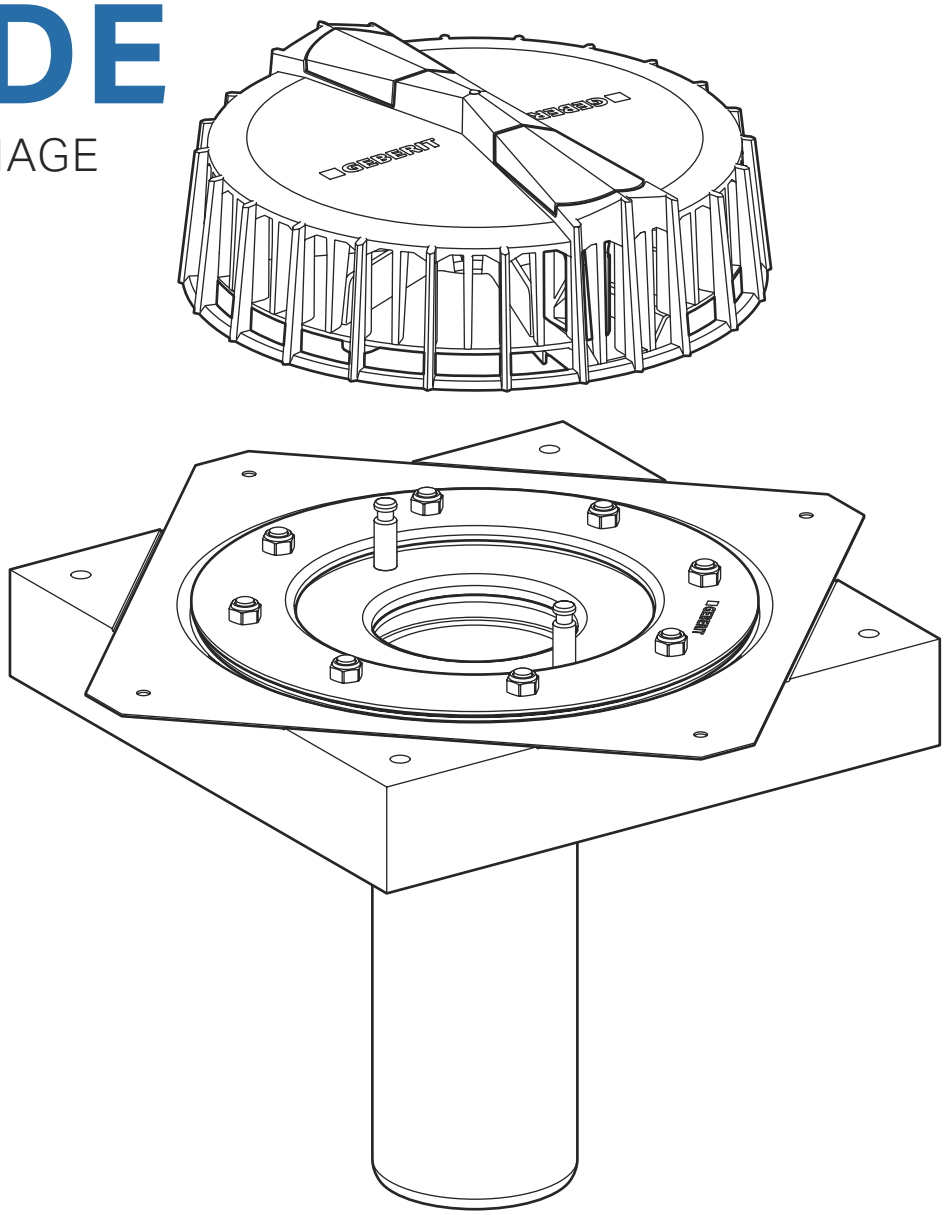
GEBERIT PLUVIA

GEBERIT

MARCH 2018

INSTALLATION GUIDE

ROOF DRAINAGE SYSTEMS



KNOW HOW INSTALLED

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1 Product data

1.1 System description

1.1.1 Overview

The Geberit Pluvia roof drainage system allows large roof areas to be drained with just a few outlets and stacks. In contrast to conventional roof drainage systems, the piping system is completely filled with water in the case of Geberit Pluvia. As a result, a negative pressure occurs in the piping system, which causes the rainwater to be quickly suctioned off the roof.

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

Geberit Pluvia can be used in both insulated and non-insulated roofs as well as in gutters. Whether 1,000 m^2 or 100,000 m^2 – Geberit Pluvia is always the right system.

1.1.2 Function

Functional principle

As soon as water enters the hose from the raised receptacle, a pressure difference results between the receptacle 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.

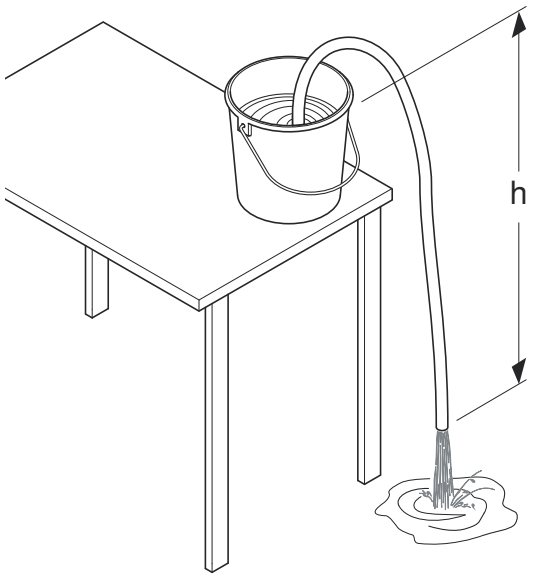


Figure 1: Geberit Pluvia functional principle

h Height of the water column

This suction effect is technically used by Geberit Pluvia. When it rains heavily, the Geberit Pluvia pipe system completely fills with water. A closed water column results from the 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 siphonic 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 Geberit Pluvia outlets. They are equipped with a function disc that allows the rainwater to flow in only laterally and thus without air.

Difference between Geberit Pluvia and conventional roof drainage systems

Behaviour during light rain:

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

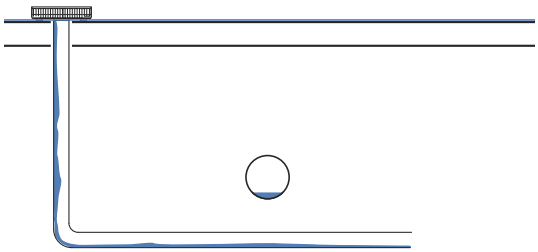


Figure 2: Conventional roof drainage system during light rain (partial filling)

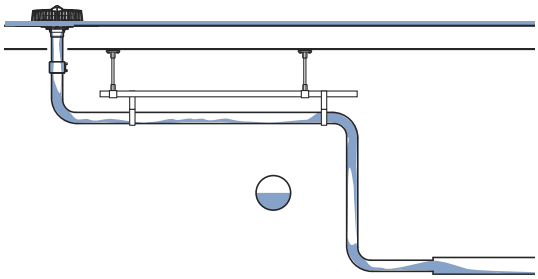


Figure 3: Geberit Pluvia during light rain (partial filling)

Behaviour during heavy rain:

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

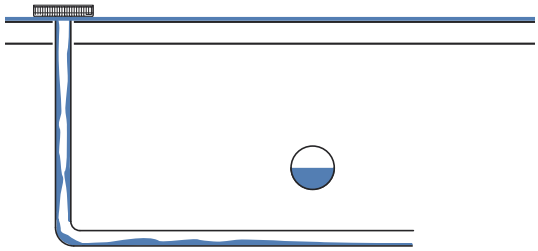


Figure 4: Conventional roof drainage system during heavy rain (partial filling)

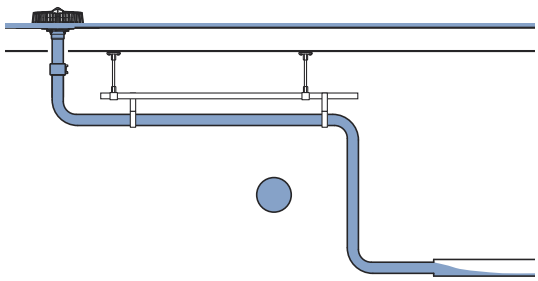


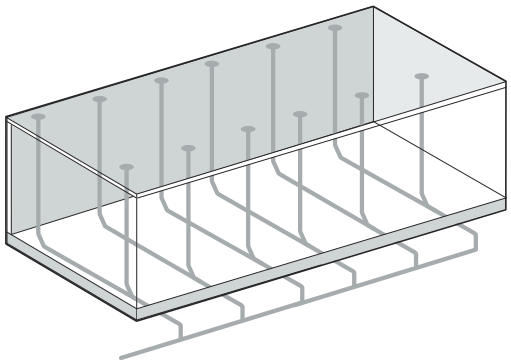
Figure 5: Geberit Pluvia during heavy rain (complete filling)

Advantages of Geberit Pluvia compared with conventional roof drainage systems

As a result of the siphonic piping system, the Geberit Pluvia roof drainage system has several advantages over a conventional roof drainage system:

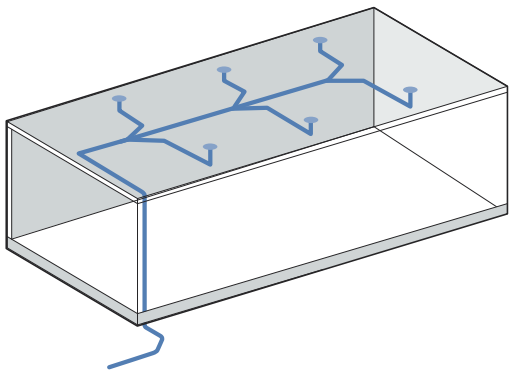
- Laying the pipelines without slopes increases planning flexibility and planning security
- More cost-effective thanks to fewer stacks and underground pipes as well as smaller pipe dimensions
- Optimal planning, tendering and work preparation with the Geberit ProPlanner software

Conventional roof drainage system



- Many sumps
- Pipes must be laid on a slope
- Many stacks
- Complicated underground pipes
- Large pipe dimensions

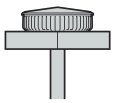
Roof drainage with Geberit Pluvia



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

1.1.3 System components

Geberit Pluvia consists of the following system components:



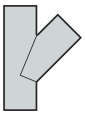
Geberit Pluvia outlets

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



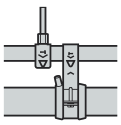
Geberit Pluvia emergency overflows

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



Geberit HDPE piping system

The Geberit HDPE piping system is a practice-oriented product range that is characterised by a low weight and absolute tightness of the welding joint.



Rail fastening system

The rail fastening system is for fastening the Geberit HDPE piping system and accommodates its changes in length caused by temperature changes.



Geberit ProPlanner calculation software

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

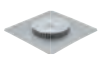


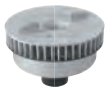
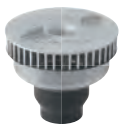
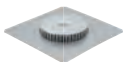
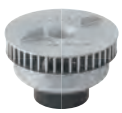
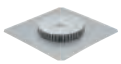
Warranty

Geberit Pluvia is made of high-quality, long-lasting components. Durable polyethylene (HDPE) is used for the pipes. In addition, you can benefit from Geberit's decades of experience in the fields of planning and design. This is just one of the reasons why with the Geberit Pluvia drainage system reliability is guaranteed.

Geberit Pluvia outlets

Overview of Geberit Pluvia outlets

	Pluvia Series 7				New Pluvia outlets		
	Picture	Product Description	Geberit Part No.		Picture	Product Description	Geberit Part No.
12 l Roof		Geberit Pluvia roof outlet, 14 L with flange connection	359.003.00.1	→		Geberit Pluvia roof outlet with fastening flange	359.105.00.1
		Geberit Pluvia roof outlet, with contact sheet and insulation against condensation	359.571.00.1				
		Geberit Pluvia roof outlet, 14 L, d56, with contact sheet for bitumen and clamp flange	358.010.00.1				
12 l Gutters		Geberit Pluvia roof outlet, with insulation against condensation and welding flange	359.636.00.1	→		Geberit Pluvia roof outlet with contact sheet	359.111.00.1
		Geberit Pluvia roof outlet, 14 L with flange for gutter	359.032.00.1				
12 l Overflow Insert		Geberit emergency overflow set for Geberit Pluvia	359.065.00.1	→		Geberit Pluvia emergency overflow	359.114.00.1
19 l Gutters		Geberit Pluvia roof outlet for gutters	359.034.00.1	No Change		Geberit Pluvia roof outlet for gutters	359.034.00.1
25 l Roof		Geberit Pluvia roof outlet with fastening flange, for roof foils	359.012.00.1 / 359.023.00.1	→		Geberit Pluvia roof outlet with flange	359.098.00.1
		Geberit Pluvia roof outlet, 25 L, with contact sheet for bitumen	359.573.00.1 / 359.506.00.1				

	Pluvia Series 7				New Pluvia outlets		
	Picture	Product Description	Geberit Part No.		Picture	Product Description	Geberit Part No.
25 l Gutters		Geberit Pluvia roof outlet 25 L, with contact seam for gutters, round	359.544.00.1 / 359.519.00.1	→		25 litres	359.100.00.1
25 l Overflow Insert		Geberit emergency overflow set for Geberit Pluvia roof outlet 25 L	358.008.00.1	→		Geberit Pluvia emergency overflow	359.101.00.1
45 l		Geberit Pluvia roof outlet for gutters	359.528.00.1	→		Geberit Pluvia roof outlet for gutters	359.342.00.1
		Geberit Pluvia roof outlet with contact sheet	359.538.00.1	→		Geberit Pluvia roof outlet with contact sheet	359.345.00.1
60 l		Geberit Pluvia roof outlet for gutters	359.536.00.1	→		Geberit Pluvia roof outlets for gutters	359.343.00.1
		Geberit Pluvia roof outlet with contact sheet	359.539.00.1	→		Geberit Pluvia roof outlet with contact sheet	359.346.00.1
100 l		Geberit Pluvia roof outlet for gutters	359.537.00.1	→		Geberit Pluvia roof outlet for gutters	359.344.00.1
		Geberit Pluvia roof outlet with contact sheet	359.540.00.1	→		Geberit Pluvia roof outlet with contact sheet	359.347.00.1

With special accessories, Geberit Pluvia outlets can be used as separate emergency overflows, → see "Emergency drainage", page 41.

Geberit Pluvia 12 l outlets

The Geberit Pluvia 12 l outlets are available in the following versions:

for flat roofs:

- with contact sheet for waterproofing layer
- with fastening flange for waterproofing membranes

for gutters:

- with fastening flange
- with contact seam

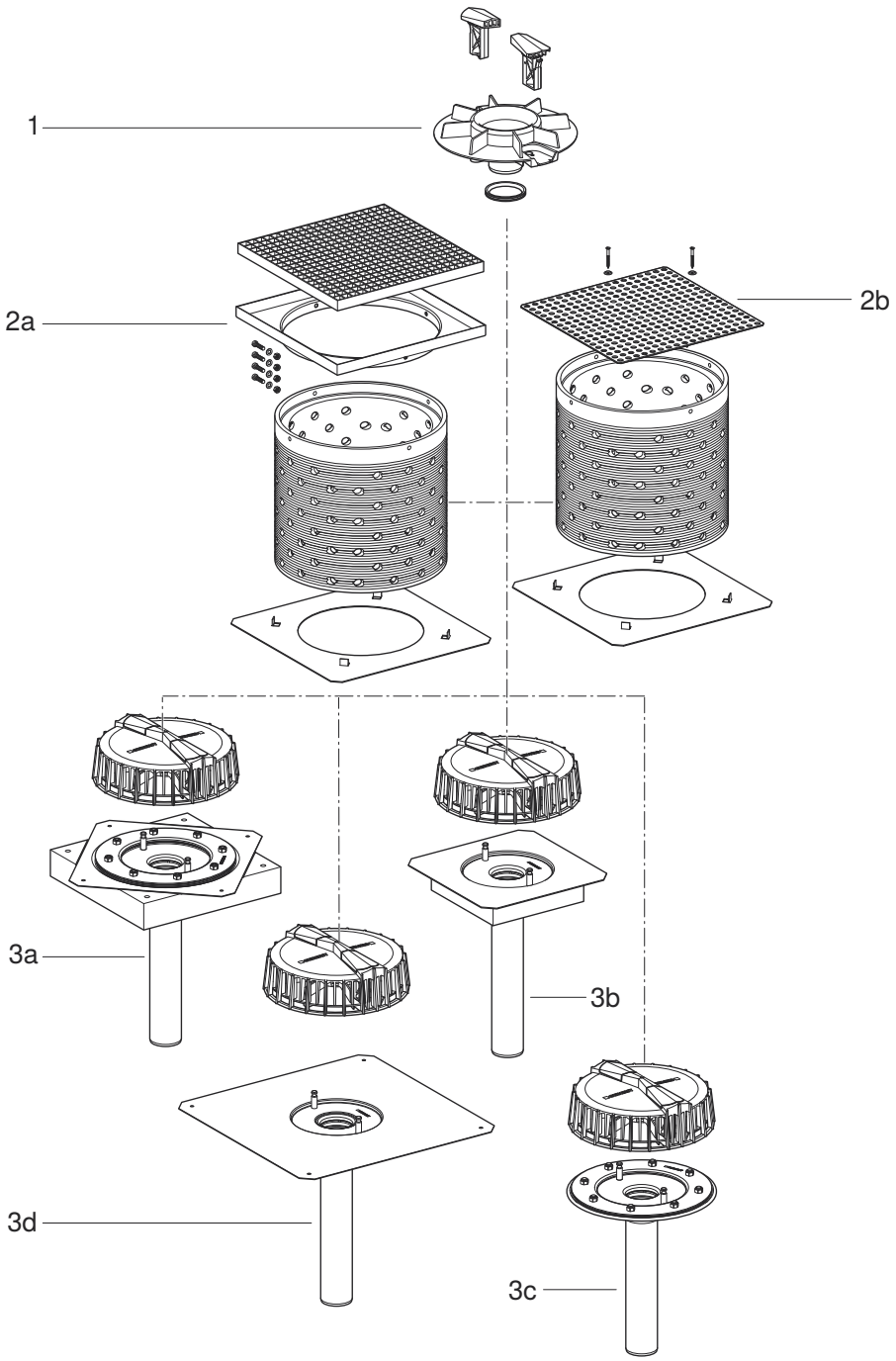


Figure 6: Overview of usable components of the prefabricated Geberit Pluvia outlets

Item no.	Base modules	Accessories
1		Emergency overflow
2a		Supplementary set with grate, suitable for trafficable decks
2b		Supplementary set with grate, suitable for non-trafficable decks
3a	Outlet with fastening flange for waterproofing membranes	
3b	Outlet with contact sheet, for gutters	
3c	Outlet with flange, for gutters	
3d	Outlet with contact sheet for waterproofing layer	

Geberit Pluvia 19 l "Piccolo" outlets

The Geberit Pluvia 19 l outlet is available in the following versions:

for roofs and gutters:

- with contact sheet

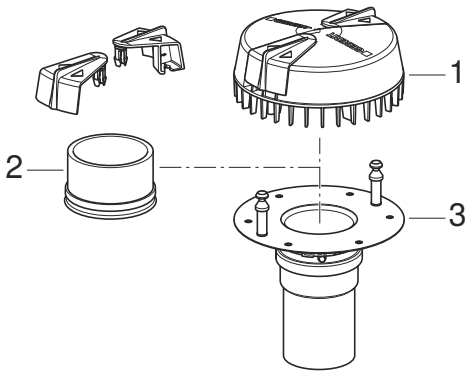


Figure 7: Components of the Geberit Pluvia 19 l outlets

Item no.	Base modules	Accessories
1	Outlet grating	
2		Emergency overflow
3	Base unit with contact seam for gutters	

Geberit Pluvia 19 l outlets can be combined with 12 l and 25 l outlets in a mixed installation.

