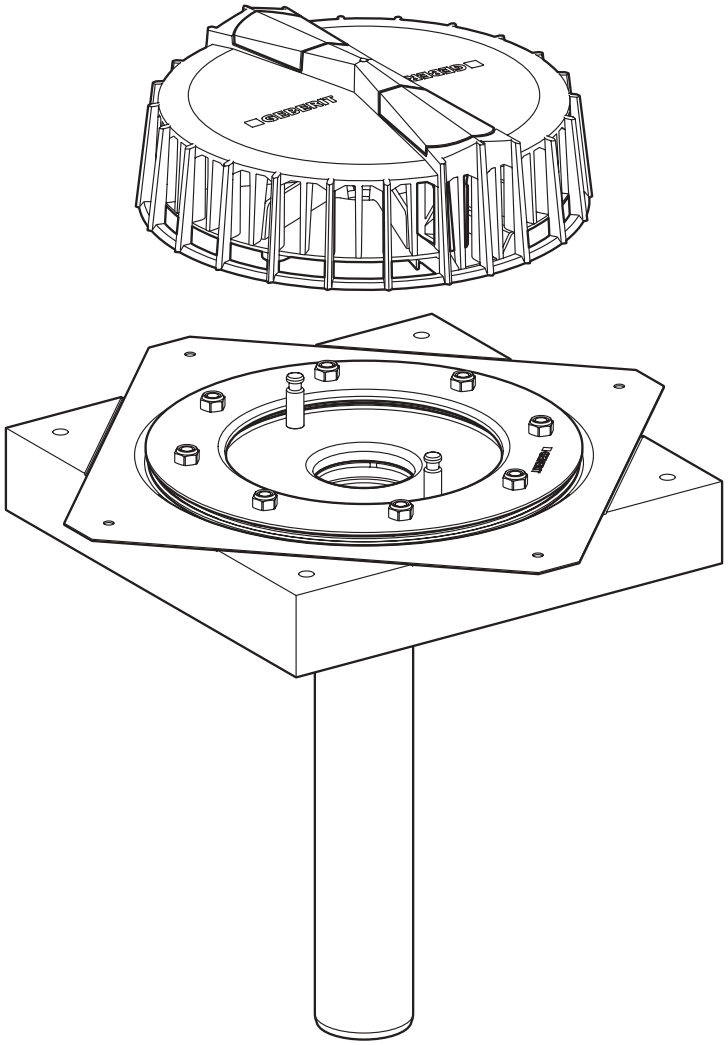
GEBERIT

PLANNING MANUAL

GEBERIT PLUVIA

VALID AS OF 1 JANUARY 2025



KNOW HOW INSTALLED

CONTENT

CHAPTER ONE

PRINCIPLES

1.1 OVERVIEW OF GEBERIT PLUVIA

Geberit Pluvia is a roof drainage system for flat roofs and gutters that functions as a completely filled syphonic roof drainage system.

Geberit Pluvia consists of the following system components:

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

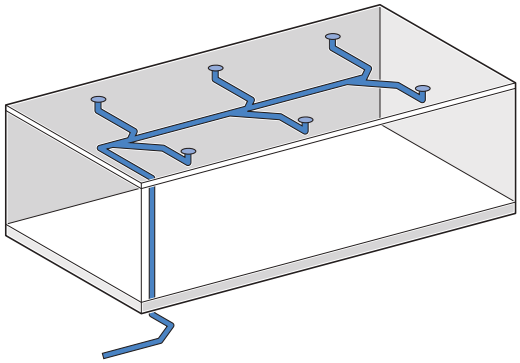
Geberit ProPlanner calculation software facilitates the hydraulic calculation and dimensioning of the Geberit Pluvia roof drainage system.

The calculation of the roof drainage system can be made in the same way directly in Autodesk® Revit®.

1.1.1 Advantages of Geberit Pluvia over a conventional roof drainage system

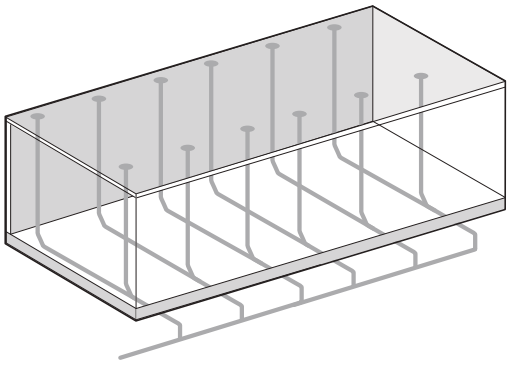
Due to the complete filling of the piping system, the Geberit Pluvia roof drainage has several advantages over conventional roof drainage:

Roof drainage with Geberit Pluvia



- Pipe laying without a slope
- Fewer discharge stacks and underground pipes
- Small pipe dimensions
- Pipes can be combined on the ceiling
- Fewer roof outlets due to the high drainage capacity per roof outlet

Conventional roof drainage system



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

1.1.2 Application range

Geberit Pluvia roof 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 1000 m^2, such as:

- factories
- storage halls
- shopping centres
- airports
- hotels
- sports centres

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

1.1.3 Functional principle of negative pressure in completely filled pipes

If the pressure in a specific volume, e.g. in a sealed receptacle, is below the ambient pressure, it is described as negative pressure.

Bernoulli's principle is the basis for a syphonic roof drainage system. Daniel Bernoulli discovered the relationship between the flow speed of a fluid and its pressure: the greater the flow speed of a liquid or gas, the lower the static pressure.

A pressure difference between the receptacle and outlet arises due to the flow speed of the closed water column in section h. This pressure difference leads to a negative pressure in the system.

The complete filling of the hose leads to the water being suctioned out of the receptacle due to the negative pressure.

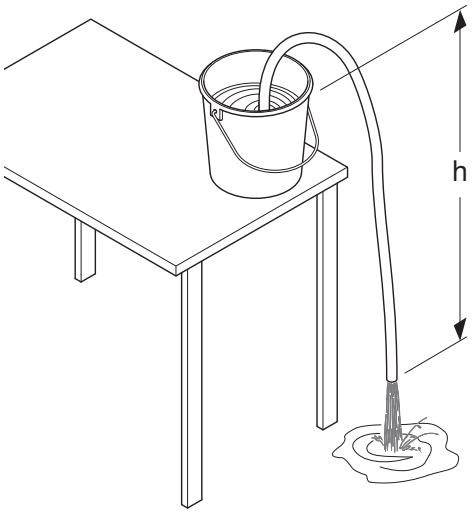


Figure 1: Functional principle of negative pressure

h Height of the water column

The suction effect due to the negative pressure is only achieved if no air enters the system.

In order to be able to use this effect technically in a piping system, it is necessary to ensure that the pipes are precisely dimensioned and completely filled.

1.1.4 Functional principle of Geberit Pluvia

The Geberit Pluvia roof drainage makes use of the physical properties of a water column. Special Geberit Pluvia roof outlets with function discs prevent the supply of air entering the piping system from a specific head of water. This leads to a rapid complete filling of the pipes and to the formation of negative pressure at the top end of the discharge stack. The results are a suction effect and a powerful discharge of precipitation. The energy for the negative pressure arises from the difference in height between the roof outlet and the transition to the conventional drainage.

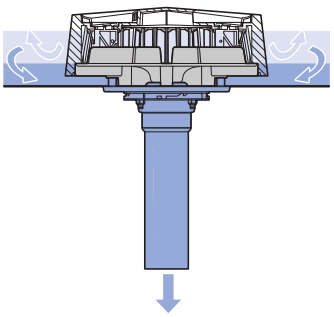


Figure 2: Functional principle of Geberit Pluvia

The correct dimensioning of the piping system as well as the structure and the correct positioning of the Geberit Pluvia roof outlets are decisive for the reliable functioning of Geberit Pluvia roof drainage.

Difference between Geberit Pluvia and a conventional roof drainage system

With 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).

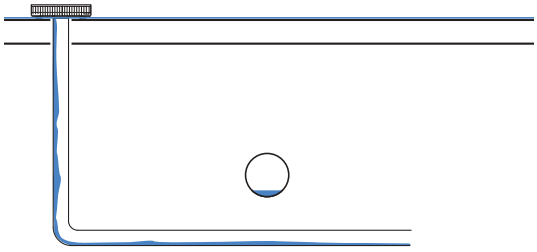


Figure 3: Conventional roof drainage system during light rain (partial filling)

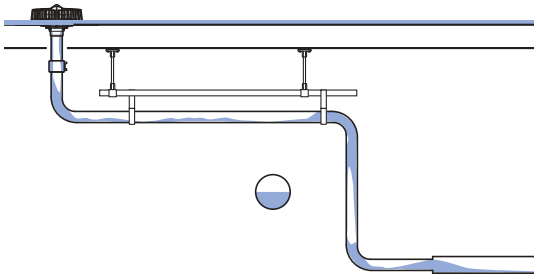


Figure 4: Geberit Pluvia with light rain (partial filling)

With heavy rain:

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

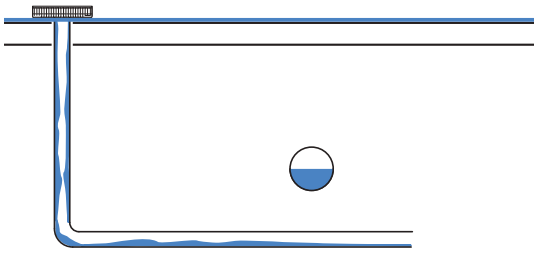


Figure 5: Conventional roof drainage system during heavy rain (partial filling)

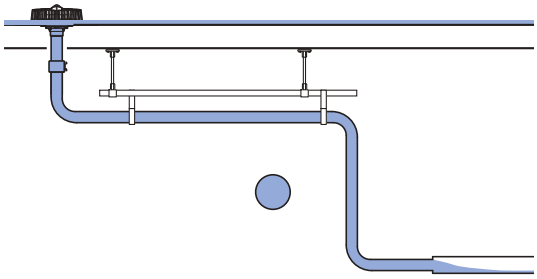


Figure 6: Geberit Pluvia with heavy rain (complete filling)

1.2 FLAT ROOF TYPES

Seamless roof sealing and a flat underlay as a support for the roof sealing are the main features of a flat roof, regardless of its design.

A sawtooth roof with valley gutter or a butterfly roof are also considered to be flat roofs if they have these features.

Flat roofs mainly differ according to the following criteria:

- physical building structure:
  - insulated roof
  - cold roof
  - inverted roof
- type of use:
  - suitable for promenade decks
  - suitable for parking decks
  - planted (greened)
  - not used (only weight-bearing for maintenance)

Flat roofs can be designed as a lightweight and solid roof.

A **lightweight roof** is a roof with an inherent weight of under 10 kg/m^2.

A **solid roof** is a roof whose supporting layer is made of a solid building material, such as concrete.

Lightweight and solid roofs are both available in the following versions:

- insulated
- uninsulated

1.2.1 Cold roof

A cold roof is a double-shell, ventilated roof.

There is a layer of air between the thermal insulation and roof sealing, which is connected to the outside air through precisely dimensioned ventilation openings on at least two sides of the roof. This ventilation takes care that the moisture diffusing through the ceiling is discharged out of the building. The thermal insulation therefore does not necessarily have to be protected by a vapour barrier on the room side, often a vapour retarder is sufficient.

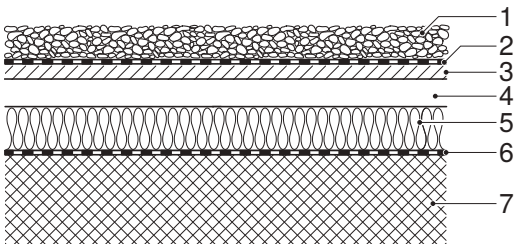


Figure 7: Layer structure on a cold roof

1 Layer of gravel
2 Roof foil
3 Underlay (e.g. timber formwork)
4 Ventilation level (layer of air)
5 Thermal insulation
6 Vapour barrier / vapour retarder
7 Supporting roof structure (e.g. concrete ceiling)

1.2.2 Insulated roof

An insulated roof is a single-shell, non-ventilated flat roof.

The roof sealing is applied directly to the thermal insulation. The thermal insulation is protected by a vapour barrier on the room side. Therefore, the moisture diffusing through the ceiling cannot penetrate into the insulation layer.

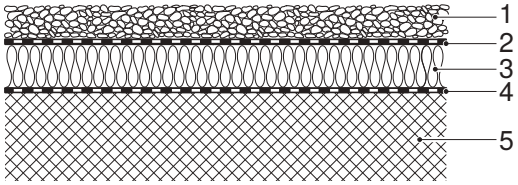


Figure 8: Layer structure on an insulated roof

1 Layer of gravel
2 Roof foil
3 Thermal insulation
4 Vapour barrier
5 Supporting roof structure (e.g. concrete ceiling)

1.2.3 Inverted roof

An inverted roof is a version of the non-ventilated insulated roof, in which the layer structure is designed in the opposite way to classic insulated roof constructions.

With an inverted roof, the roof sealing is applied directly to the supporting structure (e.g. reinforced concrete ceiling). The thermal insulation rests on the roof sealing. Due to the exposed weather conditions, only hydrophobic and rot resistant insulation materials are used for an inverted roof (e.g. extruded rigid polystyrene solid foam).

The insulation material is not sealed, but covered from above with fleece and usually weighed down with a loose layer of gravel. However, neither gravel nor fleece protect the insulation layer from moisture caused by rain or snow. They are only used to stabilise the insulation layer.

The advantage of an inverted roof is that the roof sealing is less exposed. It is protected from atmospheric influences as well as from mechanical damage. This increases its service life.

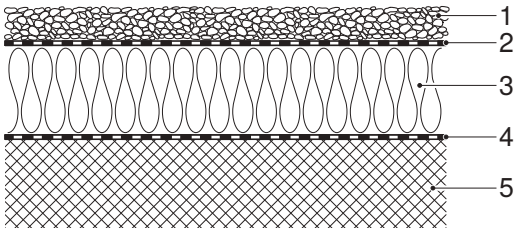


Figure 9: Layer structure on an inverted roof

1 Layer of gravel
2 Fleece
3 Thermal insulation
4 Roof sealing
5 Supporting roof structure (e.g. concrete ceiling)

1.2.4 Green roof

A green roof is characterised by a layer structure with the necessary vegetation substrate for planting.

Flat roofs of new buildings and refurbished old buildings are being increasingly greened. Both cold and insulated roofs and inverted roofs are suitable for green roofing, provided that the static requirements are met.

Green roofing always has an effect on the bearing capacity and statics of a flat roof.

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 properties.

The green roofing is divided into two groups from a drainage and vegetation point of view:

- extensive green roof
- intensive green roof

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 with a great ability for regeneration.

Extensive green roofs are designed without water retention.

Intensive green roof

Intensive green roofs are comparable to ground-based green spaces with regard to their possibilities of use and design variety.

Intensive green roofs are created using the following:

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

The plants used place varying demands on the layer structure and regular water and nutrient supply. They must be cared for regularly in line with these requirements.

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

Comparison of an extensive and intensive green roof

Green roofing essentially differs in the thickness of the layer structure and the plant growth height.

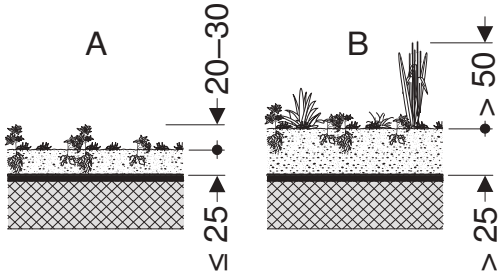


Figure 10: Different layer structure of the green roofing

A Extensive green roof
B Intensive green roof

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
- drainage layer
- a filter layer
- a vegetation layer

1.3 GEBERIT PLUVIA ROOF OUTLETS

1.3.1 Overview

The Geberit Pluvia roof outlets are specially designed outlets for different roof structures and sealing materials. They collect the rainwater that accumulates and, due to their structure, prevent air from flowing into the piping system with the rainwater.

With appropriate accessories and supplementary sets, Geberit Pluvia roof outlets with discharge rates of 9–100 l are suitable for the following roof structures:

- for flat roofs
  - solid roof
  - lightweight roof
- for gutters

1.3.2 Geberit Pluvia roof outlets 9 l and 12 l

The Geberit Pluvia roof outlets 9 l and 12 l are available in the following versions:

for flat roofs:

- with contact sheet for bitumen roof foil
- with fastening flange for roof foils

for gutters:

- with fastening flange
- with contact seam

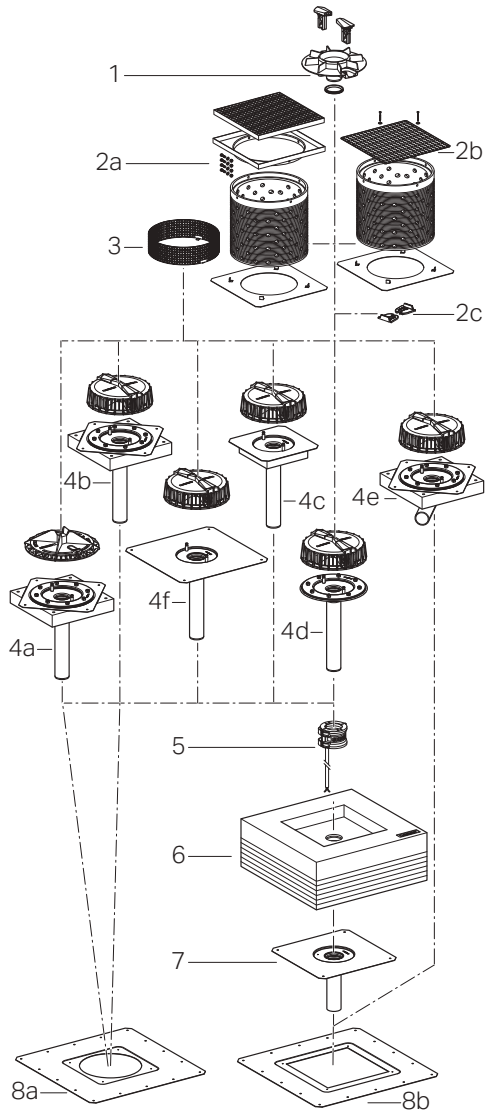


Figure 11: Overview of all usable components of the prefabricated Geberit Pluvia roof outlets

Item no.	Base modules	Accessories
1		Emergency overflow
2a		Supplementary set, suitable for parking decks
2b		Supplementary set, suitable for promenade decks
2c		Mounting clips for function disc
3		Gravel ring, fine, for gravel fraction 8–16 mm
4a	Roof outlet with contact sheet and fastening flange for roof foils, outlet grating made of aluminium cast	
4b	Roof outlet with fastening flange for roof foils	
4c	Roof outlet with contact sheet for gutters	
4d	Roof outlet with flange for gutters	
4e	Roof outlet with fastening flange for roof foils	
4f	Roof outlet with contact sheet	
5		Heating element 230 V / 8 W
6		Thermal insulation for inverted or insulated roof
7		Vapour barrier connection
8a		Installation sheet for roof outlet with fastening flange, for roof foils
8b		Installation sheet

1.3.3 Geberit Pluvia roof outlet 19 l

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

for gutters:
- with contact seam

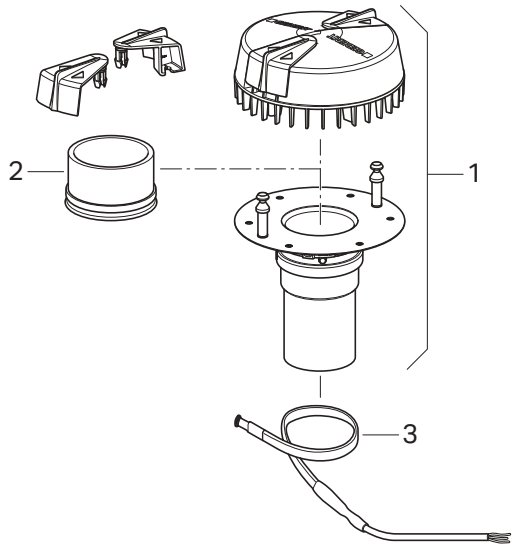


Figure 12: Components of the Geberit Pluvia roof outlet 19 l

Item no.	Base module	Accessories
1	Roof outlet for gutters	
2		Emergency overflow
3		Heating strip 230 V / 11.2 W

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

1.3.4 Geberit Pluvia 25 l roof outlets

The Geberit Pluvia roof outlets 25 l are available in the following versions:

for a flat roof:
- with fastening flange for roof foils
- with contact sheet for bitumen roof foils

for gutters:
- with contact sheet
- with flange

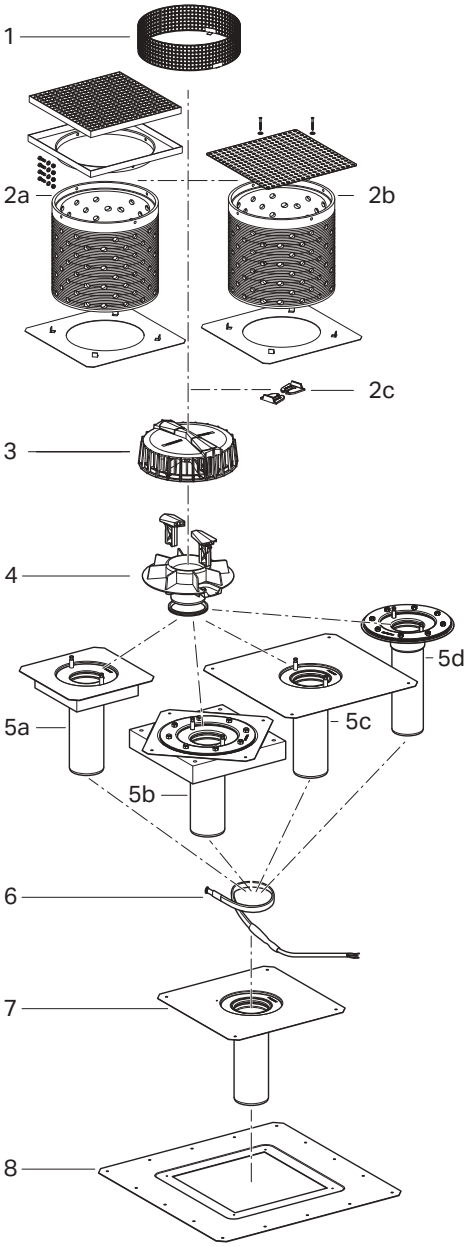


Figure 13: Components of the Geberit Pluvia roof outlets 25 l

Item no.	Base modules	Accessories
1		Gravel ring, fine, for gravel size 8–16 mm
2a		Supplementary set, suitable for parking decks
2b		Supplementary set, suitable for promenade decks
2c		Mounting clips for function disc
3	Outlet grating with integrated function disc	
4		Emergency overflow
5a	Roof outlet with contact sheet for gutters	
5b	Roof outlet with fastening flange for roof foils	
5c	Roof outlet with bitumen contact sheet	
5d	Roof outlet with flange for gutters	
6		Heating strip 230 V / 11.2 W
7		Vapour barrier connection
8		Installation sheet

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

1.3.5 Geberit Pluvia roof outlets 45 l / 60 l / 100 l

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

- with contact seam for gutters
- with contact sheet for bitumen roof foils

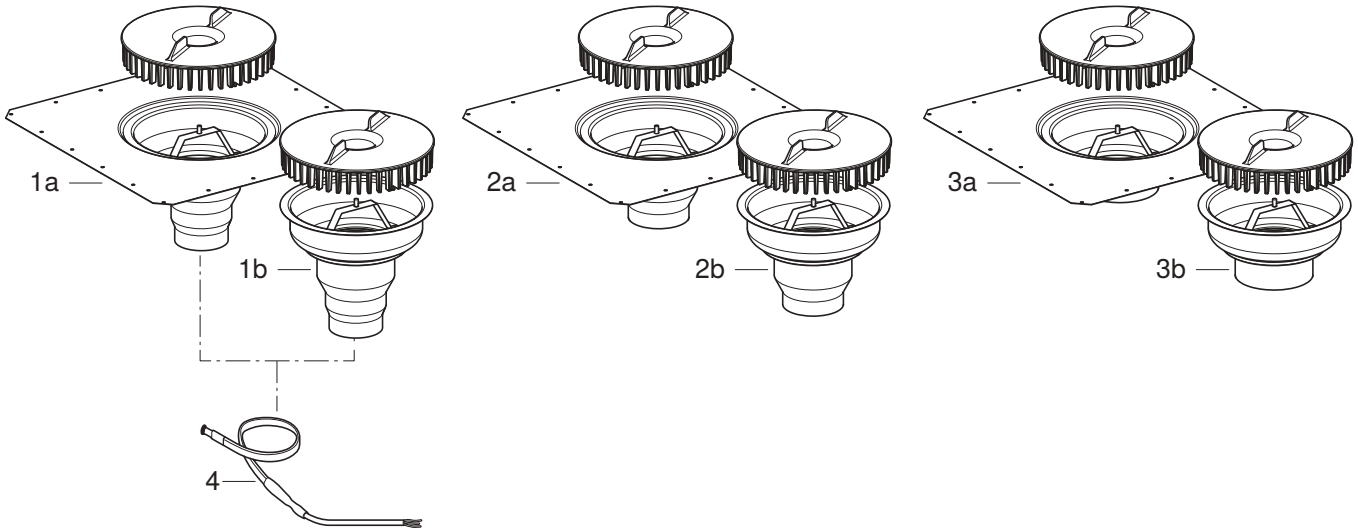


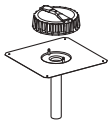
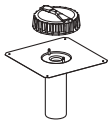
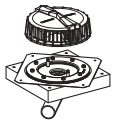
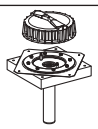
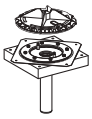
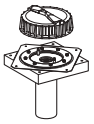
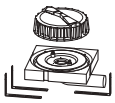
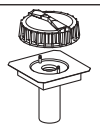
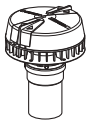
Figure 14: Components of the Geberit Pluvia roof outlets 45 l / 60 l / 100 l

Item no.	Base modules	Accessories
1a	Roof outlet 45 l with bitumen contact sheet	
1b	Roof outlet 45 l for gutters	
2a	Roof outlet 60 l with bitumen contact sheet	
2b	Roof outlet 60 l for gutters	
3a	Roof outlet 100 l with bitumen contact sheet	
3b	Roof outlet 100 l for gutters	
4		Heating strip 230 V / 11.2 W (only possible for 45 l)

Geberit Pluvia roof outlets 45 l / 60 l / 100 l 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 roof outlets in a mixed installation.

1.3.6 Application overview

Geberit Pluvia roof outlets can be used as follows:

Installation type	Water-bearing layer	Connection type	Maximum discharge rate				
			9 l	12 l	19 l	25 l	45 l[1)] 60 l[1)] 100 l[1)]
Lightweight roof / solid roof	Bitumen	Contact sheet	–	 359.108.00.1	–	 359.099.00.1	 359.345.00.1 359.346.00.1 359.347.00.1
	Roof foil	Flange	 359.117.00.1	 359.105.00.1  359.106.00.1	–	 359.098.00.1	–
	Roof foil or bitumen	Contact foil	 359.118.00.1 + 359.119.00.1	–	–	–	–
Gutter		Contact sheet	–	 359.111.00.1	–	 359.100.00.1	–
		Contact seam	–	–	 359.034.00.1	–	 359.342.00.1 359.343.00.1 359.344.00.1
		Flange	–	 359.112.00.1	–	 359.007.00.1	–

– Not available

1) Only for emergency overflow for certain roof outlets

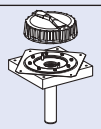
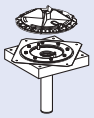
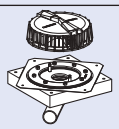
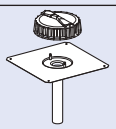
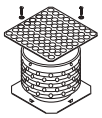
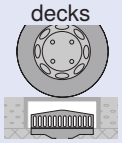
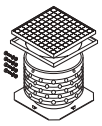
1.3.7 Applications for Geberit Pluvia roof outlets

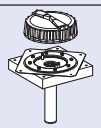
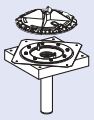
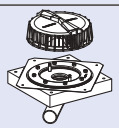
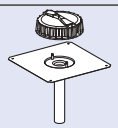
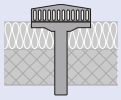
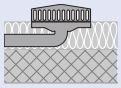
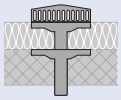
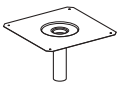
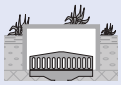
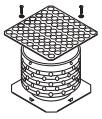
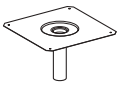
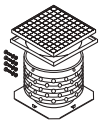
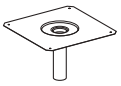
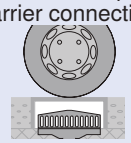
There are suitable Geberit Pluvia roof outlets for different roof constructions, such as insulated or uninsulated roofs, inverted roofs and gutter constructions.

A decision must be taken in advance as to whether the roof is to be sealed using foil or bitumen in order to choose the appropriate Geberit Pluvia roof outlet and suitable accessories.

