points

Anchor and sliding points

Rigid mounting is not recommended for fastening Geberit Pluvia. If no other type of fastening is possible, anchor and sliding points should be configured as follows:

Table 10: Configuration of anchor and sliding points for rigid mounting

		Anchor point	Sliding point
Horizontally on ceilings	Pipe bracket with electrofusion sleeve coupling		
	Pipe bracket with electrofusion tape		
Vertically on walls	Pipe bracket with electrofusion sleeve coupling		
	Pipe bracket with electrofusion tape		

The diameter of the threaded rods depends on the distance L of the pipe from the wall. The following tables indicate the diameters of the threaded rods for anchor points.

Table 11: Rigid mounting: diameter of the threaded rods with anchor points on ceilings

Ceiling spacing L [mm]	Dimension					
	$\varnothing 50$	$\varnothing 56$	$\varnothing 75$	$\varnothing 90$	$\varnothing 110$	$\varnothing 125$
100	1"	1"	1"	5/4"	1 1/2"	2"
200	5/4"	5/4"	1 1/2"	2"	–	–
300	1 1/2"	1 1/2"	2"	–	–	–
400	2"	2"	2"	–	–	–
500	2"	2"	–	–	–	–
600	2"	–	–	–	–	–

Table 12: Rigid mounting: diameter of the threaded rods with anchor points on walls

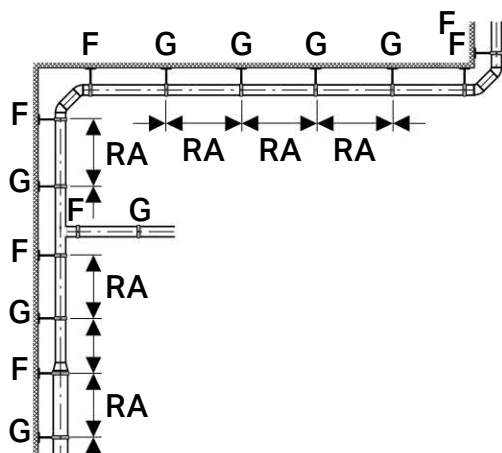
Wall spacing L [mm]	Dimension					
	ø 50	ø 56	ø 75	ø 90	ø 110	ø 125
100	1/2"	1/2"	3/4"	1"	1"	5/4"
200	3/4"	1"	1"	5/4"	5/4"	1 1/2"
300	1"	1"	5/4"	5/4"	2"	2"
400	1"	5/4"	5/4"	1 1/2"	2"	–
500	5/4"	5/4"	1 1/2"	2"	2"	–
600	5/4"	1 1/2"	1 1/2"	2"	–	–



Commercially available products can be used to create the anchor points.

Fastening distances

The following fastening distances and dimensions must be observed:



G Sliding point
RA Distance between pipe brackets
F Anchor point

Table 13: Fastening distances on ceilings and walls

ø [mm]	RA [m]
50	0.8
56	0.8
75	0.8
90	0.8
110	1.1
125	1.2

Anchor points must be attached:

- At the beginning and end of each pipe run and at each change in direction
- At each branch fitting (both main pipe and branching pipe)
- At each reducer, on the side with the larger dimension

2.4.6 Installation directly during pipe installation

In comparison to subsequent installation, material can be saved by installing the support immediately during installation of the Pluvia roof drainage system. The sliding bracket of the standard fastening system is not necessary at the points of the pipe at which supports are provided.

2.5 Dimensioning

2.5.1 Dimensioning process

A Pluvia roof drainage system is dimensioned using Geberit ProPlanner, Pluvia module.

The following parameters must be determined:

- Number and position of the roof outlets
- Building height
- Pipe layout
 - Collector pipes
 - Stacks
 - Transition to conventional drainage system
- Rainwater outflow (nominal volumetric flow)

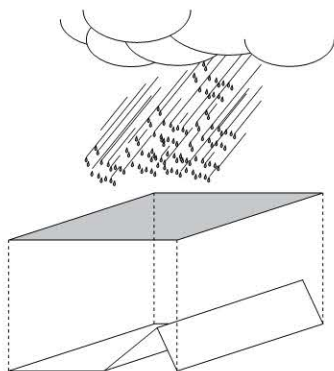
Rules and dimensions that must be observed when the Pluvia roof outlets are arranged are described in chapter 2.2 "Roof outlets" on page 20.