Geberit Pluvia 25 l outlets

The Geberit Pluvia 25 l outlet is available in two versions:

for flat roof:

- with contact sheet for waterproofing layer
- with fastening flange for waterproofing membranes

for gutters:

- contact sheet for gutters

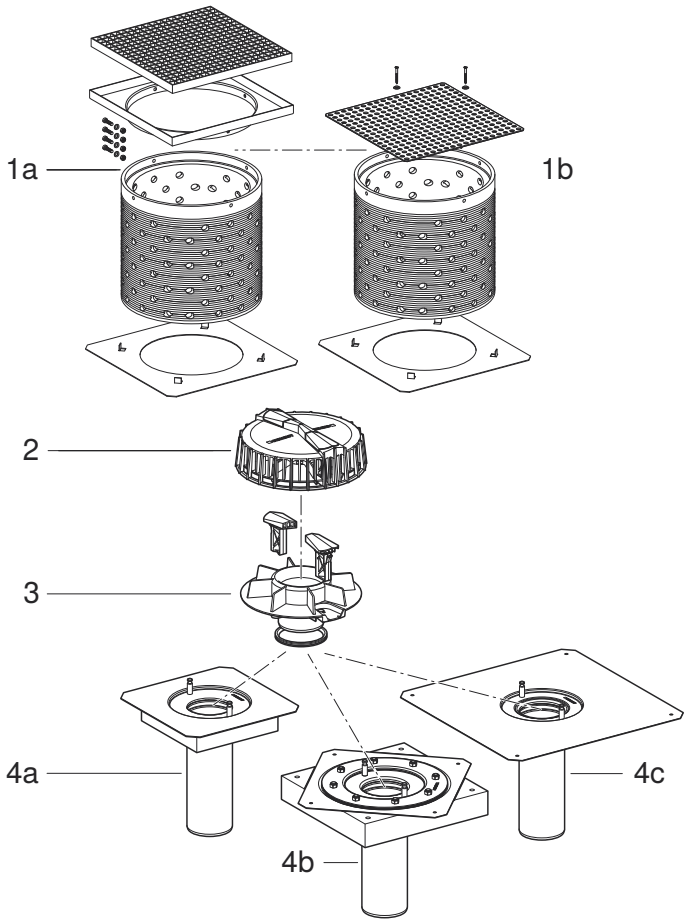


Figure 8: Components of the Geberit Pluvia 25 l outlets

Item no.	Base modules	Accessories
1a		Supplementary set with grate, suitable for trafficable decks
1b		Supplementary set with grate, suitable for non-trafficable decks
2	Outlet grating with integrated function disc	
3		Emergency overflow
4a	Outlet with contact sheet for gutters	
4b	Outlet with fastening flange for roof with waterproofing membrane	
4c	Outlet with fastening flange for roof with waterproofing layer	

Geberit Pluvia 25 l outlets can be combined with 12 l and 19 l outlets in a mixed installation.

Geberit Pluvia 45 l/60 l/100 l outlets

Geberit Pluvia 45 l/60 l/100 l outlets are available for the following types of roof sealing:

- contact seam for gutters
- contact sheet for waterproofing layer

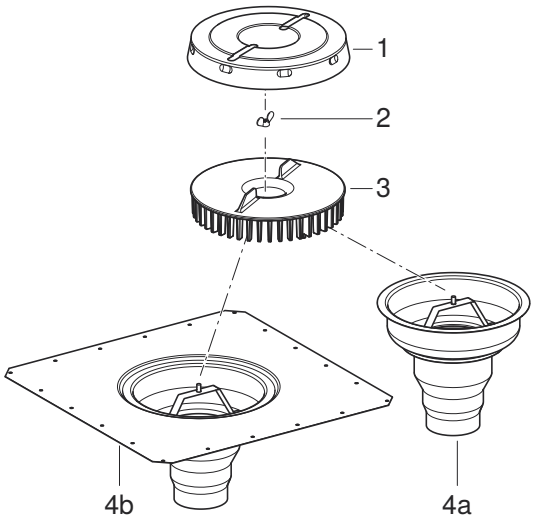


Figure 9: Components of the Geberit Pluvia 45 l/60 l/100 l outlets

Item no.	Base modules	Accessories
1	Protection box	–
2	Wing nut	–
3	Outlet grating with integrated function disc	–
4a	Base unit with contact sheet	–
4b	Base unit with contact seam for gutters	–

Geberit Pluvia 45 l/60 l/100 l outlets cannot be combined because of their different heads of water, nor can they be combined with Geberit Pluvia 12 l, 19 l and 25 l outlets in a mixed installation.

Geberit Pluvia emergency overflows

The Geberit Pluvia emergency overflows consist of:

- Geberit Pluvia outlet
- Geberit Pluvia emergency overflow set

The outlet is combined with the corresponding emergency overflow.

The emergency overflow is available in three designs:

- Geberit Pluvia emergency overflow for 12 l outlets
- Geberit Pluvia emergency overflow for 19 l outlets
- Geberit Pluvia emergency overflow for 25 l outlets

Geberit Pluvia 12 l emergency overflow

The Geberit Pluvia 12 l emergency overflow consists of the following components:

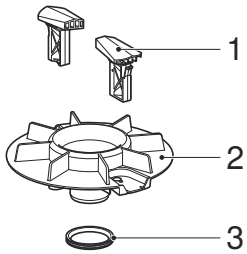


Figure 10: Components of the Geberit Pluvia 12 l emergency overflow

1 Rotating lock bar
2 Overflow section
3 Lip seal

Functional principle of the 12 l emergency overflow

The water is transported away through the Geberit Pluvia 12 l outlet up to a head of water of max. 40 mm through the roof drainage system. When the head of water exceeds 55 mm, the emergency overflow goes into action. The roof drainage and emergency overflow systems reach their maximum output of 24 l/s together at a head of water of 80 mm.

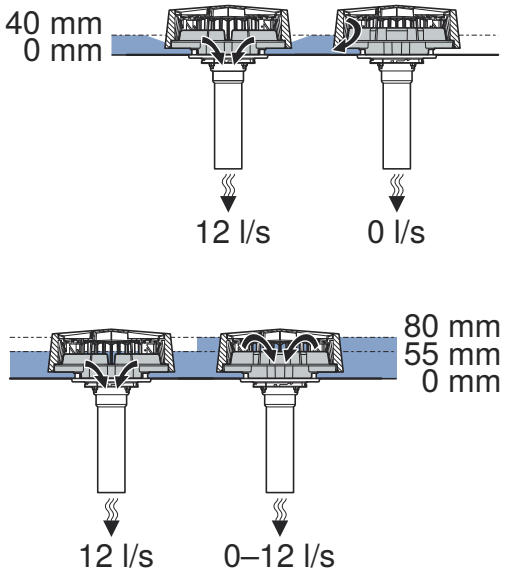


Figure 11: Functional principle of the Geberit Pluvia 12 l emergency overflow

The heads of water must be taken into account in the structural design of roofs and gutters.

Geberit Pluvia 19 l emergency overflow

The Geberit Pluvia 19 l emergency overflow consists of the following components:

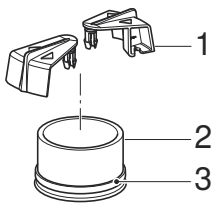


Figure 12: Components of the Geberit Pluvia 19 l emergency overflow

1 Rotary latching slider
2 Overflow section
3 Lip seal

Functional principle of the 19 l emergency overflow

The water is transported away through the Geberit Pluvia 19 l outlet up to a head of water of max. 55 mm through the roof drainage system. When the head of water exceeds 55 mm, the emergency overflow goes into action. The roof drainage and emergency overflow systems reach their maximum output of 38 l/s together at a head of water of 70 mm.

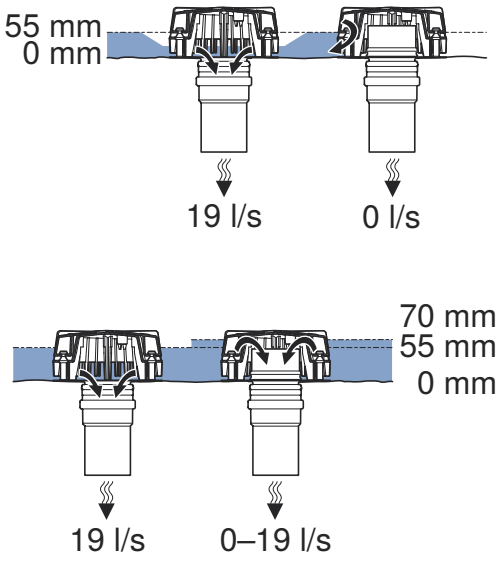


Figure 13: Functional principle of the Geberit Pluvia 19 l emergency overflow

The heads of water must be taken into account in the structural design of roofs and gutters.

Geberit Pluvia 25 l emergency overflow

The Geberit Pluvia 25 l emergency overflow consists of the following components:

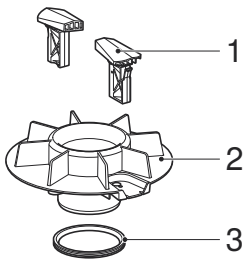


Figure 14: Components of the Geberit Pluvia 25 l emergency overflow

1 Rotating lock bar
2 Overflow section
3 Lip seal

Functional principle of the 25 l emergency overflow

The water is transported away through the Geberit Pluvia 25 l outlet up to a head of water of max. 50 mm through the roof drainage system. When the head of water exceeds 65 mm, the emergency overflow goes into action. The roof drainage and emergency overflow systems reach their maximum output of 50 l/s together at a head of water of 95 mm.

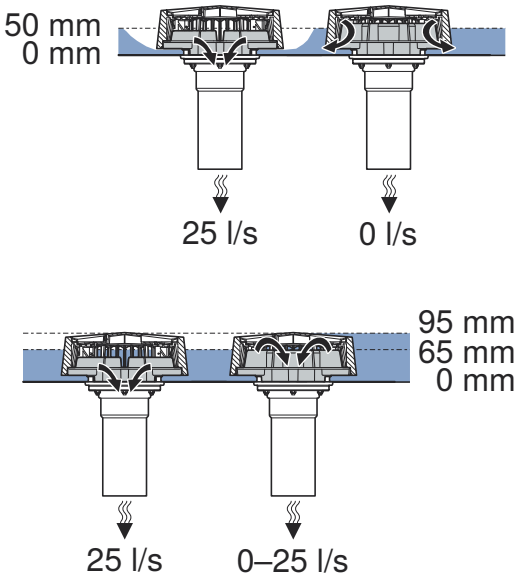


Figure 15: Functional principle of the Geberit Pluvia 25 l emergency overflow

The heads of water must be taken into account in the structural design of roofs and gutters.

Geberit HDPE piping system

The Geberit HDPE piping system consists of:

- d40–315 pipes
- Fittings
- Joints (electrofusion sleeve couplings, electrofusion couplings with integrated thermal fuses)
- Adapters for other piping systems

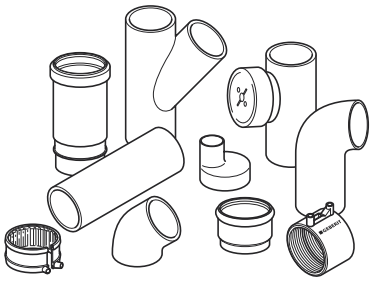
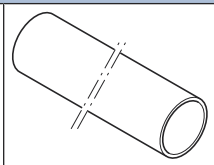
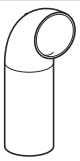
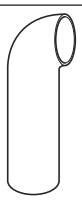


Figure 16: Geberit HDPE piping system

Geberit HDPE pipes and fittings can be connected to each other by various methods, such as electrofusion welding, butt welding or mechanical connection. The material properties of Geberit HDPE make it possible to prefabricate the piping system so that it can be mounted on-site as it is. 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 high velocities, and the resulting negative pressures, not all components of Geberit HDPE are suitable for use with Geberit Pluvia siphonic drainage systems. The following table shows which Geberit HDPE fittings are suitable for the Geberit Pluvia roof drainage system.

Table 1: Overview of Geberit HDPE pipes and fittings suitable for Geberit Pluvia

Geberit HDPE pipes and fittings		Suitable for Geberit Pluvia	
Pipe		✓	For pipe dimensions of d200 and larger, Geberit HDPE pipes PN4 must be used for negative pressures of over 450 mbar
Bend 45°		✓	
Bend 90°		✓	Only as connection bend on the outlet
Bend 90° with narrow radius		✗	
Connection bend 88.5°		✗	

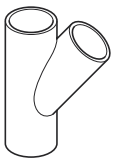
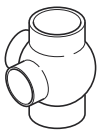
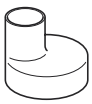
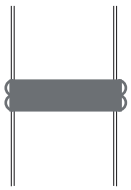
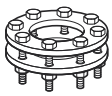
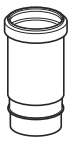
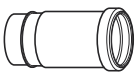
Geberit HDPE pipes and fittings		Suitable for Geberit Pluvia	
Branch fitting 45°		✓	
Branchball		✗	
Reducer		✓	For horizontal pipes, use the eccentric reducers. Install even with the upper side of the pipe.

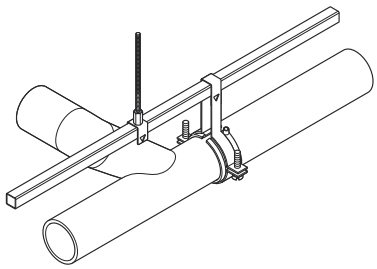
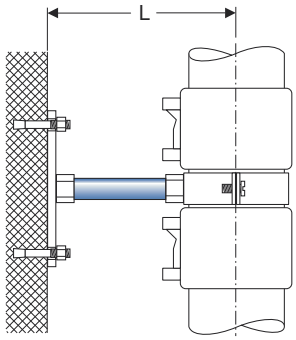
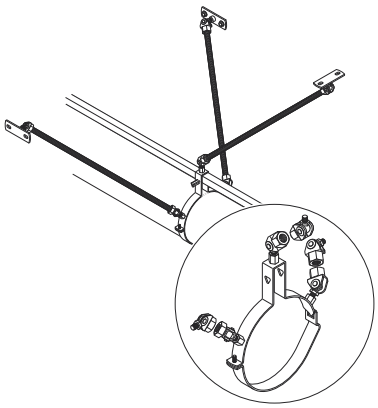
Table 2: Overview of Geberit HDPE connection types suitable for Geberit Pluvia

Connection type	Connection		Suitable for Geberit Pluvia
Welding joint	Butt welding		✓
	Electrofusion welding		✓
Flange connection	Flange connection		✗
Plug connection	Vertical expansion socket		✗
	Horizontal expansion socket		✗
	Ring seal socket		✗

Geberit will warrant a system if Geberit HDPE is correctly designed and installed.

Pipe fixation

Overview of rail fastening systems

Fastening type		Description
Horizontal fastening		The rail fastening system is for fastening the Geberit HDPE pipes horizontally and accommodates their changes in length caused by temperature changes. The shearing forces that occur are transferred through the anchor brackets to the support rail routed parallel to the pipe.
Vertical fastening	 Rigid mounting	The change in length is accommodated by the anchor point and is directly transferred to the building.
Supports		The supports provide additional support for the Geberit Pluvia rail fastening system in the event of unfavourable framework conditions such as turbulence, pressure changes or stalls.

Anchor and sliding points

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.

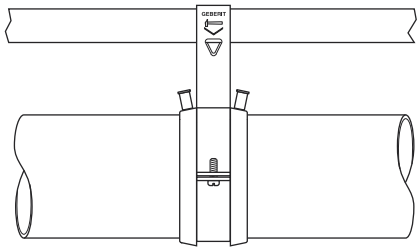
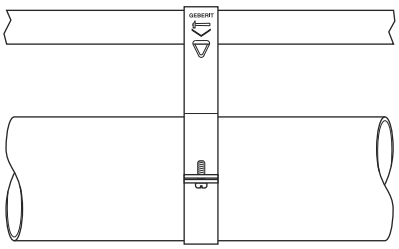
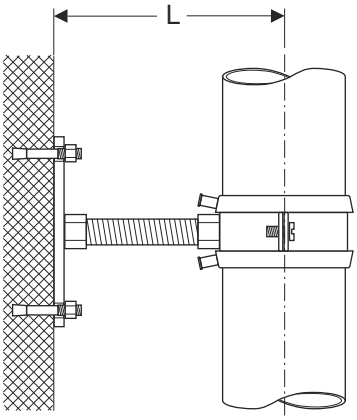
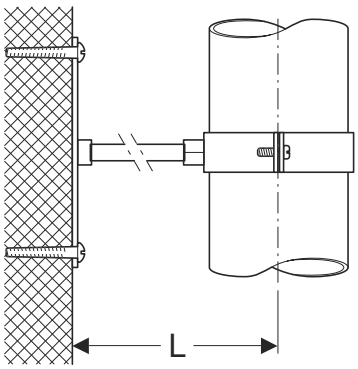
Sliding points prevent the pipe from veering to the side during thermally caused changes in length and support the weight of the water-filled pipeline.

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 induced change in length is accommodated by the support rail.

Table 3: Configuration of anchor and sliding points

Type of fastening	Anchor point	Sliding point
Horizontal on ceilings	Pipe bracket with electrofusion tape 	Pipe bracket 
Vertical on walls	Pipe bracket with electrofusion tape 	Pipe bracket 

Geberit ProPlanner Software

The Geberit Pluvia siphonic drainage system is used optimally when the piping system fills quickly and all pipe sections empty evenly. The piping system therefore has to be precisely dimensioned.

The dimensioning depends on:

- rainfall
- size of the roof area
- roof structure
- pipe layout

With Geberit ProPlanner, this data can be recorded and even complex roof projects can be easily calculated.

Geberit ProPlanner creates:



Isometric drawings



Hydraulic calculations



Material lists for pipe systems



Cost calculations with tender documents ready for shipment

All of the hydraulic calculations for Geberit Pluvia can be performed in Autodesk Revit®. For Geberit Pluvia, Geberit offers parametric BIM (Building Information Modelling) data and a plugin for hydraulic calculation directly in Autodesk Revit®.