Geberit Pluvia roof outlets 9 l and 12 l, prefabricated

In a solid roof

Solid roof		With fastening flange for roof foil			With contact sheet for bitumen	Accessories required
		 359.105.00.1	 359.106.00.1	 359.117.00.1	 359.108.00.1	
Uninsulated	Vertical outlet 	✓	✓	×	✓	–
	Outlet in structure 	×	×	✓	×	–
	Suitable for promenade decks 	✓	×	×	✓	 359.504.00.1[1)]
	Suitable for parking decks 	✓	×	×	✓	 359.635.00.1[1)]

Solid roof		With fastening flange for roof foil			With contact sheet for bitumen	Accessories required
		 359.105.00.1	 359.106.00.1	 359.117.00.1	 359.108.00.1	
Insulated	Vertical outlet 	✓	✓	×	✓	–
	Outlet in insulation 	×	×	✓	×	–
	With vapour barrier connection 	✓	✓	×	✓	 359.113.00.1
	Extensive green roof, with vapour barrier connection 	✓	×	×	✓	 359.504.00.1[1] +  359.113.00.1
	Suitable for promenade decks, with vapour barrier connection 	✓	×	×	✓	
	Intensive green roof, with vapour barrier connection 	✓	×	×	✓	 359.635.00.1[1] +  359.113.00.1
	Suitable for parking decks, with vapour barrier connection 	✓	×	×	✓	

2 / 2

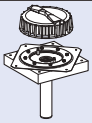
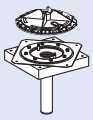
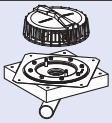
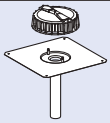
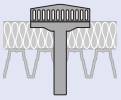
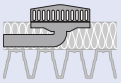
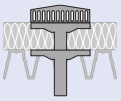
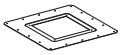
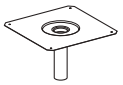
✓ Suitable

× Not suitable

– Not available

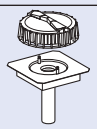
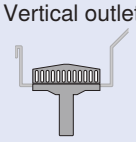
1) Suitable for Geberit Pluvia set of mounting clips for function disc (art. no. 358.060.00.1)

In a lightweight roof

Lightweight roof		With fastening flange for roof foil			With contact sheet for bitumen	Accessories required
		 359.105.00.1	 359.106.00.1	 359.117.00.1	 359.108.00.1	
Uninsulated	Uninsulated, vertical outlet 	✓	✓	×	✓	 359.006.25.1[1)]
Insulated	Insulated, vertical outlet 	✓	✓	×	✓	–
	Outlet in insulation 	×	×	✓	×	–
	With vapour barrier connection 	✓	✓	×	✓	 359.122.00.1 +  359.113.00.1

✓ Suitable
× Not suitable
– Not available
1) Only suitable for Geberit Pluvia roof outlets with fastening flange

In a gutter

Gutter	With contact sheet	With flange
	 359.111.00.1	 359.112.00.1
Vertical outlet 	✓	✓

✓ Suitable

Geberit Pluvia roof outlets 19 l and 25 l

In a solid roof

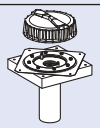
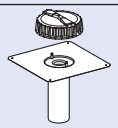
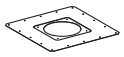
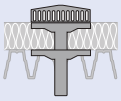
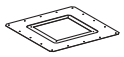
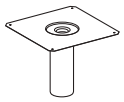
Solid roof		With fastening flange for roof foil 359.098.00.1	With contact sheet for bitumen 359.099.00.1	Accessories required
Uninsulated	Vertical outlet 	✓	✓	–
	Suitable for promenade decks 	✓	✓	 359.504.00.1[1)]
	Suitable for parking decks 	✓	✓	 359.635.00.1[1)]
Insulated	With vapour barrier connection 	✓	✓	 359.102.00.1
	Extensively greened, with vapour barrier connection 	✓	✓	 359.504.00.1[1)] + 359.102.00.1
	Suitable for promenade decks, with vapour barrier connection 	✓	✓	
	Intensively greened, with vapour barrier connection 	✓	✓	 359.635.00.1[1)] + 359.102.00.1
	Suitable for parking decks, with vapour barrier connection 	✓	✓	

✓ Suitable

– Not available

1) Suitable for Geberit Pluvia set of mounting clips for function disc (art. no. 358.060.00.1)

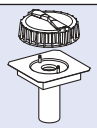
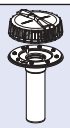
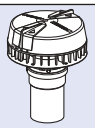
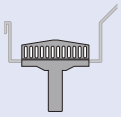
In a lightweight roof

Lightweight roof		With fastening flange for roof foil  **359.098.00.1**	With contact sheet for bitumen  **359.099.00.1**	Accessories required
Uninsulated	Vertical outlet 	✓	✓	 359.006.25.1[1)]
Uninsulated	With vapour barrier connection 	✓	✓	 359.122.00.1 +  359.102.00.1

✓ Suitable

1) Only suitable for Geberit Pluvia roof outlets with fastening flange

In a gutter

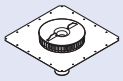
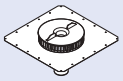
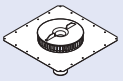
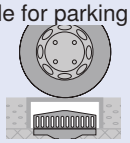
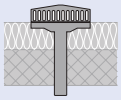
Gutter	 **359.100.00.1**	 **359.007.00.1**	 **359.034.00.1**	Accessories
	✓	✓	✓	–

✓ Suitable

– Not available

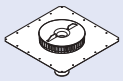
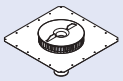
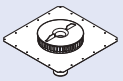
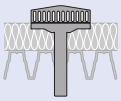
Geberit Pluvia roof outlets 45 l / 60 l / 100 l

In a solid roof

Solid roof		With contact sheet for bitumen		
		45 l	60 l	100 l
		 359.345.00.1	 359.346.00.1	 359.347.00.1
Uninsulated	Vertical outlet 	✓	✓	✓
Uninsulated	Suitable for promenade decks 	✓ + Duct construction	✓ + Duct construction	✓ + Duct construction
Uninsulated	Suitable for parking decks 	✓ + Duct construction	✓ + Duct construction	✓ + Duct construction
Insulated	Vertical outlet 	✓	✓	✓

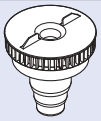
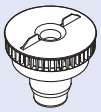
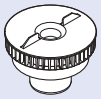
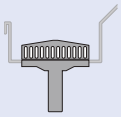
✓ Suitable

In a lightweight roof

Lightweight roof		With contact sheet for bitumen		
		45 l	60 l	100 l
		 359.345.00.1	 359.346.00.1	 359.347.00.1
Uninsulated	Vertical outlet 	✓	✓	✓
Insulated	Vertical outlet 	✓	✓	✓

✓ Suitable

In a gutter

Gutter	With contact seam for gutter		
	45 l	60 l	100 l
	 359.342.00.1	 359.343.00.1	 359.344.00.1
Vertical outlet 	✓	✓	✓

✓ Suitable

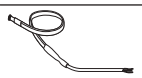
Accessories

Geberit Pluvia roof outlets can be equipped with optional accessories such as:

- heating elements
- mounting clips

Accessories protected from frost

In areas with an increased danger of frost, Geberit Pluvia roof outlets with the following accessories can be protected from frost:

	Accessories		
Geberit Pluvia roof outlets 9–12 l	Geberit Pluvia heating element 230 V / 8 W		359.971.00.1
Geberit Pluvia roof outlets 19–25 l / 45 l	Geberit heating strip 230 V / 11.2 W		359.042.00.1
Geberit Pluvia roof outlets 60 l / 100 l	Third-party products[1)]		–

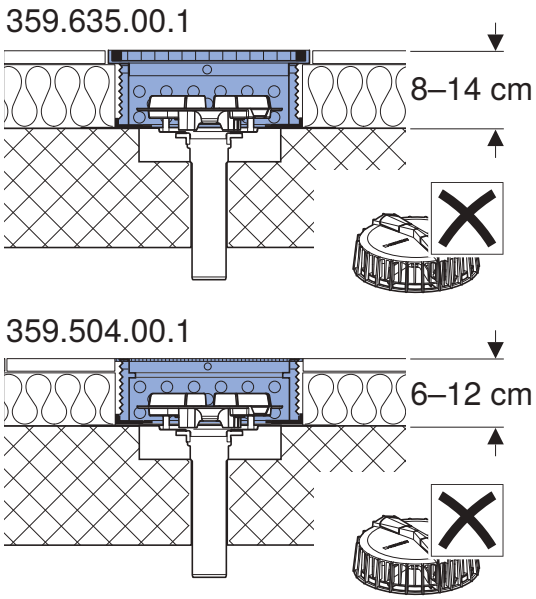
1) The Geberit heating strip 230 V / 11.2 W is too short for the dimensions of these straight connectors

Mounting clips for function disc

The function disc can be fixed with the Geberit Pluvia mounting clips for function disc on low-height roof structures suitable for promenade or parking decks where the mounting of an outlet grating is not permitted.

	Accessories		
Geberit Pluvia roof outlets 9 l / 12 l / 25 l	Geberit Pluvia set of mounting clips for function disc		358.060.00.1

These can only be used with the Geberit Pluvia supplementary sets suitable for promenade or parking decks.



1.4 GEBERIT PLUVIA EMERGENCY OVERFLOWS

1.4.1 Overview of Geberit Pluvia emergency overflows

Geberit Pluvia emergency overflows consist of:

- Geberit Pluvia roof outlet
- Geberit Pluvia emergency overflow set

The roof outlet is combined with the corresponding emergency overflow.

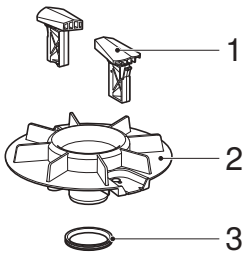
The emergency overflow is available in 4 versions:

- Geberit Pluvia emergency overflow for roof outlets (9 l) 12 l
- Geberit Pluvia emergency overflow for roof outlet 19 l
- Geberit Pluvia emergency overflows for roof outlet 25 l
- Geberit Pluvia emergency overflow for roof outlets 45 l / 60 l / 100 l

1.4.2 Structure of Geberit Pluvia emergency overflows

Emergency overflow 12 l

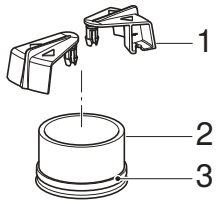
The Geberit Pluvia emergency overflow for roof outlet 12 l consists of the following components:



1 Grey rotating lock bars for visual marking
2 Overflow section
3 Lip seal

Emergency overflow 19 l

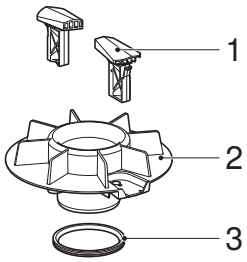
The Geberit Pluvia emergency overflow for roof outlet 19 l consists of the following components:



1 Grey rotary latching sliders for visual marking
2 Overflow section
3 Lip seal

Emergency overflow 25 l

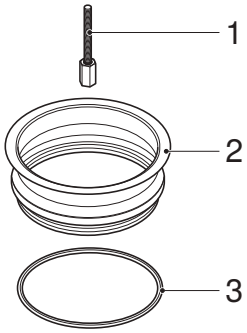
The Geberit Pluvia emergency overflow for roof outlet 25 l consists of the following components:



1 Grey rotating lock bars for visual marking
2 Overflow section
3 Lip seal

Emergency overflow 45 l / 60 l / 100 l

The Geberit Pluvia emergency overflow for roof outlet 45 l / 60 l / 100 l consists of the following components:



1 Extension screw
2 Overflow section
3 Round cord ring made of EPDM

1.4.3 Function of Geberit Pluvia emergency overflows

Function of emergency drainage

The emergency drainage has the task of discharging rainwater when the rainwater outflow exceeds the drainage capacity of the existing roof drainage system.

Further reasons for creating emergency overflows:

- dimensions of the sewage system too small
- blockage of the sewage system
- serious contamination of the roof outlets (e.g. from leaves)
- structural design of trapezoidal roofs too weak

Emergency overflow 12 l

The water is transported away through the Geberit Pluvia roof outlet 12 l to a head of water of max. 40 mm through the roof drainage system. When the head of water exceeds 55 mm (overflow height), the emergency overflow 12 l also goes into action in the emergency overflow system.

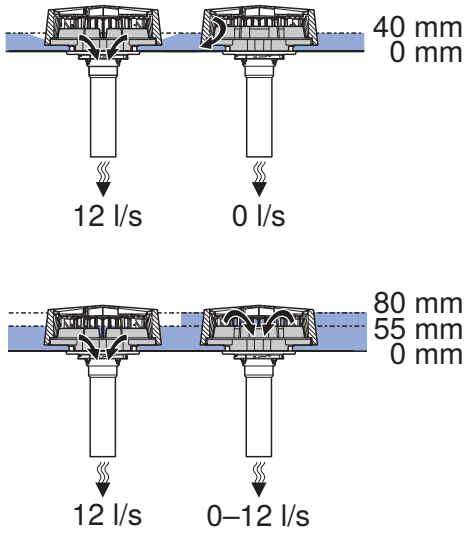


Figure 15: Functional principle of the Geberit Pluvia emergency overflow 12 l

Head of water of emergency overflow	25 mm
Overflow height of emergency overflow	55 mm
Total head of water	80 mm
Maximum output	24 l/s

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

Emergency overflow 19 l

The water is transported away through the Geberit Pluvia roof outlet 19 l to a head of water of max. 55 mm through the roof drainage system. When the head of water exceeds 55 mm (overflow height), the emergency overflow 19 l also goes into action in the emergency overflow system.

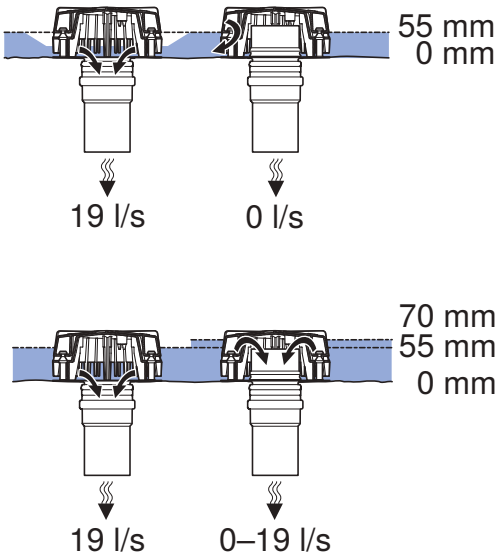


Figure 16: Functional principle of the Geberit Pluvia emergency overflow 19 l

Head of water of emergency overflow	15 mm
Overflow height of emergency overflow	55 mm
Total head of water	70 mm
Maximum output	38 l/s

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

Emergency overflow 25 l

The water is transported away through the Geberit Pluvia roof outlet 25 l to a head of water of max. 50 mm through the roof drainage system. When the head of water exceeds 65 mm (overflow height), the emergency overflow 25 l also goes into action in the emergency overflow system.

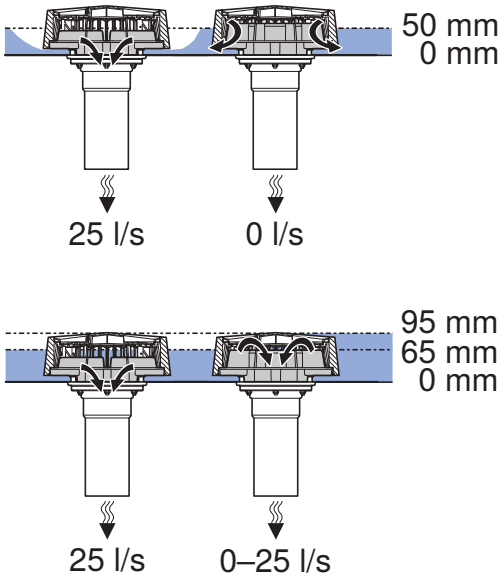


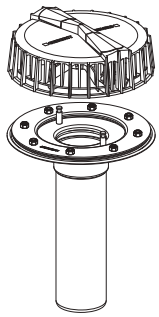
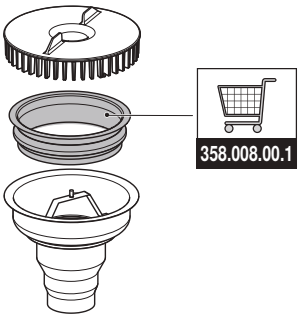
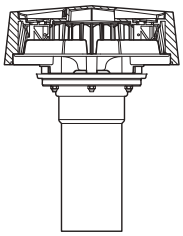
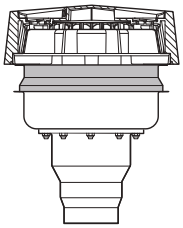
Figure 17: Functional principle of the Geberit Pluvia emergency overflow 25 l

Head of water of emergency overflow	30 mm
Overflow height of emergency overflow	65 mm
Total head of water	95 mm
Maximum output	50 l/s

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

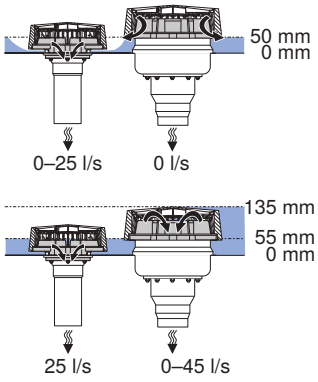
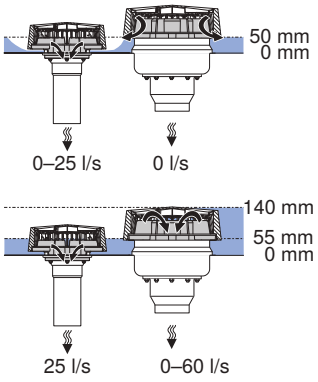
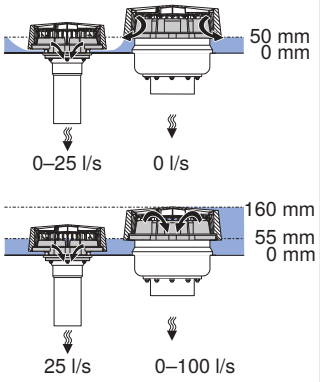
Emergency overflow 45 l / 60 l / 100 l for primary system ≤ 25 l/s

For a primary system ≤ 25 l/s, a Geberit emergency overflow is installed in each of the Geberit Pluvia roof outlets 45 l / 60 l / 100 l of the emergency overflow system.

Primary system ≤ 25 l/s	Emergency overflow 45 l / 60 l / 100 l
	
	

The water is transported away through the Geberit Pluvia roof outlet 25 l to a head of water of max. 50 mm through the roof drainage system. When the head of water exceeds 55 mm (overflow height), the emergency overflow also goes into action in the emergency overflow system.

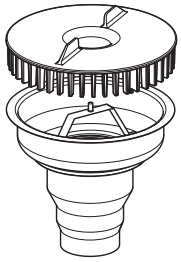
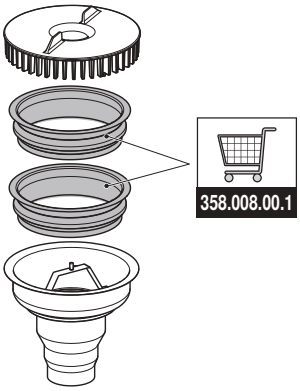
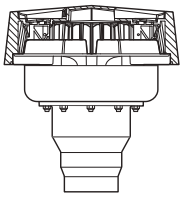
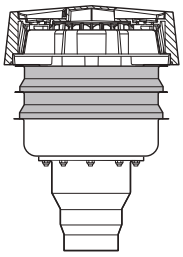
Table 1: Functional principle of the emergency overflow 45 l / 60 l / 100 l for a Geberit Pluvia primary system 25 l/s

Roof outlet	45 l	60 l	100 l
			
Head of water of emergency overflow	80 mm	85 mm	105 mm
Overflow height of emergency overflow	55 mm	55 mm	55 mm
Total head of water	135 mm	140 mm	160 mm
Maximum output	70 l/s	85 l/s	125 l/s

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

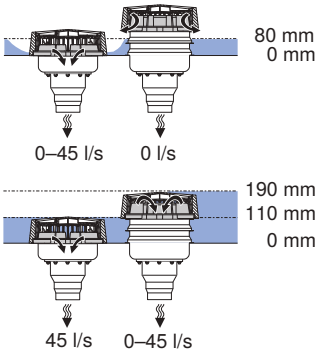
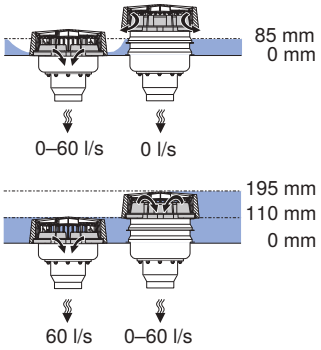
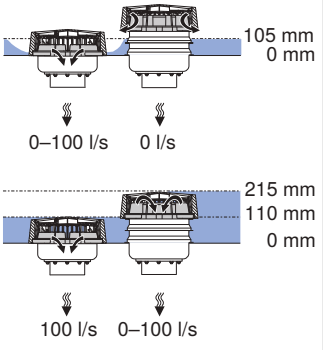
Emergency overflow 45 l / 60 l / 100 l for primary system > 25 l/s

For a primary system > 25 l/s, two Geberit emergency overflows are installed in each of the Geberit Pluvia roof outlets 45 l / 60 l / 100 l of the emergency overflow system.

Primary system > 25 l/s	Emergency overflow 45 l / 60 l / 100 l
	
	

The water is transported away through the Geberit Pluvia roof outlets 45 l / 60 l / 100 l to a head of water of max. 80 mm / 85 mm / 105 mm through the roof drainage system. When the head of water exceeds 110 mm (overflow height), the emergency overflow also goes into action in the emergency overflow system.

Table 2: Functional principle of the emergency overflow 45 l / 60 l / 100 l for a Geberit Pluvia primary system > 25 l/s

Roof outlet	45 l	60 l	100 l
			
Head of water of emergency overflow	80 mm	85 mm	105 mm
Overflow height of emergency overflow	110 mm	110 mm	110 mm
Total head of water	190 mm	195 mm	215 mm
Maximum output	90 l/s	120 l/s	200 l/s

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

1.5 GEBERIT HDPE PIPE SYSTEM

1.5.1 Overview of Geberit HDPE pipe system

The Geberit HDPE piping system must be used for the design of Geberit Pluvia installations.

Geberit HDPE pipes and fittings are made of polyethylene, which has numerous advantages over other materials. The assortment is characterised by its low weight, high resistance to breaks and tearing as well as its high temperature resistance and practice-oriented workability.

The product material characteristics of Geberit HDPE make it possible to prefabricate the components of the piping system so that it can be mounted on site. In this way, sections can be prefabricated in a safe, clean environment. The prefabrication makes it possible to mount Geberit Pluvia safely and easily.

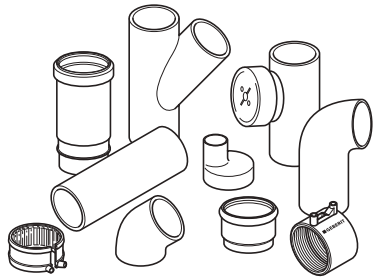


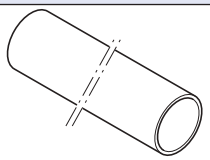
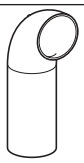
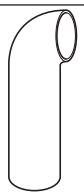
Figure 18: Geberit HDPE assortment

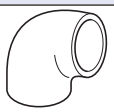
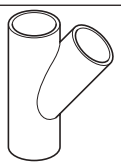
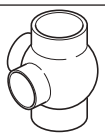
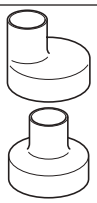
1.5.2 Geberit HDPE system components for Geberit Pluvia

The Geberit HDPE piping system consists of:

- pipes d40–315
- fittings
- connections (electrofusion sleeve couplings, electrofusion couplings with integrated thermal fuses)
- adapters for other piping systems

Table 3: 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° with large leg		✓	Only as connection bend on the roof outlet
Bend 90° with narrow radius		✕	

		Suitable for Geberit Pluvia	
Connection bend 88.5°		✕	
Branch fitting 45°		✓	
Branchball		✕	
Reducer		✓	For horizontal pipes, use the eccentric reducers. Install even with the upper side of the pipe.

2 / 2

✓ Approved without restrictions

✕ Not approved

Pipes and fittings from the Geberit Silent-db20 assortment must **not** be used.

1.5.3 Connection types for Geberit HDPE pipes and fittings

Different methods can be used to connect Geberit HDPE pipes and fittings:

- electrofusion welding
- butt welding
- mechanical connection

Using a welding joint to connect Geberit HDPE pipes and fittings ensures the absolute tightness of the connection.

The following table provides an overview of the connection types suitable for the Geberit Pluvia roof drainage system.

Table 4: Geberit HDPE connection types

Connection type	Design	Suitable for Geberit Pluvia
Welding joint	Butt welding	✓
	Electrofusion welding	✓
Flange connection	Flange connection	✓
Push-fit connection	Vertical expansion socket	✓
	Horizontal expansion socket	Only for pipe dimensions up to d110
	Ring seal socket	✕

✓ Suitable

✕ Not suitable

1.6 GEBERIT PLUVIA FASTENING SYSTEM

1.6.1 Fastening pipes

The pipe fixation carries the pipe. Pipe fastenings differ in the manner in which the thermally caused change in length is controlled. There is a fundamental difference between the “sliding installation” and “rigid installation” fastening types.

Fastening types

A distinction is made between the following fastening types:

- sliding installation
- rigid installation
  - conventional rigid installation (without Geberit Pluvia fastening system)
  - rigid installation with Geberit Pluvia fastening system

Expansion elements absorb the thermally induced change in length in a sliding installation. Expansion sockets or deflection legs are used as expansion elements.

The forces generated by the thermally induced change in length are transferred to the building in a rigid installation.

In a rigid installation with a Geberit Pluvia fastening system, the resulting forces are transferred to the Geberit support rails routed parallel to the pipe.

Geberit does not recommend the conventional rigid installation for fastening Geberit Pluvia roof drainage systems.

Anchor and sliding points

Pipes are fixed using anchor and sliding points with both rigid and sliding installations.

Anchor points are permanently mounted pipe fastenings for absorbing forces. They transfer the resulting forces to the building or to the support rail routed parallel to the pipe. They are mounted on the building structure or support rail with pipe brackets and struts.

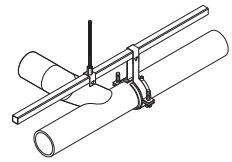
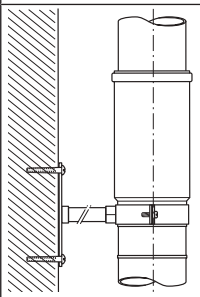
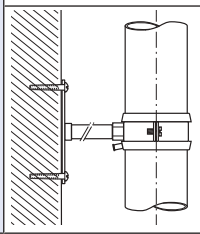
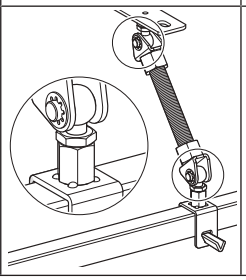
In order to ensure a secure fastening of the pipe, the calculated forces exerted on the pipe must be taken into account.

Sliding points are axially movable pipe fastenings for absorbing changes in length. They are created with pipe brackets on the pipe and a sufficiently strong pipe bracket fastening.

The creation of sliding points is the same for all fastening types.

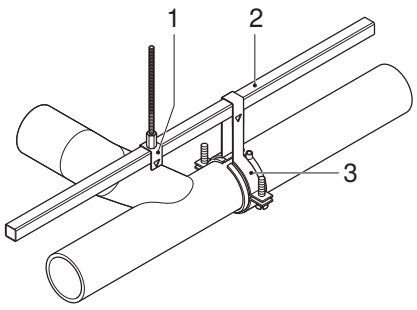
1.6.2 Overview of Geberit Pluvia fastening types

The fastening of roof drainage system components is an important part of a safe and properly functioning roof drainage system.

Fastening	Design	Characteristics
Horizontal fastening		The thermally caused change in length is absorbed by the fastening system and transferred to the support rail. The patented Geberit Pluvia fastening system was developed for mounting surface-mounted, horizontal rainwater pipes.
Vertical fastening		The thermally caused change in length is absorbed by the expansion socket. It must be controlled by the pipe fixation with anchor and sliding points.
		We advise against rigid installation since the thermally caused change in length is absorbed by the anchor point and is directly transferred to the building.
Supports		The supports provide additional support for the Geberit Pluvia fastening system.

1.6.3 Structure of Geberit Pluvia fastening system

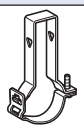
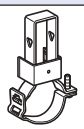
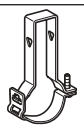
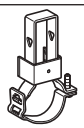
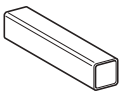
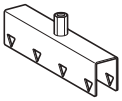
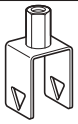
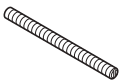
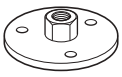
The Geberit Pluvia fastening system consists of the following main components:



1 Geberit Pluvia suspension
2 Geberit Pluvia support rail
3 Geberit Pluvia pipe bracket

The Geberit Pluvia fastening system can be used with or without a support shell.

Components of Geberit Pluvia fastening system d40–200

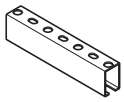
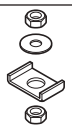
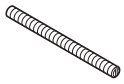
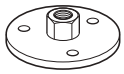
		Pipe diameter d [mm]		
		40	**50–160**	**200**
Fastening elements	Sliding point	 360.861.00.1	 36x.861.00.1	 370.861.26.1
	Anchor point	 360.861.00.1	 36x.861.00.1	 370.861.26.1
		 2 pieces 360.771.16.1	 36x.776.16.1	 370.776.16.1
	Support rail	 362.863.26.1		
	Connection element	 362.864.26.1		
	Suspension element	 362.862.26.1		
	Tension wedge	 362.865.26.1		
	Threaded rod	 362.834.26.1 (L = 200 cm) 362.836.00.1 (L = 50 cm) 362.843.26.1 (M10 connection socket)		
	Base plate	 362.837.26.11)		

1) This base plate is an example. Other base plates from the assortment may also be used.

The square profiles may only be used with pipe brackets for square profiles.

When fastening to the building, the required materials (screws, dowels, console brackets, etc.) must be clarified by the builders.

Components of Geberit Pluvia fastening system d250–315

		Pipe diameter d [mm]	
		d250	**d315**
Fastening elements	Sliding point	 371.862.00.1	 372.862.00.1
	Anchor point	 371.861.00.1	 372.861.00.1
	Support rail	 363.863.00.1	
	Connection element	 363.864.00.1	
	Suspension element	 363.862.00.1	
	Threaded rod	 362.834.26.1 (L = 200 cm) 362.836.00.1 (L = 50 cm) 362.843.26.1 (M10 connection socket)	
	Base plate	 362.837.26.11)	

1) This base plate is an example. Other base plates from the assortment may also be used.

The C-profiles may only be used with pipe brackets for C-profiles.

When fastening to the building, the required materials (screws, dowels, console brackets, etc.) must be clarified by the builders.

1.6.4 Features of the Geberit Pluvia fastening system

Changes in the pipe's length are absorbed within the system. The shearing forces that occur are transferred through the anchor brackets to the Geberit Pluvia support rails routed parallel to the pipe. Therefore, only the thermal expansion coefficient of steel must be taken into account.

The resulting change in length can be ignored. The system fastenings to the building structure must only absorb weight forces.

The Geberit Pluvia fastening system offers the following advantages:

- large span widths
- few fastenings
- premounting possible
- fastening to trapezoidal roofs possible
- no expansion socket required

1.6.5 Supports for the Geberit Pluvia fastening system

Geberit Pluvia support sets provide additional support for the Geberit Pluvia fastening system. They are used to prevent the fastening system from oscillating laterally and longitudinally.

Geberit Pluvia support sets are used in the following situations:

- horizontal pipes ≥ d90 on support rails
- for suspension elements on the ceiling
  - pipes d90–125: support rail suspended more than 60 cm
  - pipes d160–315: support rail suspended more than 30 cm

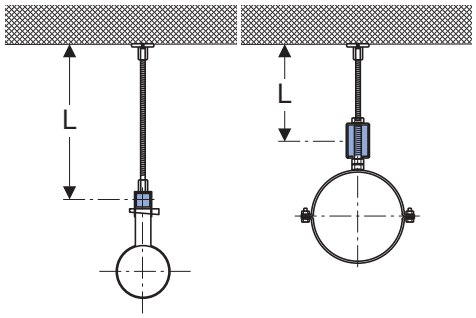


Figure 19: L = suspension elements on the ceiling

Geberit Pluvia support sets are used in new installations of Geberit Pluvia fastening systems. However, they can also be retrofitted in existing Geberit Pluvia fastening systems.

Depending on the pipe dimension, the following articles are required to attach the support sets:

	Pipe dimension	
	d90–200	**d250–315**
Geberit Pluvia support set	358.061.00.1	358.062.00.1
Geberit threaded pipe	362.852.26.1	

CHAPTER TWO

STANDARDS AND REGULATIONS

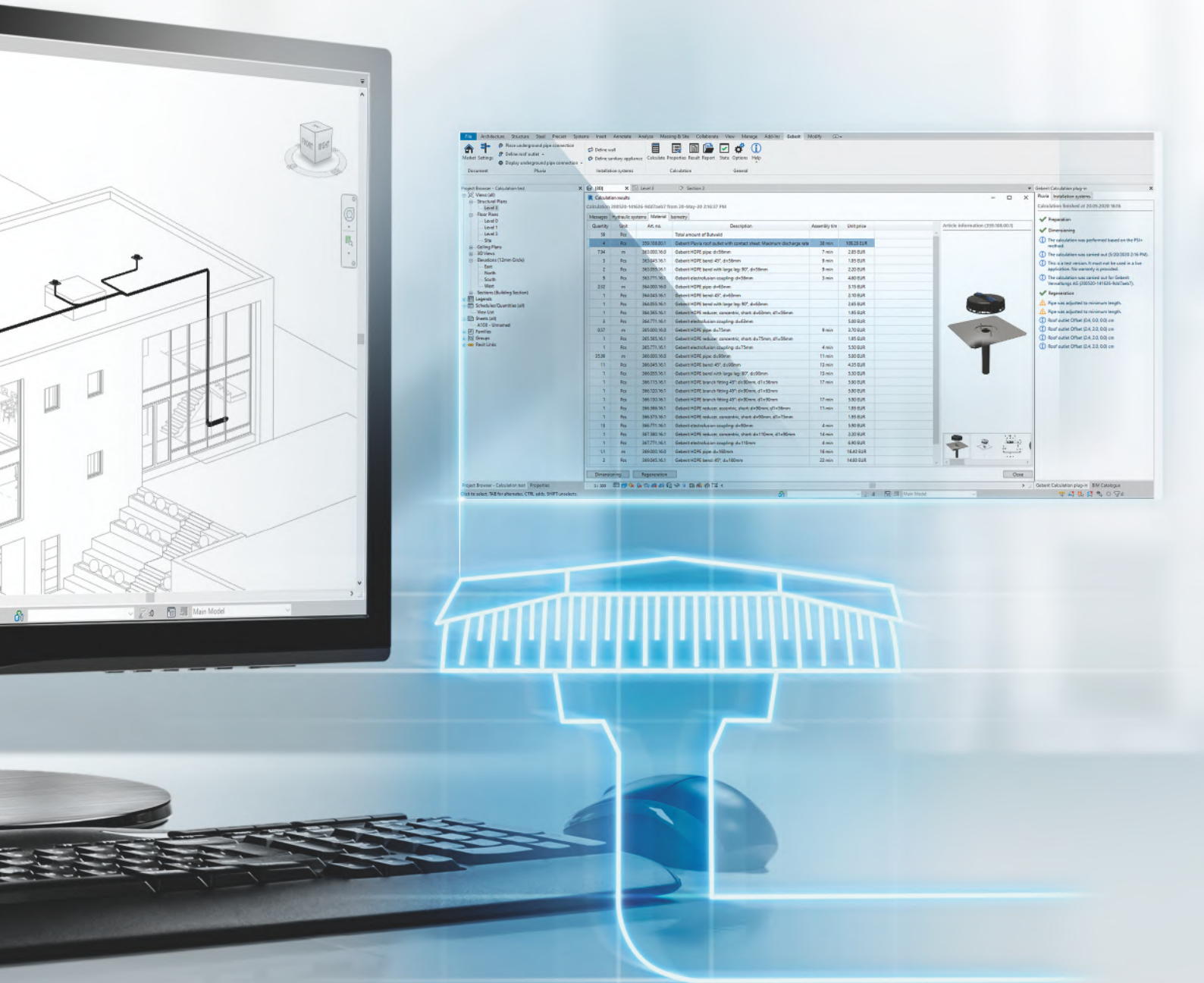
2.1 NORMATIVE REQUIREMENTS

The following documents contain information on roof and emergency drainage:

- DIN EN 12056-3:2001-01
- DIN 1986-100:2016-12
- BS 8490:2007-03-30
- SN 592000:2024
- Flat roof guidelines from the Zentralverband des Deutschen Dachdeckerhandwerks
- Avis Technique CSTB
- suissetec roof drainage directive
- Israeli standard
- SBI 273
- DS 432

CHAPTER THREE

SOLUTIONS



3.1 PLANNING OF THE GEBERIT PLUVIA ROOF DRAINAGE SYSTEM

The planning of a Geberit Pluvia roof drainage system is dependent on the roof structure.