Rules and dimensions that must be observed when the pipes are laid are described in chapter 2.3 "Pipe layout" on page 21.



If changes are made to the roof area, building height, pipe layout or number of roof outlets, the system must be recalculated.

Determination of the rainwater outflow



The rainwater outflow is calculated with the following formula:

$$Q_R = \frac{A \cdot r}{3600} \cdot C$$

Q_R	Rainwater outflow [l/s]
A	Roof area [m ²]
r	Rainfall [mm/hr]
C	Capacity factor

The ARI can be obtained from AS3500.3:2003 or from the Bureau of Meteorology (BOM) website.

The capacity factor depends on the roof structure and indicates what share of the nominal rain is actually discharged, e.g.:

- Foil and tin roofs (roofs with sealing) $C = 1.0$
- Gravel roofs $C = 0.8$
- According to manufacturer's information

Table 14: Capacity factors for greened roof areas

Layer thickness	Capacity factors C	
	Pitch up to 15°	Pitch over 15°
> 500 mm	0.1	–
> 250–500 mm	0.2	–
> 150–250 mm	0.3	–
> 100–150 mm	0.4	0.5
> 60–100 mm	0.5	0.6
> 40–60 mm	0.6	0.7
> 20–40 mm	0.7	0.8

The indicated capacity factors have been taken from the guidelines of the Landscape Development and Landscaping Research Society e.V. (Forschungsgesellschaft Landschaftsentwicklung Landschaftsbau e.V.).

Dimensioning with Geberit ProPlanner, Pluvia module

When the number and positions of the roof outlets, the pipe layout and the rainwater outflow have been determined, Geberit Pluvia can be dimensioned using Geberit ProPlanner.

The dimensioning is basically done as follows:

- Creating the piping system in isometric view
 - Set the underground pipe connection
 - Draw the pipes
 - Set the roof outlets
- Entering the pipe lengths and rainwater outflow
- Calculating the dimensions of the piping system

2.5.2 Considering the safety factor

Considering the safety factor for Geberit Pluvia leads to an undesirable overdimensioning, which can lead to malfunctions in the drainage capacity and self-cleaning.

For this reason, the safety factor is neglected when dimensioning Geberit Pluvia.

2.6 Emergency drainage

2.6.1 General

In the case of roof areas with internal drainage, such as box gutters, an emergency overflow must be present, regardless of the size of the roof area. Consequently, the type of drainage (negative pressure system with Pluvia roof drainage system or conventional roof drainage system) does not have any influence on the basic question of the creation and necessity of emergency overflows.

Further reasons for creating emergency overflows:

- Dimensions of the sewage system too small
- Blockage of the storm-water system
- Strong contamination of the roof outlets (e.g. from leaves)
- Static design of trapezoidal roofs too weak

2.6.2 Basic rules



The rules listed below are to be considered an unbinding guideline. They must be agreed upon on site with corresponding skilled persons, such as architects, hydraulic or structural engineers.

The emergency drainage has the task of discharging rainwater when the rainwater outflow exceeds the drainage capacity of the existing roof drainage system. It is a drainage system separate from the roof drainage system and must be calculated and configured separately.

It should be possible to convey at least the same amount of rainwater that is conveyed to the roof outlets through the emergency overflows. The emergency drainage can be done through the facade via an emergency overflow or through emergency overflows with an additional piping system (Fig. 59 on page 32).

The emergency drainage must not be connected to the drainage system but must be drained unhindered to land areas that can be flooded without damage.

An emergency drainage can be done as follows:

- For flat roofs with emergency overflows in the facade
- For box gutters with emergency overflows on the face of the gutter (Fig. 57 on page 31)
- With Pluvia emergency overflows with an additional piping system
- With conventionally designed emergency overflows with an additional piping system

The emergency drainage must be planned as an additional piping system when e.g. the roof geometry does not allow a drainage with emergency overflow openings in the facade.

The emergency overflows must be arranged and dimensioned so that flat roof accesses and flat roof connections cannot be flooded. The lower edge of the emergency overflows must be above the required head of water of the Pluvia roof outlets.