2 Planning

2.1 Planning rules

When planning a roof drainage system with Geberit Pluvia, the country-specific regulations for creating roof drainage must be observed.

2.2 Roof structure

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

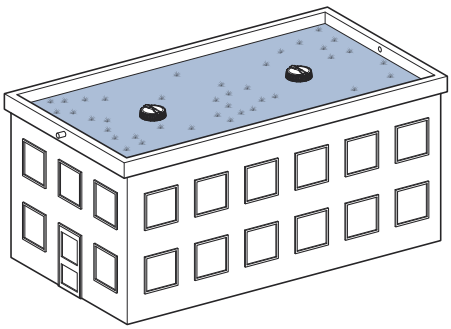


Figure 17: Flat roof

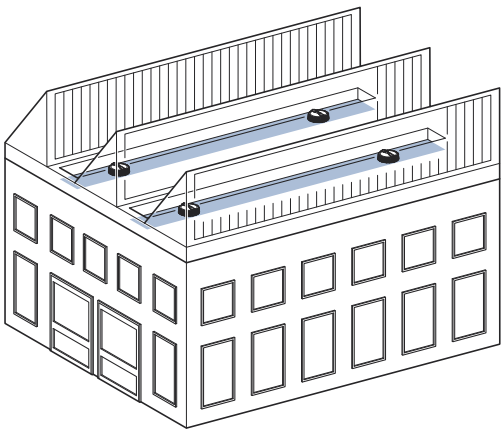


Figure 18: Sawteeth roof with box gutter

Both roof types are available in different designs, for example:

- with waterproofing membranes
- without waterproofing membranes
- trafficable decks
- non-trafficable decks
- green roof

2.2.1 Solid roof

Solid roof, non-trafficable

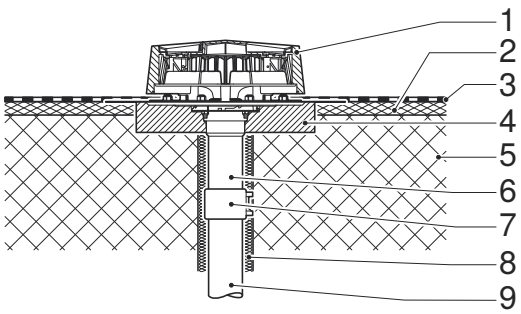


Figure 19: Solid roof construction with waterproofing layer

1 Outlet grating with function disc
2 Slope cover/slope screed
3 Waterproofing layer
4 Geberit Pluvia anticondensation insulation
5 Concrete floor
6 Connection pieces for outlet element
7 Tension resistant connection
8 Anti-condensation insulation (on-site)
9 Connection pipe

Trafficable/non-trafficable, without waterproofing layer

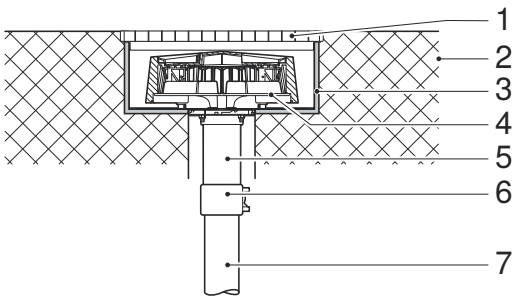


Figure 20: Installation in concrete roof without waterproofing layer, suitable for promenade or parking decks

1 Grate and frame, trafficable/non-trafficable
2 Concrete
3 Sump (cast into concrete deck)
4 Outlet grating with function disc
5 Connection pieces for outlet element
6 Tension resistant connection
7 Connection pipe

2.2.2 Gutter

Gutters have special requirements for planning and installation.

- Layout and hydraulic certification must be provided by an architect or sanitary engineer in accordance with the country-specific regulations.
- Gutters and roof areas must not be drained in a common piping system.
- The connection material of the sumps should be selected so that no corrosive influences occur.

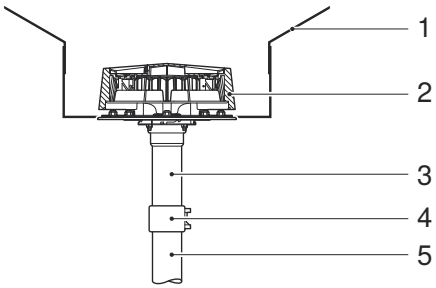


Figure 21: Gutter construction

1 Gutter
2 Geberit Pluvia sump for gutters
3 Connection pieces for outlet element
4 Tension resistant connection
5 Connection pipe

2.2.3 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 properties
- increased sound insulation
- dust binding

The layer structure of a green roof retains precipitation. Essentially, these water retention properties depend on the thickness of the applied substrate layer. The thicker the substrate layer, the higher the water retention.

From a drainage and vegetation point of view, we differentiate between intensive and extensive green roofing. The layer thickness and the height of the plant growth are the essential differences.

Extensive green roofing

Extensive green roofs are forms of vegetation created close to nature that essentially maintain themselves and develop further on their own. They are planted as closed, extensive vegetation groups and allow cost-effective planting of large roofs with low distributed loads and small layer thicknesses.

Extensive green roofs are made up of:

- mosses
- succulents
- herbs
- grasses

Plants are used that are specially adapted to the extreme local conditions and that have a great ability for regeneration.

Extensive green roofs are designed without water retention.

Intensive green roofing

Intensive green roofs include shrubs, woody plants as well as lawns and, in individual cases, even trees. With regard to the possibilities of use and design variety, they are comparable to ground-based green spaces if equipped accordingly.

Intensive green roofs are made up of:

- shrubs
- woody plants
- lawns
- trees, in individual cases

The plants used have different demands with regard to layer structure and regular water and nutrient supply. Accordingly, they need to be cared for regularly.

Intensive green roofs can be designed with or without water retention.

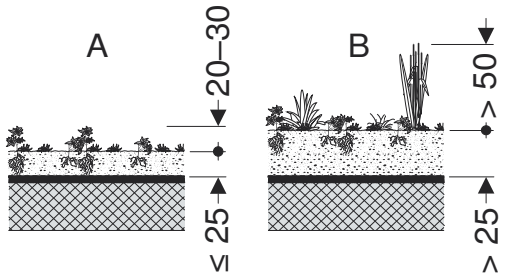


Figure 22: Comparison of an extensive green roof and an intensive green roof

A Extensive green roofing

B Intensive green roofing

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

- a protective layer against mechanical damage and root growth through the roof sealing
- a drainage layer
- a filter layer
- a vegetation layer

Planning notices

- The capacity factor must be specified by the green roofer for green roof areas.
- Green roofs with a Geberit Pluvia roof drainage system must always be designed with a drainage layer.
- Use a filter mat to avoid contamination of the sumps due to percolating and surface water.
- After applying green roofing, ensure that sumps are freely accessible for maintenance work through manholes with a removable cover.
- To prevent scaling and caking in sumps and pipelines, select surfaces from which only small quantities of carbonate can be dissolved that do not result in caking.
- A 50-cm-wide zone must be kept free from vegetation around the Geberit Pluvia sump (e.g. with a gravel bed).
- With the Geberit Pluvia roof drainage system, green roof areas must not be drained together with roof areas without green roofing through a common pipe.
- As a guide, capacity factors can be taken as:
  - extensive green roof: C = 0.3–0.5
  - Intensive green roof: C = 0.1-0.3

Refer to Section "Determining the rainwater outflow", page 40 for more details on selection of capacity factor values.

2.3 Geberit Pluvia outlets

2.3.1 Basic rules

- Regardless of the size of the roof area, an emergency overflow system must be present.
- An anchor point must be provided on the building structure to fasten the connecting pipe of the outlet.
- Per roof area, at least two outlets or one outlet and one emergency overflow must be provided.
- 45 l/60 l/100 l outlets are only for use in regions with extremely high amounts of precipitation. In most areas, it is sufficient to use the 12 l, 19 l or 25 l outlets.

Arrangement of the outlets

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

- Outlets must be distributed as practically and evenly as possible
- Arrange outlets at the lowest point of a roof area
- The maximum distance between two outlets on the same drainage line must not exceed 20 m
- To prevent the function of the outlets from being impaired, they must be positioned at least 1 m (at most 10 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 Geberit Pluvia outlets must be planned for each partial roof or terrace area. This makes it possible for water to flow from outlet to outlet or from Geberit Pluvia outlet to emergency overflow.

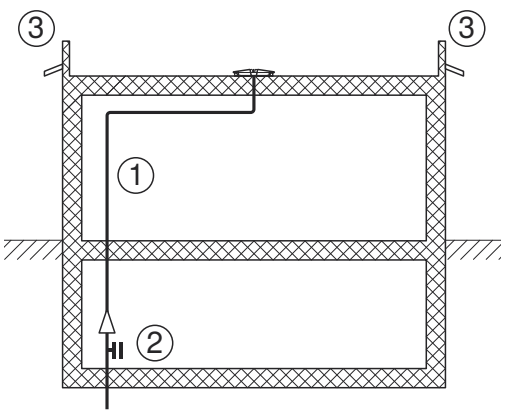


Figure 23: Outlet and pipe layout for flat roofs with parapet

1 Geberit Pluvia outlet and siphonic pipe
2 Partially filled conventional pipe
3 Emergency overflows

Box gutters

It is generally possible to use the Geberit Pluvia system for draining gutters. However, there are special requirements for planning and installation. Box gutters and the hydraulic certification are dimensioned according to the country-specific guidelines and standards.

For box gutters, at least two Geberit Pluvia outlets and one emergency overflow must be provided.

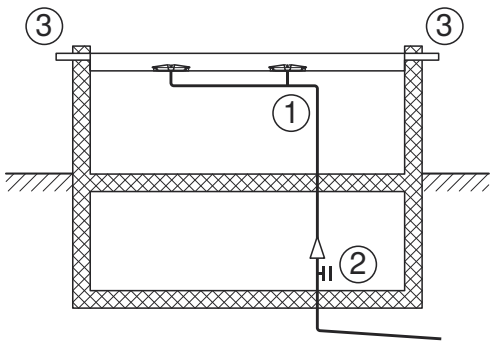


Figure 24: Outlets and pipe layout with box gutters

1 Geberit Pluvia outlet and siphonic pipe
2 Partially filled conventional pipe
3 Emergency overflows

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

- maximum distance between outlets: 20 m
- minimum width of gutter: 30 cm (21 cm for 19 l outlet)
- use only in gutters with a flat base; no transverse slopes

2.3.2 Application range

Geberit Pluvia outlets are suitable for all flat roofs. They can also be used as gutters or emergency overflows. They are predominantly used on roofs of industrial and commercial buildings with an area larger than 1,000 m^2, such as on:

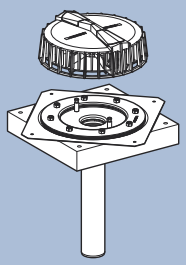
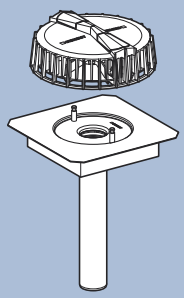
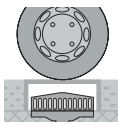
- factories
- warehouses
- shopping centres
- airports
- hotels
- sports centres and stadiums

Depending on the roof structure, different Geberit Pluvia outlets are used.

Geberit Pluvia outlets can also be used on residential buildings, car parks and for rainwater harvesting systems.

Geberit Pluvia 12 l outlets

Table 4: Application ranges of Geberit Pluvia 12 l outlets

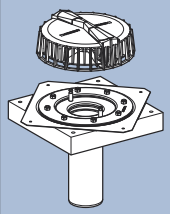
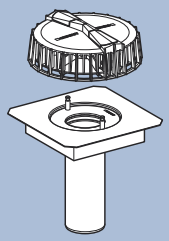
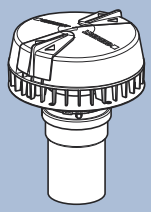
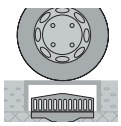
			359.105	359.111	Accessories
					
			Waterproofing membranes	Gutters	
Flat roof/concrete roof/solid roof					
Uninsulated			✓	✗	–
Uninsulated, suitable for promenade decks (Not suitable for parking decks)			✓	✗	Supplementary set, suitable for promenade decks and prefabricated sump
Uninsulated, suitable for parking decks			✓	✗	Supplementary set, suitable for parking decks and prefabricated sump
Gutter					
Gutter			✗	✓	–

✓ Suitable

✗ Not suitable

Geberit Pluvia 19 l "Piccolo" and 25 l outlets

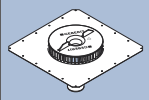
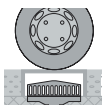
Table 5: Application ranges of Geberit Pluvia 19 l and 25 l outlets

			25 l	25 l	19 l	Accessories
			359.098	359.100	359.034	
						
			Fastening flange for waterproofing membranes	Connection for gutters		
Flat roof/concrete roof/solid roof						
Uninsulated			✓	✗	✗	–
Uninsulated, suitable for promenade decks (Not suitable for parking decks)			✓	✗	✗	Supplementary set, suitable for promenade decks and prefabricated sump
Uninsulated, trafficable decks			✓	✗	✗	Supplementary set, suitable for parking decks and prefabricated sump
Gutter						
Gutter			✗	✓	✓	–

✓ Suitable
✗ Not suitable

Geberit Pluvia 45 l/60 l/100 l outlets

Table 6: Application ranges of Geberit Pluvia 45 l/60 l/100 l outlets

			45 l	60 l	100 l	45 l	60 l	100 l
			359.345	359.346	359.347	359.342	359.343	359.344
								
			Contact sheet Universal			Contact seam for gutter		
Flat roof/concrete roof/solid roof								
Uninsulated			✓	✓	✓	✗	✗	✗
Uninsulated, suitable for promenade decks, not suitable for parking decks			✓ + Sump construction on-site	✓ + Sump construction on-site	✓ + Sump construction on-site	✗	✗	✗
Uninsulated, trafficable decks			✓ + Sump construction on-site	✓ + Sump construction on-site	✓ + Sump construction on-site	✗	✗	✗
Gutter								
Gutter			✗	✗	✗	✓	✓	✓

✓ Suitable
✗ Not suitable

2.4 Pipe layout

2.4.1 Basic rules

- The maximum negative pressure in the piping system is:
  - d40–160 = -800 mbar
  - d200-315 = -450 mbar
  - d200–315 Geberit HDPE pipes PN4 = -800 bar
- For this reason, only a welded piping system made of Geberit HDPE may be used. Fitted connections or clamping connectors (e.g. CV clamping connectors) are not permitted.
- Horizontal pipes must be laid without slopes.
- Foreign water, e.g. condensed water, must not be channelled into the Geberit Pluvia roof drainage system.

As a guide, the length of horizontal pipe should not exceed the maximum length as defined by the following equation:

$L_{max} = 10 \cdot h$

L_{max}	Maximum length of horizontal pipe
h	Vertical distance between outlets and transition to the conventional drainage system

2.4.2 Separate pipe layout

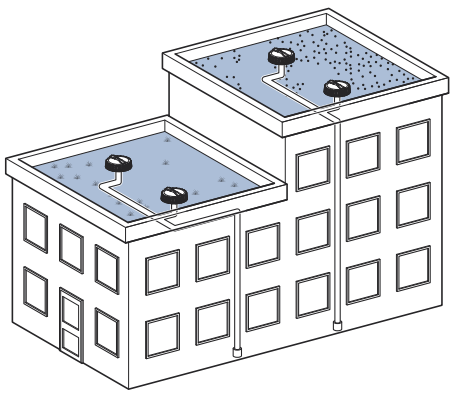


Figure 25: Separate pipe layout

Roof areas must be drained separately in the event of:

- different capacity factors
- areas >5,000 m^2
- a 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.

2.4.3 Connections and reducers

Connection of the Geberit Pluvia outlets

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

Geberit Pluvia 12 l, 19 l and 25 l outlets can also be connected with a reducer or an expander.

Direct reduction or expansion of the Geberit Pluvia 45 l/60 l/100 l outlets, on the other hand, is not possible.

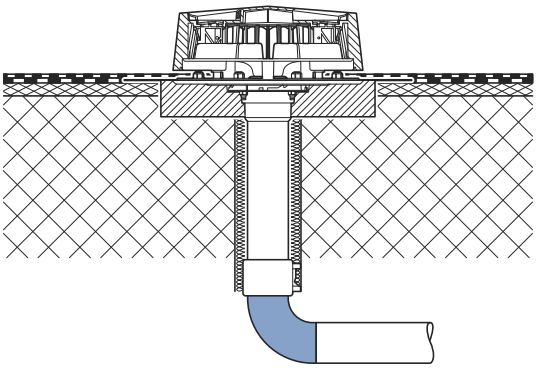


Figure 26: Connecting the Geberit Pluvia outlet with a 90° bend

Subsequently, all 90° changes in direction in the Geberit Pluvia pipe system may only be made with two 45° bends.

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

- Geberit Pluvia 12 l outlets can be reduced up to a minimum of d40
- Geberit Pluvia 19 l outlets can be reduced up to a minimum of d56
- Geberit Pluvia 25 l outlets can be reduced up to a minimum of d75

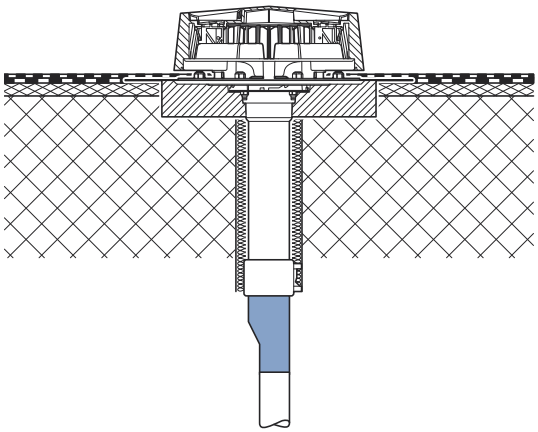


Figure 27: Connecting the Geberit Pluvia outlet with a reducer

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

- Geberit Pluvia 12 l outlets can be expanded up to a maximum of d75
- Geberit Pluvia 19 l outlets can be expanded up to a maximum of d110
- Geberit Pluvia 25 l outlets can be expanded up to a maximum of d110

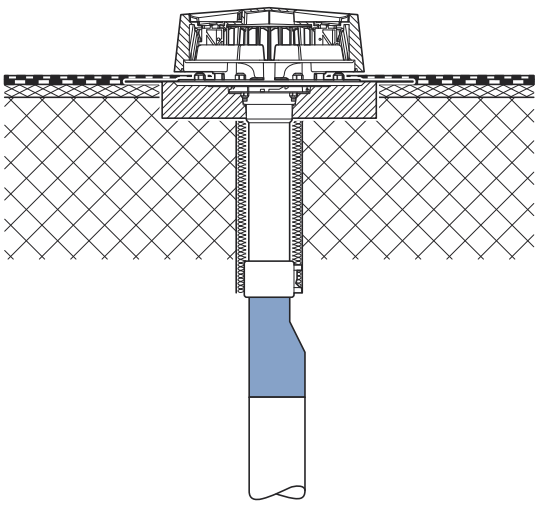


Figure 28: Connecting the Geberit Pluvia outlet with an expansion

Reducers

For Geberit Pluvia eccentric reducers are preferred.