The stability of a flat roof is influenced by factors such as increased roof loads, rainwater backpressure or snow loads. With lightweight roofs in particular, the bearing capacity must be checked. The construction engineer and architect must be informed of the expected static load of the building structure.

The components used in roof drainage must be coordinated with each other, suitable for the resulting positive or negative pressures and withstand the resulting loads.

The following basic rules must be observed:

- Only a welded piping system made of Geberit HDPE may be used. Fitted connections or clamping connectors (e.g. CV clamping connectors) are not admissible.
- Horizontal pipes must be laid without slopes.
- Foreign water, e.g. condensation, must not be channelled into the Geberit Pluvia roof drainage system.
- Do not drain more than 5,000 m^2 through a single discharge stack. For larger roof areas, additional discharge stacks must be planned accordingly.
- Roof areas with a height difference > 4 m must be drained separately.

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

3.2 ROOF TYPES FOR LARGE ROOF AREAS

The most important roof types for large roof areas are the flat roof and sawtooth roof with valley gutters.

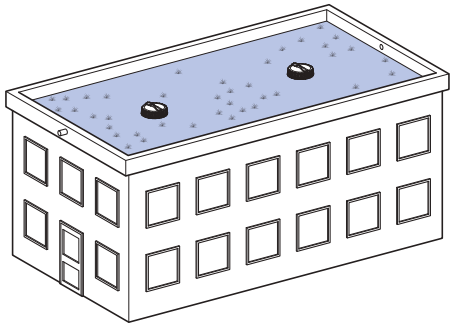


Figure 20: Flat roof

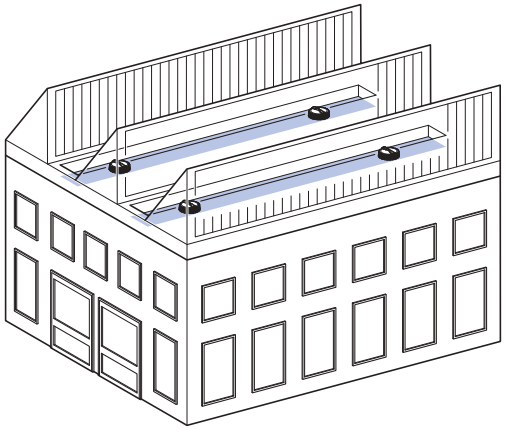


Figure 21: Sawtooth roof with valley gutter

The sawtooth roof is used primarily in buildings with large floor areas when the lighting of the room from the roof downwards also plays a role.

Flat roofs come in different designs depending on the structure and use, for example:

- insulated
- uninsulated
- insulated, with vapour barrier
- suitable for promenade or parking decks
- green roof

3.2.1 Planning and connection rules for roofs with vapour barrier

The vapour barrier must be planned and connected according to the country-specific regulations. Moisture from inside the building structure must not penetrate the overlying thermal insulation.

For roofs with a vapour barrier, a vapour barrier connection must be used in addition to the roof outlet.

3.2.2 Planning rules for green roofs

The following rules must be observed with the drainage of green roofing:

- The capacity factor must be specified by the green roofer.
- Green roofs with a Geberit Pluvia roof drainage system must always be equipped with a drainage layer.
- Filter mats must be used to prevent contamination of the roof outlets due to the presence of seepage and surface water.
- In order to exclude scaling and caking in roof outlets and pipes, the surfaces must be executed in such a way that only small amounts of carbonate can be released.
- Roof outlets must be freely accessible for maintenance work after installing green roofing using inspection chambers with removable covers.
- A 50 cm wide zone must be kept free from vegetation around the roof outlet (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.

3.2.3 Planning rules for gutters

It is generally possible to use the Geberit Pluvia roof drainage system for draining gutters. However, there are special installation and planning requirements:

- Valley gutters and the hydraulic certification are assessed according to the country-specific standards by the responsible sanitary engineers, structural engineers or architects.
- Geberit Pluvia roof outlets must only be used in square gutters and without transverse slopes.
- Roof outlets must be distributed as evenly as possible.
- The maximum distance between 2 roof outlets must not exceed 20 m.
- For valley gutters, at least 2 roof outlets and one emergency overflow must be provided.
- Gutters and roof areas must not be drained in a common piping system.
- The connecting material of the roof outlets must be selected so that no corrosive influences occur.
- You need to check whether a trace heater is required on-site. The trace heater must be modified in accordance with country-specific circumstances.

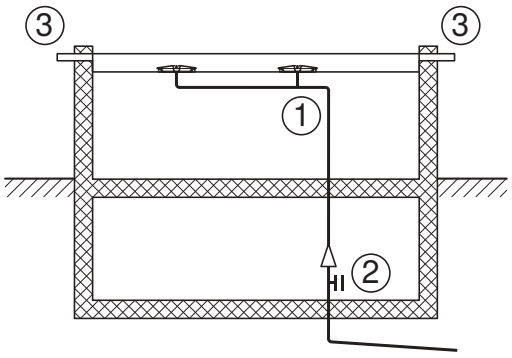


Figure 22: Roof outlets and pipe layout with valley gutters

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

3.2.4 Protection from caking on roofs suitable for promenade or parking decks

Roofs suitable for promenade and parking decks are protected by flagstones. These should be plastic-bonded in order to protect Geberit Pluvia roof outlets from caking and scaling.

When using tiles containing cement, it is important to create a raised gravel bed measuring at least 1.30 m x 1.30 m around the Geberit Pluvia roof outlet in order to filter the carbonate washed out of the cement.

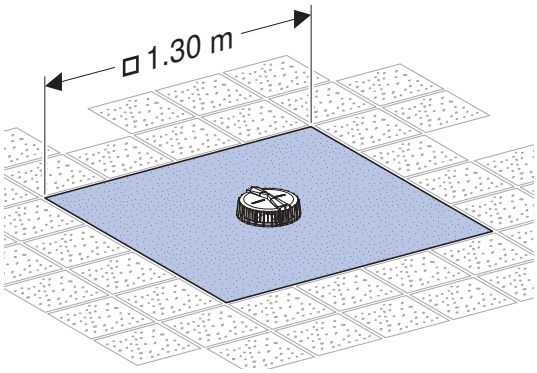


Figure 23: Gravel bed (gravel fraction = 16–32 mm)

3.3 ARRANGING THE GEBERIT PLUVIA ROOF OUTLETS

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

- Roof outlets must be distributed as evenly as possible and arranged at the lowest point of the roof area.
- Roof outlets must be arranged at a maximum distance of 20 m.
- Roof outlets must be arranged at a distance of at least 0.3 m (maximum 10 m) away from walls, parapets etc.
- At least 2 roof outlets must be provided per roof area.
- Roof areas with different peak capacity factors must not be discharged into a common discharge stack.

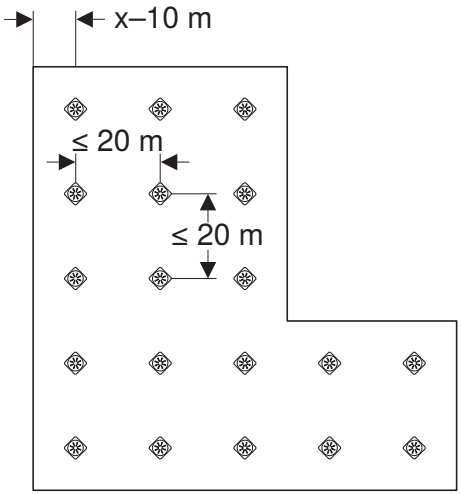


Figure 24: Conventions regarding distances for roof outlets

x Minimum distance 0.3 m, at least 1 m in the event of exposure to drifting snow or leaves

3.4 INSTALLATION METHOD FOR GEBERIT PLUVIA ROOF OUTLETS

The different roof constructions, e.g. insulated or uninsulated roofs, inverted or green roofs, each require their own installation method for Geberit Pluvia roof outlets.

Depending on the gutter material the Geberit Pluvia roof outlets are installed either with a flange connection or with a welded or soldered connection.

3.4.1 Installation in a solid roof uninsulated

With roof foil

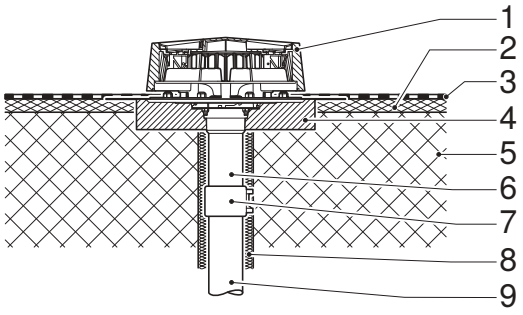


Figure 25: Installation in a solid roof uninsulated with roof foil

1 Outlet grating with function disc
2 Slope cover/screed
3 Roof foil
4 Anticondensation insulation
5 Concrete floor
6 Straight connector for outlet element
7 Non-positive connection
8 Anticondensation insulation (on-site)
9 Branch discharge pipe

With bitumen roof foil, suitable for promenade decks

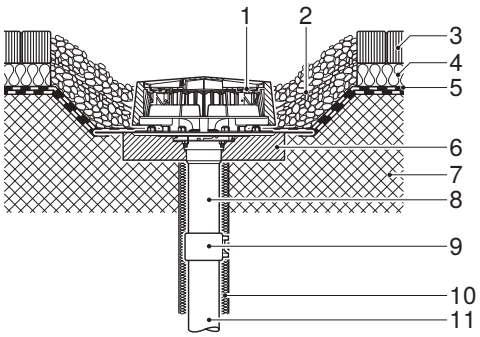


Figure 26: Installation in a solid roof uninsulated with bitumen roof foil, suitable for promenade decks

1 Outlet grating with function disc
2 Gravel bed
3 Flagstones in the area of the roof outlet
4 Flagstone substructure
5 Bitumen roof foil (at least 2 layers)
6 Anticondensation insulation
7 Concrete floor
8 Straight connector for outlet element
9 Non-positive connection
10 Anticondensation insulation (on-site)
11 Branch discharge pipe

With bitumen roof foil, suitable for parking decks

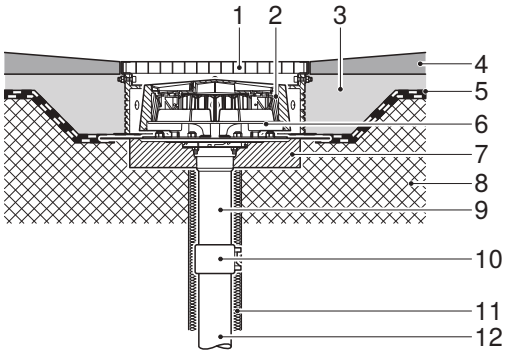


Figure 27: Installation in a solid roof uninsulated with bitumen roof foil, suitable for parking decks

1 Grating (from Geberit Pluvia supplementary set, suitable for parking decks)
2 Duct pipe (from Geberit Pluvia supplementary set, suitable for parking decks)
3 Thermally insulating separating layer
4 Bitumen covering
5 Bitumen roof foil (at least 2 layers)
6 Outlet grating with function disc
7 Anticondensation insulation
8 Concrete floor
9 Straight connector for outlet element
10 Non-positive connection
11 Anticondensation insulation (on-site)
12 Branch discharge pipe

3.4.2 Installation in a solid roof insulated

With roof foil

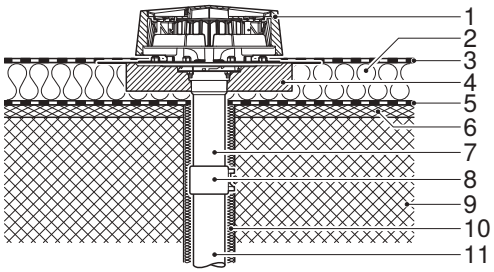


Figure 28: Installation in a solid roof insulated with roof foil

1 Outlet grating with function disc
2 Thermal insulation
3 Roof foil
4 Anticondensation insulation
5 Vapour barrier (on-site)
6 Slope cover
7 Straight connector for outlet element
8 Non-positive connection
9 Concrete floor
10 Anticondensation insulation (on-site)
11 Branch discharge pipe

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

With bitumen roof foil

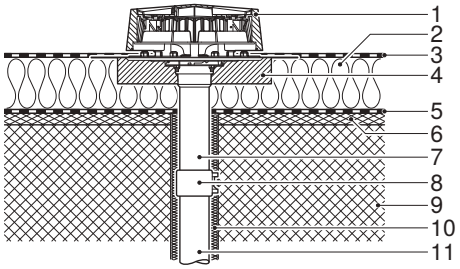


Figure 29: Installation in a solid roof insulated with bitumen roof foil

1 Outlet grating with function disc
2 Thermal insulation
3 Bitumen roof foil (at least 2 layers)
4 Anticondensation insulation
5 Vapour barrier (on-site)
6 Slope cover
7 Straight connector for outlet element
8 Non-positive connection
9 Concrete floor
10 Anticondensation insulation (on-site)
11 Branch discharge pipe

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

With roof foil and Geberit Pluvia vapour barrier connection

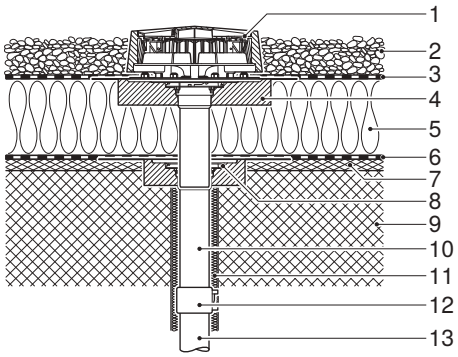


Figure 30: Installation in a solid roof insulated with roof foil and vapour barrier

1 Outlet grating with function disc
2 Load layer (gravel)
3 Roof sealing
4 Anticondensation insulation
5 Thermal insulation
6 Vapour barrier (on-site)
7 Slope cover
8 Geberit Pluvia vapour barrier connection
9 Concrete floor
10 Straight connector for outlet element
11 Anticondensation insulation (on-site)
12 Non-positive connection
13 Branch discharge pipe

With horizontal outlet in the thermal insulation and with roof foil

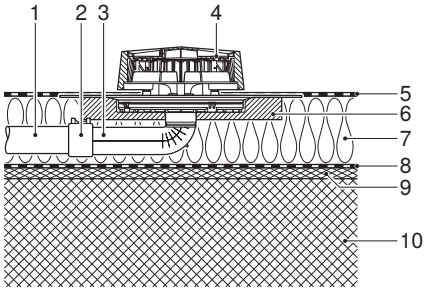


Figure 31: Installation in a solid roof insulated with horizontal outlet in the thermal insulation, roof foil and vapour barrier

1 Branch discharge pipe
2 Non-positive connection
3 Connection bend
4 Outlet grating with function disc
5 Roof foil
6 Anticondensation insulation
7 Thermal insulation
8 Vapour barrier (on-site)
9 Slope cover
10 Concrete floor

The pipe layout through the vapour barrier must be arranged by the roofer on site.

With vapour barrier and roof foil, suitable for promenade decks

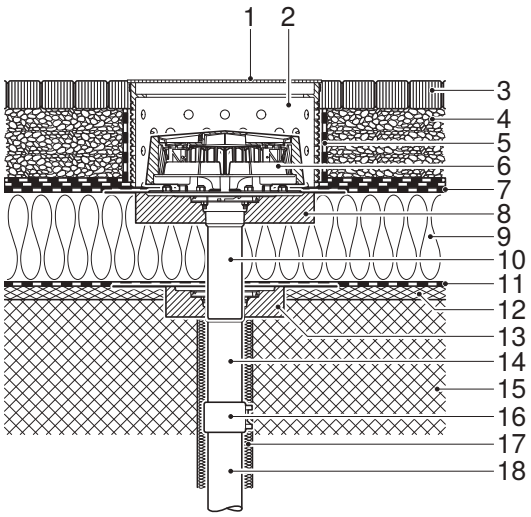


Figure 32: Installation in a solid roof insulated with vapour barrier and roof foil, suitable for promenade decks

1 Grating (from Geberit Pluvia supplementary set, suitable for promenade decks)
2 Duct pipe (from Geberit Pluvia supplementary set, suitable for promenade decks)
3 Flagstones
4 Gravel bed
5 Filter mat / separating layer
6 Outlet grating with function disc
7 Roof foil
8 Anticondensation insulation
9 Thermal insulation
10 Straight connector for outlet element
11 Vapour barrier (on-site)
12 Slope cover
13 Geberit Pluvia vapour barrier connection
14 Straight connector for vapour barrier connection
15 Concrete floor
16 Non-positive connection
17 Anticondensation insulation (on-site)
18 Branch discharge pipe

With vapour barrier and roof foil, suitable for parking decks

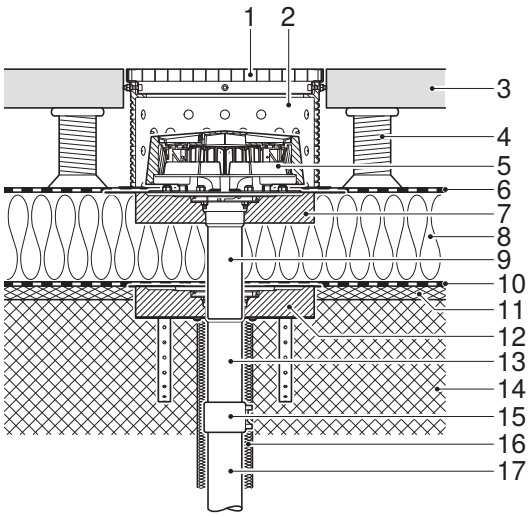


Figure 33: Installation in a solid roof insulated with vapour barrier and roof foil, suitable for parking decks

1 Grating (from Geberit Pluvia supplementary set, suitable for parking decks)
2 Duct pipe (from Geberit Pluvia supplementary set, suitable for parking decks)
3 Plates / flooring suitable for parking decks
4 Paving support (on-site)
5 Outlet grating with function disc
6 Roof foil
7 Anticondensation insulation
8 Thermal insulation
9 Straight connector for outlet element
10 Vapour barrier (on-site)
11 Slope cover
12 Geberit Pluvia vapour barrier connection and installation frame
13 Straight connector for vapour barrier connection
14 Concrete floor
15 Non-positive connection
16 Anticondensation insulation (on-site)
17 Branch discharge pipe

Inverted roof with gravelling and roof foil

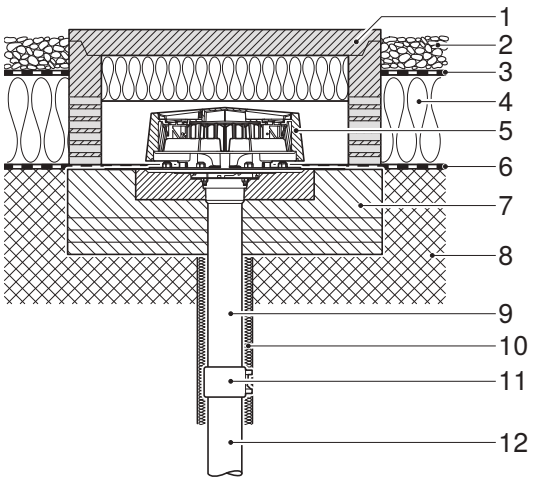


Figure 34: Installation in a solid roof (roof structure: inverted roof) insulated with roof foil, gravelling

1 Insulated drainage shaft (e.g. in conjunction with Geberit Pluvia supplementary set, suitable for promenade decks)
2 Layer of gravel measuring 16/32 mm according to the flat roof guidelines
3 Filter mat / separating layer
4 Water-permeable thermal insulation
5 Outlet grating with function disc
6 Roof foil
7 Inserted thermal insulation (e.g. Geberit Pluvia thermal insulation)
8 Concrete floor
9 Straight connector for outlet element
10 Anticondensation insulation (on-site)
11 Non-positive connection
12 Branch discharge pipe

Measures for avoiding cold bridges:

- It is possible that the thermal insulation (item 7) may not meet the building requirements. The thermal insulation must be adapted to the building-specific requirements and must be determined by a building physicist.
- The static bearing capacity of the concrete floor must be ensured. The concrete thickness below the insulation must not be less than 5 cm. It may be necessary to consult a statics engineer.

3.4.3 Installation in a lightweight roof uninsulated

With roof foil

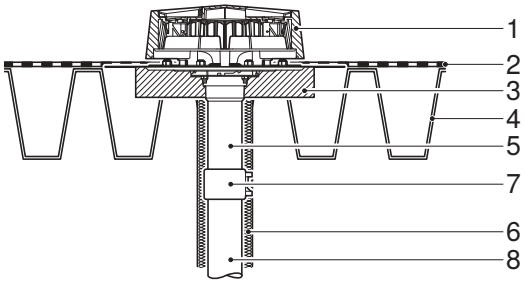


Figure 35: Installation in a lightweight roof uninsulated with roof foil

1 Outlet grating with function disc
2 Roof foil
3 Anticondensation insulation
4 Lightweight roof
5 Straight connector for outlet element
6 Anticondensation insulation (on-site)
7 Non-positive connection
8 Branch discharge pipe

With contact foil

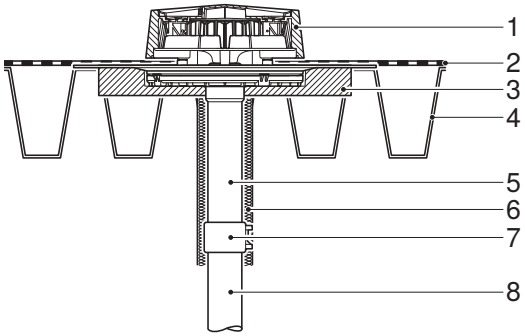


Figure 36: Installation in a lightweight roof uninsulated with Geberit Pluvia contact foil

1 Outlet grating with function disc
2 Roof foil, connected to contact foil
3 Anticondensation insulation
4 Lightweight roof
5 Straight connector for outlet element
6 Anticondensation insulation (on-site)
7 Non-positive connection
8 Branch discharge pipe

3.4.4 Installation in a lightweight roof insulated

With roof foil

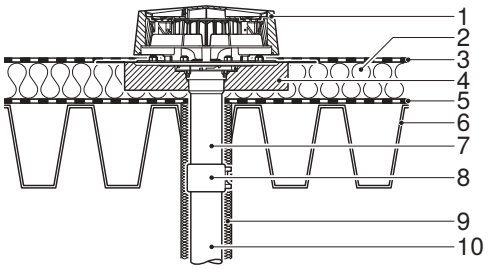


Figure 37: Installation in a lightweight roof insulated with roof foil

1 Outlet grating with function disc
2 Thermal insulation
3 Roof foil
4 Anticondensation insulation
5 Vapour barrier (on-site)
6 Lightweight roof
7 Straight connector for outlet element
8 Non-positive connection
9 Anticondensation insulation (on-site)
10 Branch discharge pipe

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

With bitumen roof foil and vapour barrier connection

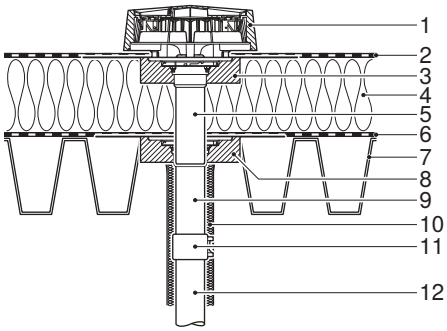


Figure 38: Installation in a lightweight roof insulated with bitumen roof foil

1 Outlet grating with function disc
2 Bitumen roof foil (at least 2 layers)
3 Anticondensation insulation
4 Thermal insulation
5 Straight connector for outlet element
6 Vapour barrier (on-site)
7 Lightweight roof
8 Geberit Pluvia vapour barrier connection
9 Straight connector for vapour barrier connection
10 Anticondensation insulation (on-site)
11 Non-positive connection
12 Branch discharge pipe

With roof foil and vapour barrier connection

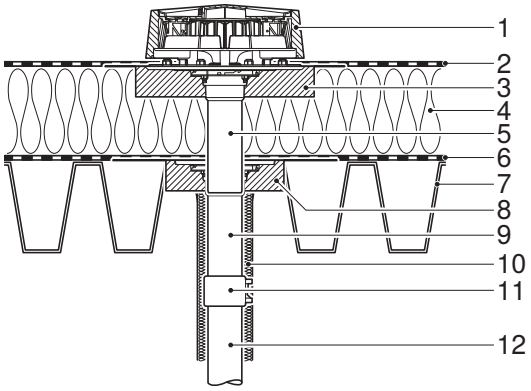


Figure 39: Installation in a lightweight roof insulated with roof foil and vapour barrier connection

1 Outlet grating with function disc
2 Roof foil
3 Anticondensation insulation
4 Thermal insulation
5 Straight connector for outlet element
6 Vapour barrier (on-site)
7 Lightweight roof
8 Geberit Pluvia vapour barrier connection
9 Straight connector for vapour barrier connection
10 Anticondensation insulation (on-site)
11 Non-positive connection
12 Branch discharge pipe

With horizontal outlet in the thermal insulation and roof foil

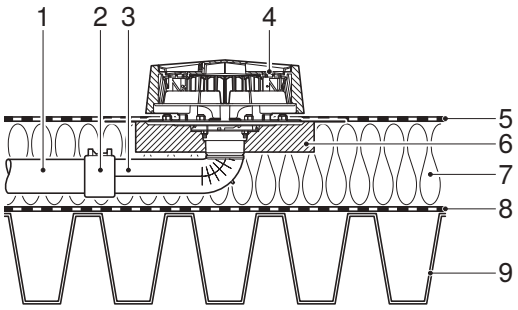


Figure 40: Installation in a lightweight roof insulated, horizontal outlet in the thermal insulation with roof foil and vapour barrier

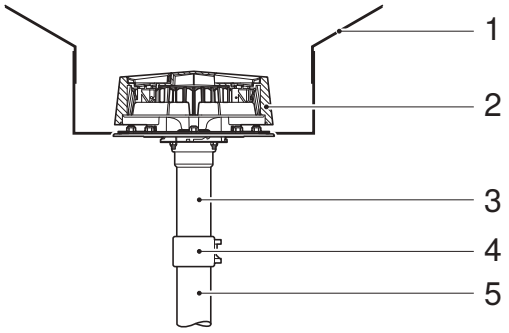
1 Branch discharge pipe
2 Non-positive connection
3 Connection bend
4 Outlet grating with function disc
5 Roof foil
6 Anticondensation insulation
7 Thermal insulation
8 Vapour barrier (on-site)
9 Lightweight roof

The pipe layout through the vapour barrier must be arranged by the roofer on site.

3.4.5 Installation in a gutter

Gutters have special requirements for planning and installation.

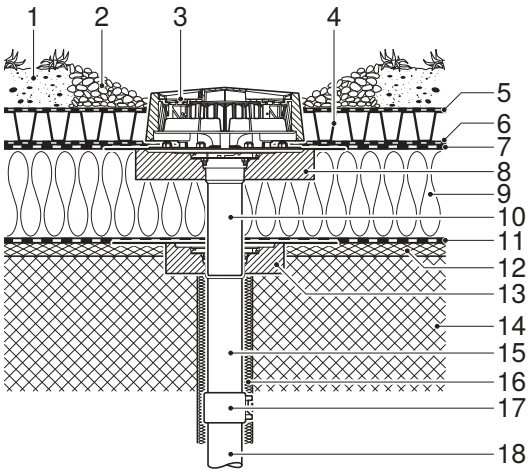
- Layout and hydraulic certification must be provided by an architect or sanitary engineer in accordance with the country-specific regulations.
- Gutters and roof areas must not be drained in a common pipe system.
- The connecting material of the roof outlets must be selected so that no corrosive influences occur.
- You need to check whether a trace heater is required on-site. The trace heater must be modified in accordance with country-specific circumstances.



1 Gutter
2 Geberit Pluvia roof outlet for gutters
3 Straight connector for outlet element
4 Tension resistant connection
5 Branch discharge pipe

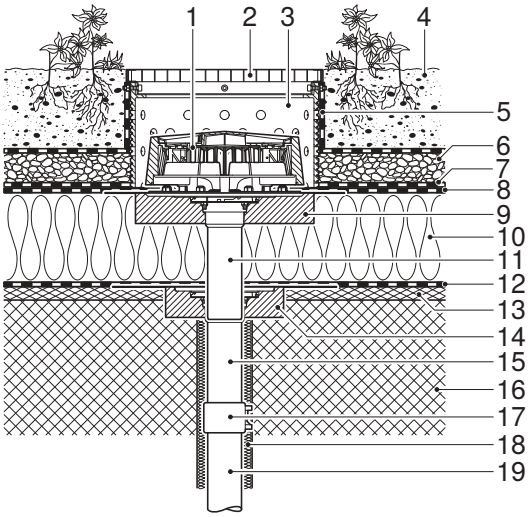
3.4.6 Installation in a green roof

Extensively greened roof



1 Extensive green roof with gravel bed in the area of the roof outlet
2 Gravel bed
3 Outlet grating with function disc
4 Drainage
5 Separating layer
6 Filter mat
7 Roof foil
8 Anticondensation insulation
9 Thermal insulation
10 Straight connector for outlet element
11 Vapour barrier (on-site)
12 Slope cover
13 Geberit Pluvia vapour barrier connection
14 Concrete floor
15 Straight connector for vapour barrier connection
16 Anticondensation insulation (on-site)
17 Tension resistant connection
18 Branch discharge pipe

Intensively greened roof



1 Outlet grating with function disc
2 Grating (from Geberit Pluvia supplementary set, suitable for parking decks)
3 Duct pipe (from Geberit Pluvia supplementary set, suitable for parking decks)
4 Intensive green roof
5 Separating layer
6 Gravel bed
7 Filter mat
8 Roof foil
9 Anticondensation insulation
10 Thermal insulation
11 Straight connector for outlet element
12 Vapour barrier (on-site)
13 Slope cover
14 Geberit Pluvia vapour barrier connection
15 Straight connector for vapour barrier connection
16 Concrete floor
17 Tension resistant connection
18 Anticondensation insulation (on-site)
19 Branch discharge pipe

3.5 CALCULATION FOR GEBERIT PLUVIA ROOF DRAINAGE

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

The following parameters must be determined:

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

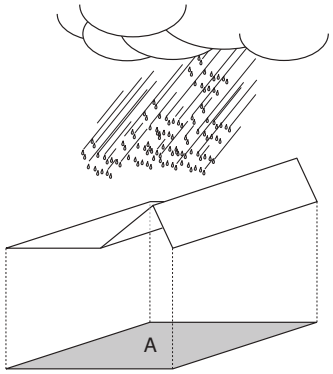
Rules and dimensions that must be observed when the Geberit Pluvia roof outlets are arranged are described in the chapter → Arranging the roof outlets.

Rules and dimensions that must be observed when the pipes are laid are described in the chapter → Pipe layout.

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

3.5.1 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:

$$Q_R = r \cdot A \cdot C$$

Q_R	Rainwater outflow [l/s]
A	Horizontal projection of the roof area [m^2]
r	Rainfall [l/s • m^2]
C	Capacity factor

If the value for the rainfall is not known, it must be determined with the architect, sanitary engineer and possibly the building insurer. This value is based on the rainfall statistics from the local meteorological institute. The average rainfall per 10 minutes within ten years is recommended.

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

- foil and tin roofs (roofs with sealing) C = 1.0
- tar and gravel roofs C = 0.8
- according to manufacturer's information

Table 5: 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.).

3.5.2 Dimensioning with Geberit ProPlanner calculation software

The Geberit Pluvia performs at its optimum when the piping system fills quickly and all pipe sections empty evenly. The piping system therefore has to be precisely dimensioned.

The “Roof drainage” module of the Geberit ProPlanner software calculates the necessary parameters.

For correct dimensioning, the following factors, amongst others, must be taken into account:

- size of the roof area
- rainfall
- roof structure
- pipe layout
- number and position of the roof outlets
- building height
- rainwater outflow (target volumetric flow rate)

This data can be recorded and complex roof projects can be calculated easily with Geberit ProPlanner.

Geberit ProPlanner creates:

- isometric drawings of the piping system
- hydraulic calculations
- material lists for piping systems and fastening elements
- cost calculations with tender documents ready for shipment

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

3.5.3 Calculation for roof drainage systems directly in Autodesk® Revit®

The hydraulic calculation for the roof drainage can be carried out Autodesk® Revit® directly. The Geberit Pluvia plug-in is installed in addition to the Geberit HDPE piping system in Revit® format.

In a similar way to the hydraulic calculation in the Roof drainage planning module of Geberit ProPlanner, the Revit® plug-in certifies the dimensioning for the roof drainage system with a hydraulic certificate. It is therefore possible work in a single software environment during the BIM planning.

Range of functions of the Geberit Pluvia plug-in:

- The plug-in is integrated seamlessly into Autodesk® Revit® via a user-friendly menu bar.
- All hydraulic calculations for the Geberit Pluvia roof drainage can be carried out using Autodesk® Revit®.
- The automatic dimensioning of the planned roof drainage system can be performed with the plug-in.
- The plug-in certifies the dimensioning for roof drainage with a hydraulic certificate and makes it available as a PDF or Excel export.