2.6.3 Emergency drainage on the building structure for flat roofs

Flat roofs can be drained with emergency overflows in the facade.

These must be placed so that the flow path of the rainwater between the roof outlet and the emergency overflow is not obstructed.

Regardless of the design of emergency overflows, the lower edge of the emergency overflows must be arranged 50 mm above the uppermost covering layer (also holds true for green roofs). Furthermore, it must be ensured that there are no flat roof terminations, roof accesses etc. below the emergency overflow level.

In order for the emergency overflows to react quickly to the rainwater outflow, they should be designed to be square and long.

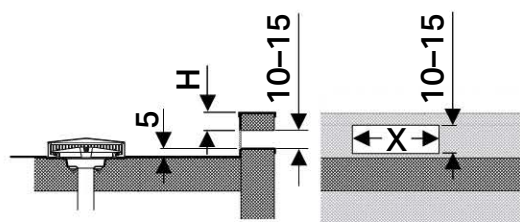


Figure 53: Emergency overflow with flat roof, in the facade
X Width of the emergency overflow
H Distance of parapet upper edge

2.6.4 Emergency drainage with gutters

Roofs with gutter drainage can be drained with emergency overflows in the gutter.

Eaves gutters

In the case of eaves gutters, the lower front edge can be used as an emergency overflow.

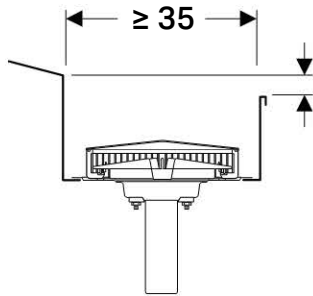


Figure 54: Emergency overflow with eaves gutters

In the case of eaves gutters, the emergency overflows can also be used with the roof outlets (lowest point of the respective gutter section) as well as at the front.

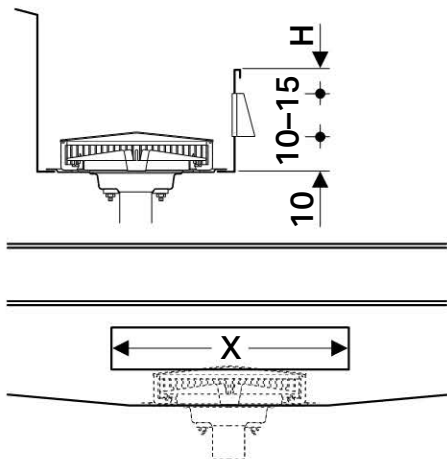


Figure 55: Emergency overflow with gutter, on the longitudinal side

X Width of the emergency overflow

H Distance from the upper edge to the gutter

Box gutters

Emergency overflows must be correctly positioned. This is especially important for box gutters (e.g. with sawteeth roofs) because the emergency overflow function can only be ensured through the front sides of the gutter.

Pay attention to the following points:

- Emergency overflows must be provided on both front sides
- Emergency overflows must be as wide as the gutter and open upwards
- The lower edge of the emergency overflow must be 50–100 mm above the next roof outlet opening

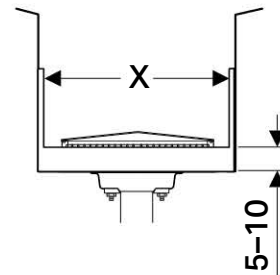


Figure 56: Emergency overflow with gutter, on the front side – width of the emergency overflow

X Width of the emergency overflow

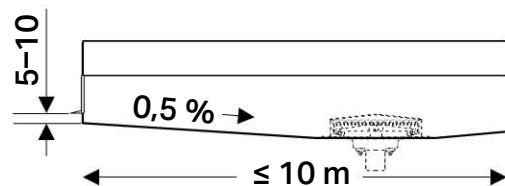


Figure 57: Emergency overflow with gutter, on the front side – overflow edge and distance from next roof outlet



The head of water must be taken into account in the static calculation for the roof and the gutters.

2.6.5 Emergency drainage with Pluvia emergency overflows

For emergency drainage, Pluvia roof outlets can be used in connection with the corresponding Pluvia emergency overflow set as emergency overflows simply, quickly and without increasing the roof membrane.