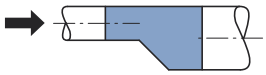


Figure 29: Eccentric reducer

To achieve an optimal rainwater flow, reducers should be used as follows:

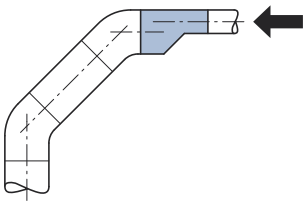


Figure 30: Eccentric reducer with a horizontal pipe

When fastening the Geberit Pluvia system, the eccentric reducers must be installed even with the upper side of the pipe for a horizontal pipe.

2.4.4 Transition to conventional roof drainage system

The Geberit Pluvia roof drainage system ends at a defined point. From this point on, the piping system must be dimensioned as a conventional drainage system. The local drainage regulations serve as the basis for this.

This point is also the transition from the siphonic roof drainage system (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.

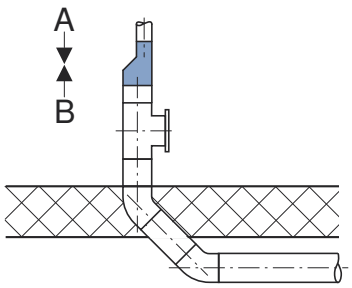


Figure 31: Expansion using a reducer

A Geberit Pluvia siphonic (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.

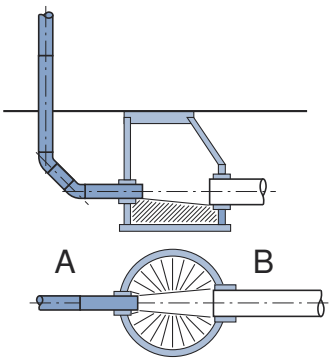


Figure 32: Expansion through release into a manhole

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

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

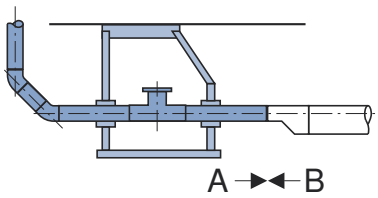


Figure 33: Expansion after a manhole is allowed

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

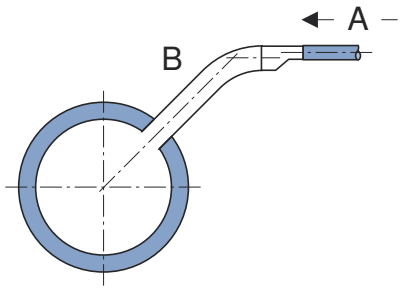


Figure 34: Expansion up to before the sewage system

A Geberit Pluvia roof drainage system
B Conventional drainage of at least 2 m length as a transition section before the sewage system

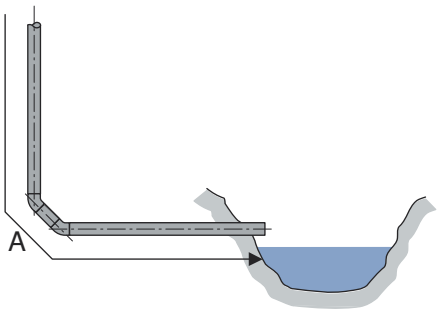


Figure 35: Expansion at the receiving waters

A Geberit Pluvia roof drainage system

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

2.4.5 Protection against hail damage

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

Flat roof construction

On flat roofs, a grating (hole size approx. 8 x 20 mm) can be installed in the area of the outlet.

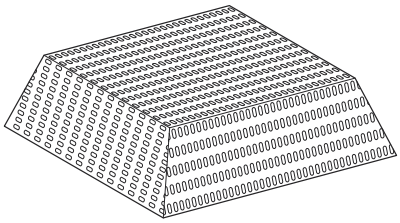


Figure 36: Grating for Geberit Pluvia outlet

Box gutter construction

Box gutters can be covered with a grating (hole size approx. 8 x 20 mm) along the entire length of the gutter.

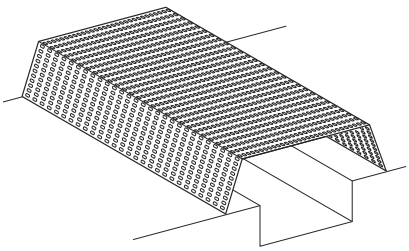


Figure 37: Grating for gutter

2.4.6 Sound 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 sound 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 outlets and pipelines

To prevent the transmission of structure-borne sound, sound decoupling 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.

When the Geberit Pluvia roof drainage system is used in buildings with acoustic insulation requirements, a building acoustic engineer should be consulted.

2.5 Pipe fixation

2.5.1 Rigid mounting: Geberit Pluvia rail fastening system

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

Positioning of the anchor points:

- at the beginning and end of each pipe run
- at each change in direction of the pipeline
- 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

These are guidelines only and should be verified with the bracketing manufacturer.

The positioning of anchor points should be checked for structural suitability.

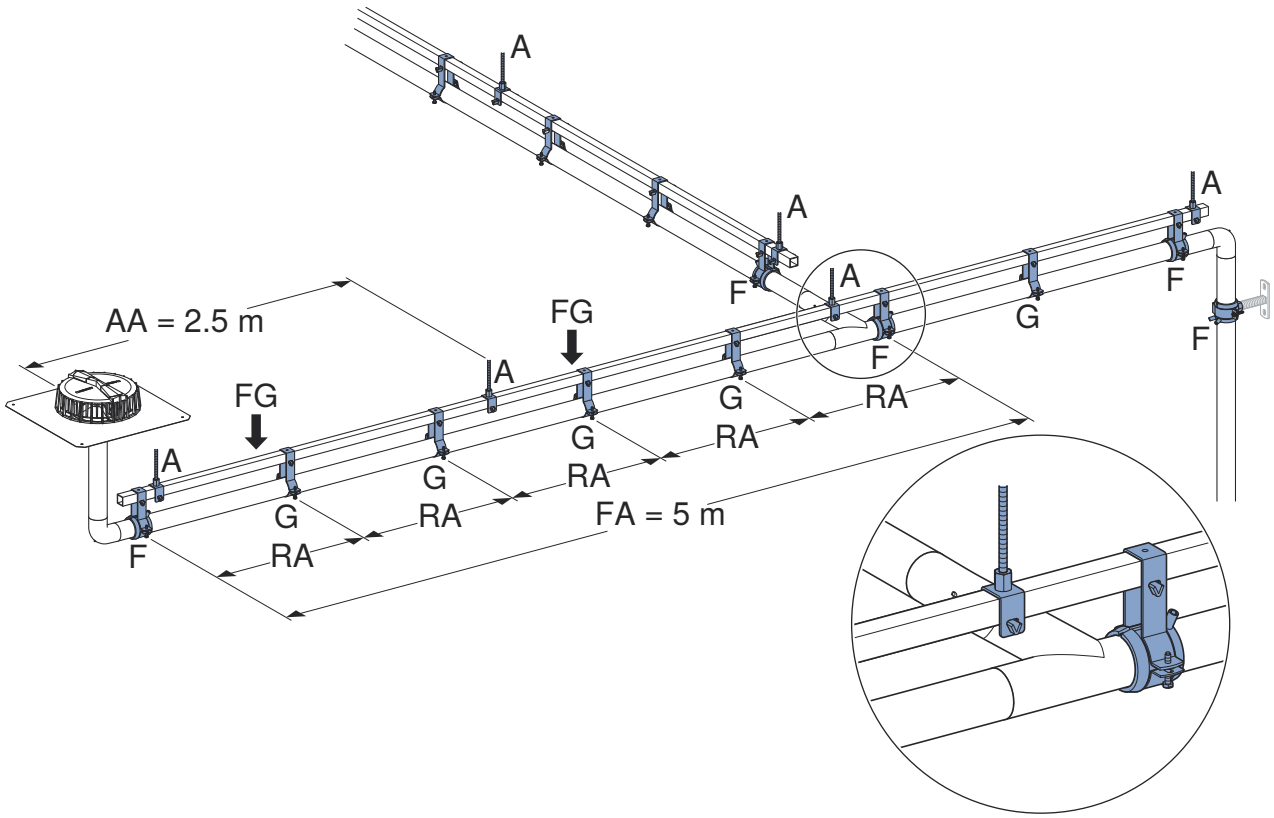


Figure 38: Fastening distances for Geberit Pluvia rail fastening systems without support shells

A	Suspension
F	Anchor point
G	Sliding point
AA	Distance between suspensions
RA	Distance between pipe brackets
FA	Distance between anchor points
FG	Weight of the syphonic system on the suspension

Geberit Pluvia d40–200 rail fastening system

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

Table 7: Configuration of anchor and sliding points with Geberit Pluvia rail fastening system

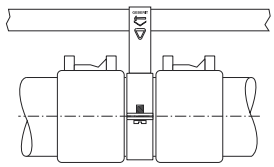
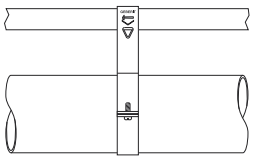
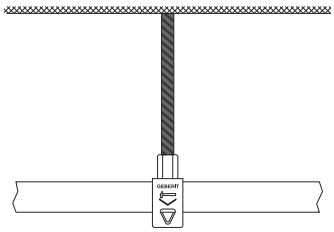
Anchor point	Sliding point	Suspension
Geberit Pluvia pipe bracket with electrofusion sleeve coupling 	Pipe bracket 	

Table 8: Recommended fastening distances of fixed and sliding brackets for rigid mounting

d [mm]	RA [m]	FG[1)] [kg]	FA [m]	AA [m]
40	0.8	7.2	5.0	2.5
50	0.8	9	5.0	2.5
56	0.8	10.9	5.0	2.5
63	0.8	12.7	5.0	2.5
75	0.8	15.9	5.0	2.5
90	0.9	20.7	5.0	2.5
110	1.1	28.5	5.0	2.5
125	1.3	35.5	5.0	2.5
160	1.6	56.1	5.0	2.5
200	2.0	86.8	5.0	2.5

[1)] With fastening material

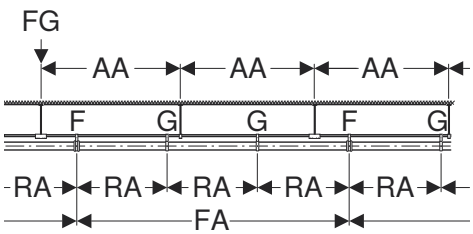


Figure 39: Recommended fastening distances for Geberit Pluvia rail fastening system d40-200

A Suspension
F Anchor point
G Sliding point
AA Distance between suspensions
RA Distance between pipe brackets
FA Distance between anchor points
FG Approx. weight for each Geberit Pluvia suspension for a distance of 2.5 m

Geberit Pluvia d250-315 rail fastening system

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

Table 9: Configuration of anchor and sliding points with Geberit Pluvia

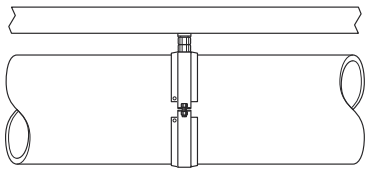
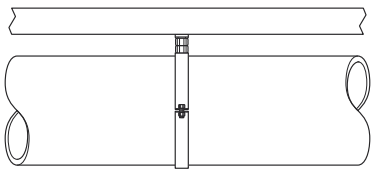
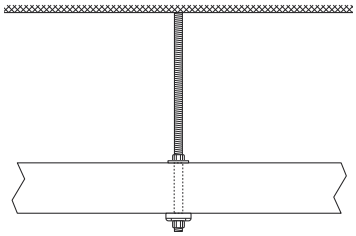
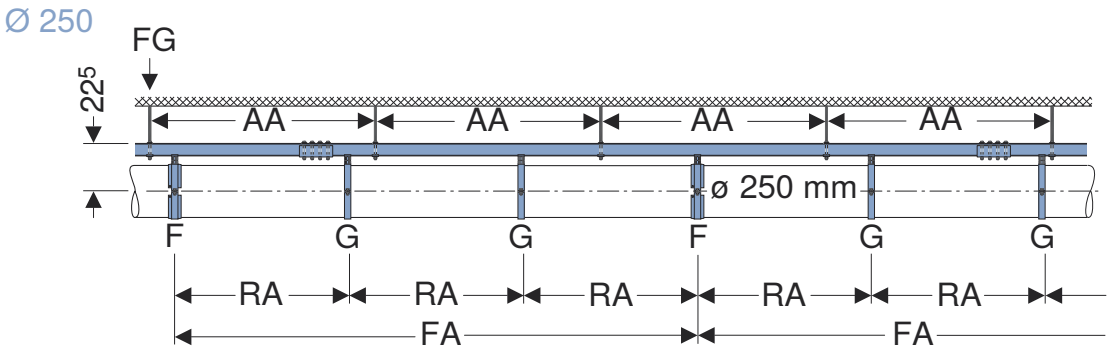
Anchor point	Sliding point	Suspension
 Geberit Pluvia pipe bracket with electrofusion tape	 Geberit Pluvia pipe bracket	

Table 10: Fastening distances of fixed and sliding brackets for rigid mounting

d [mm]	RA [m]	FG[1)] [kg]	FA [m]	AA [m]
250	1.7	134.6	5.0	2.5
315	1.7	210.0	5.0	2.5

1) With fastening material



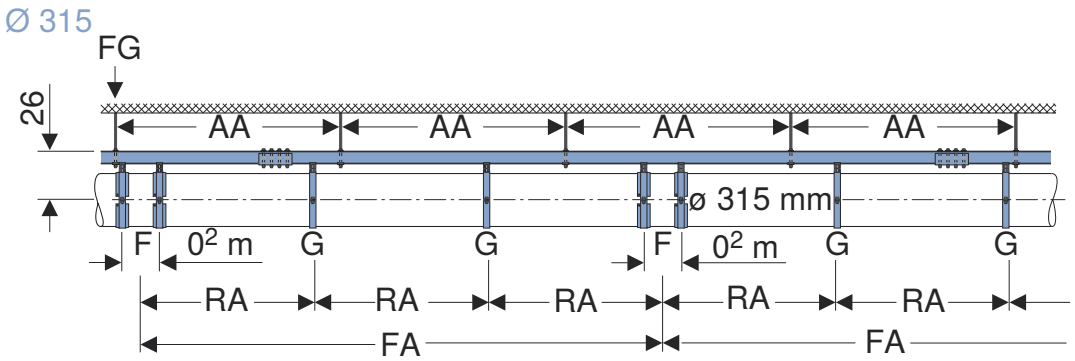


Figure 40: Fastening distances for Geberit Pluvia d250–315 rail fastening system

F	Anchor point
G	Sliding point
AA	Distance of the suspensions
RA	Distance between pipe brackets
FA	Distance between anchor points
FG	Approx. weight for each Geberit Pluvia suspension for a distance of 2.5 m

Observe installation guidelines

The fitter must observe the installation guidelines of the manufacturer of the rail fastening system.

2.5.2 Conventional rigid mounting

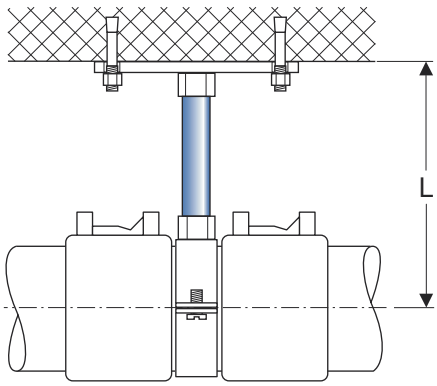
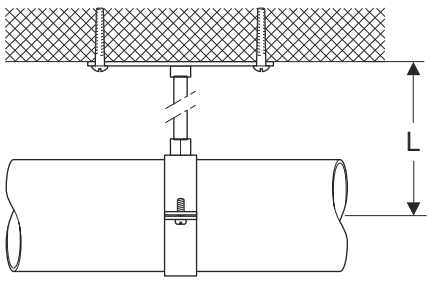
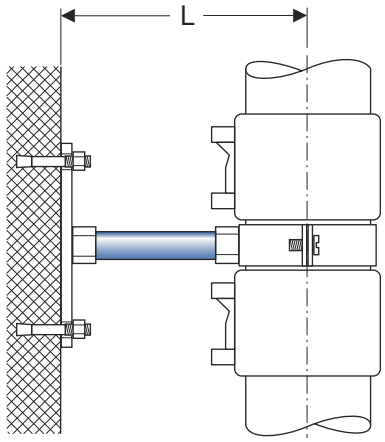
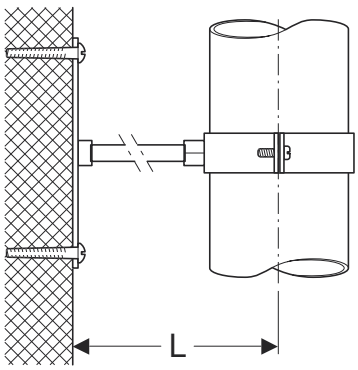
Pipe laying with conventional rigid mounting:

- Can be used for horizontal and vertical pipes
- Recommended up to DN125 (d125)
- 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:

Geberit Pluvia rail fastening is preferred for fastening Geberit Pluvia roof drainage systems. However, if no other type of fastening is possible, anchor and sliding points should be configured as follows:

Table 11: Configuration of anchor and sliding points for rigid mounting

	Anchor point	Sliding point
Horizontal on ceilings	Pipe bracket with electrofusion sleeve coupling 	Pipe bracket 
Vertical on walls	Pipe bracket with electrofusion sleeve coupling 	Pipe bracket 

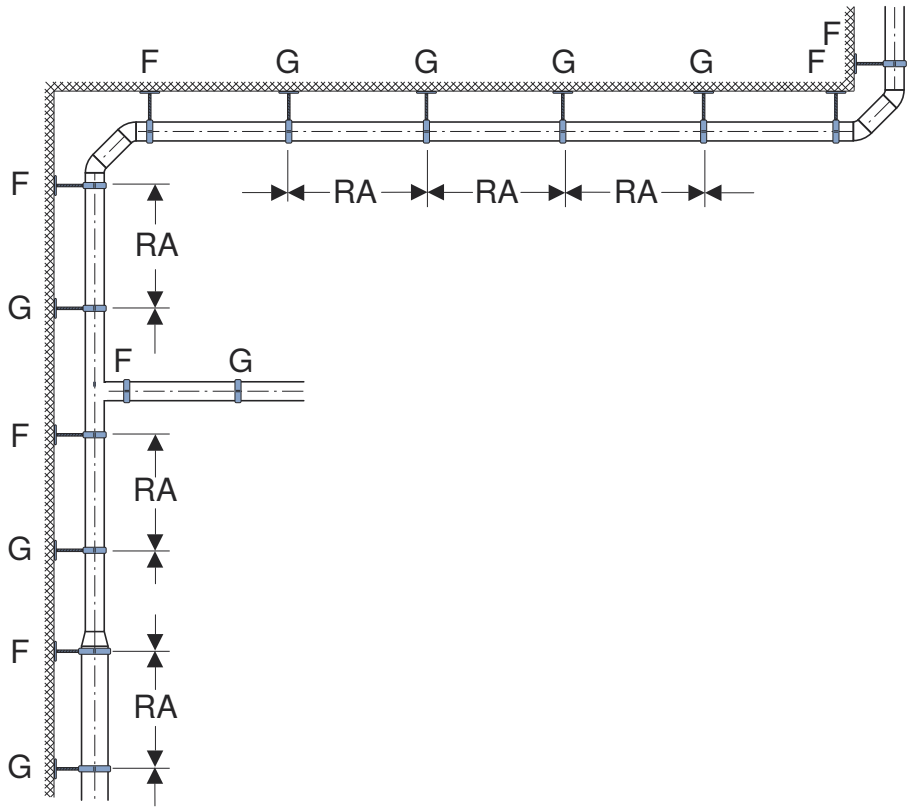
Commercially available products can be used to create the anchor points.