3.5.4 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 mbar
- 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.

3.5.5 Dimensioning of emergency overflows according to DIN 1986-100

According to DIN 1986-100:2016-12, the drainage and emergency overflow system together must be able to drain the 5-minute rainfall to be expected at the building location over 5 minutes ($r_{(5,100)}$).

The minimum discharge capacity of the emergency overflows results from the difference between the 5-minute rainfall and the maximum drainage capacity of the roof drainage system. The calculation of the maximum drainage capacity is based on the calculated rainfall ($r_{(D,T)}$).

The calculated rainfall describes the rainfall event relevant for the dimensions, usually with a statistical frequency of 5 years and a rainfall duration of 5 minutes ($r_{(5,5)}$).

$$Q_{NOT} = (r_{(5,100)} - r_{D,T} \cdot C) \cdot \frac{A}{10000}$$

Q_{NOT}	Minimum discharge capacity of the emergency overflows in litres per second (l/s)
$r_{(5,100)}$	5-minute rainfall in litres per second and hectare that must be expected once in 100 years
$r_{(D,T)}$	Calculated rainfall in litres per second and hectare [l/(s • ha)]
D	Rainfall duration in minutes
T	Annuality of the rainfall event
C	Capacity factor (it is only admissible to take into account the capacity factor C when calculating the discharge from the calculated rainfall $r_{(5,5)}$ for the roof area)
A	Effective precipitation area in m^2

If an unusual amount of protection is necessary for a building, the emergency overflow system alone should be able to drain the 5-minute rainfall $r_{(5,100)}$. This holds true for hospitals, theatres, sensitive communication institutions, storage rooms for substances that emit toxic or flammable gases upon moisture, and buildings in which special works of art are stored.

3.5.6 Simplified dimensioning of the emergency overflows as a construction measure

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

An emergency overflow opening of 25 cm^2 is required for rainfall of 1 l/s.

Example:

- roof area with 4 roof outlets of 8 l/s each
- total rainfall: 4 x 8 l/s = 32 l/s
- total emergency overflow openings required: 32 x 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 rectangular emergency overflow must be kept between 10 cm and a maximum of 15 cm.

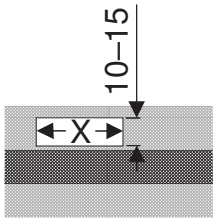


Figure 41: Dimensions of the emergency overflow in the facade

X Width of the emergency overflow

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

3.5.7 Safety factor

The safety factor indicates the factor by which the drainage capacity is set higher than it would have to be when calculated theoretically.

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

Therefore, an additional safety factor is not required with the dimensioning of Geberit Pluvia.

3.5.8 Thermal expansion of pipes

Pipes expand differently due to thermal effects depending on the material. This thermal expansion is designated as a thermally induced change in length Δl.

The following have an influence on the thermally induced change in length Δl:

- material
- building conditions
- operating conditions

3.5.9 Calculation of the change in length ΔL

The change in length ΔL is calculation with the following formula:

$$\Delta L = L \cdot \alpha \cdot \Delta T$$

ΔL Change in length [mm]
L Pipe length [m]
ΔT Temperature differential (operating temperature – ambient temperature during installation) [K]
α Thermal expansion coefficient [mm/(m • K)]

Given:

- Material: Geberit HDPE
- L = 4 m
- α = 0.17 mm/(m • K)
- ΔT = 60 K (operating temperature 80 °C – ambient temperature during installation 20 °C)

Required:

- Change in length ΔL [mm]

Solution:

$$\Delta L = L \cdot \alpha \cdot \Delta T \left[\frac{m \cdot mm \cdot K}{m \cdot K} = mm \right]$$

ΔL = 4 m • 0.17 mm/(m•K) • 60 K

ΔL= 40.8 mm

The change in length ΔL can also be calculated in a simplified manner from the following table.

Table 6: Change in length **ΔL** in mm for Geberit HDPE system pipes

L [m]	**Temperature differential ΔT [K]**									
	10	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
1	1.7	3.4	5.1	6.8	8.5	10.2	11.9	13.6	15.3	17.0
2	3.4	6.8	10.2	13.6	17.0	20.4	23.8	27.2	30.6	34.0
3	5.1	10.2	15.3	20.4	25.5	30.6	35.7	40.8	45.9	51.0
4	6.8	13.6	20.4	27.2	34.0	40.8	47.6	54.4	61.2	68.0
5	8.5	17.0	25.5	34.0	42.5	51.0	59.5	68.0	76.5	85.0
6	10.2	20.4	30.6	40.8	51.0	61.2	71.4	81.6	91.8	102.0
7	11.9	23.8	35.7	47.6	59.5	71.4	93.3	95.2	107.1	119.0
8	13.6	27.2	40.8	54.4	68.0	81.6	95.2	108.8	122.4	136.0
9	15.3	30.6	45.9	61.2	76.5	91.8	107.1	122.4	137.7	153.0
10	17.0	34.0	51.0	68.0	85.0	102.0	119.0	136.0	153.0	170.0
20	34.0	68.0	102.0	136.0	170.0	204.0	238.0	272.0	306.0	340.0
30	51.0	102.0	153.0	204.0	255.0	306.0	357.0	408.0	459.0	510.0
40	68.0	136.0	204.0	272.0	340.0	408.0	476.0	544.0	612.0	680.0
50	85.0	170.0	255.0	340.0	425.0	510.0	595.0	680.0	765.0	850.0

3.5.10 Linear expansion with and without the Geberit Pluvia fastening system

The following example shows the advantages of a rigid installation with the Geberit Pluvia fastening system on a 25 m suspended roof drainage pipe.

Calculation of the linear expansion without a Geberit Pluvia fastening system. The physical properties of Geberit HDPE apply.

Given:

- Material: Geberit HDPE
- L = 25 m
- α = 0.17 mm/(m•K)
- ΔT = 50 K

Required:

- Change in length ΔL [mm]

Solution:

$$\Delta L = L \cdot \alpha \cdot \Delta T \left[\frac{m \cdot mm \cdot K}{m \cdot K} = mm \right]$$

ΔL = 25 • 0.17 • 50

ΔL = 212.5 mm

In conclusion:

The thermal expansion must be taken into account.

Calculation of the change in length with a Geberit Pluvia fastening system. Since the change in length is absorbed by the Geberit Pluvia fastening system, the physical properties of the Geberit Pluvia support rail apply.

Given:

- Material: Steel
- L = 25 m
- α = 0.011 mm/(m•K)
- ΔT = 50 K

Required:

- Change in length ΔL [mm]

Solution:

ΔL = 25 • 0.011 • 50

ΔL = 13.8 mm

In conclusion:

When using the Geberit Pluvia fastening system and applying the rigid installation principle, the resulting change in length can be ignored. The system fastenings to the building structure therefore only have to absorb weight forces.

3.6 PIPE LAYOUT

3.6.1 Separate pipe layout

Roof areas must be drained separately in the event of:

- different capacity factors
- areas > 5000 m^2
- height difference > 4 m

Roof areas with a height difference < 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. Only Geberit Pluvia roof outlets 12 l and 25 l may be used for this application.

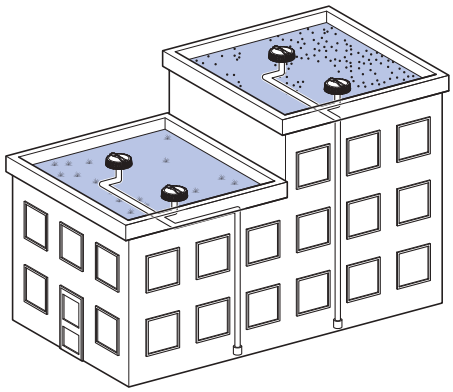


Figure 42: Separate pipe layout

3.6.2 Pipe layout for 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 roof outlets must be planned for each partial roof or terrace area. This makes it possible for water to flow from roof outlet to roof outlet or from the Geberit Pluvia roof outlet to the emergency overflow.

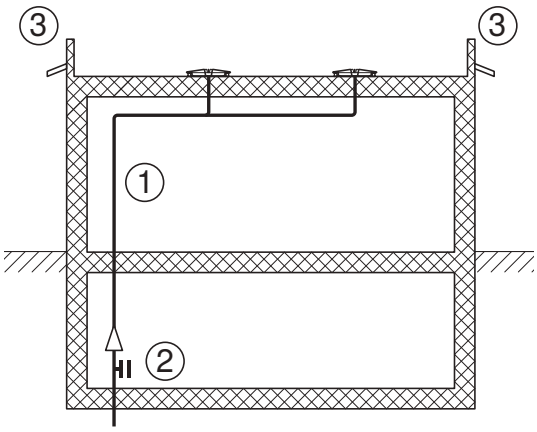
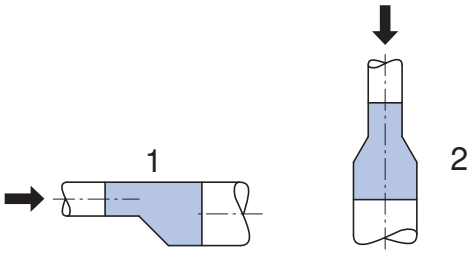


Figure 43: Roof outlets and pipe layout for flat roofs with parapet

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

3.6.3 Expansion of the pipe using reducers

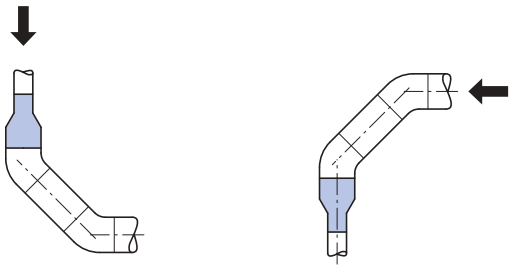
Both concentric and eccentric reducers can be used for Geberit Pluvia.



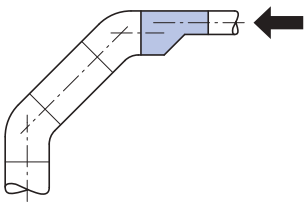
1 Eccentric reducer
2 Concentric reducer

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

- concentric reducers with a vertical pipe



- eccentric reducers with a horizontal pipe



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

3.6.4 Connection of Geberit Pluvia roof outlets to the pipe system

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

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

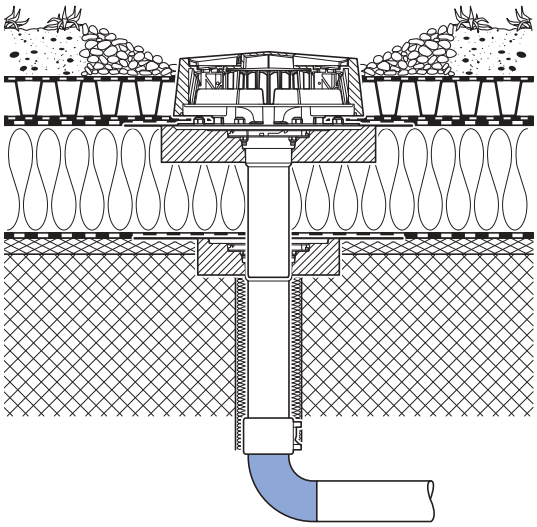


Figure 44: Connecting the Geberit Pluvia roof outlet with a bend 90°

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

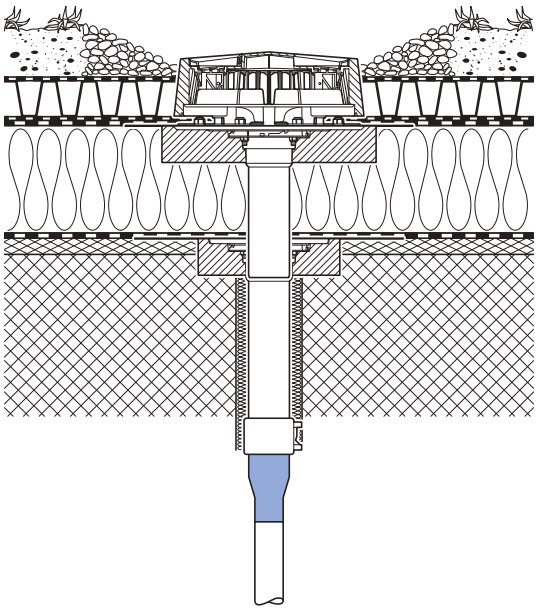


Figure 45: Connecting the Geberit Pluvia roof outlet with a reducer

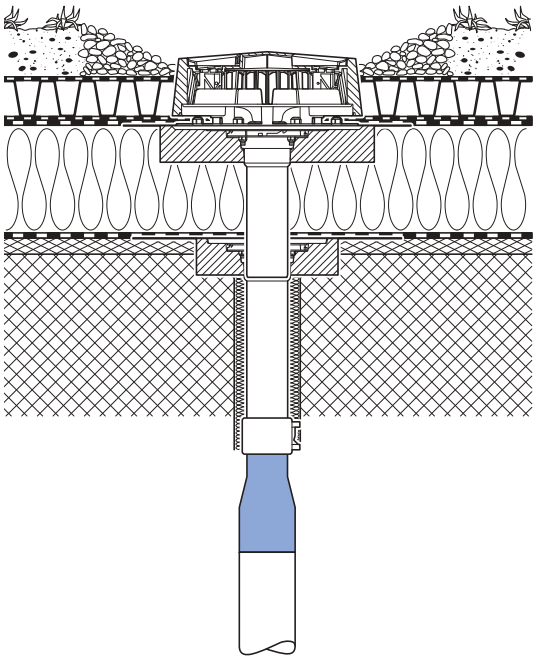


Figure 46: Connecting the Geberit Pluvia roof outlet with an expander

The following dimensions must be observed when connecting the Geberit Pluvia roof outlets with a reducer or expander:

Roof outlet	Can be reduced to maximum	Can be expanded to maximum
12 l	d40	d75
19 l	d56	d110
25 l	d75	d110

A direct reducer or expander is not an option with Geberit Pluvia roof outlets 45 l / 60 l / 100 l.

3.6.5 Transition to conventional system

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

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

After the transition to partial filling, at least the first 2 m of pipe length must be executed as transition section.

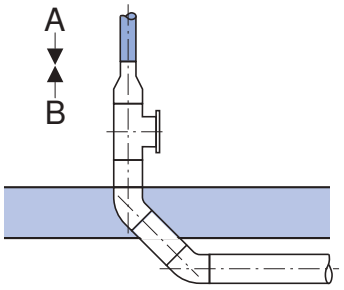


Figure 47: Expansion using a reducer

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

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

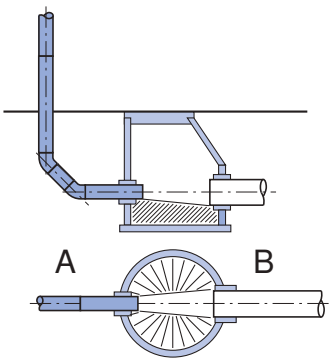


Figure 48: Expansion through release into a manhole

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

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

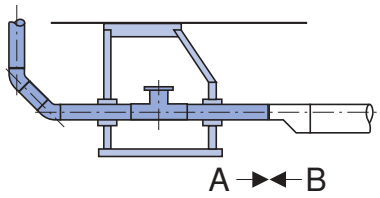


Figure 49: Expansion after a manhole is allowed

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

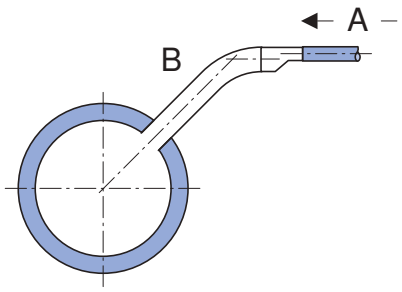


Figure 50: Expansion up to before the sewage system

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

If the Geberit Pluvia roof drainage system is drained into receiving waters, the connection up to the receiving waters must be designed so that no ice forms at the outlet.

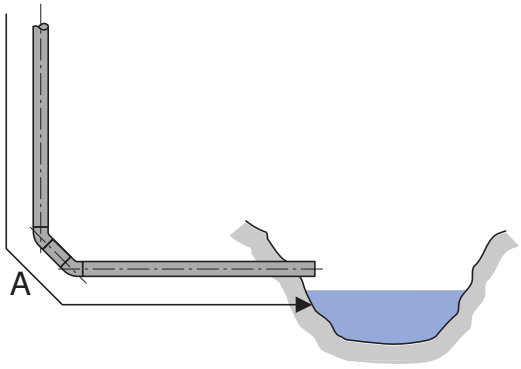


Figure 51: Geberit Pluvia up to the receiving waters

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.

3.6.6 Anticondensation insulation

In accordance with EN 12056-1, discharge pipes that carry cold water (e.g. rainwater pipes) must be fully insulated against condensation if the climatic conditions, the temperatures in the building and the humidity require this. These measures are implemented with the Geberit Isol Flex sound insulation mat.

Design of anticondensation insulation with a Geberit Isol Flex sound insulation mat

The Geberit Isol Flex sound insulation mat can be used as anticondensation insulation under the following conditions:

- rainwater temperature ≥ 0 °C
- room temperature < 25 °C
- moisture < 60 %

When the Geberit Isol Flex sound insulation mat is used as anticondensation insulation, all edges must be taped off using a suitable adhesive tape (taping width ≥ 7 cm) as follows:

- axial edge parallel to the axis of the pipe
- radial edge
- for fittings, all outer edges

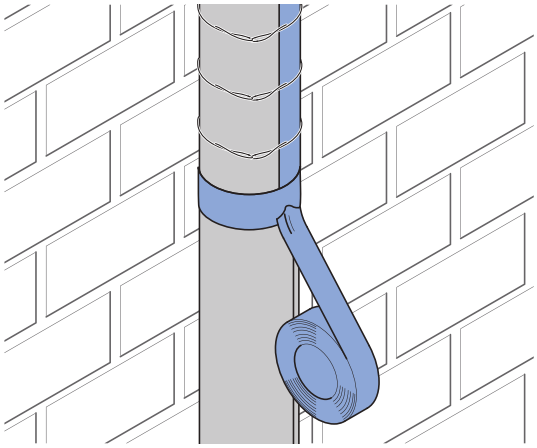


Figure 52: Anticondensation insulation with a Geberit Isol Flex sound insulation mat

3.7 PLANNING AND PROCESSING THE GEBERIT PLUVIA FASTENING SYSTEM

3.7.1 Planning of anchor and sliding points for a rigid installation with the Geberit Pluvia fastening system

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

Positioning of anchor points:

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

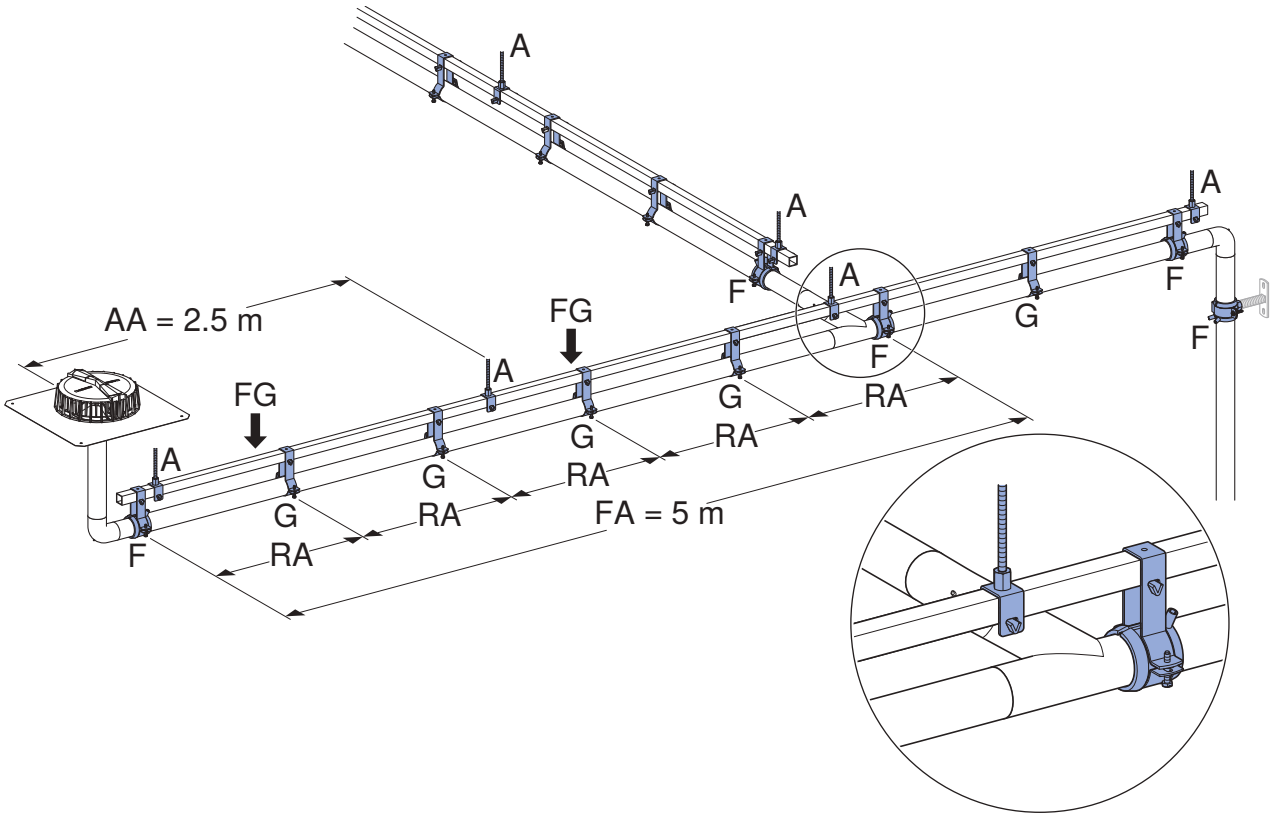


Figure 53: Fastening distances for the Geberit Pluvia fastening system without support shells

A	Suspension (threaded joint M10)
F	Anchor point
G	Sliding point
AA	Distance between suspensions
RA	Distance between pipe brackets
FA	Distance between anchor points
FG	Weight of the completely filled system on the suspension

3.7.2 Geberit Pluvia d40–200 fastening system

For horizontal fastening with the Geberit Pluvia fastening system, anchor and sliding points are created as follows:

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

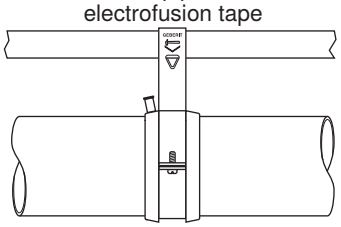
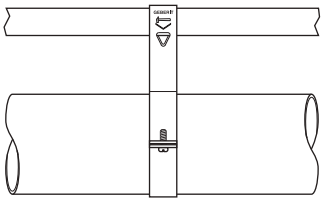
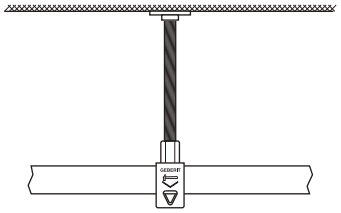
Anchor point	Sliding point	Suspension
Geberit Pluvia pipe bracket with electrofusion tape	Geberit Pluvia pipe bracket	
		

Table 8: Fastening distances between fixed and sliding brackets for rigid installation

d [mm]	RA [m]	FG[1)] [N]	FA [m]	AA [m]
40	0.8	70	5.0	2.5
50	0.8	88		
56	0.8	107		
63	0.8	124		
75	0.8	156		
90	0.9	203		
110	1.1	279		
125	1.3	348		
160	1.6	550		
200	2.0	850		

1) With fastening material

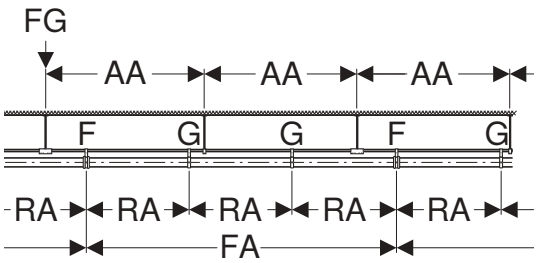


Figure 54: Fastening distances for the Geberit Pluvia fastening system d40–200

A Suspension (threaded socket M10)
F Anchor point
G Sliding point
AA Distance between suspensions
RA Distance between pipe brackets
FA Distance between anchor points
FG Weight for each Geberit Pluvia suspension for a distance of 2.5 m

3.7.3 Geberit Pluvia fastening system d250–315

For horizontal fastening with the Geberit Pluvia fastening system, anchor and sliding points are created as follows:

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

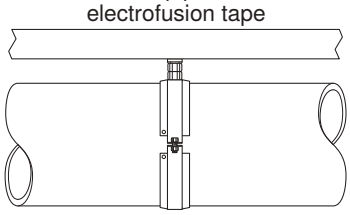
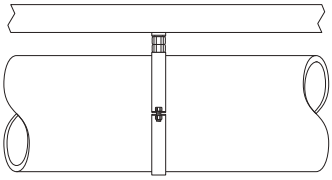
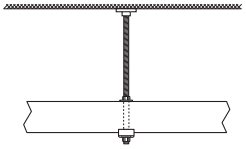
Anchor point	Sliding point	Suspension
Geberit Pluvia pipe bracket with electrofusion tape	Geberit Pluvia pipe bracket	
		

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

d [mm]	RA [m]	FG[1)] [N]	FA [m]	AA [m]
250	1.7	1320	5.0	2.5
315	1.7	2060	5.0	2.5

1) With fastening material

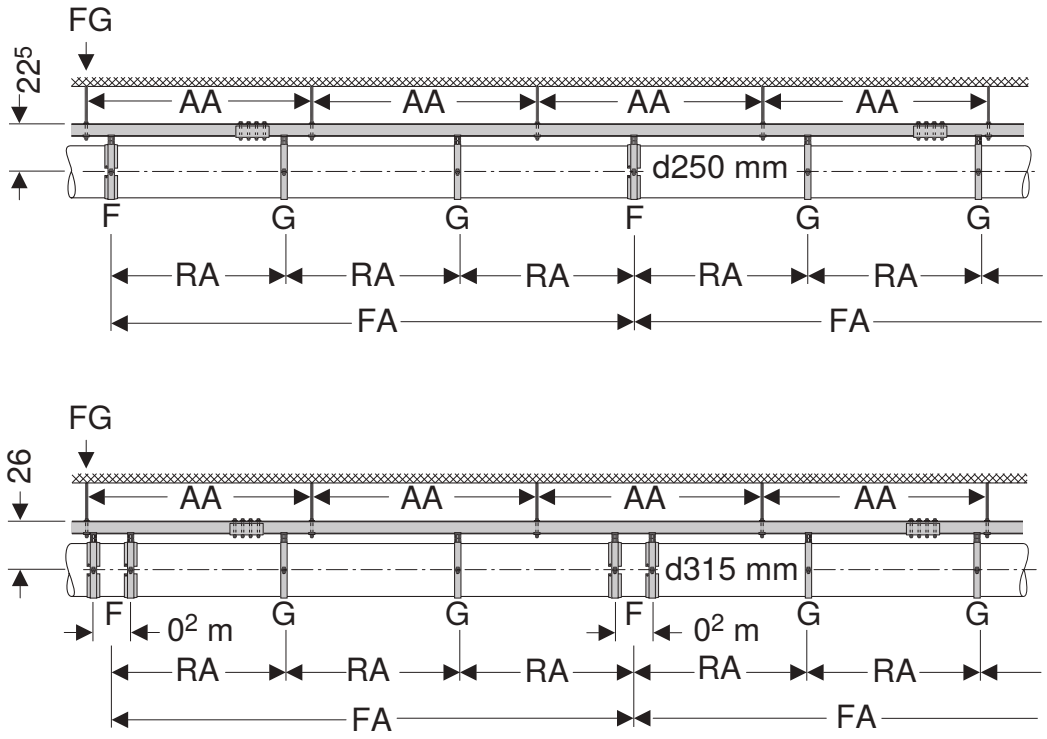


Figure 55: Fastening distances for the Geberit Pluvia fastening system d250–315

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

For pipes d315, all anchor points must be created with 2 pipe brackets with electrofusion tape. The distance between the two pipe brackets is 0.2 m.

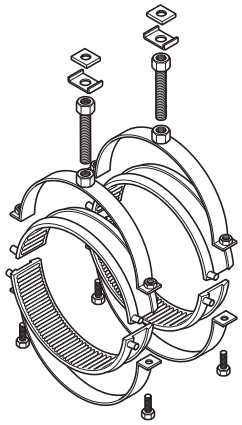


Figure 56: Geberit Pluvia pipe bracket with threaded socket M16 and electrofusion tape

For the transition from d200 to d250 or d315, the support rails cannot be connected to each other, since their distance from the pipe centre differs by 10 mm.

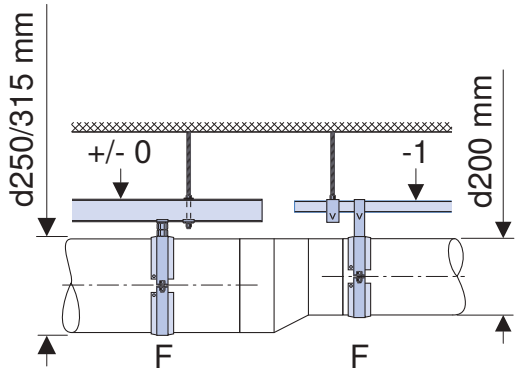


Figure 57: Non-connectable support rails

F Anchor point

3.7.4 Fastening distances with an interruption of the Geberit Pluvia support rail

The maximum pipe bracket spacing with an interruption of the support rail is dependent on the pipe dimension.

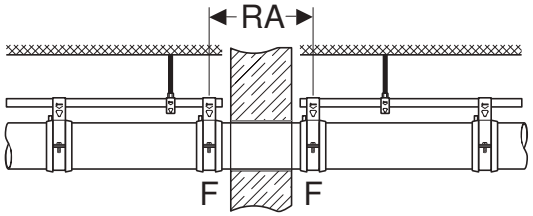


Figure 58: Pipe bracket spacing with a single interruption of the Geberit Pluvia support rail

RA Pipe bracket spacing
F Anchor point

Pipe dimension [mm]	Maximum pipe bracket spacing RA [m]
≤ DN 70 (d75)	0.8
DN 90 (d90)	0.9
DN 100 (d110)	1.1
DN 125 (d125)	1.3
DN 150 (d160)	1.6
DN 200 (d200)	2.0
≥ DN 250 (d250)	1.7

3.7.5 Overview of fastening types

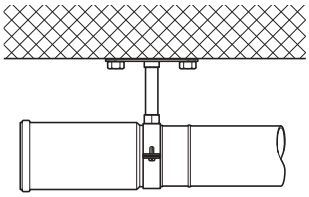
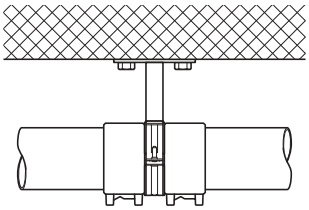
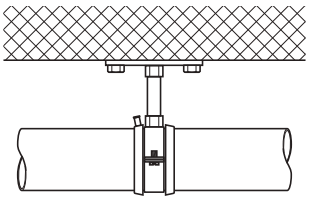
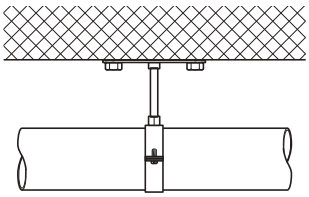
Pipe fixations differ in the manner in which the thermally induced change in length is controlled. A distinction is made between:

- sliding installation
- rigid installation

Expansion elements absorb the thermally induced change in length in a sliding installation. Expansion sockets or deflection legs are used as expansion elements. The forces generated by the thermally induced change in length are transferred to the building in a rigid installation.

The following table gives an overview of the possible fastenings for anchor and sliding points in a sliding and rigid installation with Geberit HDPE. The fastening types are suitable for horizontal and vertical installation.

Geberit recommends using an expansion socket in a sliding installation.

<table>
<tr><th></th><th>Sliding installation</th><th>Rigid installation</th></tr>
<tr><td rowspan="2">Anchor point</td><td rowspan="2">With pipe bracket on an expansion socket
  </td><td>Variant 1: with pipe bracket and 2 electrofusion couplings
  </td></tr>
<tr><td>Variant 2: with pipe bracket on electrofusion tape
  </td></tr>
<tr><td>Sliding point</td><td colspan="2">With pipe bracket
  </td></tr>
</table>

3.7.6 Sliding installation

Design with expansion sockets

The Geberit HDPE expansion socket absorbs the thermally induced change in length of the pipe in the design with expansion sockets. The following rules must be observed in this case:

- The expansion socket is assigned a maximum pipe length of 6 m.
- Anchor and sliding points must be designed properly.
- Each expansion socket must be designed as an anchor point.