For flat roofs, Pluvia roof outlet and Pluvia emergency overflow should be planned in the immediate vicinity (approx. 1 m) of each other.

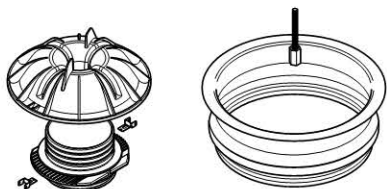


Figure 58: Pluvia emergency overflow 14 L and 25 L

The Pluvia emergency overflow system is a drainage system separate from the Pluvia roof drainage system. The collected rainwater must be drained unhindered to land areas that can be flooded without damage.

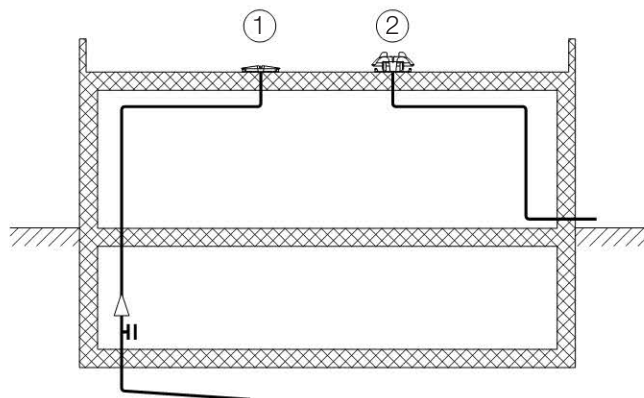


Figure 59: Pluvia emergency overflow system as a separate drainage system

- 1 Pluvia drainage system
- 2 Pluvia emergency overflow system

2.6.6 Conventional emergency drainage

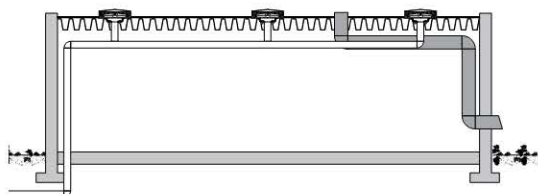


Figure 60: Pluvia system with emergency drainage through a conventional pipe system

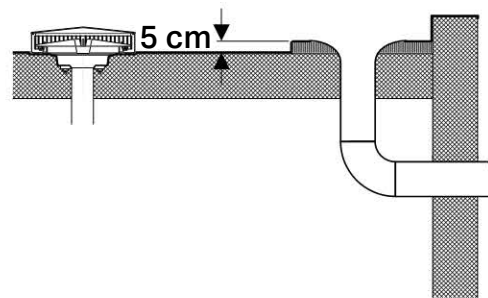


Figure 61: Conventional emergency drainage as a construction measure

In the case of emergency drainage as a construction measure, the lower edge of the emergency overflow must be at least 50 mm higher than the uppermost covering layer.

2.6.7 Dimensioning of emergency overflows

Simplified dimensioning of the emergency overflows as a construction measure

The emergency overflows can be dimensioned using the following empirical value:

$$\text{Total rainfall in l/s} \times 25 \text{ cm}^2$$

Example

- Roof area with 4 roof outlets of 8 l/s each
- Total rainfall: $4 \times 8 \text{ l/s} = 32 \text{ l/s}$ multiplied by $25 \text{ cm}^2 = 800 \text{ cm}^2$

In order to ensure optimum discharge of the rainwater and prevent excessive loading of the roof, the height of the emergency overflow must be kept between 100 to max. 150 mm.

Applied to the example, this yields a requirement for emergency overflow openings of 80 x 10 cm or 54 x 15 cm. The total requirement should be divided among several openings, e.g. 4 openings of 20 x 10 cm.

Dimensioning of emergency overflows according to AS3500.3:203

The emergency overflow system has to be able to drain the same capacity as the primary siphonic system.