Fastening distances for conventional rigid mounting

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

The following fastening distances and dimensions must be observed:



G Sliding point (minimum 1/2" pipe bracket)

F Anchor point

RA Distance between pipe brackets

Table 12: Fastening distances on ceilings and walls

d [mm]	Pipe dimension DN	RA [m]
40	40	0.8
50	50	0.8
56	56	0.8
63	60	0.8
75	70	0.8
90	90	0.9
110	100	1.1
125	125	1.3
160	150	1.6

Forces generated in Geberit HDPE pipes with rigid mounting

Much greater forces are generated during cooling than during heating. Under normal conditions, the values in column A can be used. The fastening is to be calculated based on the values in column B for pipelines that are laid outdoors, e.g. when constructing bridges. For rigid mounting, pipe brackets are to be used with struts that are appropriately supported by the building structure in accordance with the calculated forces. In such cases, ensure that the fastening screws can withstand the generated forces.

Table 13: Forces generated in Geberit HDPE pipes

d [mm]	Annular profile [cm^2]	Expansion force in [N]	
		+20 °C – +90 °C	-20 °C – +20 °C
		A	B
40	3.5	1,100	4,500
50	4.4	1,150	4,700
56	5.0	1,250	5,300
63	5.8	1,450	5,950
75	6.8	1,700	7,150
90	9.5	2,400	10,050
110	14.0	3,600	15,050
125	18.5	4,650	19,450
160	29.6	7,500	31,550
200	37.7	9,450	39,700
250	59.5	14,850	62,450
315	93.9	23,500	98,850

2.5.3 Fastening overview

Materials expand when the temperature rises. When it cools down, they shrink.

The expansion or shrinkage due to temperature differences depends on the material and is described using the coefficient of linear expansion α [mm/m·K].

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

For Geberit HDPE pipes, a temperature difference of ΔT = 50 °C results in an expansion of 10 mm per metre.

A temperature difference of ΔT = 30 °C results in shortening of the pipeline of 6 mm per meter.

Example:

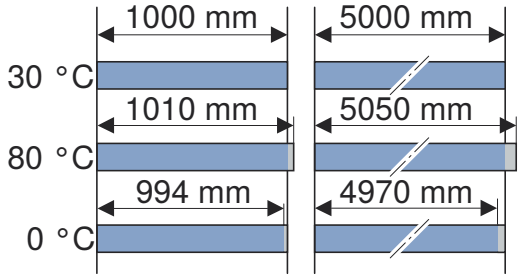


Figure 41: Example of thermal expansion in Geberit HDPE

For Geberit HDPE, the thermal expansion Δl can be determined using the following diagram:

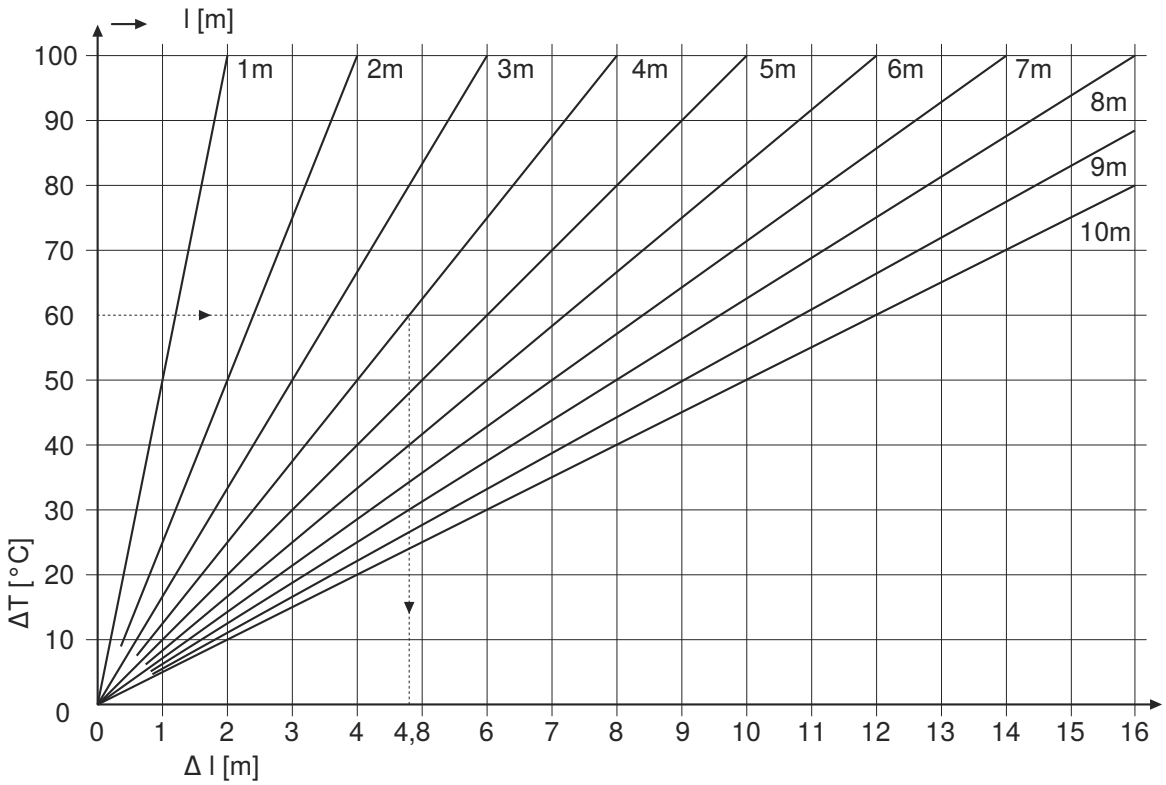


Figure 42: Diagram for determining the thermal expansion with Geberit HDPE

Δl	Linear expansion or shrinkage
ΔT	Temperature differential
l	Pipe length

2.6 Dimensioning

A Geberit Pluvia roof drainage system is dimensioned using the Roof drainage module in Geberit ProPlanner.

The following parameters must be determined:

- number and position of the outlets
- building height
- pipe layout
  - collector pipes
  - stacks
  - transition to conventional drainage system
- rainwater outflow (target volumetric flow rate)

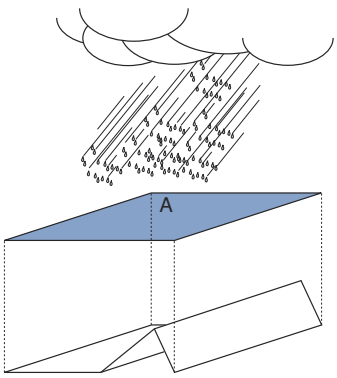
Rules and dimensions that must be observed when the Geberit Pluvia outlets are arranged are described in Section → "Geberit Pluvia outlets", page 24.

Rules and dimensions that must be observed when the pipes are laid are described in Section → "Pipe layout", page 28.

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

2.6.1 Determining the rainwater outflow

The rainwater outflow is the amount of water that is fed to the rainwater pipes per second.



The rainwater outflow is calculated with the following formula:

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

Q_R	Rainwater outflow [l/s]
A	Horizontal projection of the roof area [m ^{2}]
r	Rainfall intensity [mm/hr]
C	Capacity factor

The design rainfall intensity can be obtained from the Bureau of Meteorology (BOM) website, in accordance with AS/NZS3500.3.

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

- tin roofs with waterproofing C = 1.0
- gravel roofs C = 0.8
- according to the manufacturer's information

Table 14: Capacity factors for greened roof areas

Layer thickness	Capacity factors C	
	Pitch up to 15°	Pitch over 15°
> 50 cm	0.1	–
> 25–50 cm	0.2	–
> 15–25 cm	0.3	–
> 10–15 cm	0.4	0.5
> 6–10 cm	0.5	0.6
> 4–6 cm	0.6	0.7
> 2–4 cm	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.).

2.6.2 Dimensioning with the roof drainage module in the Geberit ProPlanner

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

The dimensioning is done roughly as follows:

- Create the piping system in isometric view.
  - Set the underground pipe connection.
  - Draw the pipes.
  - Set the outlets.
- Enter the pipe lengths and rainwater outflow.
- Calculate the dimensions of the piping system.

2.6.3 Safety factor

Design flows are determined in accordance with AS/NZS3500.3. There is no requirement to apply an additional safety factor. Doing so could result in oversizing of pipe dimensions and a reduction in hydraulic performance.

2.7 Emergency drainage

2.7.1 General

Country-specific standards and provisions must always be observed and applied.

The standard AS/NZ3500.3 must be observed in Australia and New Zealand.

For 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 Geberit 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 sewage system
- serious contamination of the outlets (e.g. from leaves)
- structural design of trapezoidal roofs too weak

Basic rules

The rules described 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 sumps through the emergency overflows. The emergency drainage can be done through the façade via an emergency overflow or through emergency overflows with an additional piping system.

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

An emergency drainage can be installed as follows:

- for flat roofs with emergency overflows in the façade
- for box gutters with emergency overflows on the face of the gutter
- with Geberit 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, for example, the roof geometry does not allow a drainage system with emergency overflow openings in the façade. The Geberit Pluvia emergency overflow system is a separate outlet system.

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 Geberit Pluvia outlets.

2.7.2 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 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 5.5 cm above the sealing 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 must be designed to be square and long.

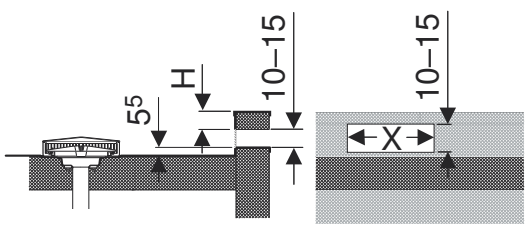


Figure 43: Emergency overflow with flat roof, in the facade

X Width of the emergency overflow

H Distance from the upper edge to the parapet

2.7.3 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.

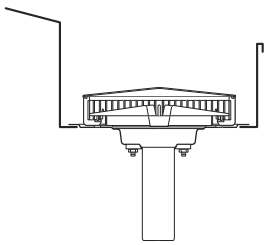


Figure 44: Emergency overflow with eaves gutters

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

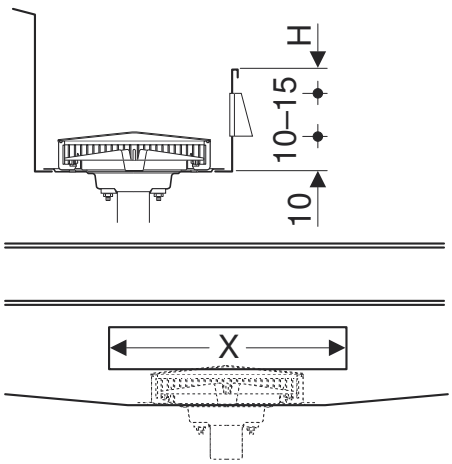


Figure 45: Emergency overflow with gutter, on the longitudinal side

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 5.5–10 cm above the next sump opening

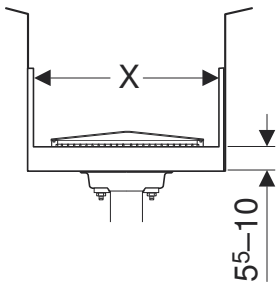


Figure 46: Emergency overflow with gutter, on the front end.

X Width of the emergency overflow

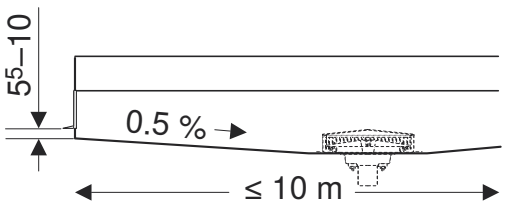


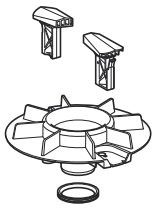
Figure 47: Emergency overflow with gutter, on the front end. Overflow edge and distance from next outlet.

It is essential to take the head of water into account in the static calculation for the roof and the gutters.

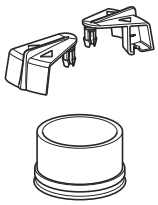
2.7.4 Emergency drainage with Geberit Pluvia emergency overflows

For emergency drainage, Geberit Pluvia outlets can be used in conjunction with the corresponding Geberit Pluvia emergency overflow simply, quickly and without increasing the roof membrane.

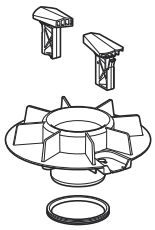
For flat roofs, the Geberit Pluvia outlet and Geberit Pluvia emergency overflow should be planned in the immediate vicinity (approx. 1 m) of each other.



12 l emergency overflow



19 l emergency overflow



25 l emergency overflow

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

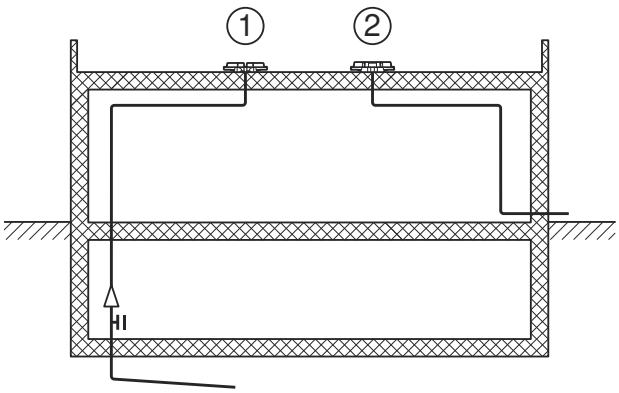


Figure 48: Geberit Pluvia emergency overflow system as a separate drainage system

1 Geberit Pluvia roof drainage system
2 Geberit Pluvia emergency overflow system

Conventional emergency drainage

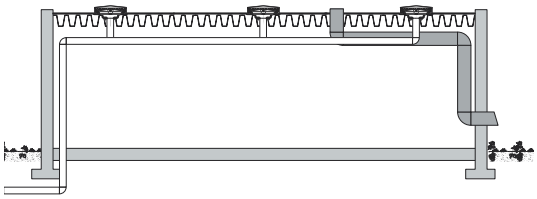


Figure 49: Geberit Pluvia system with emergency drainage through a conventional pipe system

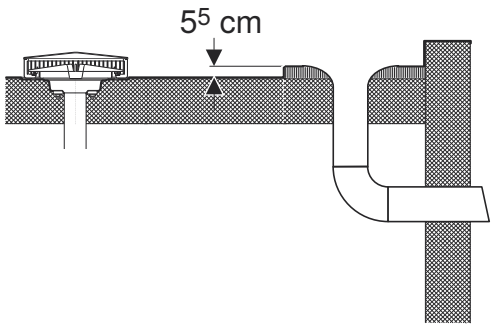


Figure 50: Conventional emergency drainage as a construction measure

In the case of emergency drainage as a construction measure, the lower edge of the emergency overflow must be at least 5.5 cm higher than the uppermost covering layer.

Dimensioning emergency overflows

Simplified dimensioning of the emergency overflows as a construction measure

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

Total rainfall in l/s x 25 cm^2

Example:

- roof area with 4 sumps of 8 l/s each
- total rainfall: 4 x 8 l/s = 32 l/s multiplied by 25 cm^2 = 800 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 10 and max. 15 cm.

Applied to this 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 according to AS/NZS3500.3

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

3 Installation

3.1 Geberit Pluvia outlets

The following installation instructions are abbreviated and incomplete versions. They contain the key steps. For installation, use the complete installation manual that is provided with every product.

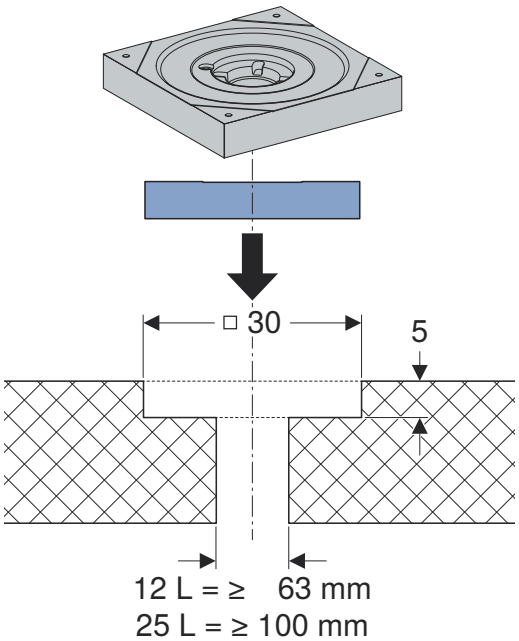
3.1.1 Basic rules

- The connection pipe of the outlet must always be fastened with an anchor point.
- In order to ensure the drainage capacities of the outlets, the function disc and the outlet grating must be installed immediately after the roof sealing work has been completed. If these are not installed, only emergency drainage that performs significantly less well is available during the construction phase.
- When connecting roof sealings and contact sheets for gutters, ensure that the outlet is not damaged during the installation or welding procedure.

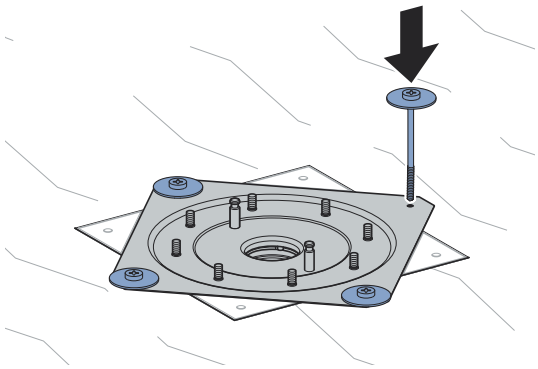
3.1.2 Geberit Pluvia 12/25 l outlets

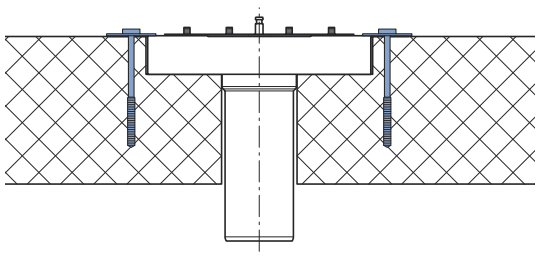
Solid roof

For installation in a solid roof/flat roof/concrete roof, the following dimensions must be observed:



The outlet for roofs with waterproofing membranes is directly fastened to the roof structure.