Anchor and sliding points must be designed as follows so that the change in length is directed towards and absorbed by the expansion socket:

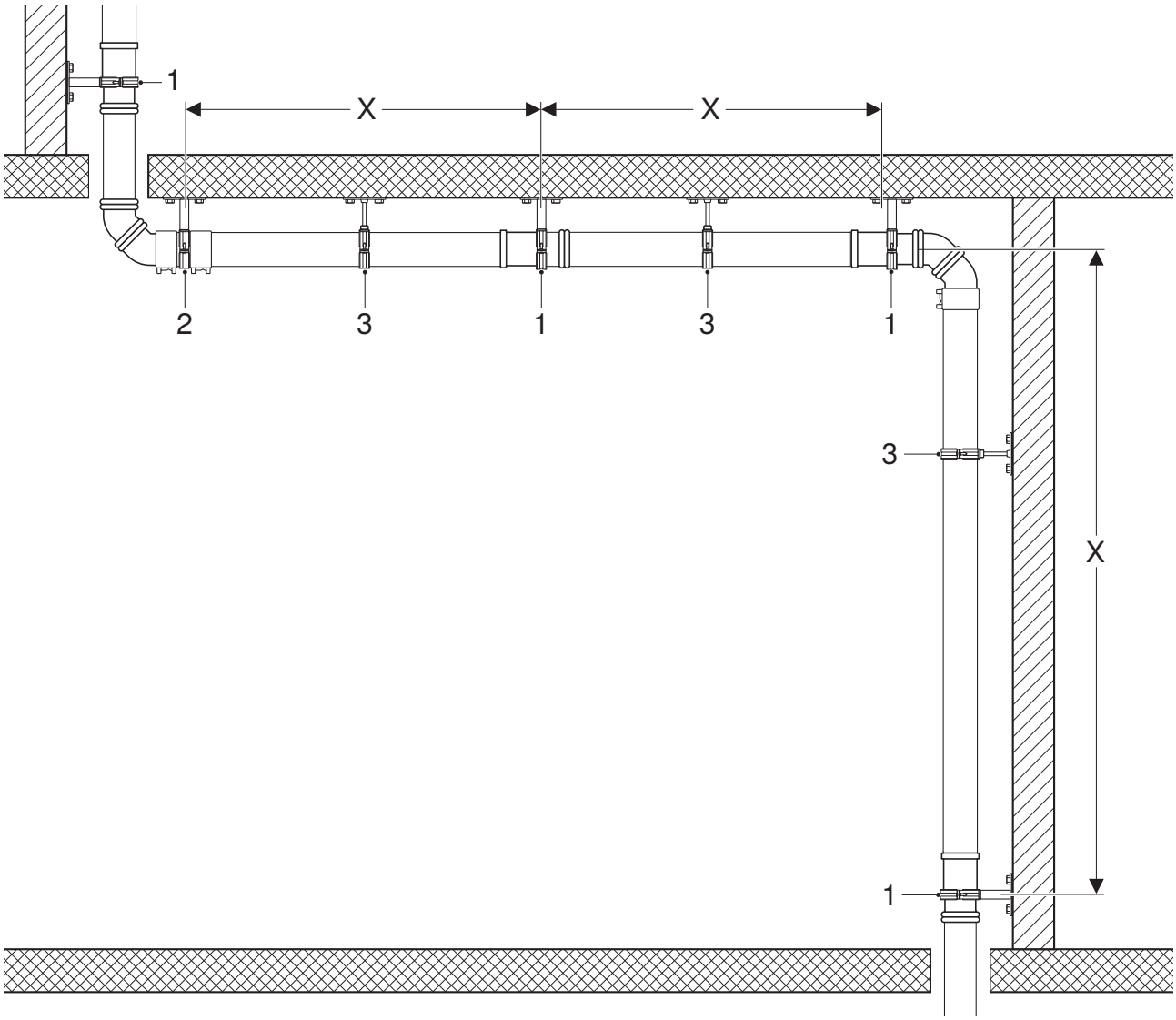


Figure 59: Design of the sliding installation with Geberit HDPE expansion sockets

1 Expansion socket with pipe bracket as an anchor point
2 Pipe bracket with 2 Geberit electrofusion couplings as an anchor point
3 Pipe bracket as a sliding point
X Max. distance of 6 m between the expansion sockets

Forces on the Geberit HDPE expansion socket during installation and operation

The following forces are generated on the Geberit HDPE expansion socket during installation and operation:

- installation force
- sliding resistance

The installation force is the force that has to be exerted when inserting the chamfered spigot. The sliding resistance is the force at which the Geberit HDPE expansion socket needs to be maintained so that it can absorb the change in length.

Table 11: Forces during installation and operation of the Geberit HDPE expansion socket

d [mm]	Installation force [N]	Sliding resistance during operation [N]
32	100	70
40	140	80
50	190	90
56	200	100
63	230	140
75	250	150
90	300	200
110	350	300
120	430	350
160	600	400
200	1200	1000
250	1800	1500
315	2600	2200

Insertion depth of the Geberit HDPE expansion socket

The insertion depth of the Geberit HDPE expansion socket is dependent on the installation temperature. The following example shows the difference between the insertion depths at 0 °C and 20 °C based on the Geberit HDPE expansion socket d110.

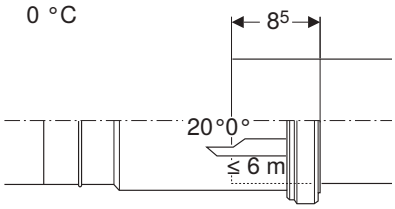


Figure 60: Insertion depth of 8.5 cm for d110 and an installation temperature of 0 °C

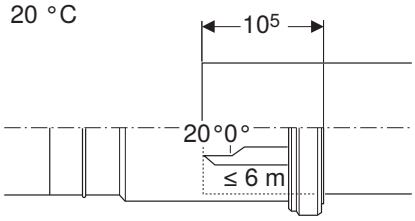


Figure 61: Insertion depth of 10.5 cm for d110 and an installation temperature of 20 °C

Table 12: Insertion depth in cm depending on the dimension of the Geberit HDPE expansion socket and the installation temperature

d [mm]	Installation temperature						
	-10 °C	0 °C	10 °C	20 °C	30 °C	40 °C	50 °C
32	3.5	4.0	5.0	5.5	6.0	6.5	7.0
40–56	6.5	7.5	8.5	9.5	11.0	12.0	13.0
63–90	7.0	8.0	9.5	10.5	11.5	12.5	13.5
110	7.5	8.5	9.5	10.5	12.0	13.0	14.0
125–160	8.0	9.0	10.0	11.0	12.0	13.5	14.5
200–315	17.0	18.0	19.0	20.5	21.5	22.5	23.5

Anchor point with the Geberit HDPE expansion socket

Anchor points are designed with suitable pipe brackets and a sufficiently strong pipe bracket fastening on the Geberit HDPE expansion socket.

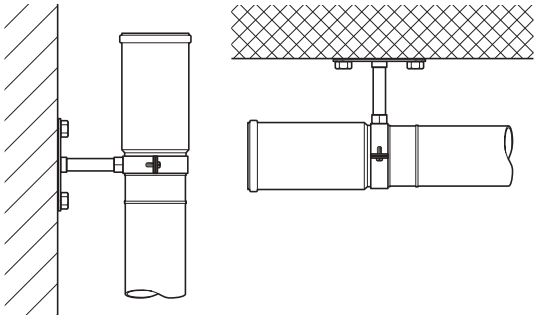


Figure 62: Vertical and horizontal anchor-point fastening with pipe bracket on the Geberit HDPE expansion socket

Thickness of the pipe fixation for anchor points

Geberit offers a suitable fastening system with pipe brackets, expansion sockets, threaded rods, threaded pipes as well as base plates in various thread sizes. The required thickness of the threaded rods must be selected depending on the ceiling or wall distance.

Table 13: Required thickness of the pipe fixation when fastening horizontally to ceilings and walls

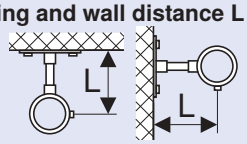
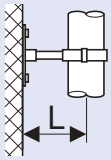
DN	d [mm]	Ceiling and wall distance L [cm] 					
		10	20	30	40	50	60
40	40	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
50	50	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
56	56	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
60	63	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
70	75	1/2"	1/2"	1/2"	1/2"	1/2"	3/4"
90	90	1/2"	1/2"	1/2"	1/2"	3/4"	3/4"
100	110	1/2"	1/2"	1/2"	3/4"	3/4"	3/4"

Table 14: Required thickness of the pipe fixation when fastening vertically to walls

DN	d [mm]	Wall distance L [cm] 					
		10	20	30	40	50	60
40	40	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
50	50	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
56	56	1/2"	1/2"	1/2"	1/2"	1/2"	3/4"
60	63	1/2"	1/2"	1/2"	1/2"	1/2"	3/4"
70	75	1/2"	1/2"	1/2"	1/2"	3/4"	3/4"
90	90	1/2"	1/2"	1/2"	3/4"	3/4"	3/4"
100	110	1/2"	1/2"	3/4"	3/4"	1"	1"
125	125	1/2"	3/4"	3/4"	1"	1"	1"
150	160	–	3/4"	1"	1"	5/4"	5/4"
200	200	–	1"	5/4"	5/4"	1 1/2"	1 1/2"
250	250	–	5/4"	5/4"	1 1/2"	2"	2"
300	315	–	5/4"	1 1/2"	2"	2"	–

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

Pipe bracket spacing when fastening horizontally to ceilings and walls, without support shells

The following pipe bracket spacing RA is applied for pipe fixations without support shells:

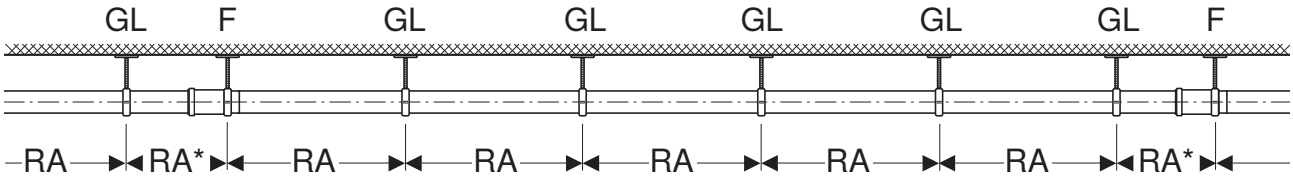


Figure 63: Pipe bracket spacing RA when fastening to ceilings and horizontally to walls, without support shells

GL Sliding point
F Anchor point
RA Pipe bracket spacing
RA* Distance to the expansion socket (not relevant for the design with a deflection leg)

DN	d [mm]	RA [m]	RA* [m]	Weight force FG[1)] [N]
30	32	0.8	0.4	6
40	40	0.8	0.4	11
50	50	0.8	0.4	16
56	56	0.8	0.4	20
60	63	0.8	0.4	25
70	75	0.8	0.4	36
90	90	0.9	0.5	58
100	110	1.1	0.6	106

1) Weight force per pipe bracket, pipe filled with water (10 °C)

Pipe bracket spacing when fastening horizontally to ceilings and walls, with support shells

The following pipe bracket spacing RA is applied for pipe fixations with support shells:

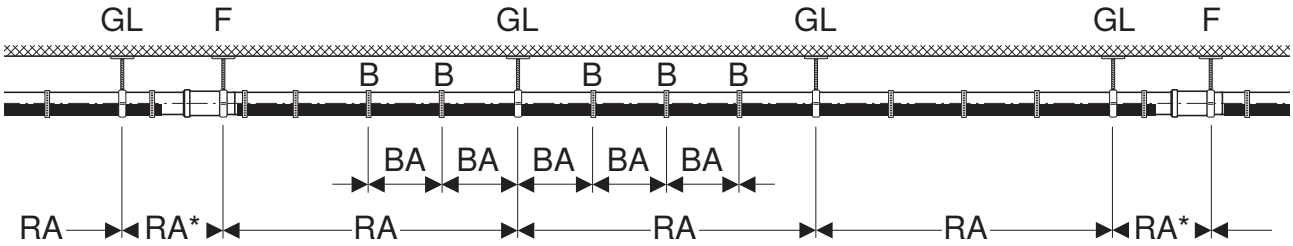


Figure 64: Pipe bracket spacing RA when fastening to ceilings and walls, with support shells

GL	Sliding point
F	Anchor point
B	Support shell fastening
BA	Spacing of fastening strips
RA	Pipe bracket spacing
RA*	Distance to the expansion socket (not relevant for the design with a deflection leg)

DN	d [mm]	RA [m]	RA* [m]	BA [m]	Weight force FG[1)] [N]
30	32	1.0	0.5	0.5	8
40	40	1.0	0.5	0.5	13
50	50	1.0	0.5	0.5	20
56	56	1.0	0.5	0.5	25
60	63	1.0	0.5	0.5	32
70	75	1.2	0.6	0.5	45
90	90	1.4	0.7	0.5	86
100	110	1.7	0.9	0.5	158

1) Weight force per pipe bracket, pipe filled with water (10 °C)

Anchor and sliding points for fastening on the wall

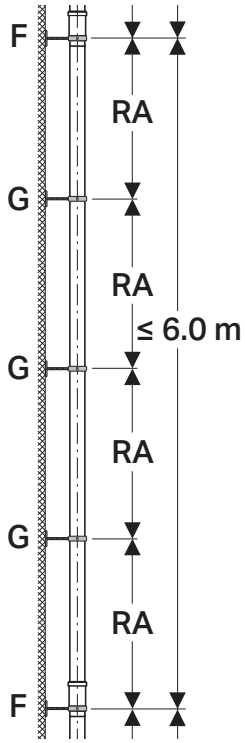


Figure 65: Configuration of anchor and sliding points for fastening on the wall

G Sliding point
F Anchor point
RA Maximum distance between 2 pipe brackets

Table 15: Fastening distances when fastening on the wall

d [mm]	DN [mm]	RA [m]
40	40	1.0
50	50	
56	56	
63	60	
75	70	1.2
90	90	1.4
110	100	1.7
125	125	1.9
160	150	2.4
200	200	3.0
250	250	
315	300	

3.7.7 Conventional rigid installation

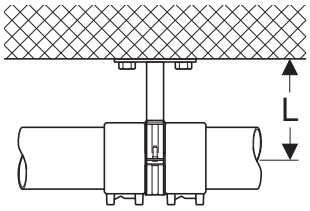
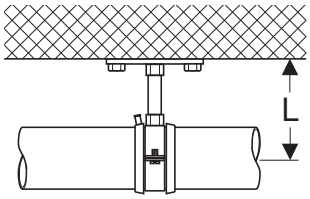
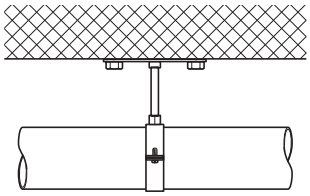
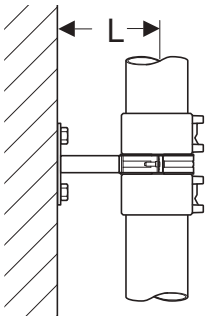
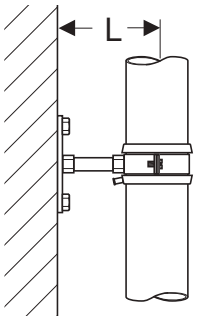
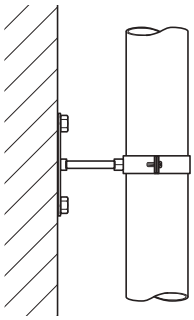
Pipe laying with conventional rigid installation:

- can be used for horizontal and vertical pipes
- recommended up to DN 125 (d125)
- expansion forces resulting 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:

Conventional rigid installation is not recommended for fastening Geberit Pluvia roof drainage systems. If no other type of fastening is possible, anchor and sliding points should be configured as follows:

Table 16: Configuration of anchor and sliding points for conventional rigid installation

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

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

Conventional rigid installation design

The forces generated by the thermally induced change in length are transferred to the building through anchor points in a conventional rigid installation. The following rules must be observed in this case:

- An anchor point must be created immediately before each branch fitting as well as each outlet from the branch fitting.
- An anchor point must be created immediately before and after each reducer.

Anchor and sliding points must be designed as follows so that the change in length can be transferred to the building through the rigid installation:

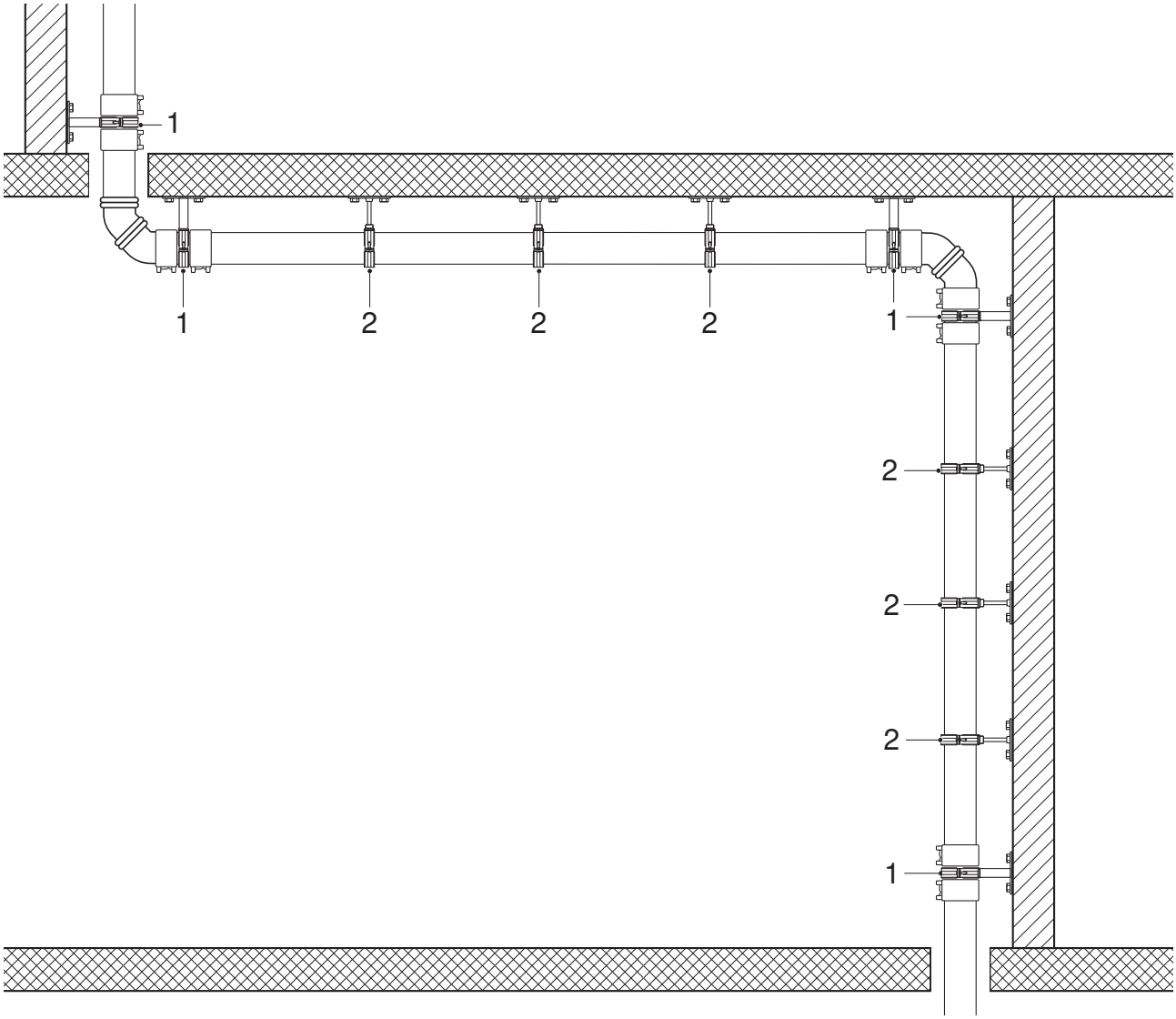


Figure 66: Design of the conventional rigid installation

1 Pipe bracket with 2 Geberit electrofusion couplings as an anchor point
2 Pipe bracket as a sliding point

Anchor point with Geberit electrofusion tape

Anchor points are designed with suitable pipe brackets and a sufficiently strong pipe bracket fastening on the Geberit electrofusion tape (d50–315).

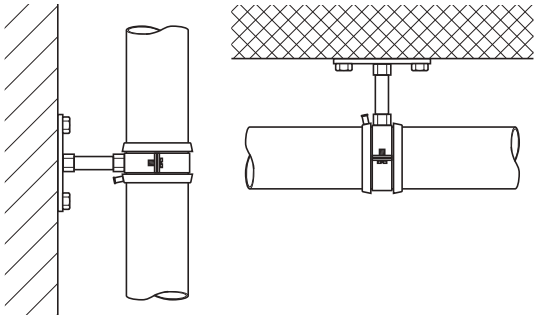


Figure 67: Vertical and horizontal anchor-point fastening on Geberit electrofusion tape

Anchor point with Geberit electrofusion couplings

Anchor points are designed with suitable pipe brackets and a sufficiently strong pipe bracket fastening on the pipe with 2 Geberit electrofusion couplings (d40–160).

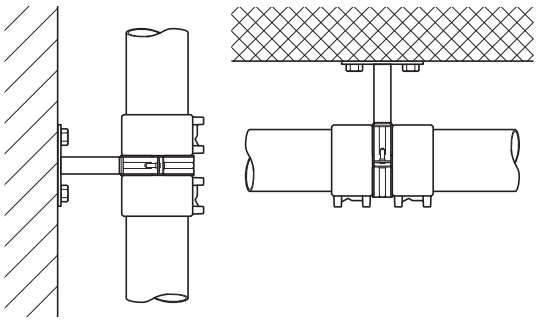


Figure 68: Vertical and horizontal anchor-point fastening with a pipe bracket on the pipe with 2 Geberit electrofusion couplings

Thickness of the pipe fixation for anchor points in a rigid installation

Geberit recommends consulting a specialist in fastening technology for the pipe bracket fixation for anchor points in a rigid installation.

The required thickness of the threaded rods/threaded pipes must be selected depending on the ceiling or wall distance.

The required thicknesses of the pipe bracket fixation below are calculated on the basis of the expansion forces on anchor points in a rigid installation when heated to a temperature of between approx. +20 °C and +90 °C.

Table 17: Required thickness of the pipe bracket fixation when fastening horizontally to ceilings and walls

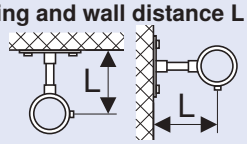
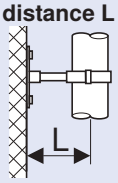
DN	d [mm]	Ceiling and wall distance L [cm] 					
		10	20	30	40	50	60
40	40	3/4"	1 1/4"	1 1/4"	1 1/2"	2"	2"
50	50	1"	1 1/4"	1 1/2"	2"	2"	2"
56	56	1"	1 1/4"	1 1/2"	2"	2"	–
60	63	1"	1 1/2"	2"	2"	–	–
70	75	1"	1 1/2"	2"	2"	–	–
90	90	1 1/4"	2"	–	–	–	–
100	110	1 1/2"	–	–	–	–	–
125	125	2"	–	–	–	–	–
150	160	–	–	–	–	–	–

Table 18: Required thickness of the pipe bracket fixation when fastening vertically to walls

DN	d [mm]	Wall distance L [cm] 					
		10	20	30	40	50	60
40	40	1/2"	3/4"	1"	1"	1"	1 1/4"
50	50	1/2"	3/4"	1"	1"	1 1/4"	1 1/4"
56	56	1/2"	1"	1"	1 1/4"	1 1/4"	1 1/2"
60	63	3/4"	1"	1"	1 1/4"	1 1/4"	1 1/2"
70	75	3/4"	1"	1 1/4"	1 1/4"	1 1/2"	1 1/2"
90	90	1"	1 1/4"	1 1/4"	1 1/2"	2"	2"
100	110	1"	1 1/4"	2"	2"	2"	–
125	125	1 1/4"	1 1/2"	2"	–	–	–
150	160	–	–	–	–	–	–

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

Fastening in the case of a small wall and ceiling distance

If the Geberit Pluvia fastening system cannot be fitted due to insufficient distance to the wall or ceiling, it can be fastened with pipe brackets and threaded rods with the following thicknesses, provided that the following requirement is met:

- The pipes are in a zone with constant temperatures.

Outdoor installations (exposed to sunshine) are excluded from this application.

If there is any doubt as to whether this particular solution can be used, use the values in the tables showing the thickness of the pipe bracket fixation for anchor points in a rigid installation.

Table 19: **Anchor points** for a wall and ceiling distance of **12 cm**

DN	d [mm]	Thickness of the threaded rod [Inches]
40–150	40–160	1/2

Table 20: **Sliding points for a wall and ceiling distance of 12 cm**

DN	d [mm]	Thickness of the threaded rod
40–150	40–160	M10

Pipe bracket spacing in a rigid installation without support shells

The following pipe bracket spacing RA is applied in a rigid installation without support shells:

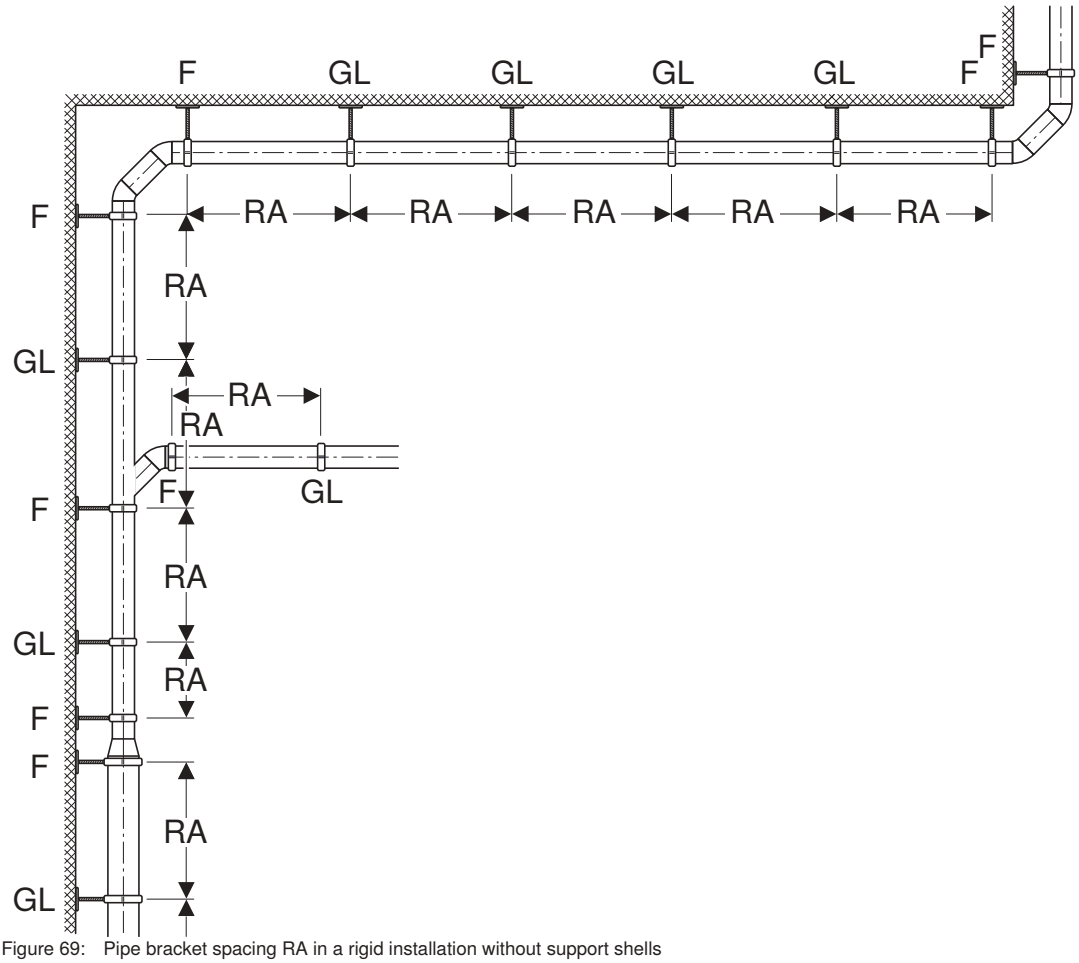


Figure 69: Pipe bracket spacing RA in a rigid installation without support shells

G Sliding point
F Anchor point
RA Pipe bracket spacing

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

Forces generated in Geberit HDPE pipes with rigid installation

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 installation, 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, it must be ensured that the fastening screws can withstand the generated forces.

Table 21: Forces generated in Geberit HDPE pipes

d [mm]	Annular profile [cm^2]	Expansion force [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

3.7.8 Sliding point fixation

Sliding points are created with pipe brackets on the pipe and a sufficiently strong pipe bracket fixation. The design of sliding points is the same for all fastening types.

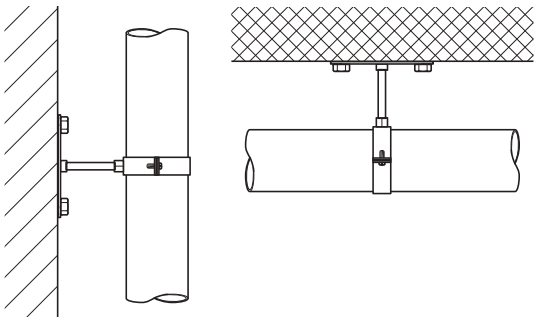


Figure 70: Vertical and horizontal fastening of sliding points with a pipe bracket on the pipe

Thickness of the pipe fixation for sliding points

Geberit offers a suitable fastening system with pipe brackets, threaded rods, threaded pipes as well as base plates with threaded rods in different thicknesses. The required thickness of the threaded rods for the fastening must be selected depending on the ceiling or wall distance.

Table 22: Required thickness of the pipe bracket fixation when fastening horizontally to ceilings and walls

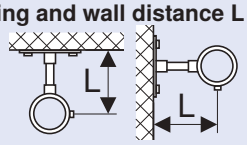
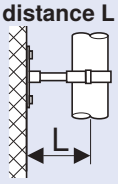
DN	d [mm]	Ceiling and wall distance L [cm] 					
		10	20	30	40	50	60
30	32	M10	M10	M10	M10	M10	1/2"
40	40	M10	M10	M10	M10	M10	1/2"
50	50	M10	M10	M10	M10	M10	1/2"
56	56	M10	M10	M10	M10	M10	1/2"
60	63	M10	M10	M10	M10	M10	1/2"
70	75	M10	M10	M10	M10	M10	1/2"
90	90	M10	M10	M10	M10	M10	1/2"
100	110	M10	M10	M10	M10	1/2"	1/2"
125	125	M10	M10	M10	1/2"	1/2"	1/2"
150	160	–	M10	1/2"	1/2"	1/2"	1/2"
200	200	–	1"	1"	1"	1"	1"
250	250	–	1"	1"	1"	1"	1"
300	315	–	1"	1"	1"	1"	1"

Table 23: Required thickness of the pipe bracket fixation when fastening vertically to walls

DN	d [mm]	Wall distance L [cm] 					
		10	20	30	40	50	60
30	32	M10	M10	M10	1/2"	1/2"	1/2"
40	40	M10	M10	M10	1/2"	1/2"	1/2"
50	50	M10	M10	M10	1/2"	1/2"	1/2"
56	56	M10	M10	M10	1/2"	1/2"	1/2"
60	63	M10	M10	M10	1/2"	1/2"	1/2"
70	75	M10	M10	M10	1/2"	1/2"	1/2"
90	90	M10	M10	M10	1/2"	1/2"	1/2"
100	110	M10	M10	1/2"	1/2"	1/2"	1/2"
125	125	M10	1/2"	1/2"	1/2"	1/2"	1/2"
150	160	–	1/2"	1/2"	1/2"	1/2"	1/2"
200	200	–	1"	1"	1"	1"	1"
250	250	–	1"	1"	1"	1"	1"
300	315	–	1"	1"	1"	1"	1"

3.7.9 Determining the distance and number of supports

Geberit Pluvia support sets can be fastened on ceilings as well as walls.

The number and positioning of the Geberit Pluvia support sets in a piping system can be determined with the Geberit ProPlanner planning software.