3 Installation

3.1 Pluvia roof outlets

3.1.1 Basic rules

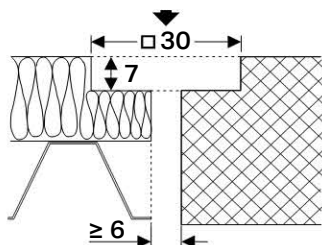
- The branch discharge pipe of the roof outlet must always be fastened to the building structure with an anchor point
- In order to ensure the drainage capacities of the roof outlets, the function disc and the outlet grating must be installed immediately after the roof sealing work has been completed. If they are not installed, only an emergency drainage with a considerably minimised capacity will be possible during the construction phase
- The placement of the branch discharge pipe in the thermal insulation should be avoided. If this is not possible, the roof outlet must be additionally fastened with the installation sheet, article no. 359.630.00.1
- When connecting roof sealing and contact sheets for gutters, make sure that the roof outlet is not damaged by the installation or welding process

3.1.2 Installation in the roof structure

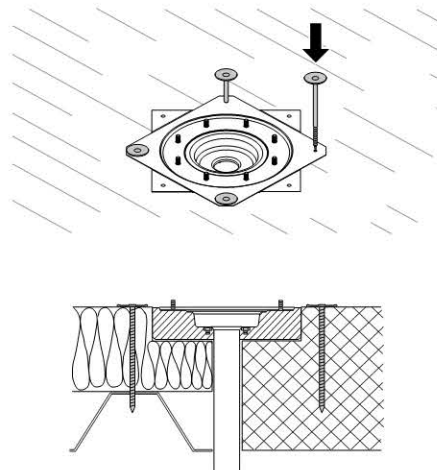
Prefabricated 14 L roof outlets

Solid roof and insulated roof structure

When installing in a solid roof or in an insulated roof structure, the following dimensions must be observed:

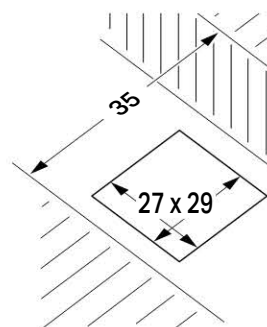


The roof outlet for roof foils as well as the roof outlet for bitumen are directly fastened to the roof structure.

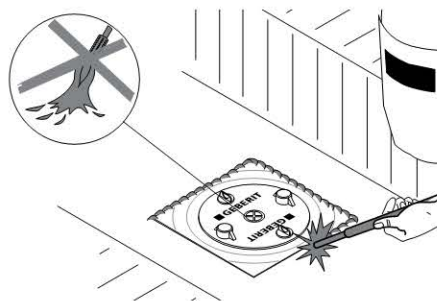


Gutter

When the roof outlet is installed in gutters, the following dimensions must be observed:



Depending on the product material, the roof outlet is soldered or welded to the gutter.



Roof outlets 25 L / 45 L / 60 L / 100 L

Installation dimensions

For installation in the roof structure, the recess for a roof outlet must be made with the following dimensions:

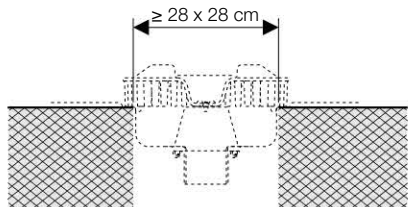


Figure 62: Solid roof

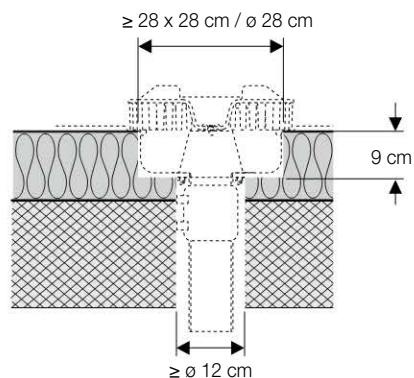


Figure 63: Insulated roof structure

- Minimum diameter: ø 170 mm for 45 L / 60 L / 100 L
- Minimum diameter: ø 120 mm for 25 L

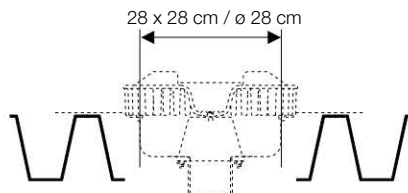


Figure 64: Lightweight roof

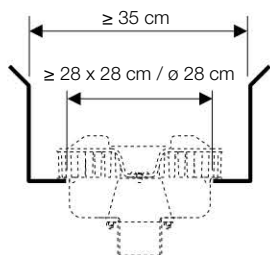
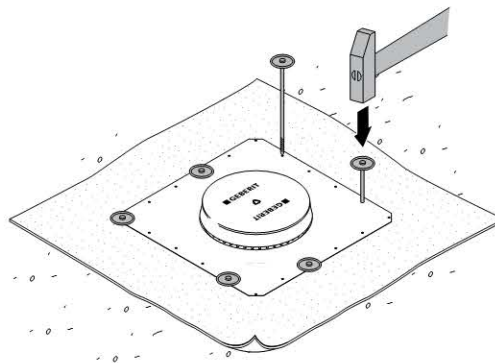