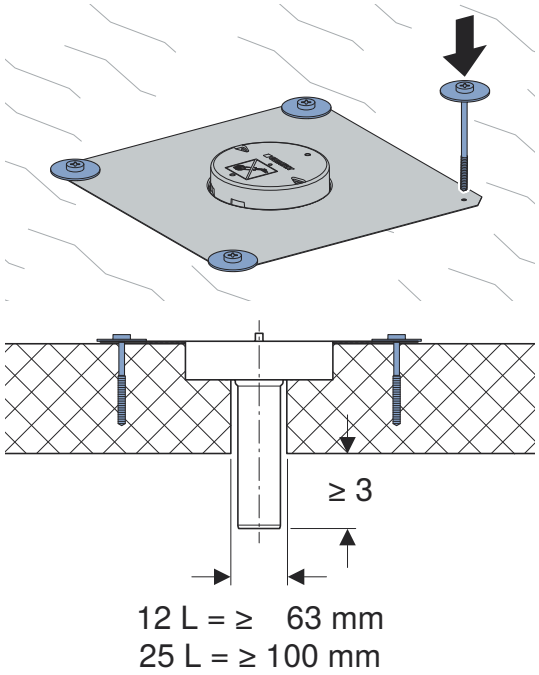


Connections

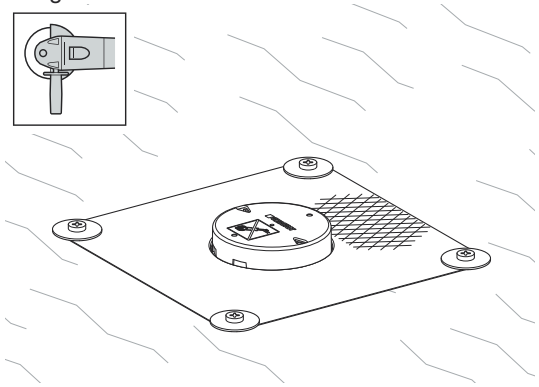
The roof sealing material must be handled and installed in accordance with the manufacturer's recommendations.

Connection to roofs with waterproofing layers

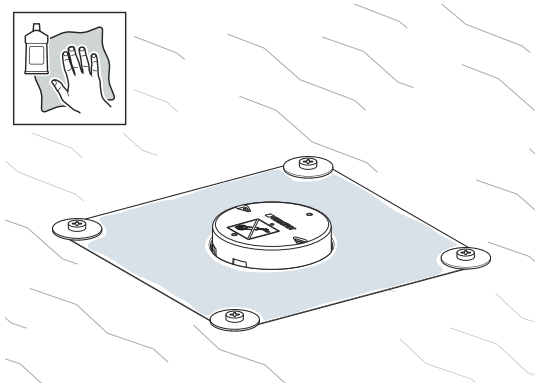
1 Fasten outlet.



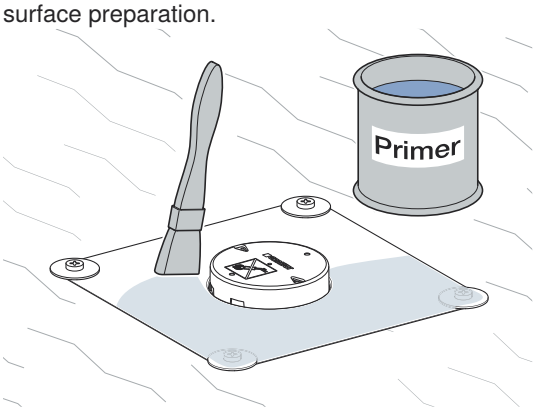
2 Roughen the metallic surface of the outlet.



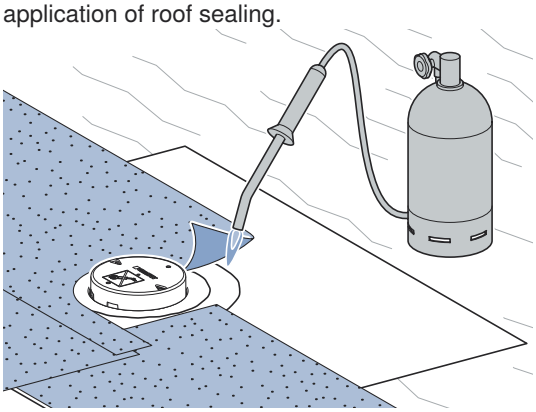
3 Clean the surface using primer to degrease the contact sheet.



4 Follow the manufacturer's recommendation for surface preparation.

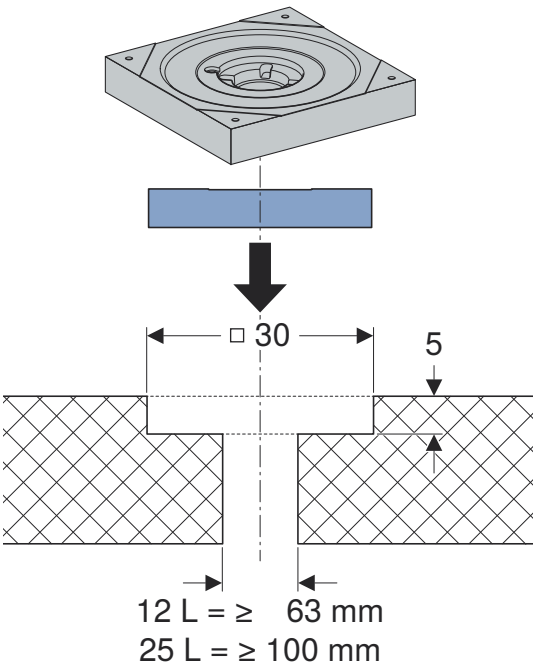


5 Follow the manufacturer's recommendation for application of roof sealing.

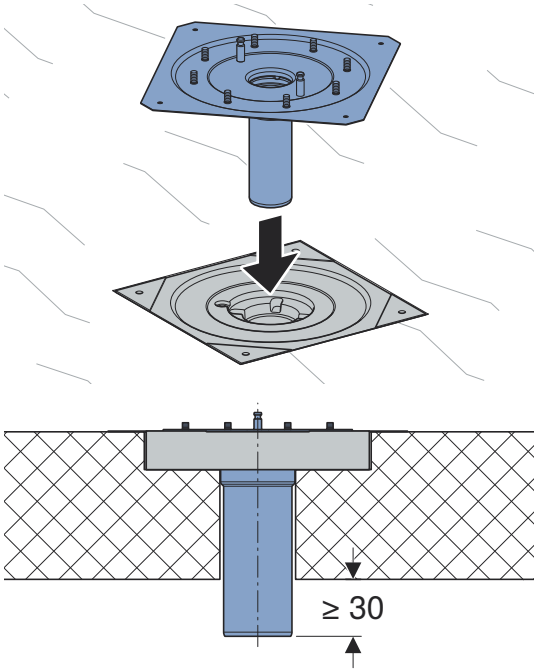


Connection to roofs with waterproofing membranes

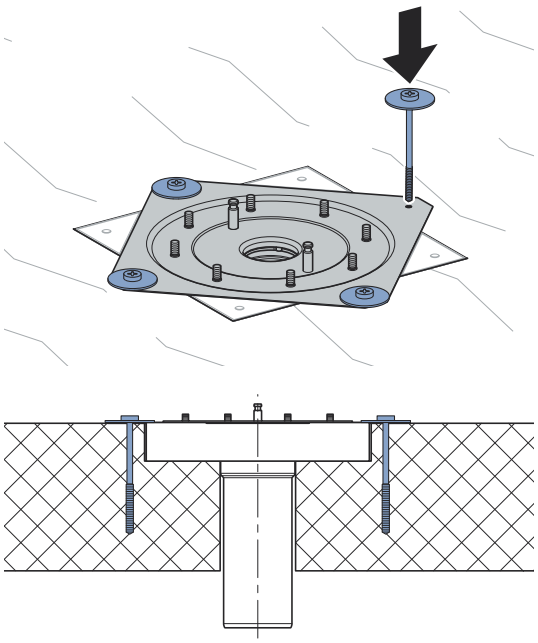
1 Place anti-condensation insulation.



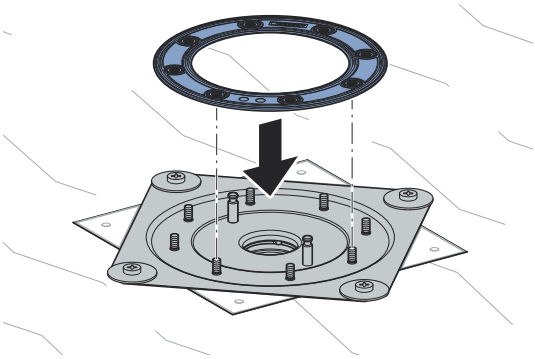
2 Insert outlet element.



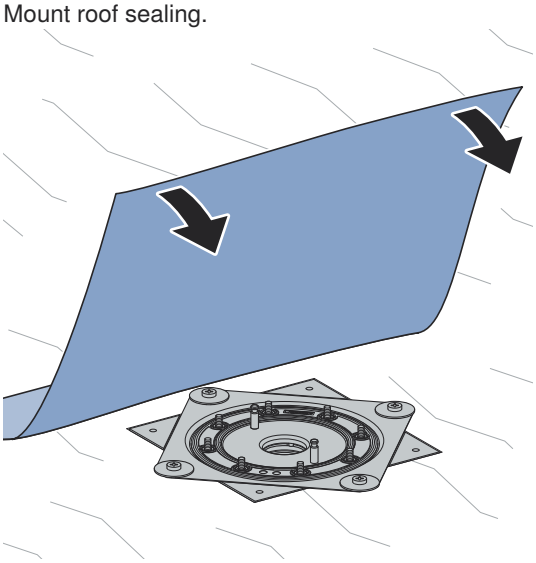
3 Fasten outlet element.



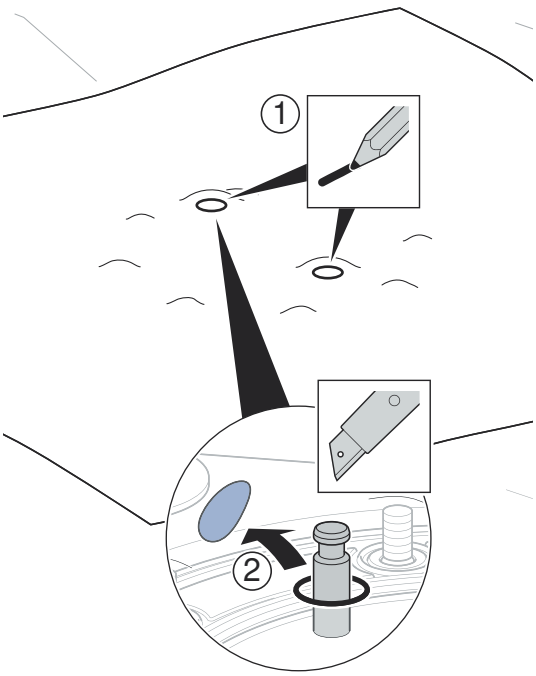
4 Install flange gasket.



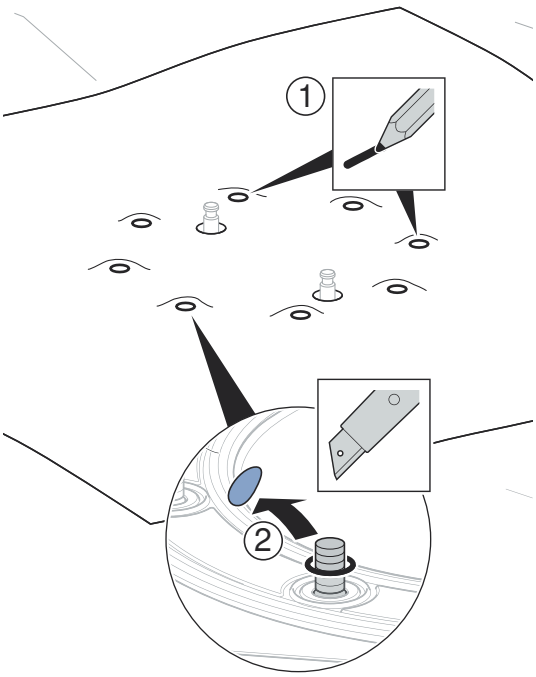
5 Mount roof sealing.



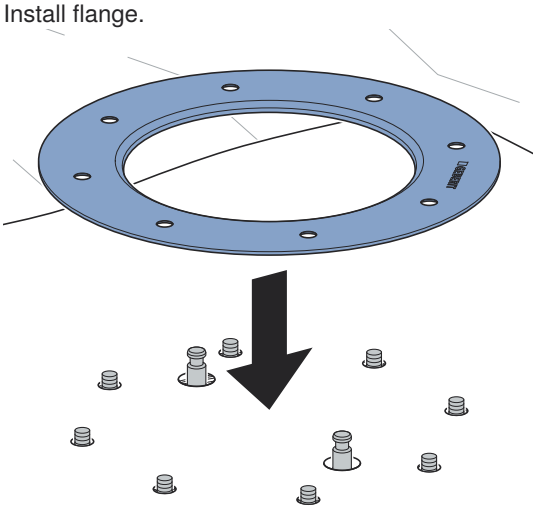
6 Create opening for outlet grating bolts.



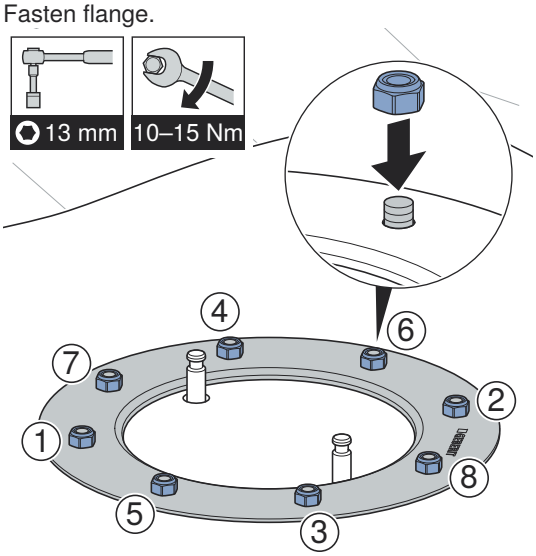
7 Create opening for push-in bolts.



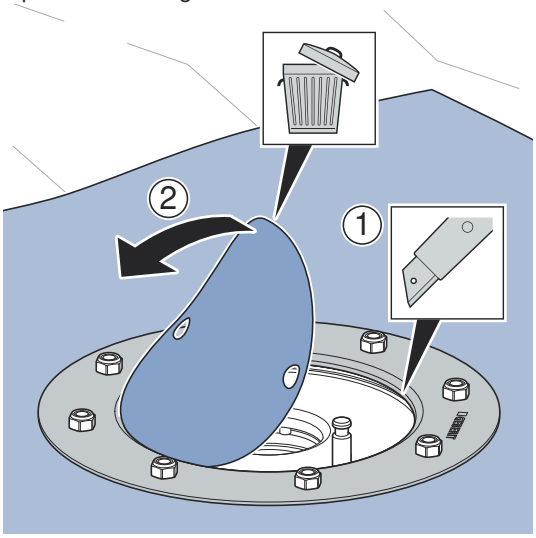
8 Install flange.



9 Fasten flange.

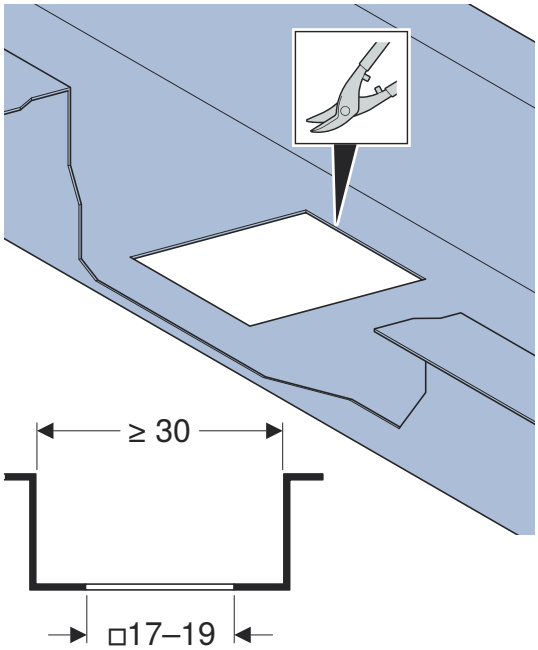


10 Open roof sealing.



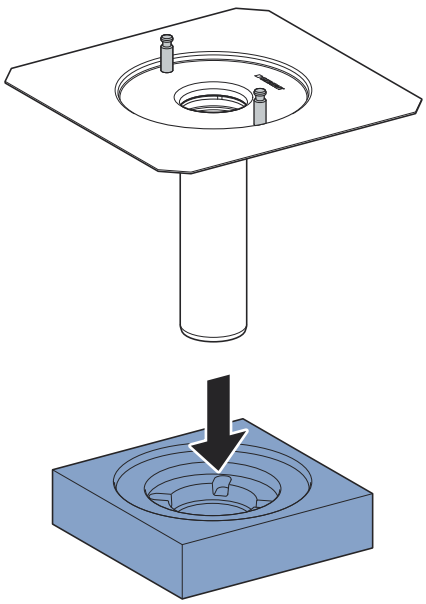
Connection to gutters

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

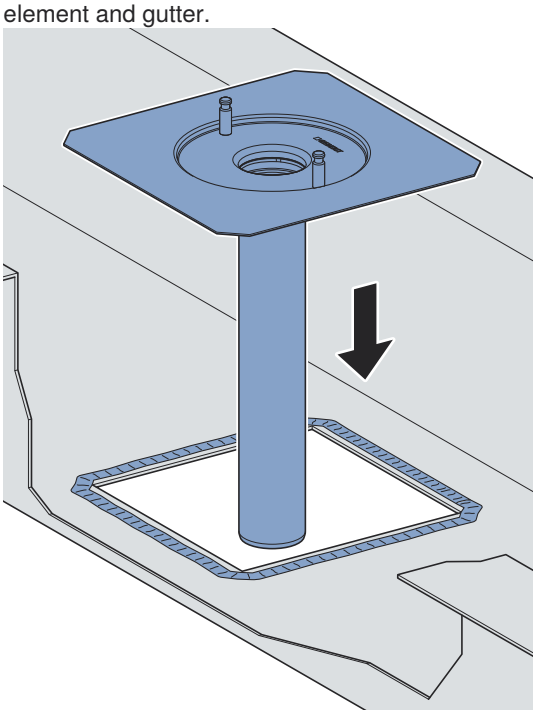


Depending on the product material, a sealant is applied between the outlet and gutter.