Examples of supports used with Geberit Pluvia branch discharge pipes:

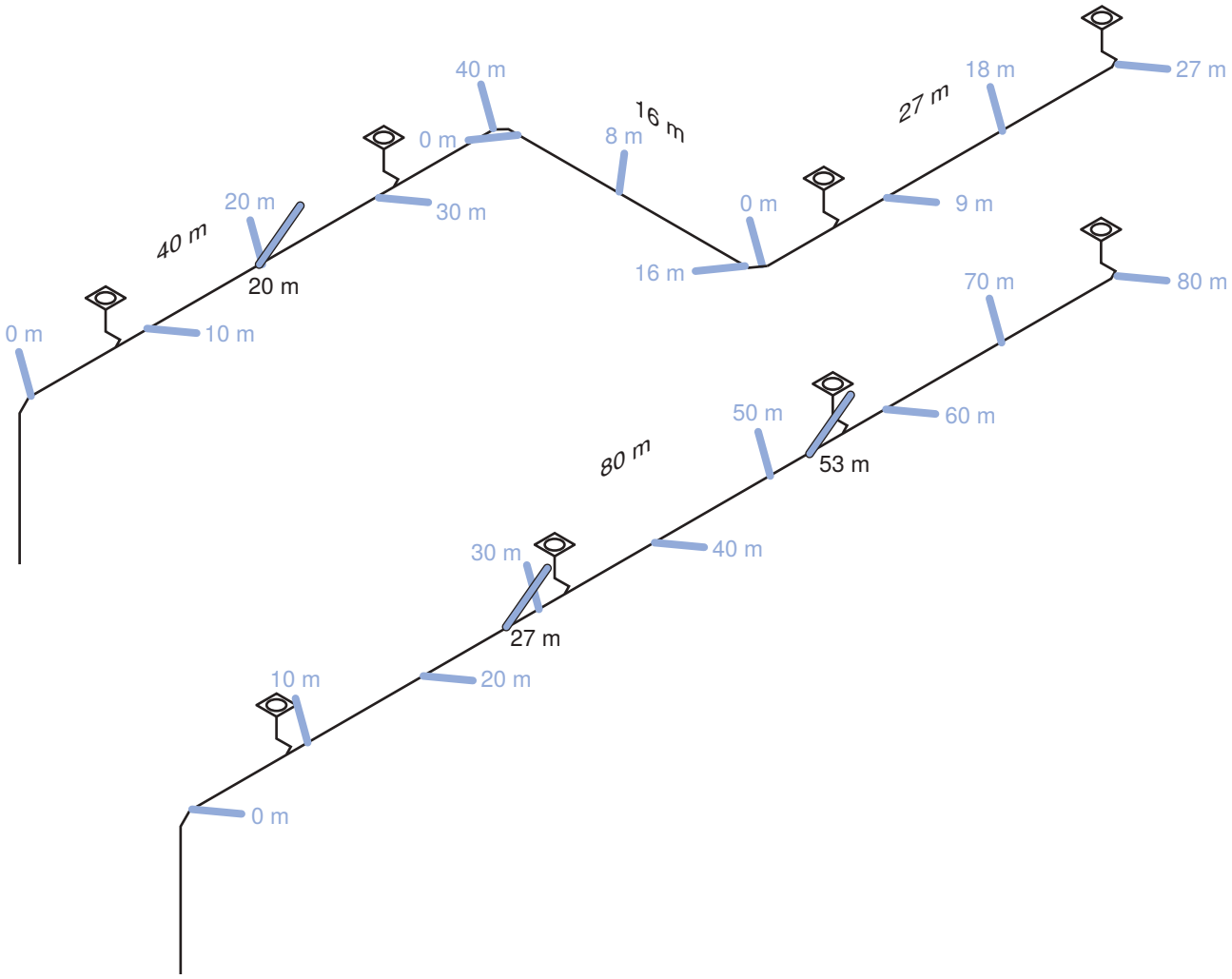


Figure 71: Examples of attaching Geberit Pluvia supports to branch discharge pipes

For ceiling fastening

When fastening Geberit Pluvia support sets **sideways** on the ceiling, the following rules must be observed:

- Attach 1 support set at the start and end of every pipe section.
- The maximum distance between the support sets must not exceed 10 m.
- The support sets must be attached on the left and right sides of the support rail alternately at an angle of > 45° to the ceiling.

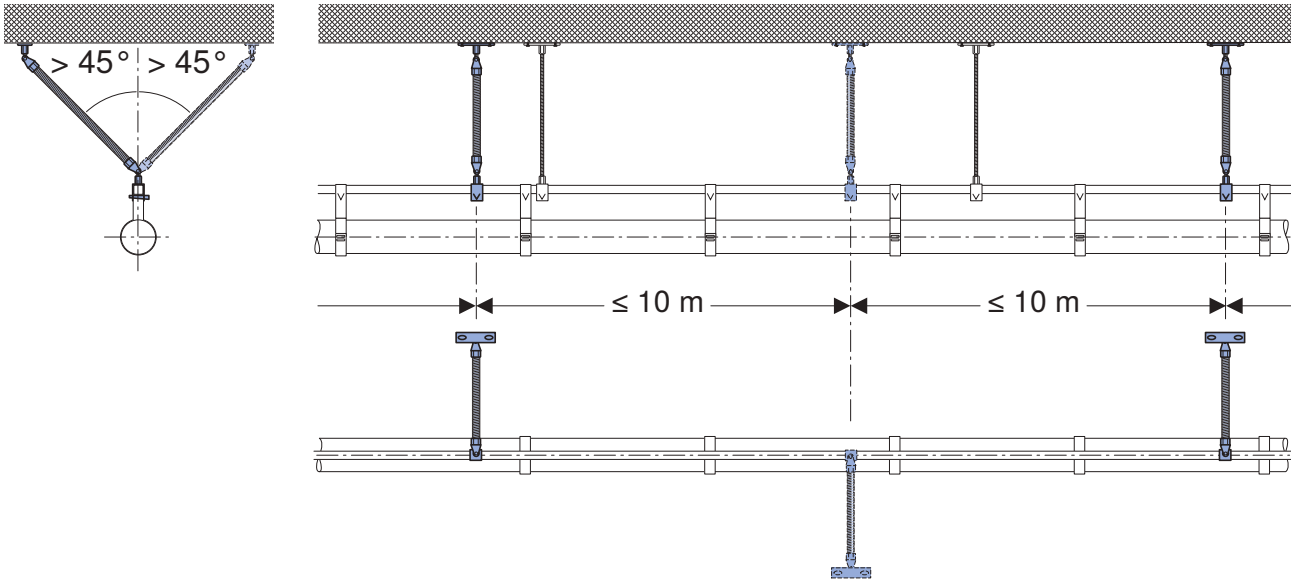


Figure 72: Positioning of Geberit Pluvia support sets installed sideways on the ceiling

If pipe sections longer than 30 m are being used, additional Geberit Pluvia support sets must be mounted on the ceiling, **lengthwise** in relation to the pipe. The following rules must be observed during this process:

- The maximum distance between the support sets must not exceed 30 m lengthwise.
- The support sets must be mounted lengthwise in relation to the support rail at an angle of > 45° to the ceiling. They can be installed either in the direction of flow or against it.

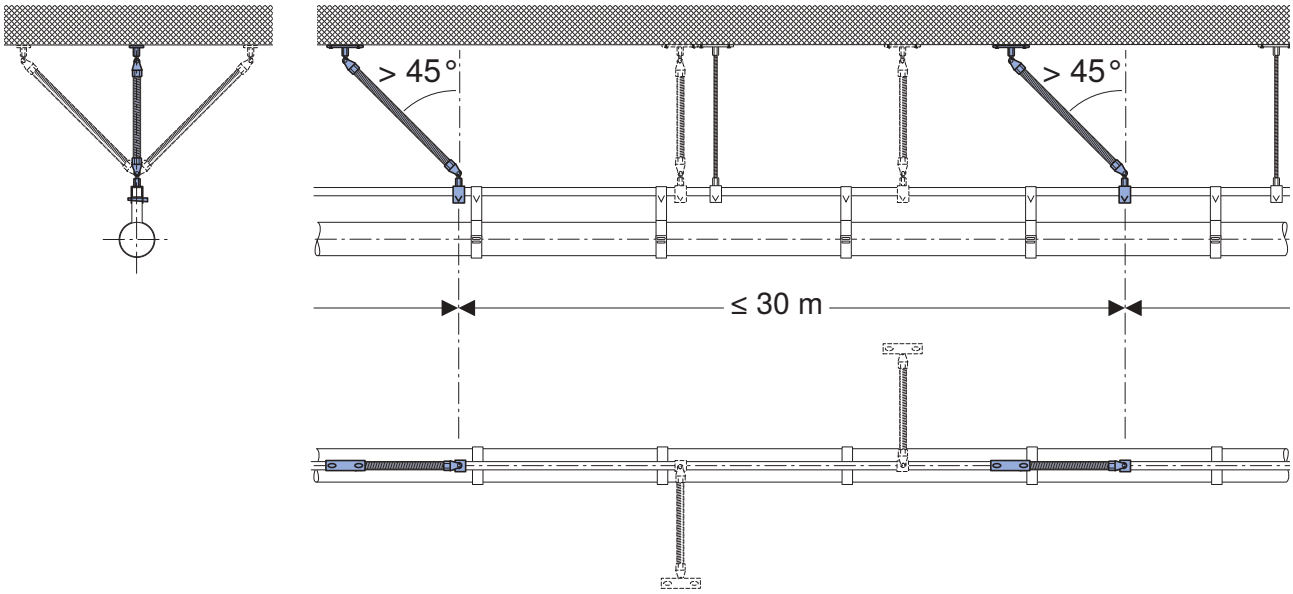


Figure 73: Positioning of Geberit Pluvia support sets installed on the ceiling, lengthwise in relation to the pipe

For wall fixing

In the case of Geberit Pluvia support rails suspended at a distance, or a Geberit Pluvia pipe positioned close to the wall, the Geberit Pluvia support sets can be fastened to the wall **sideways**. The following rules must be observed during this process:

- Attach 1 support set at the start and end of every pipe section.
- The maximum distance between the support sets must not exceed 10 m.

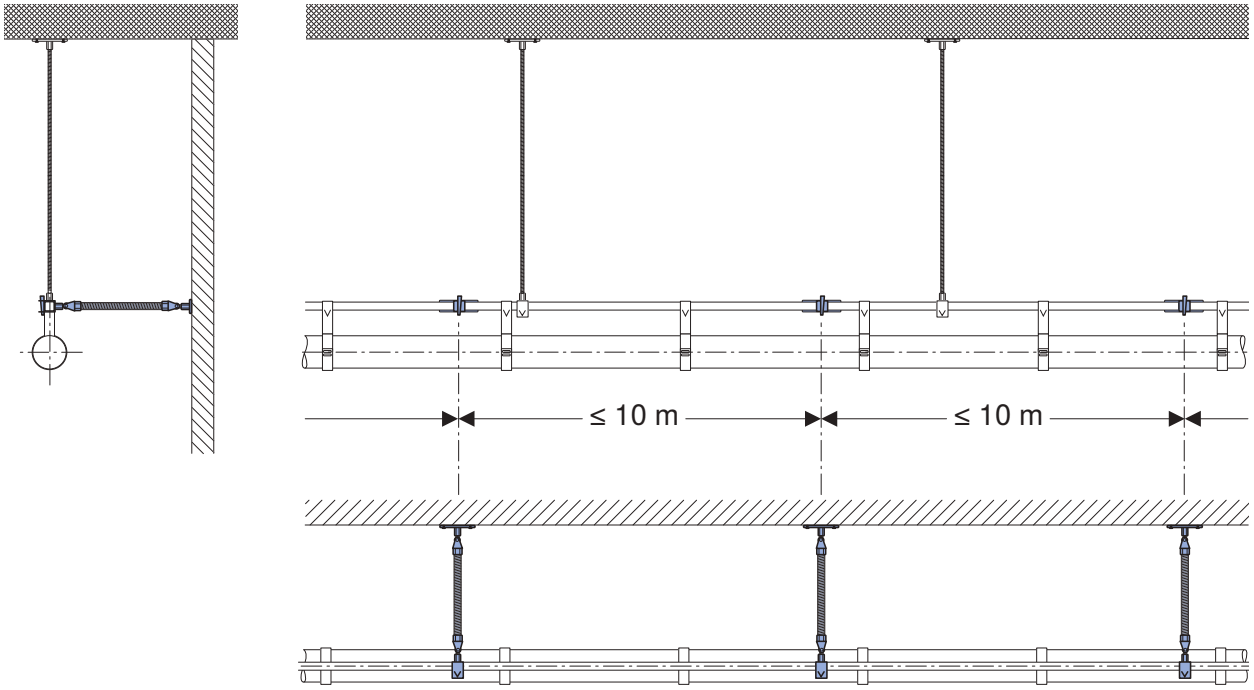


Figure 74: Positioning of Geberit Pluvia support sets installed sideways on the wall

If pipe sections longer than 30 m are being used, additional Geberit Pluvia support sets must be mounted on the wall, **lengthwise** in relation to the pipe. The following rules must be observed during this process:

- The maximum distance between the support sets must not exceed 30 m lengthwise.
- The support sets must be mounted lengthwise in relation to the support rail at an angle of > 45° to the wall. They can be installed either in the direction of flow or against it.

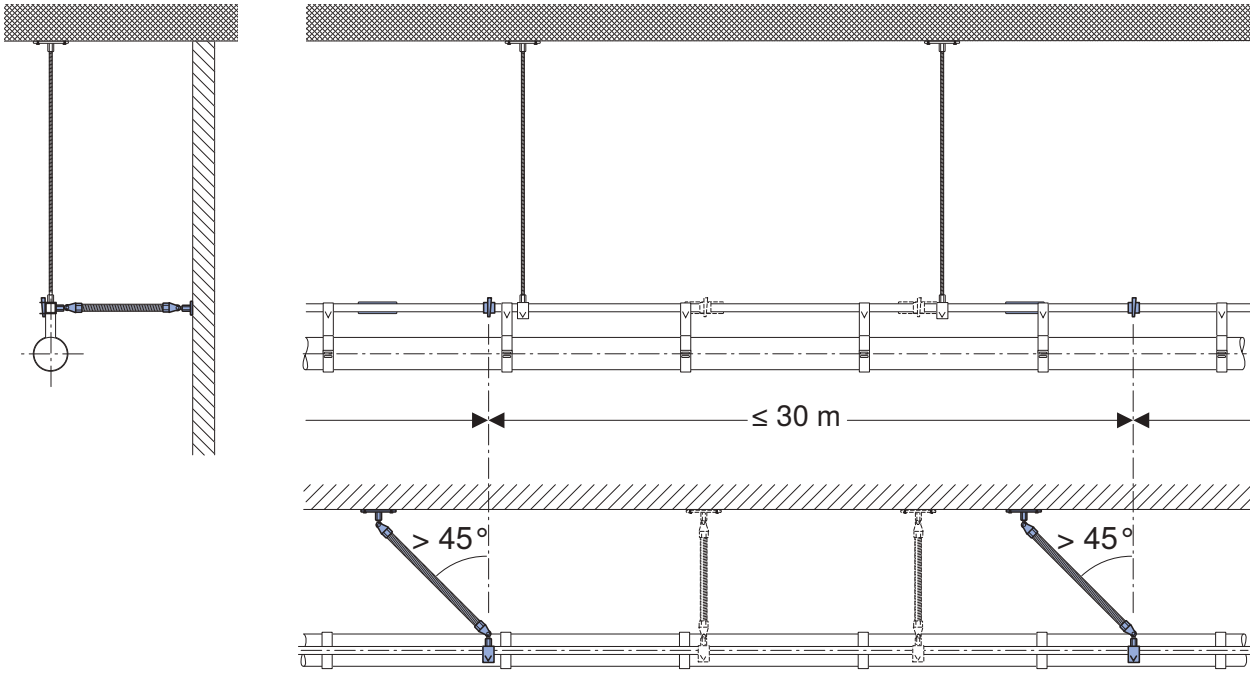


Figure 75: Positioning of Geberit Pluvia support sets installed on the wall, lengthwise in relation to the pipe

3.7.10 Installation rules for Geberit Pluvia support sets

Geberit Pluvia support sets are fastened to ceilings or walls. The following rules must be observed:

- Screw articulated joints into the nuts fully, and unscrew by a maximum of one half revolution to ensure alignment.
- Always use 2 lead-through pins in the case of profile hangers for lead-through installation.
- Use at least 2 screws on both sides in the case of profile hangers for screw fastening.

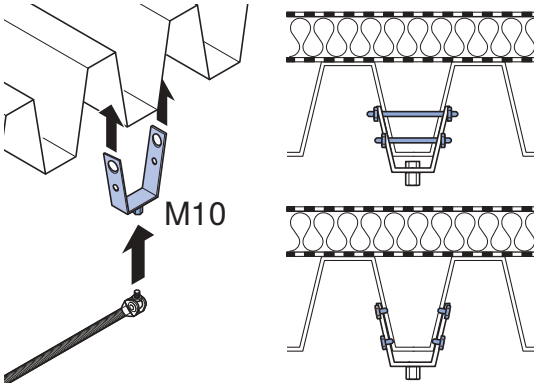


Figure 76: Fastening Geberit Pluvia support sets on a trapezoidal roof using profile hangers

Observe the load bearing capacity of the profiled sheet when using profile hangers.

Profile hangers are not Geberit products and must be purchased on-site.

- When installing Geberit Pluvia support sets on the wall, attach the Geberit Pluvia suspension elements sideways to the Geberit Pluvia support rail.
- In the case of pipe dimensions up to d200, ensure that the Geberit Pluvia suspension element is positioned so that the Geberit Pluvia tension wedge is installed pointing downwards.

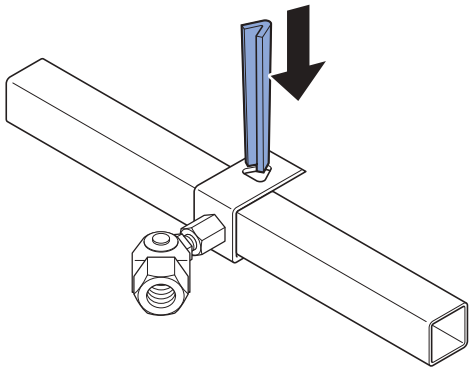


Figure 77: Sideways attachment of the Geberit Pluvia suspension element

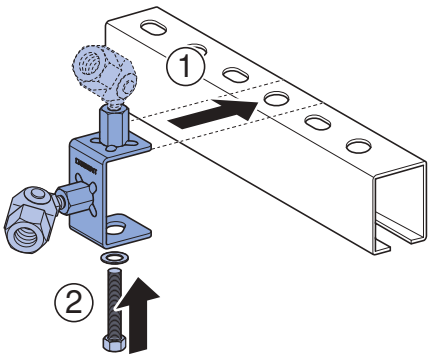


Figure 78: Attaching the Geberit Pluvia suspension element in the case of pipes d250–315

3.8 MOISTURE PROTECTION

If there are differences in temperature between the roof drainage pipe, roof structure and environment, condensation can form on the pipeline.

To prevent condensation, the roof drainage pipe must be equipped with anticondensation insulation.

Combined sound insulation and moisture protection can be attained with the Geberit sound insulation mat Isol Flex. In addition to the use as a sound insulation mat, the Geberit Isol Flex sound insulation mat is also suitable as anticondensation insulation in rooms that are subject to normal use.

The following environmental data is taken into account:

- temperature of the rainwater 0 °C
- room temperature < 25 °C
- humidity < 60 %

For other environmental data or applications, combined solutions with additional cold insulation (e.g. Armaflex) must be provided.

Table 24: Insulation of rainwater pipes (rainwater 0 °C, room temperature < 25 °C, humidity < 60 %)

Pipe dimension		**Anticondensation, structure-borne sound and airborne sound insulation**	**Anticondensation and structure-borne sound insulation**	
		Geberit sound insulation mat Isol Flex[1] s = 17 mm	**Armaflex AF[2] s = 13 mm**	**Armaflex AF[2] s = 13 mm**
DN	**d**	**Art. no.**	**Art. no.**	**Art. no.**
40	40	356.015.00.1	H-042	13 x 042
50	50		H-054	13 x 054
56	56		H-057	13 x 060
60	63		H-064	13 x 064
70	75		H-076	13 x 076
90	90		H-089	13 x 089
100	110		H-114	13 x 114
125	135		H-113/140	13 x 140

1) All joints must be taped off

2) Source: Insulating material trade. Equivalent products can also be used.

3.9 FROST PROTECTION

For heat-insulated roofs and projecting roofs, frost protection measures are a good idea since parts of the pipe can freeze. Here, we recommend insulating the pipes and the roof outlets appropriately.

Insulated roofs do not require frost protection measures in the form of trace heaters. Pipes inside a building are also frost-free.

With Geberit Pluvia roof outlets that cover unheated rooms or are positioned in the shade, we recommend installing a self-regulating trace heater. Make sure that the trace heater is mounted outside and the discharge capacity of the roof outlet is not reduced.

The following standards and building regulations must be observed:

- Heating elements must comply with DIN EN 60335-2-83:2009-02.
- Heating elements must be installed properly and in accordance with DIN VDE 0100.

Installation and use must be done according to the manufacturer information on the respective trace heater.

Regardless of the heating element used, we recommend using a thermostat with an outside temperature sensor to switch off the heating element in the warmer months.

3.9.1 Geberit Pluvia heating element 230 V / 8 W

The Geberit Pluvia heating element is used to heat Geberit Pluvia roof outlets in non-ventilated flat-roof structures.

The Geberit Pluvia heating element is suitable for use for:

- roof structures with insulation thicknesses ≥ 12 cm
- Geberit Pluvia roof outlets with outlet pipe connection d56

Figure 79: Geberit Pluvia heating element 230 V / 8 W

Nominal voltage	230 V AC
Power consumption at 4 °C	8 W
Connecting dimension	56 mm

3.9.2 Geberit heating strip 230 V / 11.2 W

For Geberit Pluvia roof outlets with discharge rates of 19 l/s and 25 l/s or 45 l/s, the Geberit heating strip is used for heating.

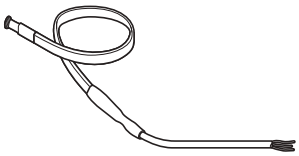


Figure 80: Geberit heating strip 230 V / 11.2 W

Nominal voltage	230 V AC
Power consumption at 4 °C	11.2 W
Connecting dimension	56–110 mm

3.10 PROTECTION AGAINST HAIL DAMAGE

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

3.10.1 Hail damage for Geberit Pluvia roof outlets on flat roofs

A grating (hole size of approx. 8 x 20 mm) is mounted on flat roofs to protect the Geberit Pluvia roof outlet.

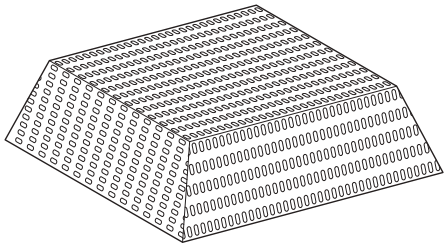


Figure 81: Grating for Geberit Pluvia roof outlet

The grating is not part of the Geberit assortment and must be purchased separately.

3.10.2 Hail protection for Geberit Pluvia roof outlets in valley gutters

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

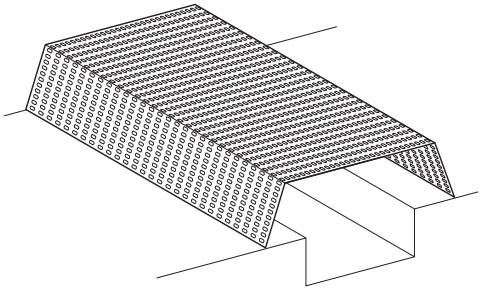


Figure 82: Grating for gutter

The grating is not part of the Geberit assortment and must be purchased separately.

3.11 SOUND INSULATION

Due to the high flow speed in the piping system, the sound pressure level with 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 sound insulation requirements, a sound-optimised pipe layout is achieved by:

- optimum placement of the roof outlets and pipes
- reduction of the sound transmission to the building structure
- reduction of the spread of airborne sound

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, laying in sound-optimised installation ducts and/or insulation with an insulating layer is possible.

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

Combined sound insulation and moisture protection can also be attained with the Geberit sound insulation mat Isol Flex. This can be used as both a sound insulation mat and anticondensation insulation in rooms subject to normal usage.

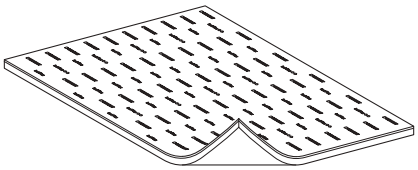


Figure 83: Geberit sound insulation mat Isol Flex

The following environmental data is taken into account:

- temperature of the rainwater 0 °C
- room temperature < 25 °C
- humidity < 60 %

All joints must be taped off:

- axial edges parallel to the pipe axis
- radial edges
- all outer edges of the fittings

3.12 EMERGENCY DRAINAGE

3.12.1 Emergency drainage on the building structure for flat roofs

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

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

Regardless of the design of emergency overflows, the lower edge of the emergency overflows must be arranged 5.5 cm above the uppermost 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.

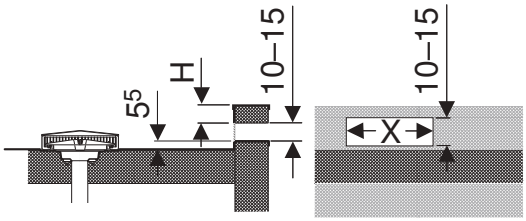


Figure 84: Emergency overflow with flat roof, in the facade

X Width of the emergency overflow
H Distance from the upper edge to the parapet

3.12.2 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.

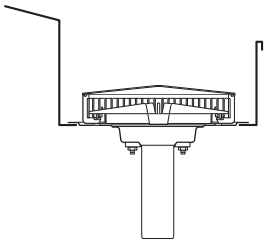


Figure 85: Emergency overflow with eaves gutters

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

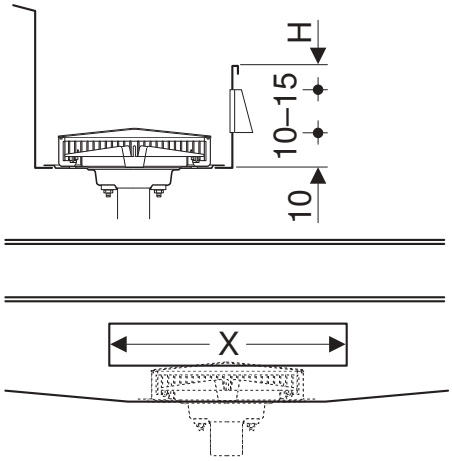


Figure 86: Emergency overflow with gutter, on the longitudinal side

X Width of the emergency overflow
H Distance from the upper edge to the gutter

Valley gutters

Emergency overflows must be correctly positioned. This is especially important for valley gutters (e.g. with sawtooth 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 roof outlet opening.

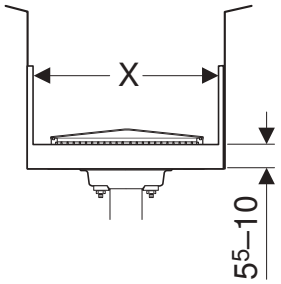


Figure 87: Emergency overflow with gutter, on the front side.

X Width of the emergency overflow

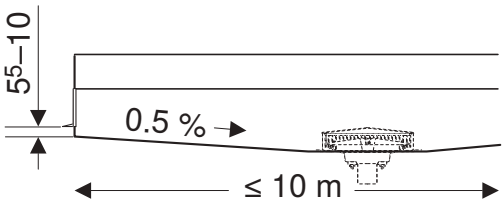


Figure 88: Emergency overflow with gutter, on the front side. Overflow channel and distance from the next roof outlet.

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

3.13 INSTALLATION DIMENSIONS AND INSTALLATION PROCESSES FOR GEBERIT PLUVIA ROOF OUTLETS

3.13.1 Geberit Pluvia roof outlets

The following installation processes are abridged and incomplete versions from Geberit installation instructions. They include the most important steps. The full installation instructions included with the product must be used for the installation.

Unless otherwise stated, the dimensions are given in cm.

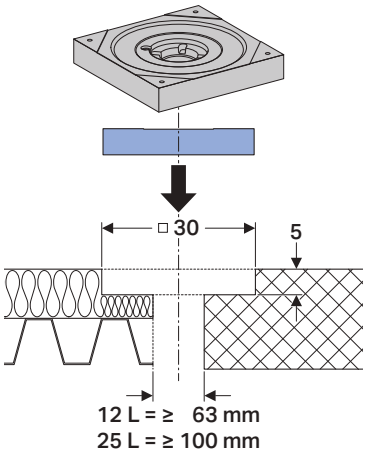
Basic rules

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

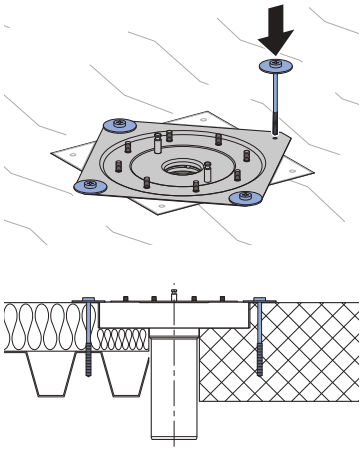
Geberit Pluvia roof outlets 12 / 25 l

Solid roof and insulated roof structure

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

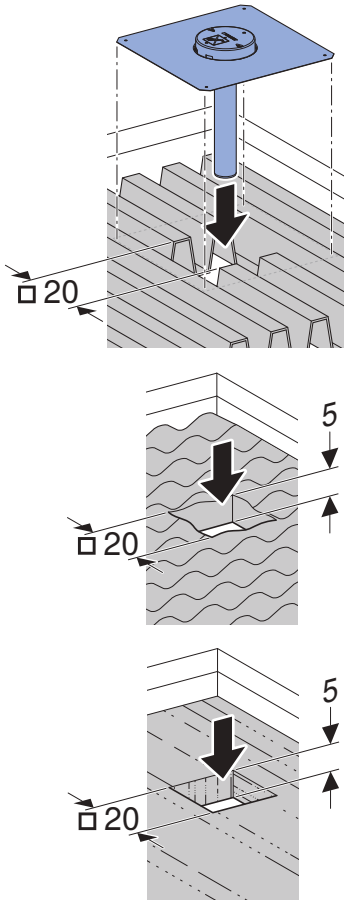


The Geberit Pluvia roof outlet for roof foils and the Geberit Pluvia roof outlet for bitumen are directly fastened to the roof structure.

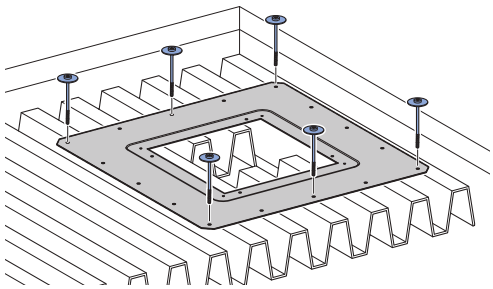


Lightweight roof

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



The Geberit Pluvia roof outlet for roof foils is fastened with the installation sheet, art. no. 359.006.25.1, in the roof structure.

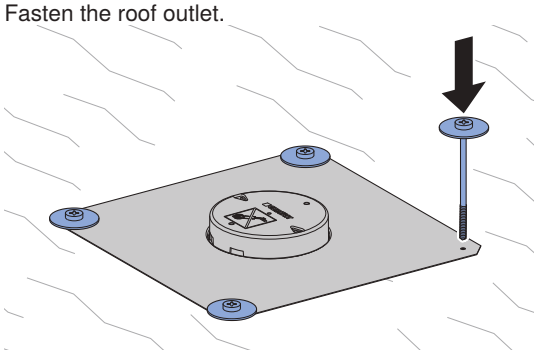


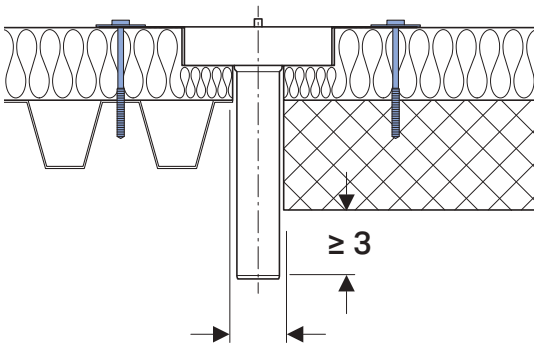
Connections

The handling and installation of the roof sealing material has to follow the installation rules and technique of the roof sealing material.

Connection with the bitumen roof foil

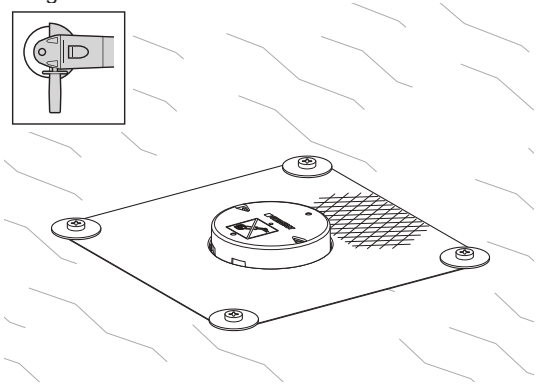
1 Fasten the roof outlet.



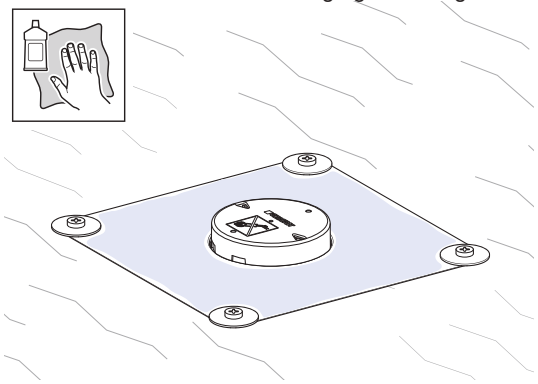


12 L = ≥ 63 mm
25 L = ≥ 100 mm

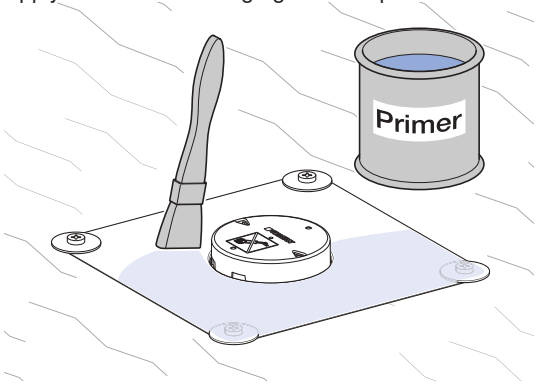
2 Roughen the metal surface of the roof outlet.