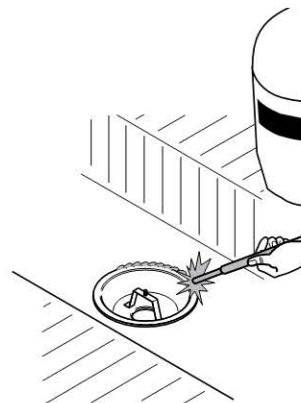
Figure 65: Gutter

Fastening in the roof structure

In the case of flat roofs, the roof outlet is directly fastened in the roof structure.



In the case of gutters, the roof outlet is soldered to the gutter or welded depending on the product material.



3.1.3 Connecting the roof sealing

Roof foil

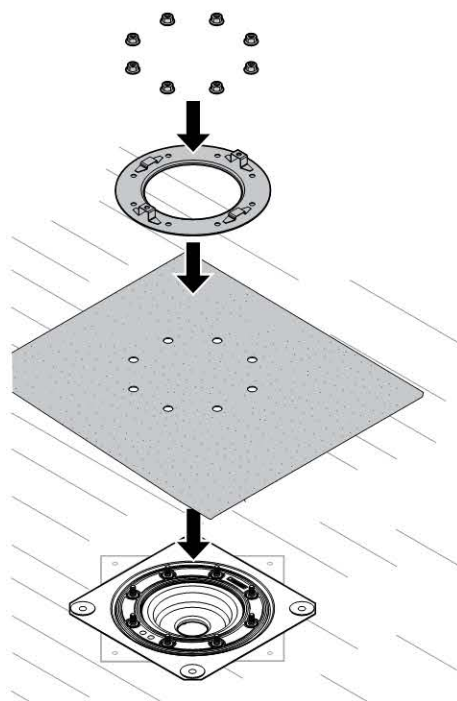
Connection with contact foil

For a connection with contact foil, the roof sealing is connected with the corresponding contact foil.

Connection with fastening flange

The foil piece is placed on the flange gasket and fastened with the flange.

1. Roll roof foil over the roof outlet.
2. Cut out holes for the threaded rod.
3. Connect the fastening flange.
4. Cut out opening for the roof outlet.



Bitumen roof foil

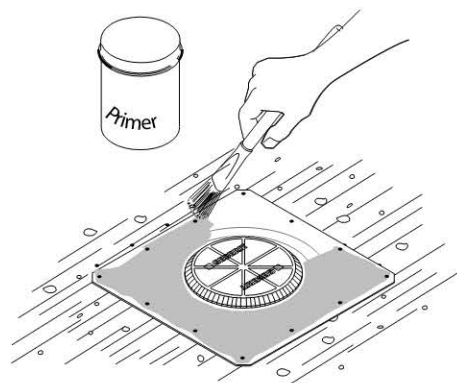
Before the bitumen roof foil is applied, the contact sheet must be roughened with sandpaper and cleaned.



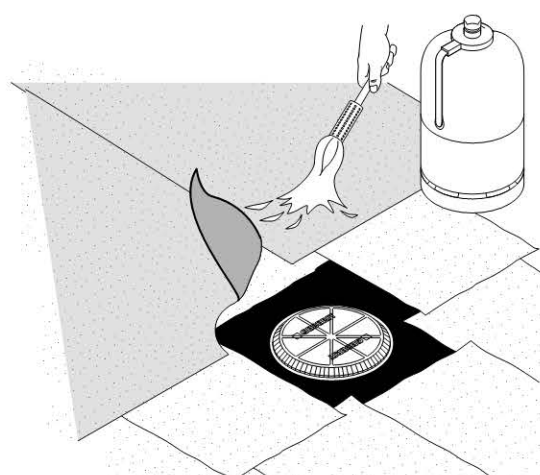
Observe the recommendations of the manufacturer.