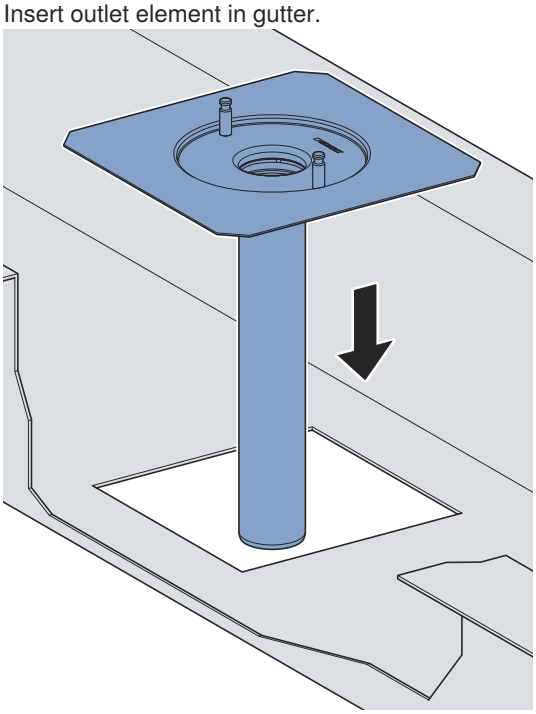
1 Remove insulation.



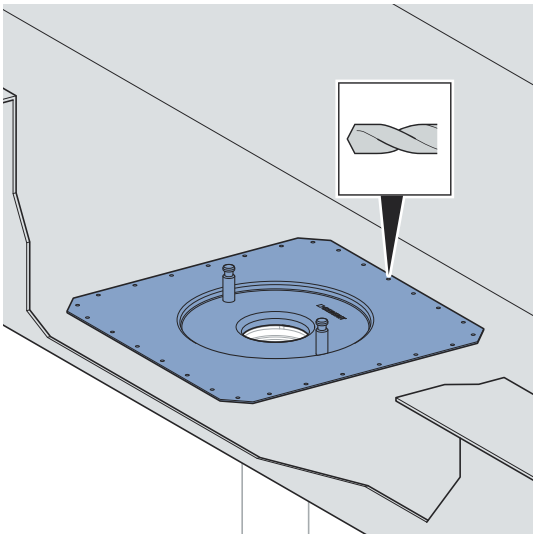
2 Apply a suitable sealant between the outlet element and gutter.



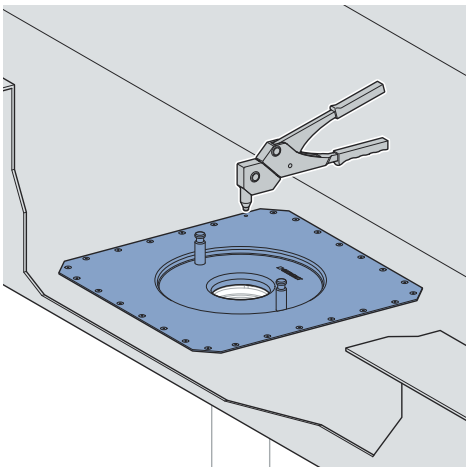
3 Insert outlet element in gutter.



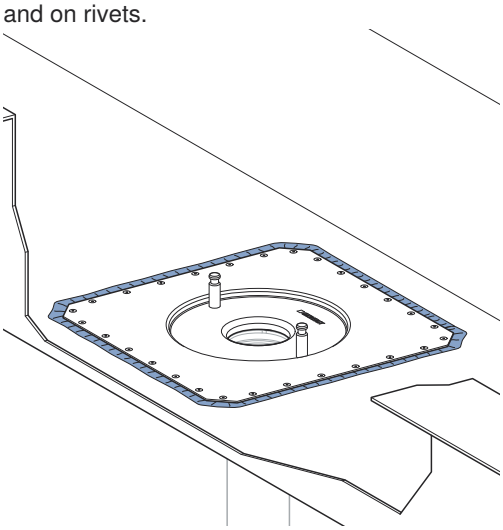
4 Drill outlet element.



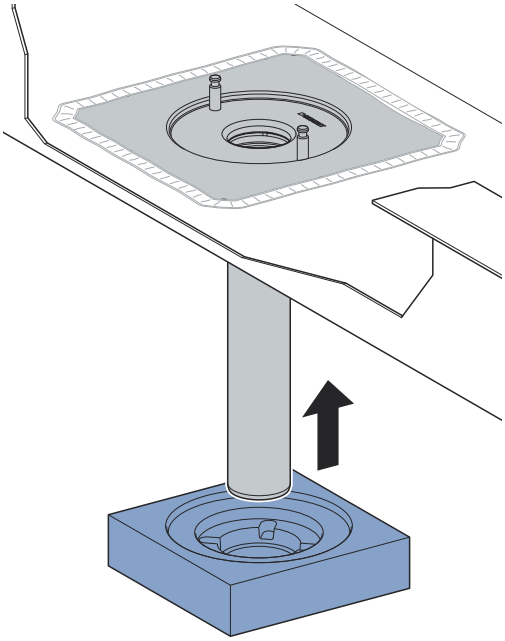
5 Rivet outlet element.



6 Apply final layer of sealant along edge of outlet and on rivets.

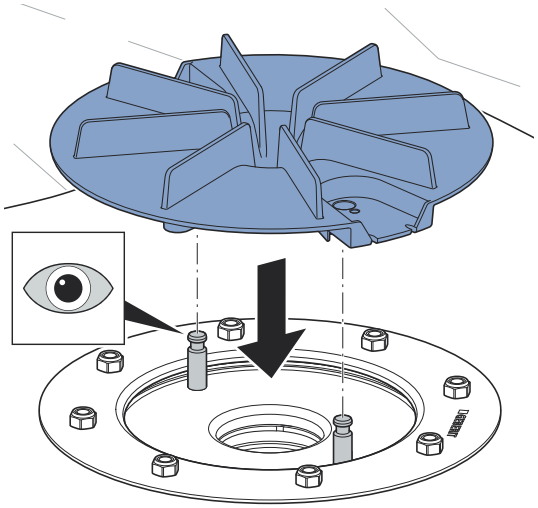


7 Install anti-condensation insulation.

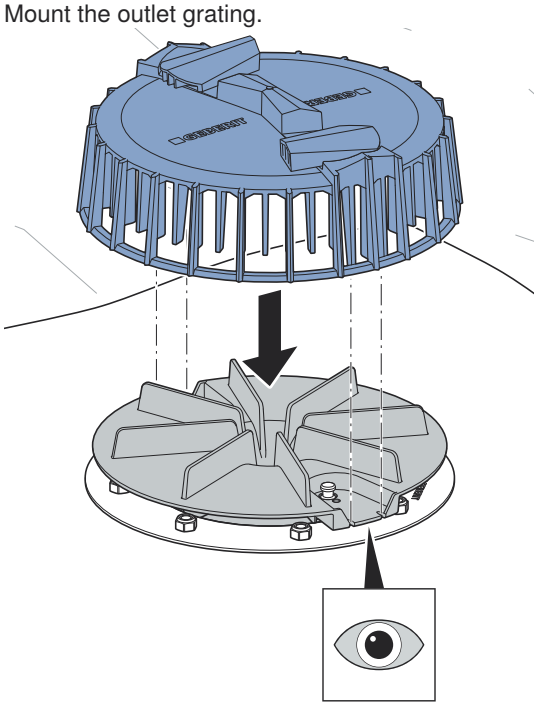


Installing the outlet grating (roofs or gutters)

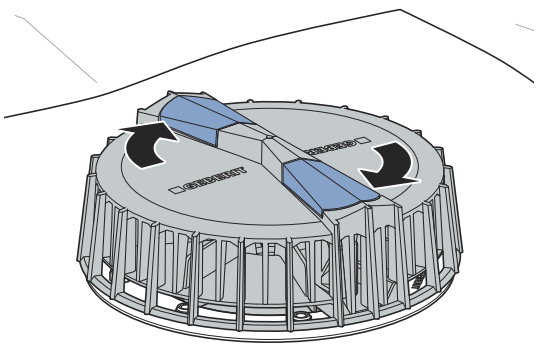
1 Mount the function disc.



2 Mount the outlet grating.



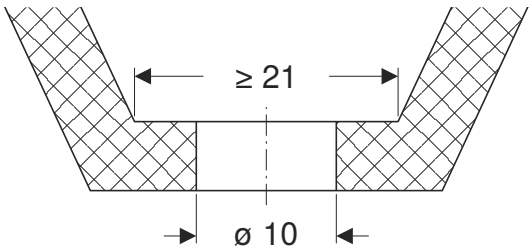
3 Lock both rotating lock bars.



3.1.3 Geberit Pluvia 19 l outlets

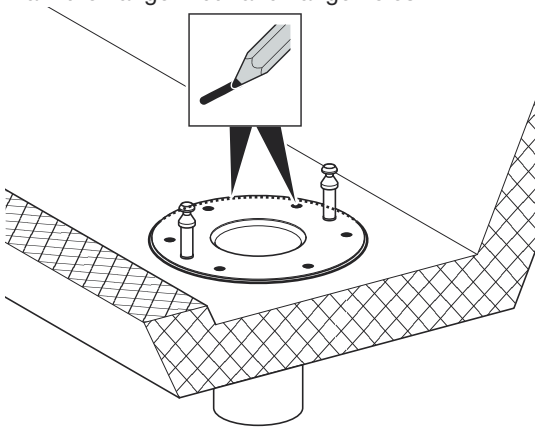
Connection with concrete gutter

Prerequisite

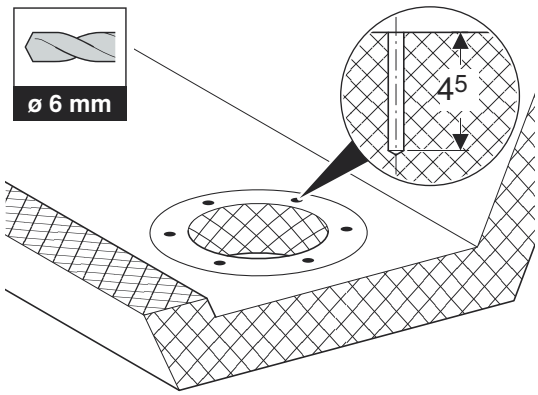


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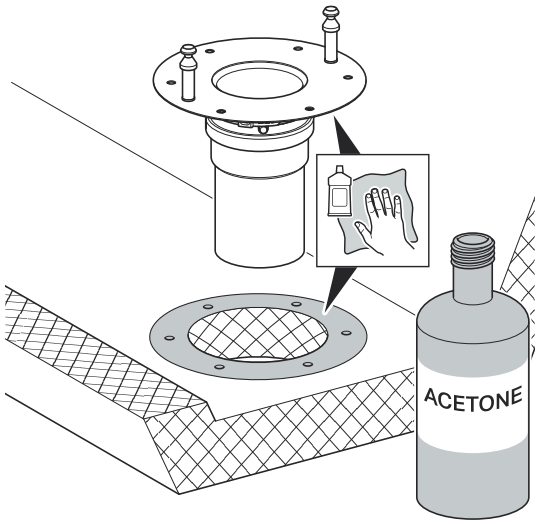
1 Mark the flange width and flange holes.



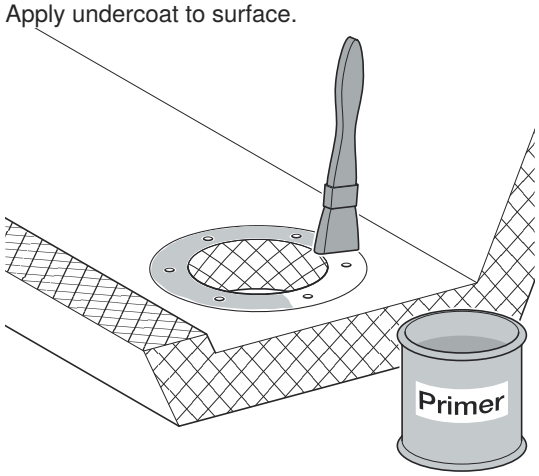
2 Create holes.



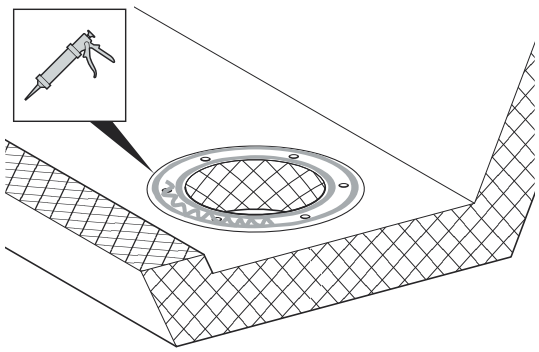
3 Clean flange and clamping range.



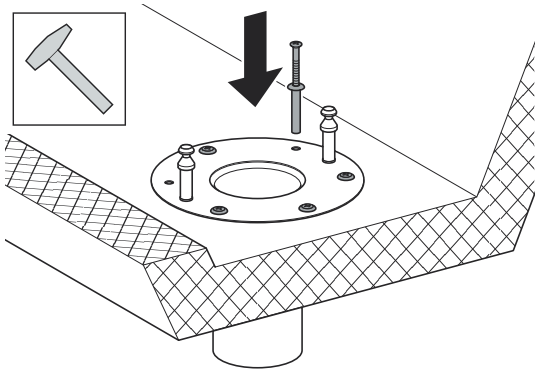
4 Apply undercoat to surface.



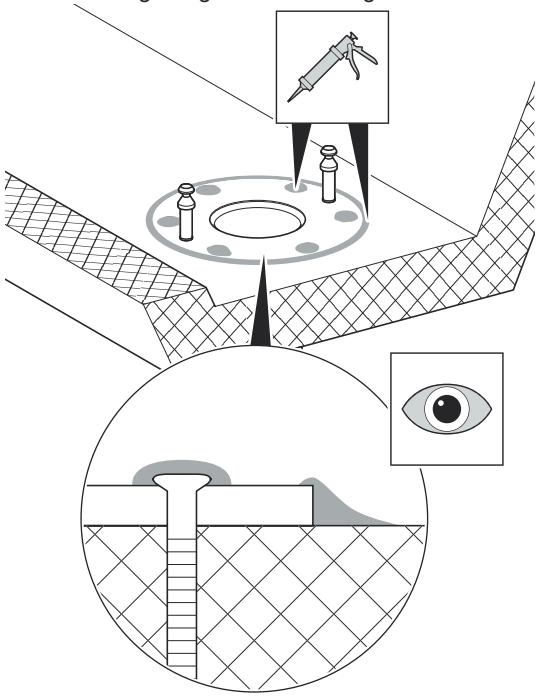
5 Apply sealing material.



6 Place and fasten the outlet element.

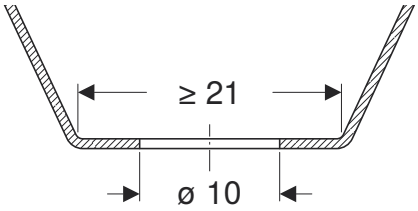


7 Seal the flange edge and fastening material.



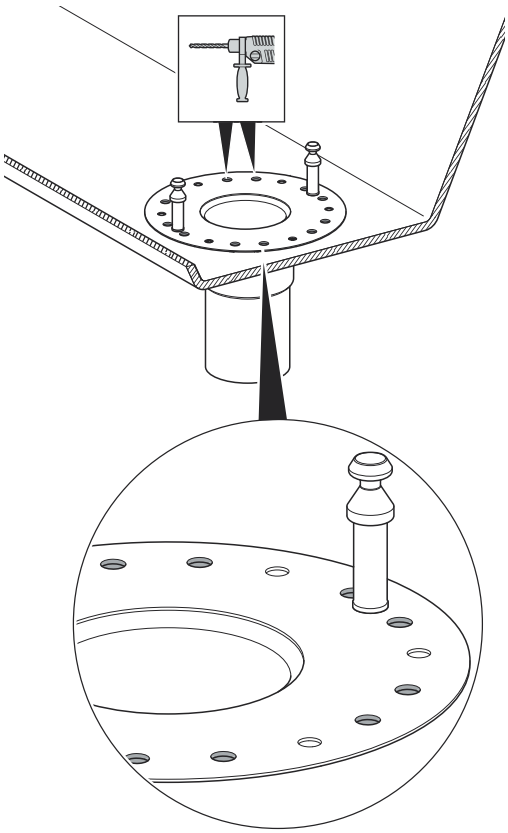
Connection with metal gutter

Prerequisite

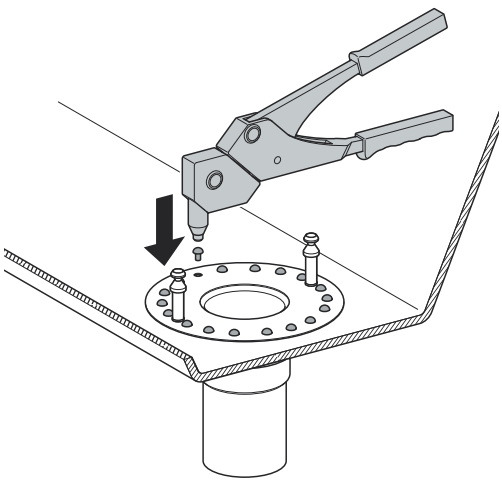


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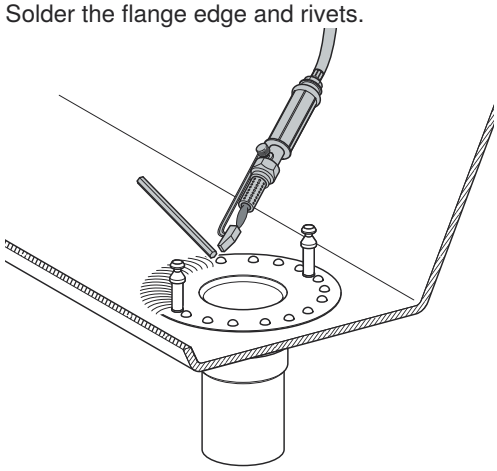
1 Place outlet element and drill rivet holes.