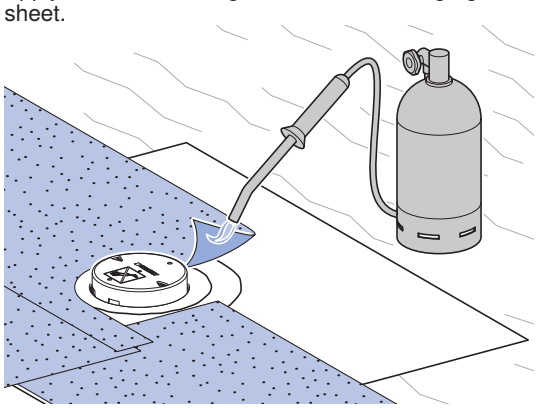
3 Clean the surface with a bonding agent to degrease the contact sheet.



4 Apply a bitumen bonding agent for improved adhesion of the bitumen sheeting.

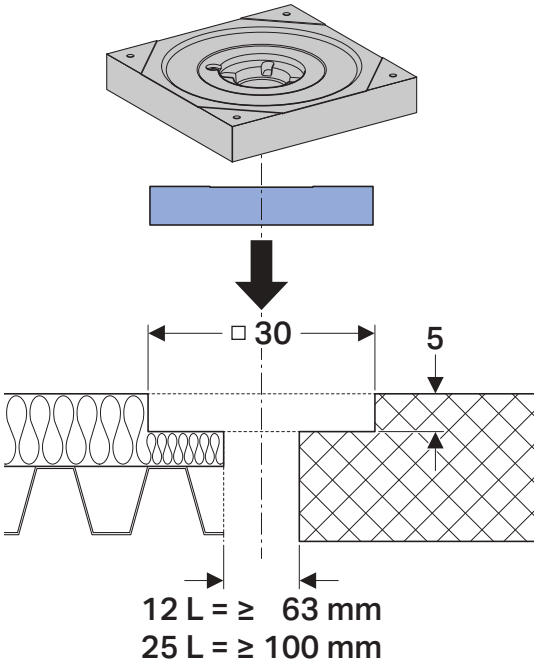


5 Apply bitumen sheeting to the dried bonding agent. Use the protection box cover and avoid heat being applied to the contact sheet.

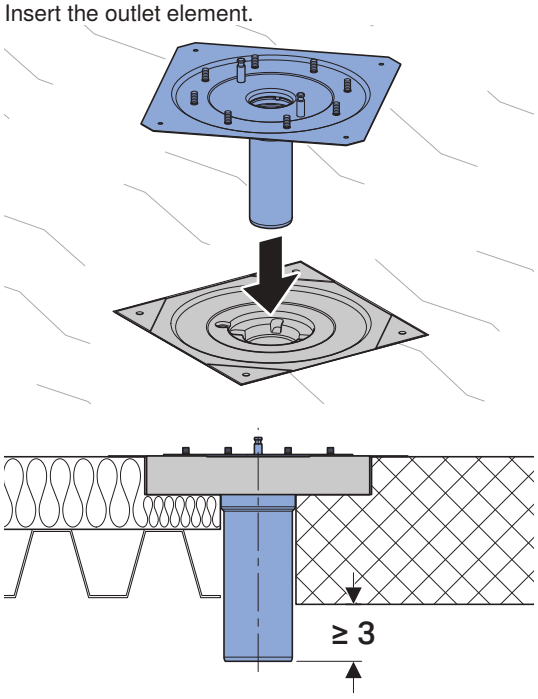


Connection with fastening flange

1 Put the anticondensation insulation in place.

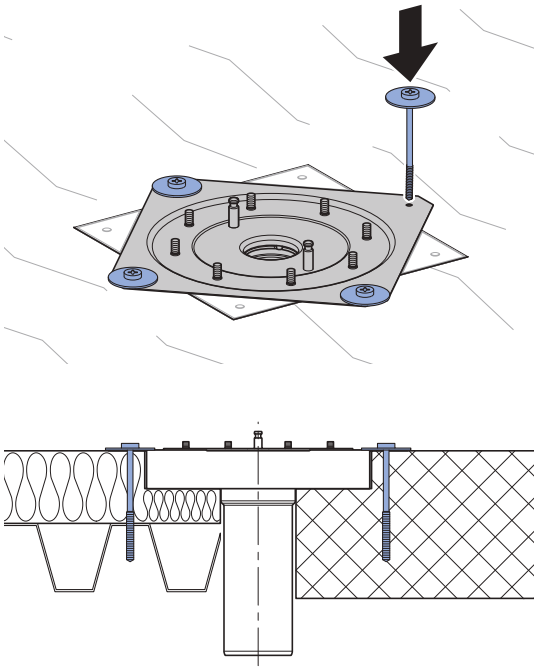


2 Insert the outlet element.



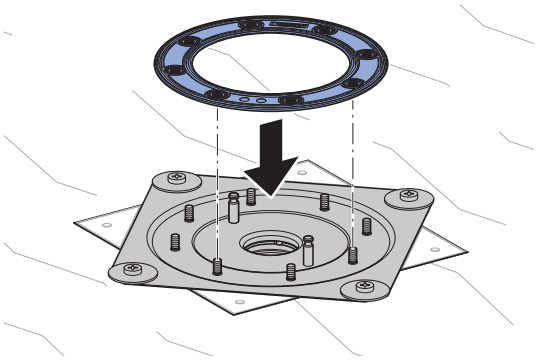
3

Fasten the outlet element.



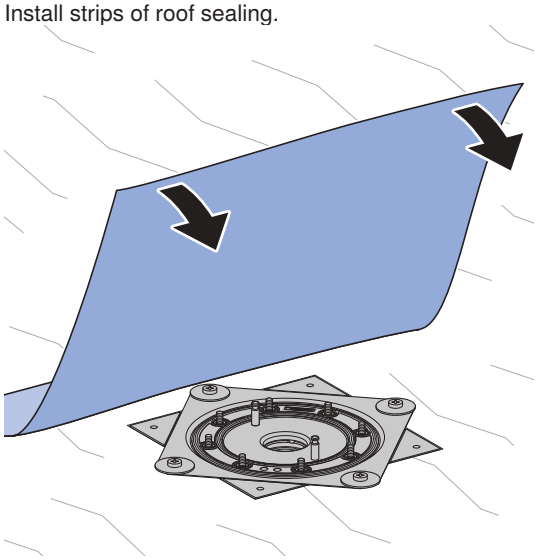
4

Install the flange gasket.



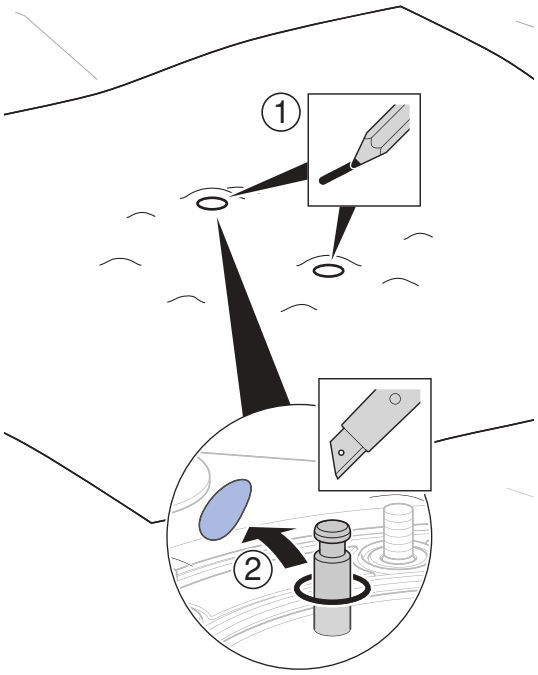
5

Install strips of roof sealing.



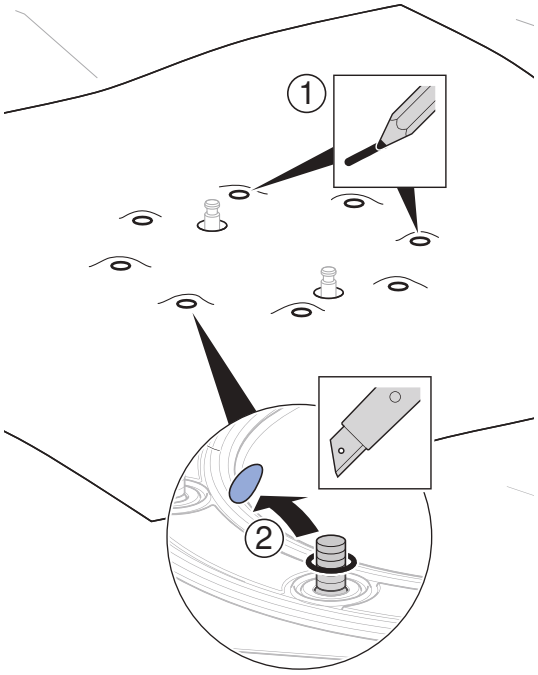
6

Create opening for outlet grating bolts.



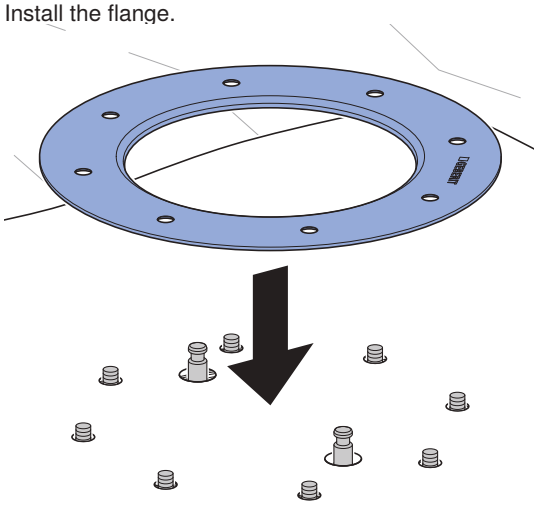
7

Create opening for push-in bolts.



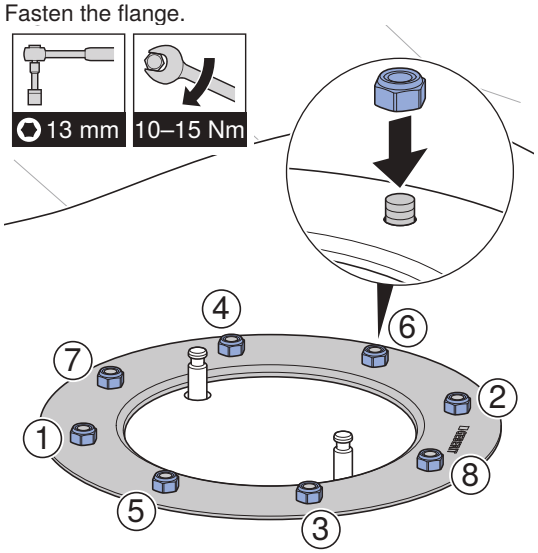
8

Install the flange.



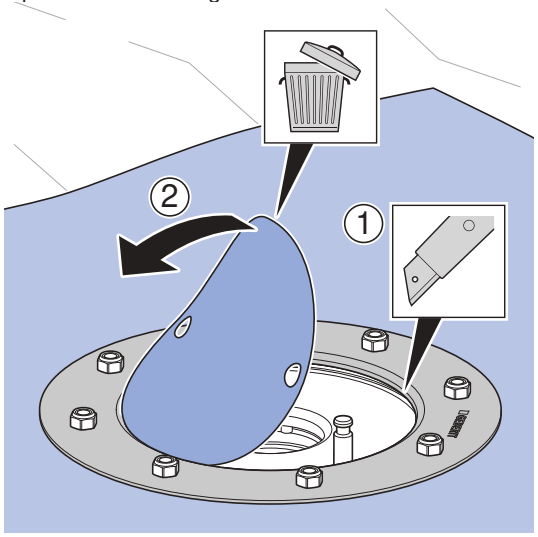
9

Fasten the flange.



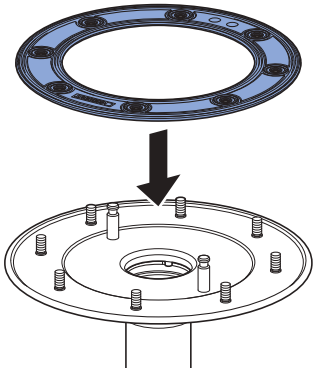
10

Open the roof sealing.

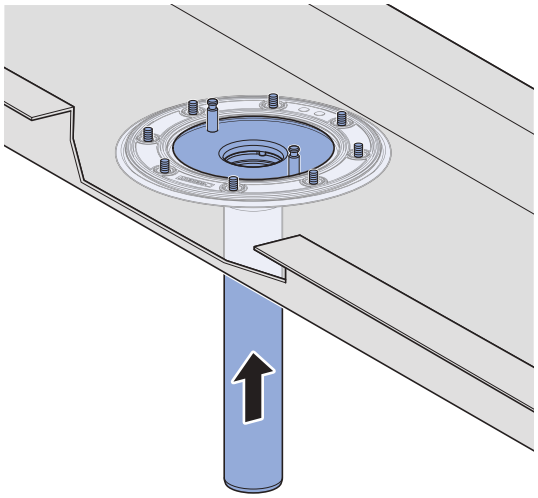


Connection with fastening flange (gutter)

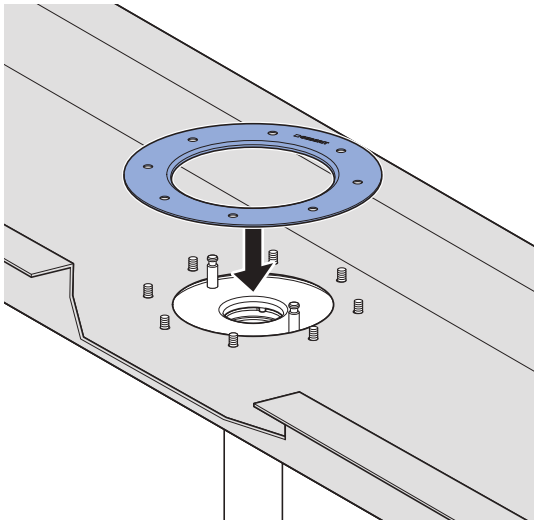
1 Mount the flange gasket on the outlet element.



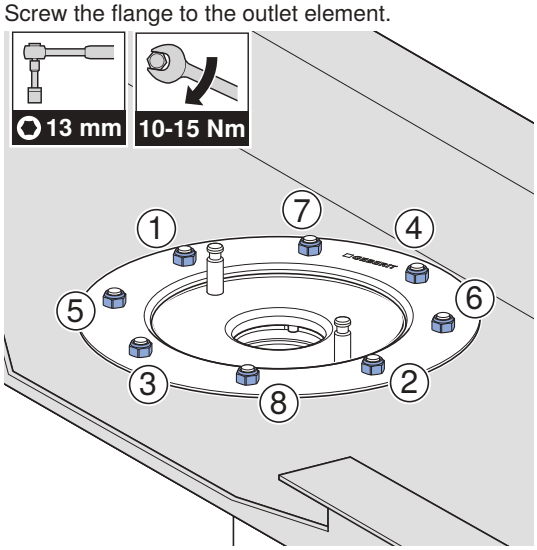
2 Mount the outlet element on the underside of the gutter.



3 Mount the flange.

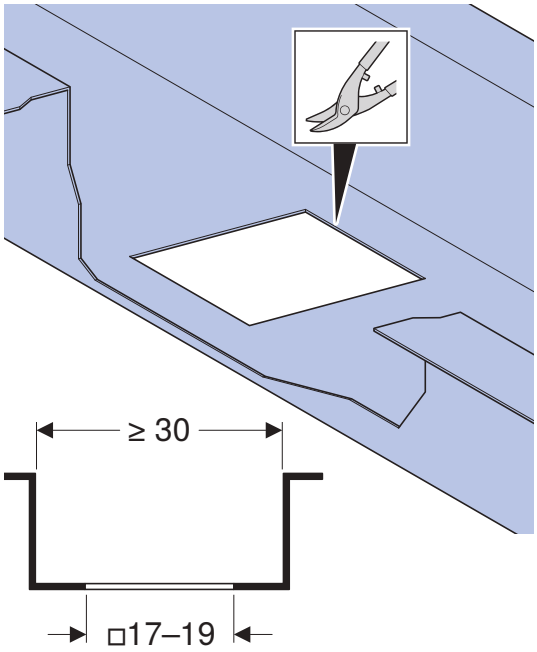


4 Screw the flange to the outlet element.



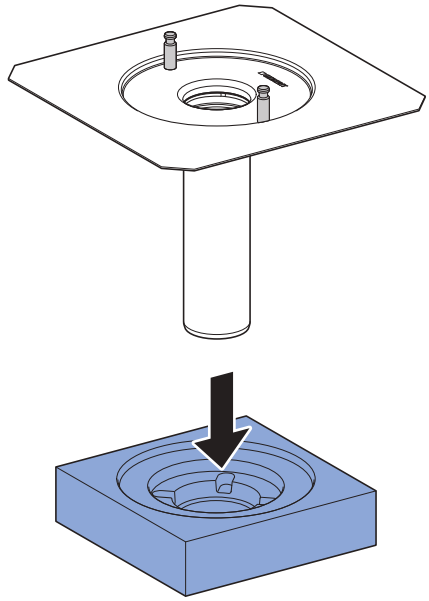
Connection with contact seam (gutter)

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

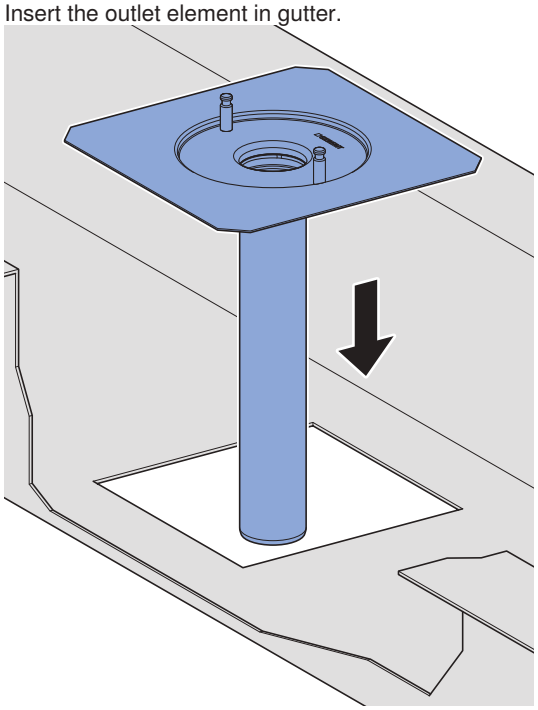


Depending on the product material, the roof outlet is soldered to the gutter or welded.

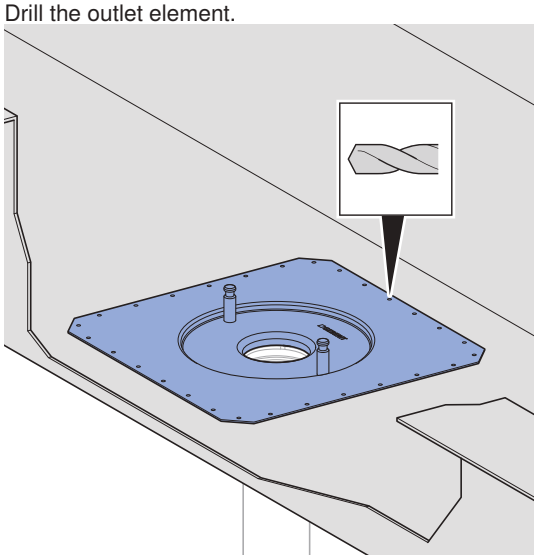
1 Remove the insulation.



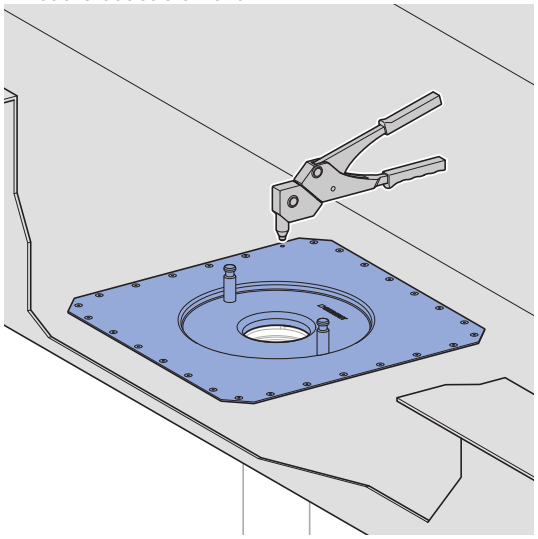
2 Insert the outlet element in gutter.



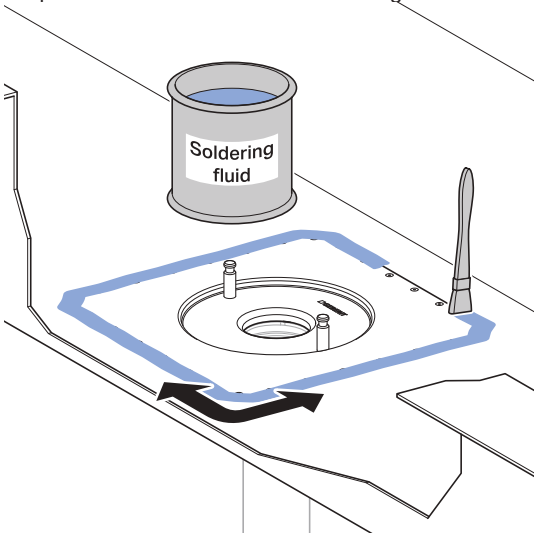
3 Drill the outlet element.



4 Rivet the outlet element.

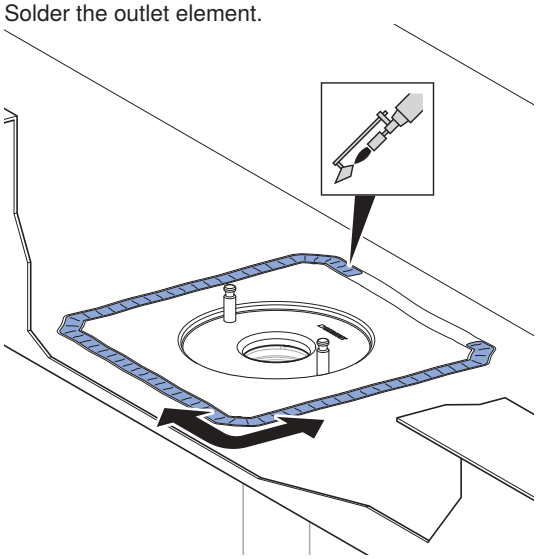


5 Prepare the outlet element for soldering.



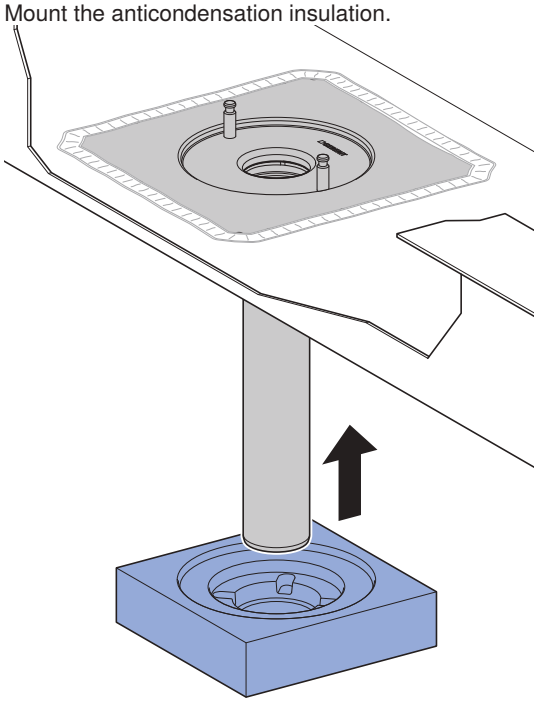
6

Solder the outlet element.



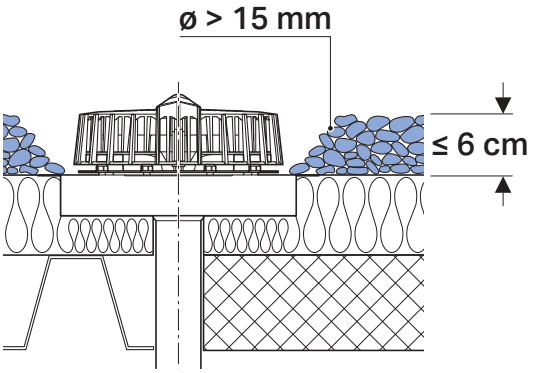
7

Mount the anticondensation insulation.



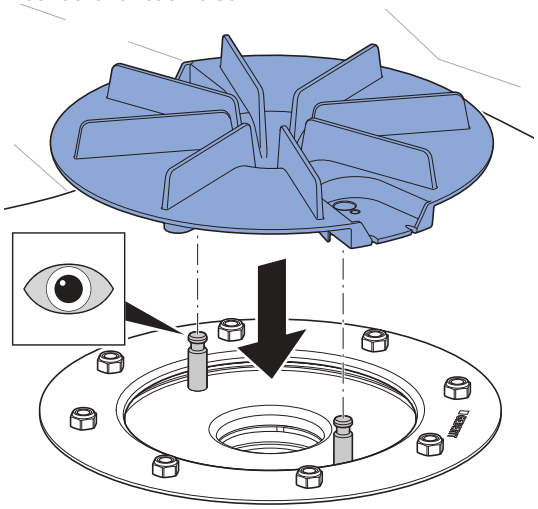
Installing the outlet grating

✓

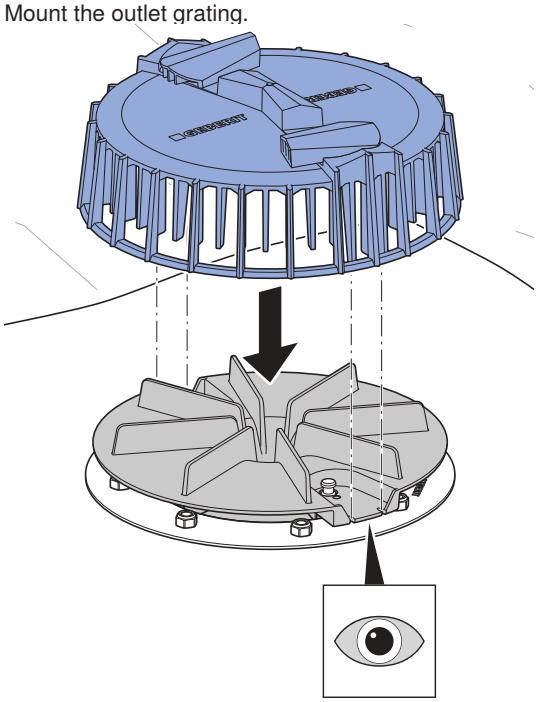


ø 8–15 mm = 359.124.00.1

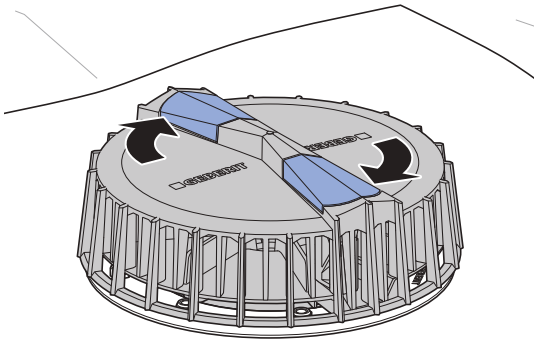
1 Mount the function disc.



2 Mount the outlet grating.



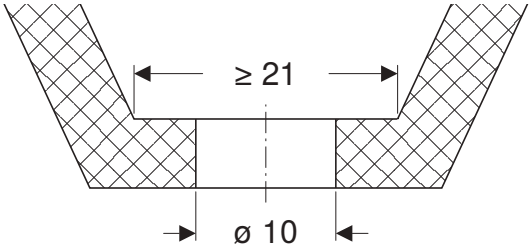
3 Lock both rotating lock bars.



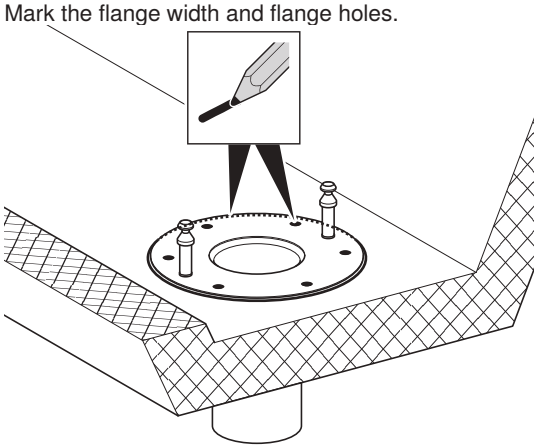
Geberit Pluvia roof outlet 19 l

Connection with concrete gutter

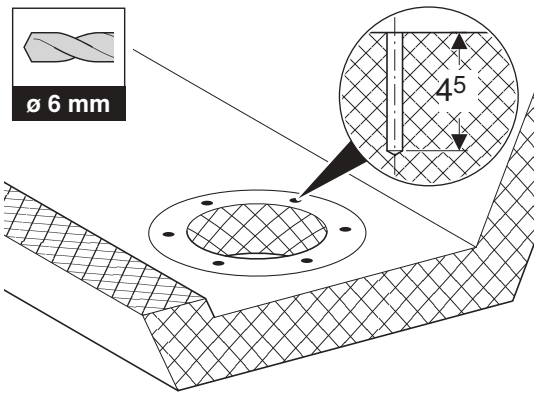
✓



1 Mark the flange width and flange holes.

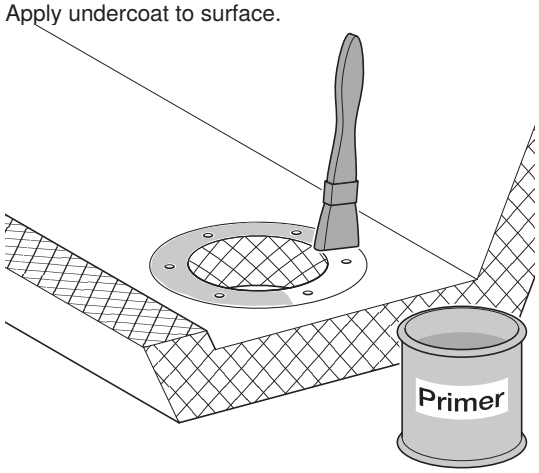


2 Create holes.

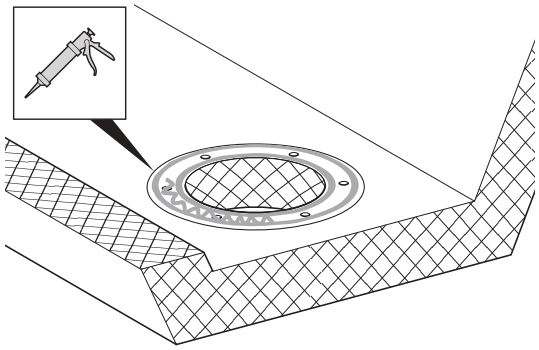


3 Clean flange and clamping range.

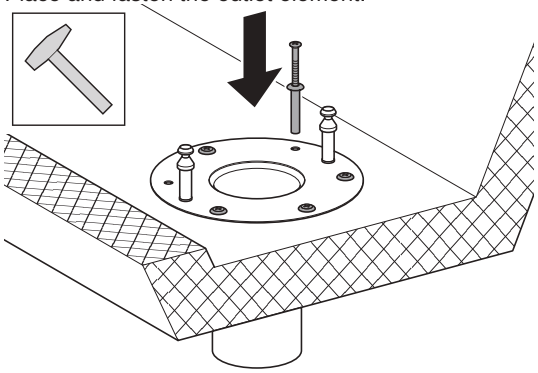
4 Apply undercoat to surface.



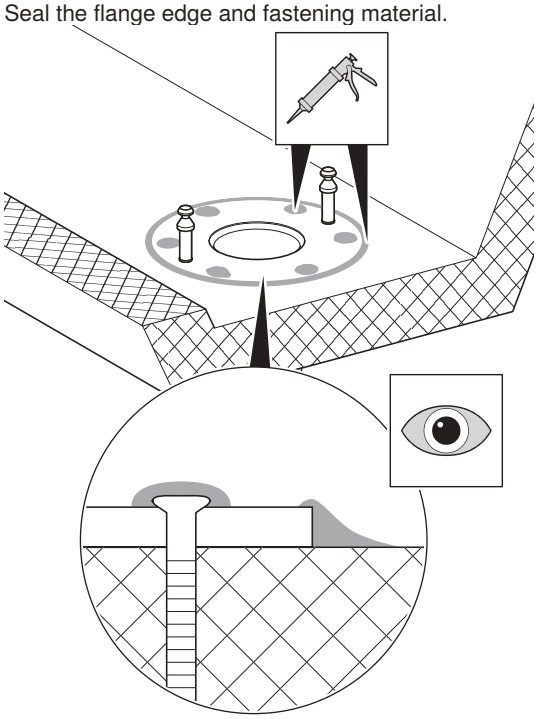
5 Apply sealing material.