Apply primer to the contact sheet.



Apply bitumen sheeting to the dried primer.



3.2 Initial commissioning

Control points:

- Check the configured system with the configuration plans and the configuration calculation.
In particular:
 - The roof area effectively exposed to rain
 - The capacity factor
 - The arrangement, configuration and correct installation of the Pluvia roof outlets and the corresponding protection against caking or flushing in of substrate. The operating parts must be completely present and the outlet grating must be firmly attached to the roof outlet
 - The pipe layout and pipe dimensions
 - Design of the transition from the complete to the partial filling (transition section)
 - Design of any cleaning and inspection openings
 - Deviations from approved plans must be tracked. In the case of large deviations, the calculation must be checked
- Check the products used. Only Geberit pipes and fittings that are suitable for Geberit Pluvia may be installed
- Check the fastenings, correct form and number of the pipe fixations
- Check the correct and complete arrangement of the emergency overflows
- The roof area must be cleaned before commissioning. It is particularly important that no residue of packaging or insulation material remain on the roof area
- All roof drainage pipes must be flushed

4 Maintenance

4.1 Introduction

Checking and maintenance of the Pluvia roof drainage system is the responsibility of the building owner. Geberit recommends having this work planned and carried out by skilled persons.

This work is to be done periodically or as needed and recorded in writing. This makes it possible to evaluate the ageing behaviour of the flat roof.

Control and maintenance work make it possible to recognize and correct signs of wear and damage early on. This extends the service life of the roof drainage system. Furthermore, the ageing behaviour of the roof structure can be evaluated and a modernisation can be planned in the long term.

Control or maintenance work is to be done periodically or as needed and recorded in writing. A checklist can be downloaded at www.international.geberit.com.

After storms, the roof drainage system must be checked by the building owner or a skilled person.

Regular maintenance of the flat roof, the drainage gutter and the roof outlets ensures a continuously safe and optimum roof drainage.

4.1.1 Basic rules

- The Pluvia roof drainage system is low-maintenance
- A 500 mm wide zone must be kept free from vegetation around the Pluvia roof outlet (e.g. with a gravel bed). Contamination, e.g. by leaves or growth must be periodically removed to prevent humus formation or blockage
- The cleaning must be performed regularly according to the respective environmental influences and also includes flat roof, drainage gutter as well as emergency overflows
- Contamination and blockage of the pipelines of critical roof structures must be prevented by periodically cleaning the pipes

4.1.2 Cleaning Pluvia roof outlets

Maintenance work on the roof outlet depends on the respective environmental conditions. It is therefore not possible to define exact maintenance intervals.

Maintenance work	Maintenance interval
Remove foreign bodies such as dirt, leaves or roof growth	Select maintenance intervals so that obstruction of the roof outlet is prevented
Clean the roof outlet and function disc	Select maintenance intervals so that obstruction of the roof outlet is prevented; however, at least once per year

The roof outlet is cleaned as follows:

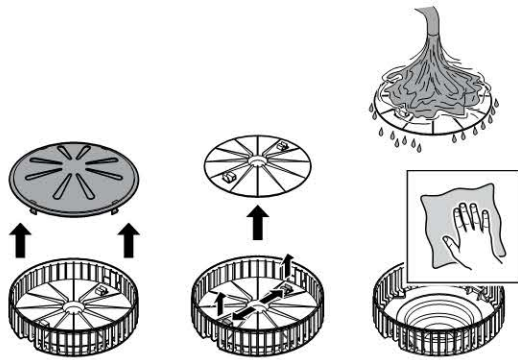


Figure 66: Cleaning of the Pluvia roof outlet 14 L

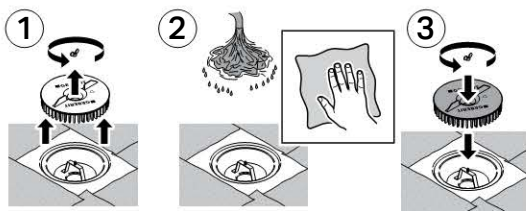


Figure 67: Cleaning of the Pluvia roof outlet 25 L and 45 L / 60 L / 100 L

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