2 Rivet the outlet element.

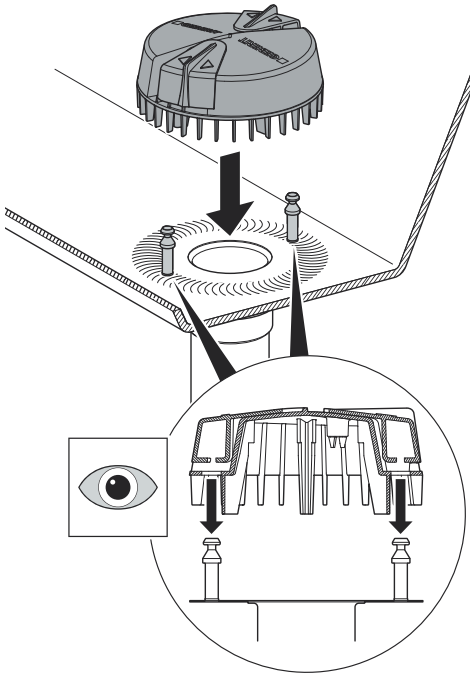


3 Solder the flange edge and rivets.

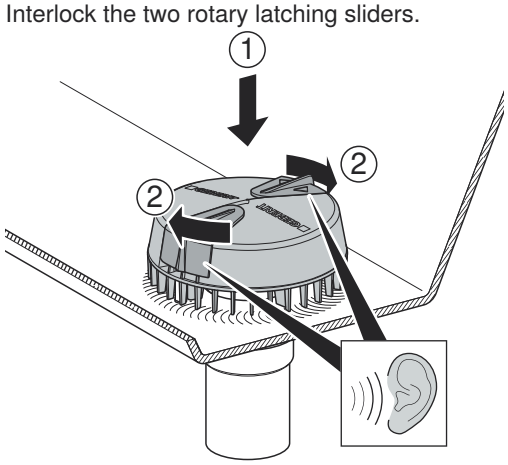


Installing the outlet grating

1 Place the outlet grating on the two pins.



2 Interlock the two rotary latching sliders.



3.1.4 Geberit Pluvia 45 l/60 l/100 l outlets

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

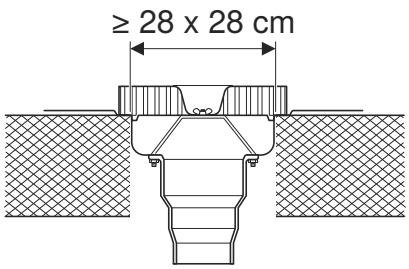
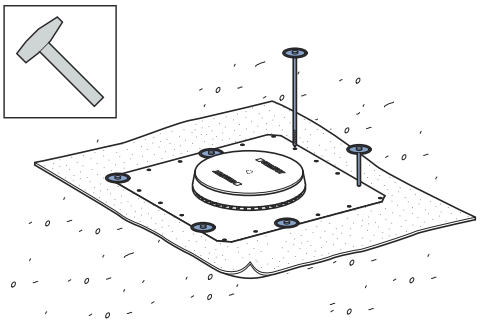


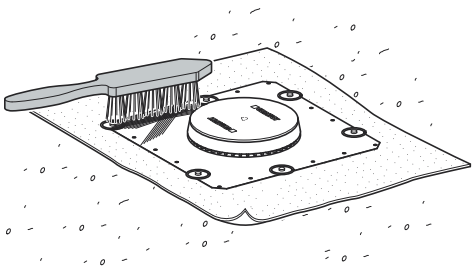
Figure 51: Solid roof

Connection to solid roof

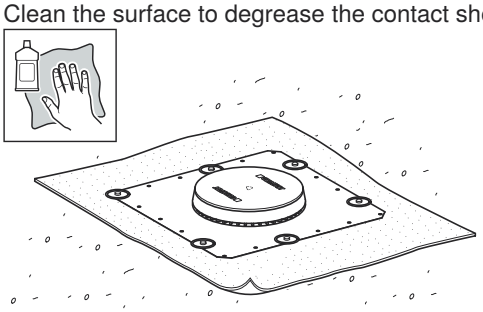
1 Fasten outlet.



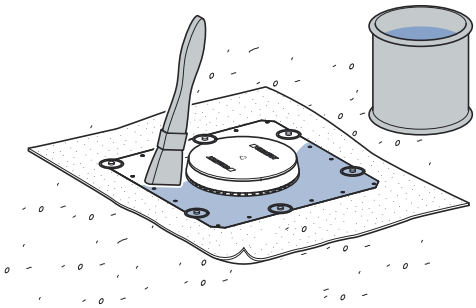
2 Roughen the metallic surface of the outlet.



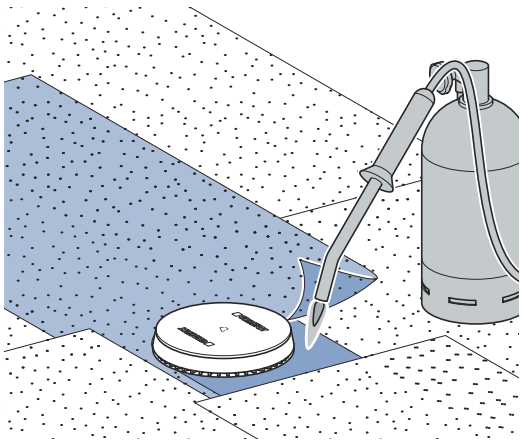
3 Clean the surface to degrease the contact sheet.



4 Prepare the surface according to the recommendations of the manufacturer of the roof sealing.

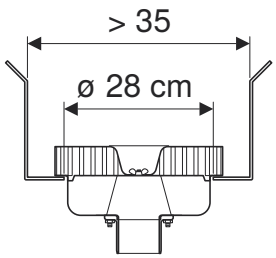


5 Follow the manufacturer's recommendation for application of roof sealing.



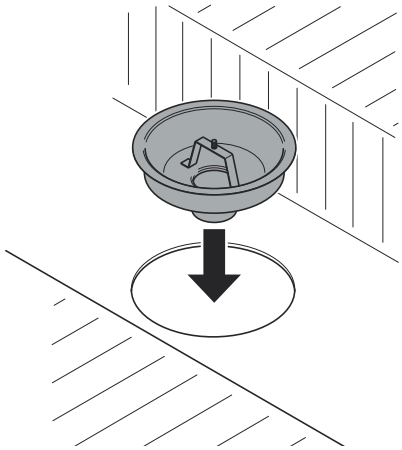
Connection to gutters

Prerequisite

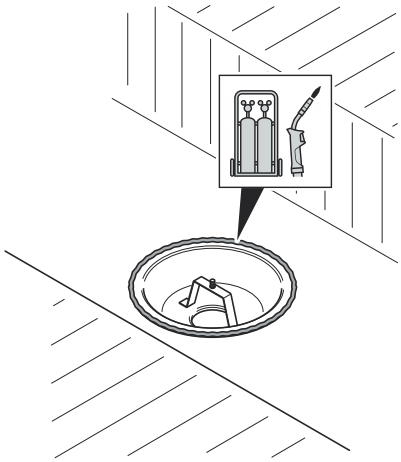


Depending on the product material, the outlet is soldered to the gutter or welded.

1 Insert outlet element in gutter

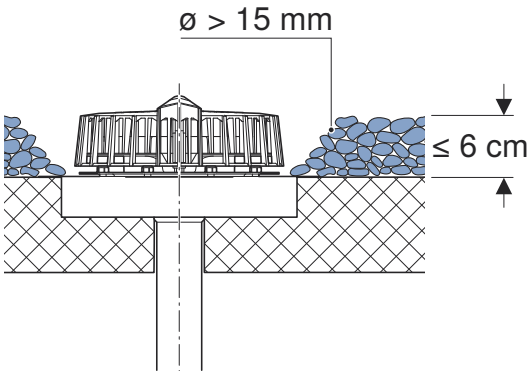


2 Solder or weld outlet element



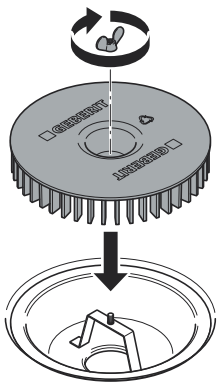
Install the outlet grating (roofs or gutters)

Prerequisite



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4 Install the outlet grating



4 Initial commissioning

Check points:

- Check the installed system is installed in accordance with the design drawings and hydraulic calculations.
  In particular:
  - the roof area effectively exposed to rain
  - the capacity factor
  - the arrangement, configuration and correct installation of the Geberit Pluvia 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 outlet.
  - the pipe layout and pipe dimensions
  - the design of the transition from the siphonic to the non-siphonic, or conventional system (transition section)
  - the configuration of possible cleaning and service openings
  - the deviations from approved plans must be tracked and subjected to a control calculation.
- Check 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 remains on the roof area.
- Flush all roof drainage pipes.

5 Maintenance

5.1 General maintenance notes

The building owner must check and maintain the Geberit Pluvia roof drainage system. Geberit recommends using skilled persons to plan and carry out this work.

Checks and maintenance must be performed periodically or as required and recorded in writing.

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.

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 sumps ensures continuously safe and optimum roof drainage.

5.1.1 Regular maintenance work

The Geberit Pluvia siphonic roof drainage system is low maintenance.

- A 500 mm wide zone must be kept free from vegetation around the Geberit Pluvia 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.

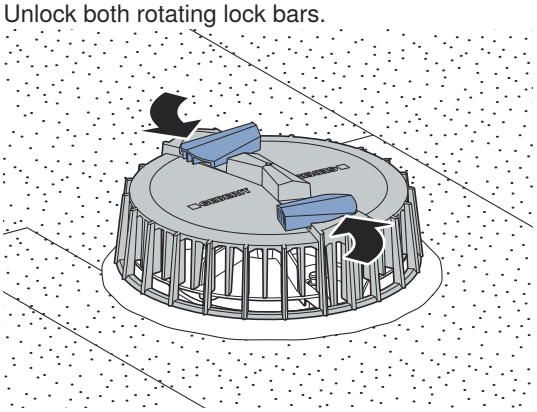
5.2 Maintenance intervals and cleaning of Geberit Pluvia outlets

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

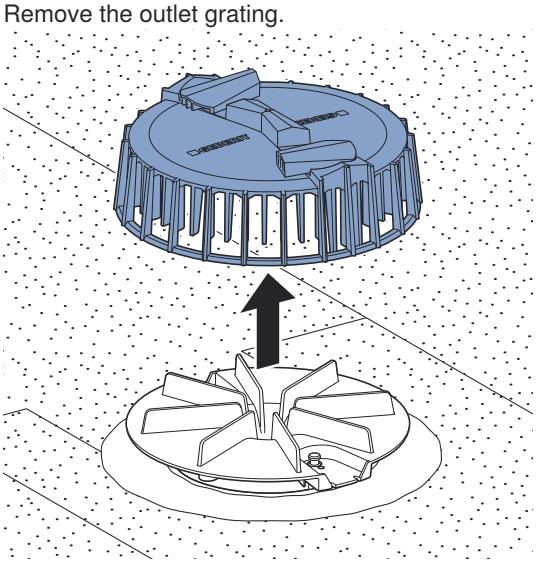
Maintenance work	Maintenance interval
Remove foreign bodies such as dirt, leaves or roof growth.	Select maintenance intervals so that obstruction of the sump is prevented.
Clean the outlet and function disc.	Select maintenance intervals so that obstruction of the outlet is prevented; however, at least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

5.2.1 Cleaning the Geberit Pluvia 12 l and 25 l outlet

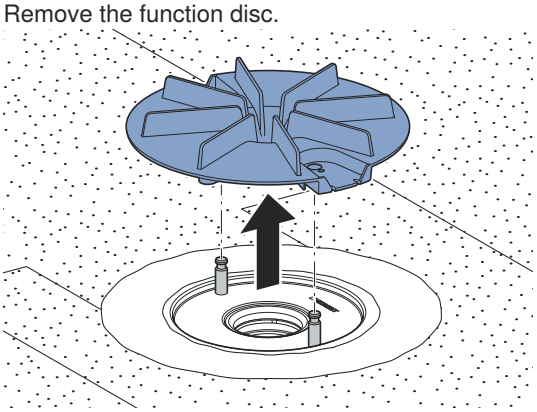
1 Unlock both rotating lock bars.



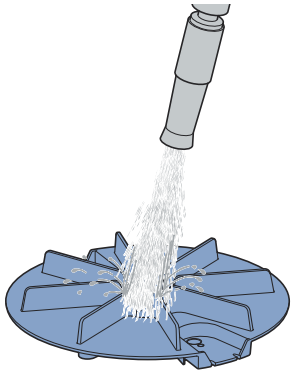
2 Remove the outlet grating.



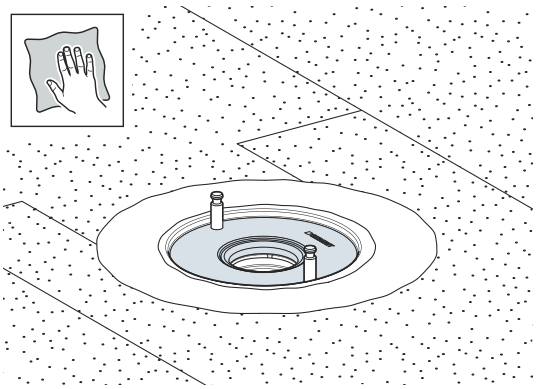
3 Remove the function disc.



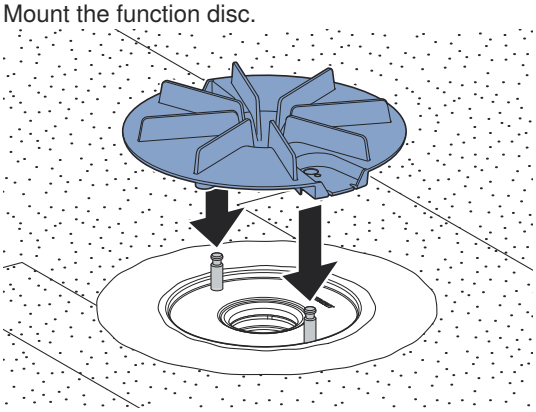
4 Clean the function disc.



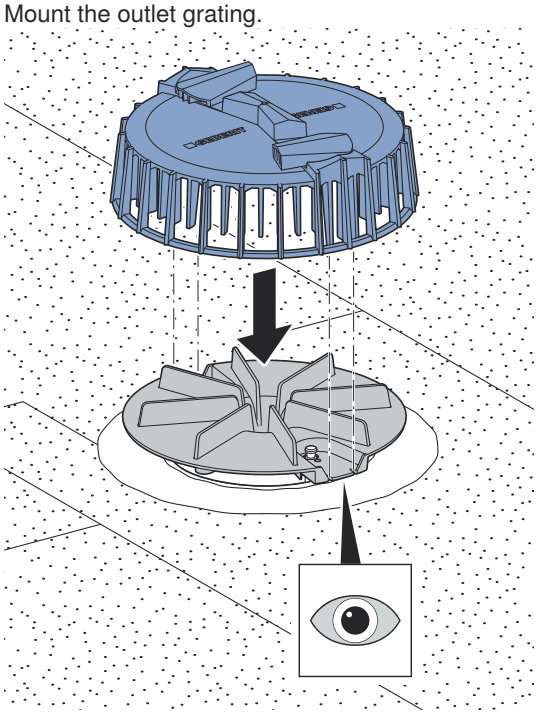
5 Clean the entire outlet area.



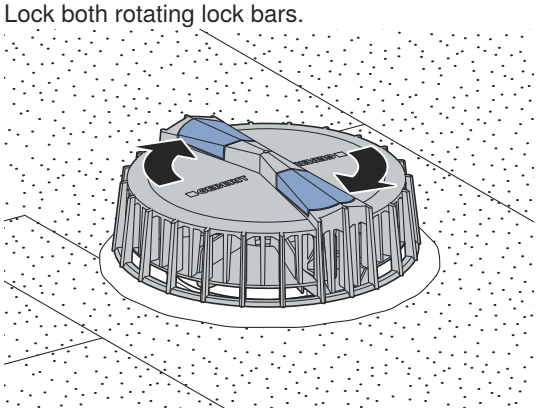
6 Mount the function disc.



7 Mount the outlet grating.

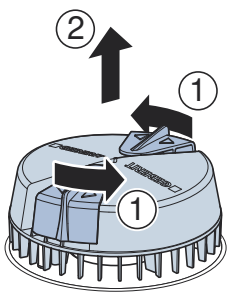


8 Lock both rotating lock bars.

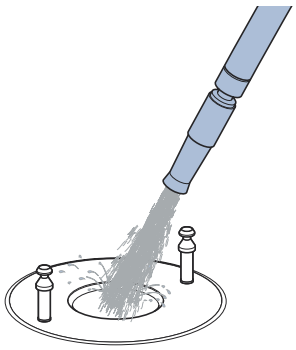


5.2.2 Cleaning the Geberit Pluvia 19 l outlet

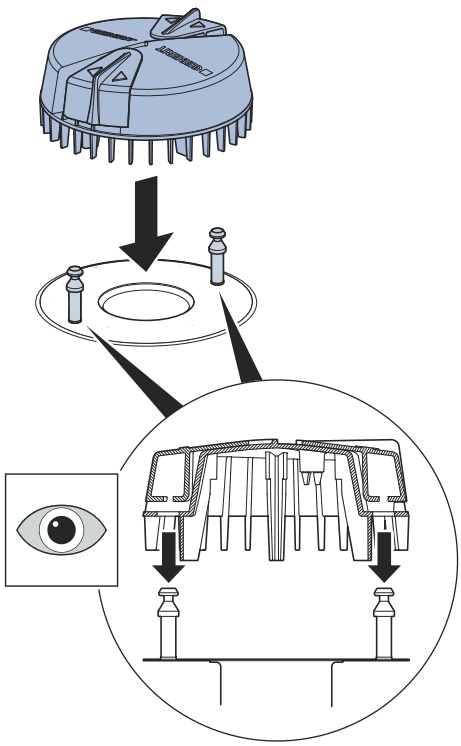
1 Open both rotary latching sliders and remove the outlet grating.



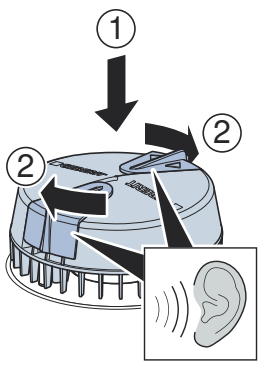
2 Clean the outlet grating and outlet area.



3 Place the outlet grating on the pins.

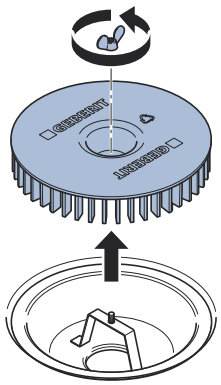


4 Mount the outlet grating and close both rotary latching sliders.

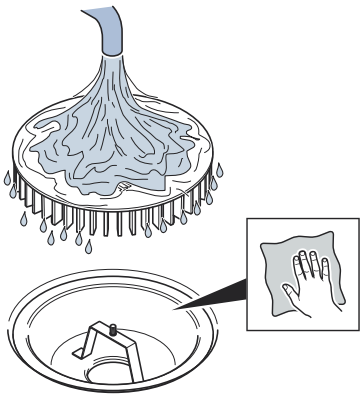


5.2.3 Cleaning the Geberit Pluvia 45 l, 60 l and 100 l outlet

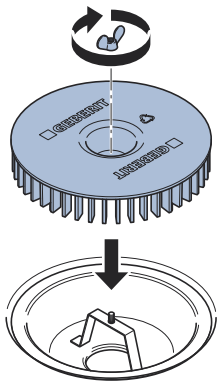
1 Remove the wing bolt.



2 Clean the outlet grating and outlet area.



3 Mount the outlet grating and fasten the wing bolt.



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Subject to change without notice. The information in this document contains general description of the technical options available, which do not always have to be present in the individual cases.

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