6 Place and fasten the outlet element.

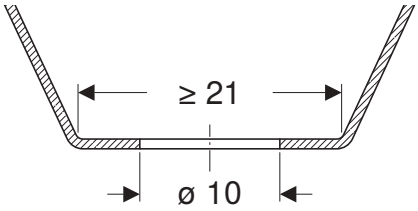


7 Seal the flange edge and fastening material.

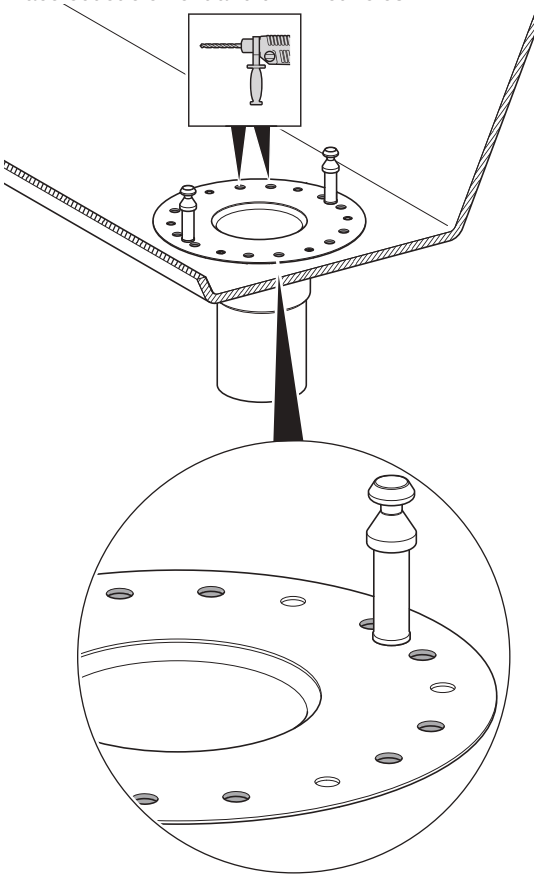


Connection with metal gutter

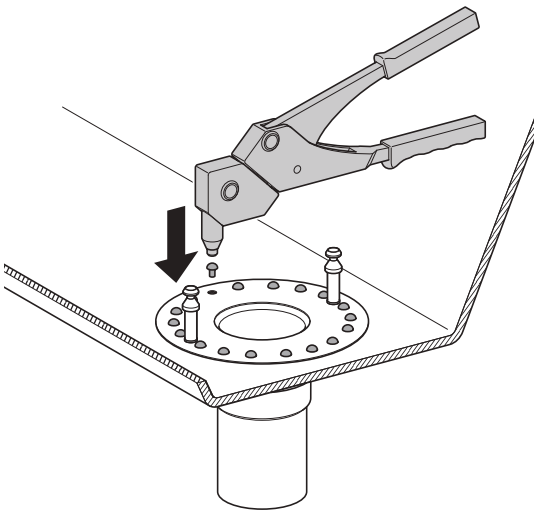
✓



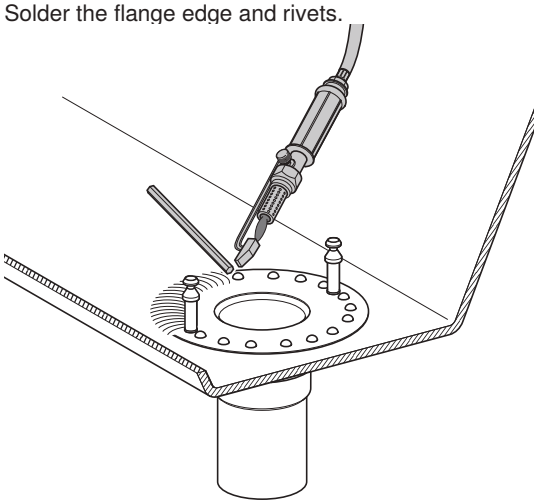
1 Place outlet element and drill rivet holes.



2 Rivet the outlet element.

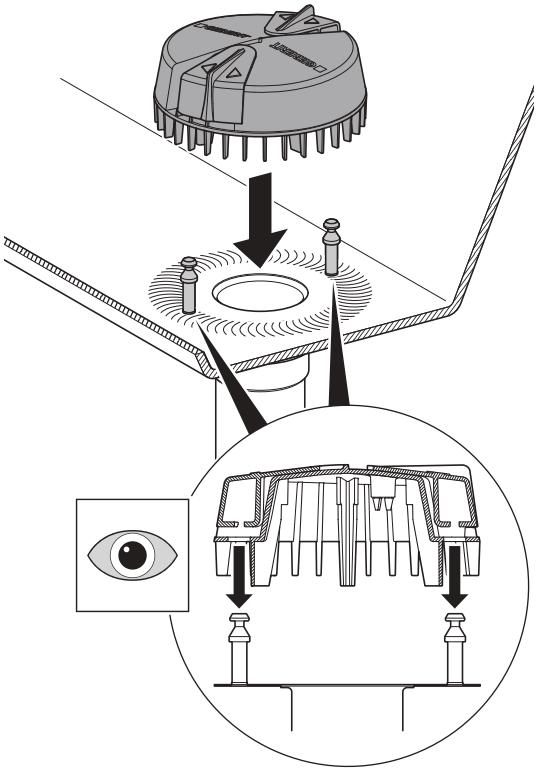


3 Solder the flange edge and rivets.

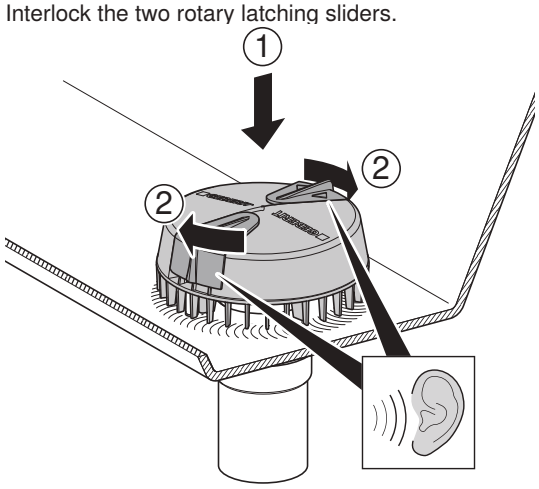


Installing the outlet grating

1 Place the outlet grating on the two pins.



2 Interlock the two rotary latching sliders.



Geberit Pluvia 45 l, 60 l and 100 l roof outlets

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

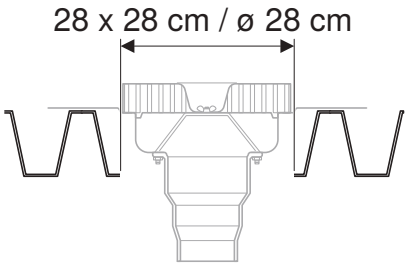


Figure 89: Lightweight roof

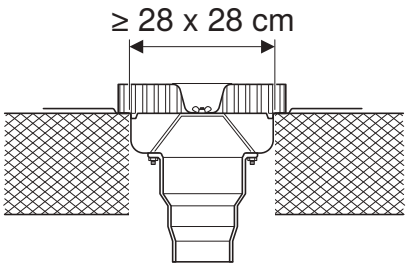


Figure 90: Solid roof

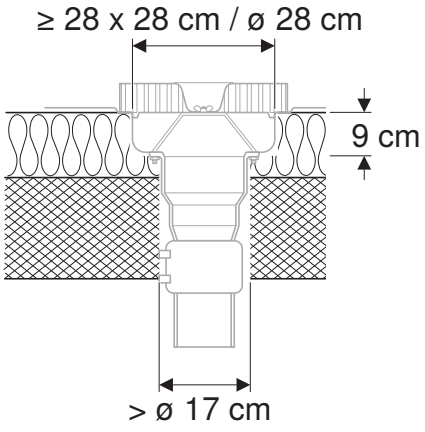
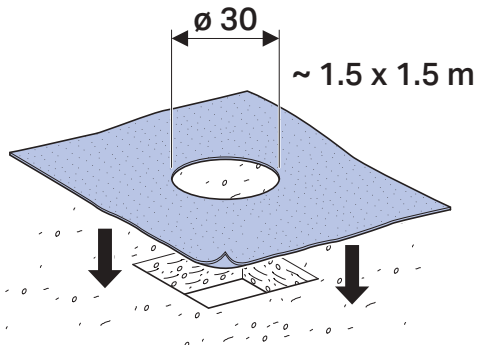


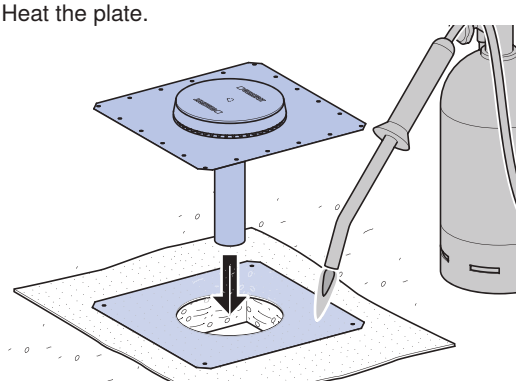
Figure 91: Insulated roof structure

Connection with bitumen roof

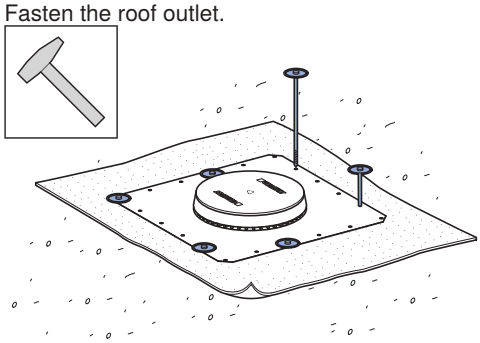
1 Apply the contact foil.



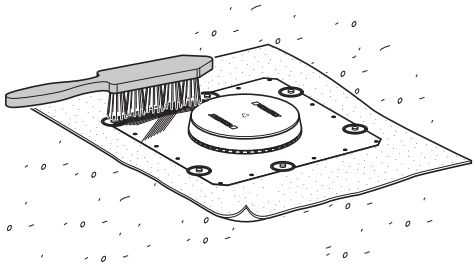
2 Heat the plate.



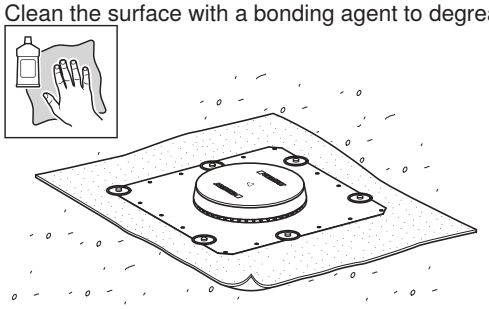
3 Fasten the roof outlet.



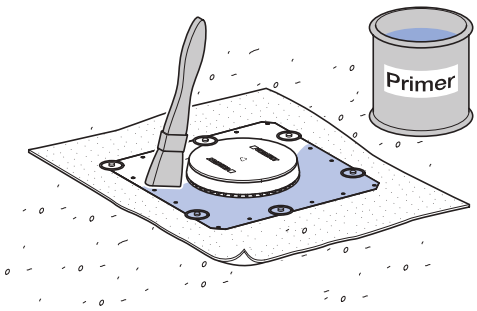
4 Roughen the metal surface of the roof outlet.



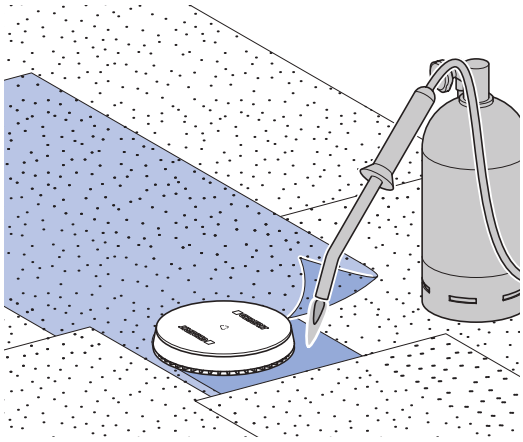
5 Clean the surface with a bonding agent to degrease the contact sheet.



6 Apply a bitumen bonding agent for improved adhesion of the bitumen sheeting.

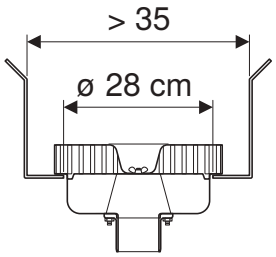


7 Apply bitumen sheeting to the dried bonding agent. Use the protection box cover and avoid heat being applied to the contact sheet.



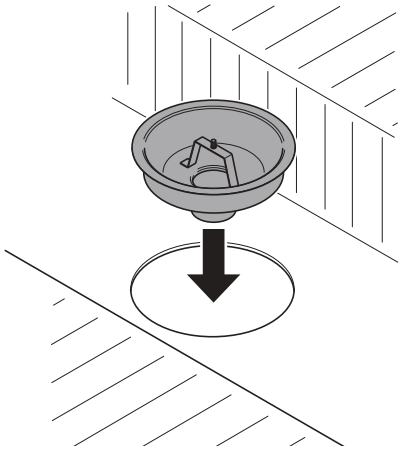
Connection with contact seam (gutter)

Prerequisite

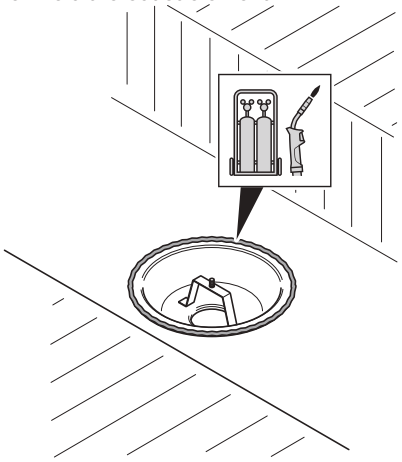


Depending on the product material, the roof outlet is soldered to the gutter or welded.

1 Insert the outlet element into the gutter.

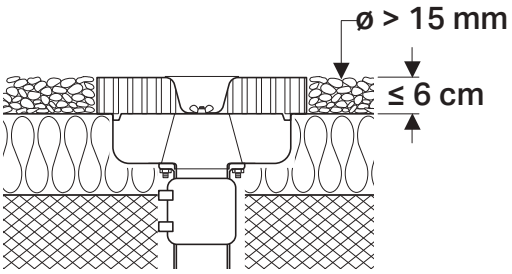


2 Solder or weld the outlet element.

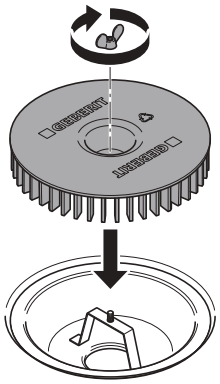


Install the outlet grating

✓



▶ Mount the outlet grating.

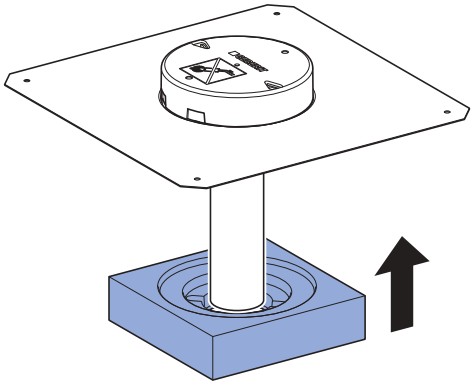


Vapour barrier connection

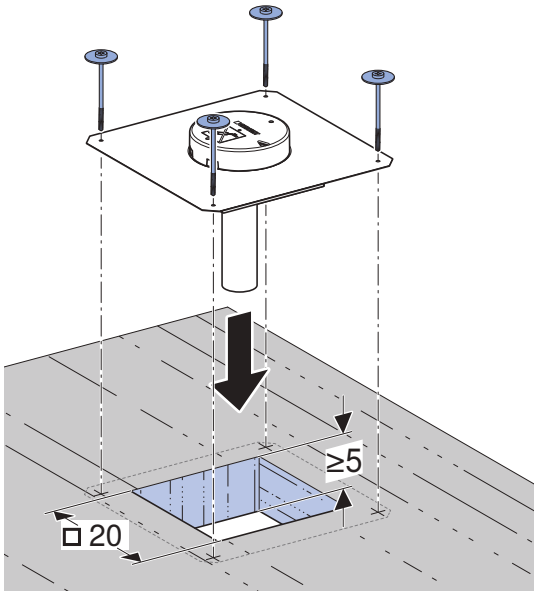
For a roof structure with vapour barrier, the base unit of the vapour barrier connection is installed in the roof structure (solid roof, lightweight roof, insulated roof) like the Geberit Pluvia roof outlets.

Vapour barrier elements in solid roof, bitumen

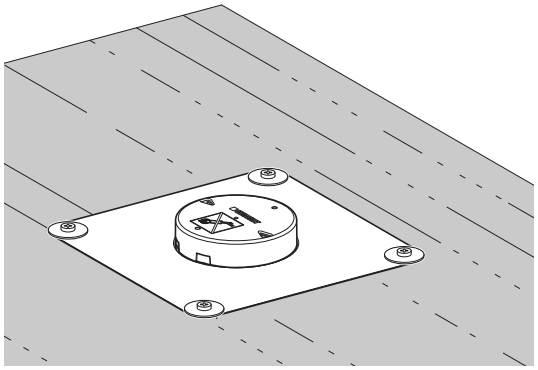
1 Mount the anticondensaton insulation.



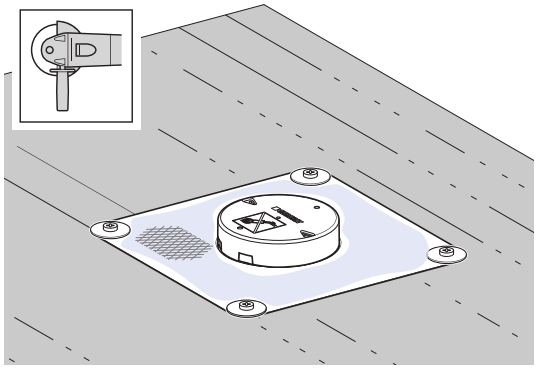
2 Place the vapour barrier connection on the roof recess.



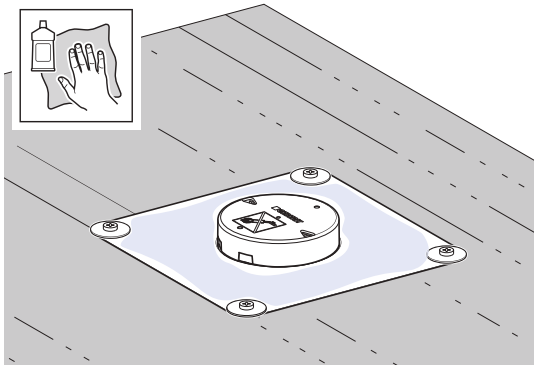
3 Fasten the vapour barrier connection.



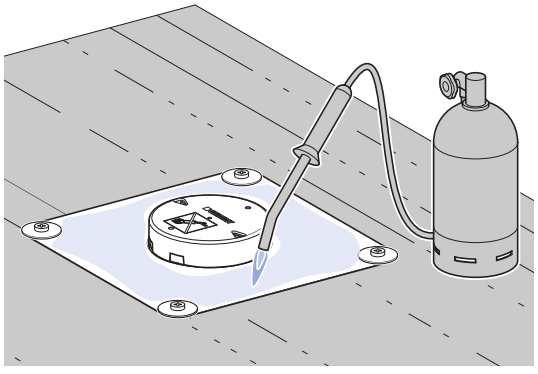
4 Roughen the vapour barrier connection.



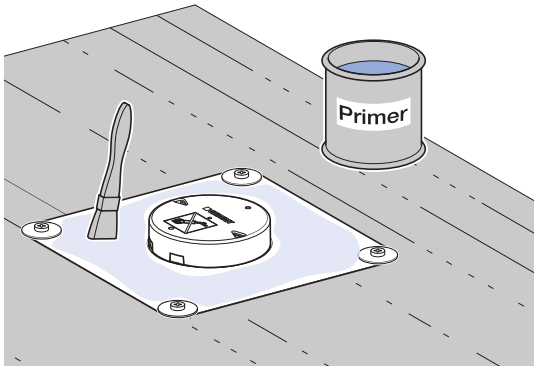
5 Clean the vapour barrier connection.



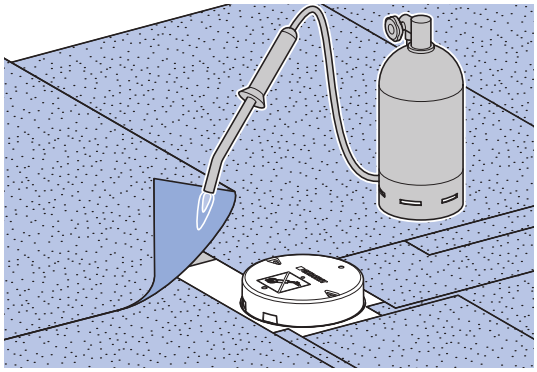
6 Heat the vapour barrier connection.



7 Apply an undercoat to the surface.



8 Bond the bitumen foil. Use the protection box cover and avoid heat being applied to the contact sheet.



Prepare the heating element feed-through.

359.113.00.1 +

→ 965.846

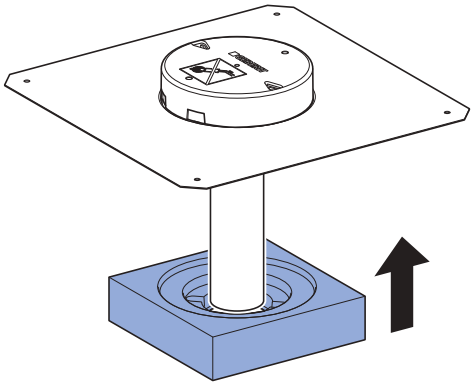
Prepare the heating element feed-through.

359.102.00.1 +

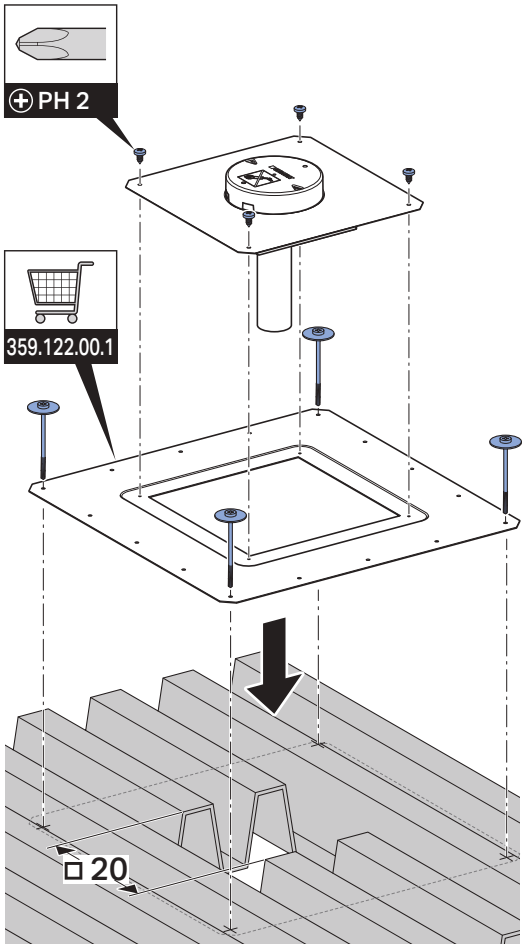
→ 965.947

Vapour barrier elements in lightweight roof, plastic foil

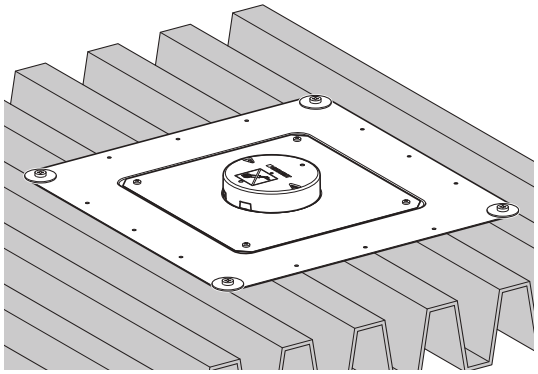
1 Mount the anticondensation insulation.



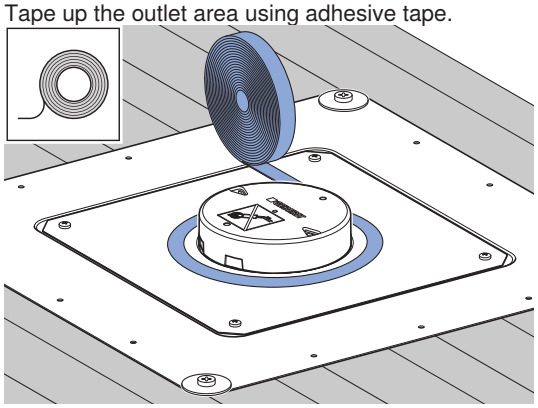
2 Place the vapour barrier connection on the roof recess.



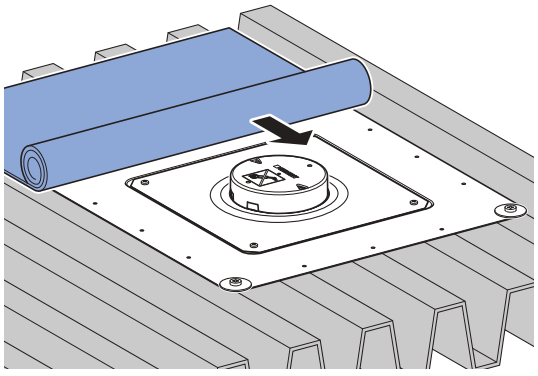
3 Fasten the vapour barrier connection.



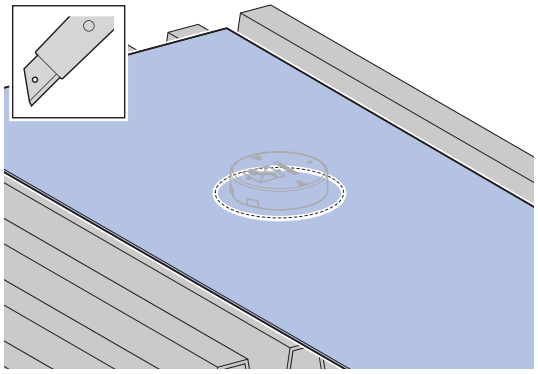
4 Tape up the outlet area using adhesive tape.



5 Lay out the vapour barrier foil.

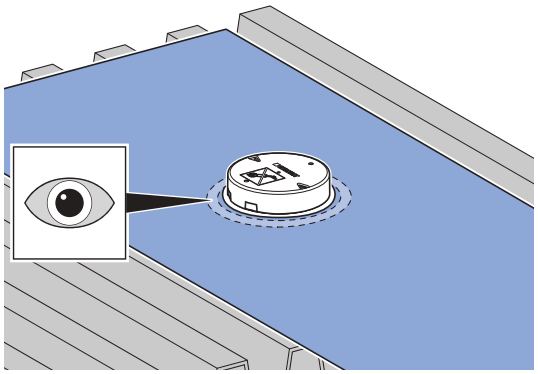


6 Create an opening in the vapour barrier foil.



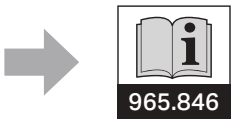
7

Tape up the vapour barrier foil.



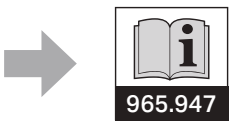
Prepare the heating element feed-through.

359.113.00.1 +



Prepare the heating element feed-through.

359.102.00.1 +

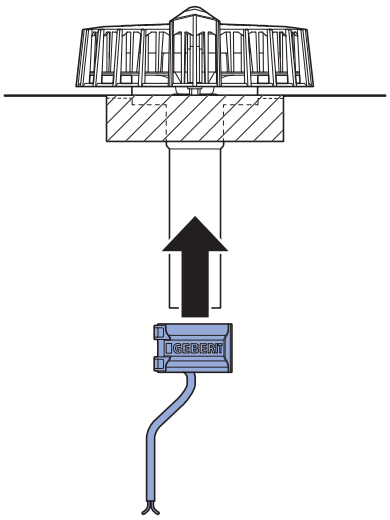


Heating elements for Geberit Pluvia roof outlets 12 l

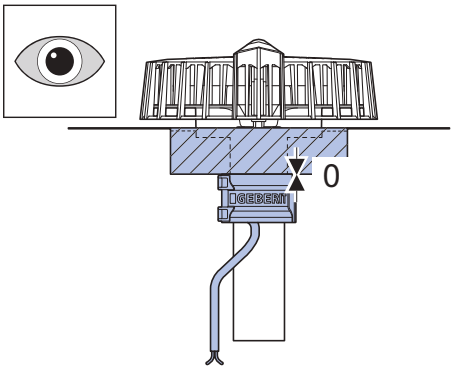
Geberit Pluvia roof outlets 12 l can be supplemented with heating element 359.971.00.1 as an option.

Installing the heating element for Geberit Pluvia roof outlets 12 l standard

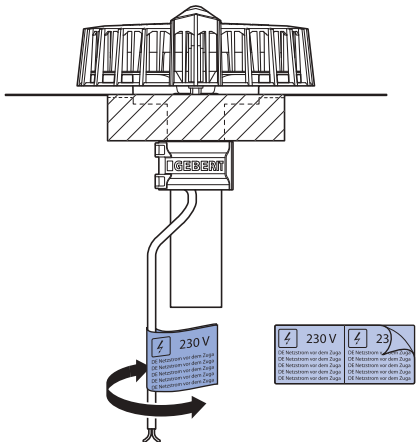
1 Slide the heating element onto the straight connector for the roof outlet.



2 Slide the heating element into place so that it is flush with the anticondensation insulation.

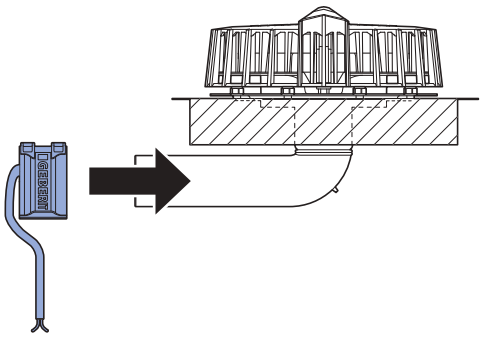


3 Attach a notice sticker to the mains cable.

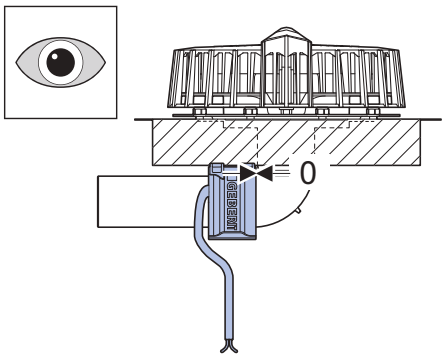


Installing the heating element for horizontal Geberit Pluvia roof outlets 12 l

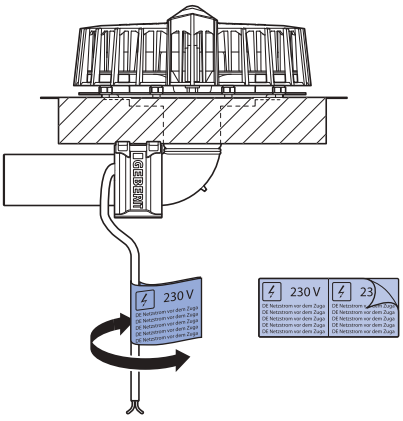
1 Slide the heating element onto the straight connector for the roof outlet.



2 Slide the heating element up to the bend.

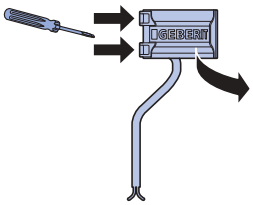


3 Attach a notice sticker to the mains cable.

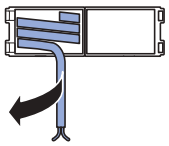


Retrofitting the heating element for Geberit Pluvia roof outlets 12 l

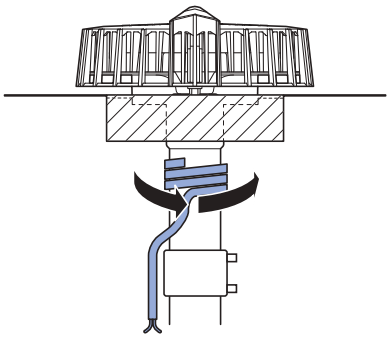
1 Open the heating element housing.



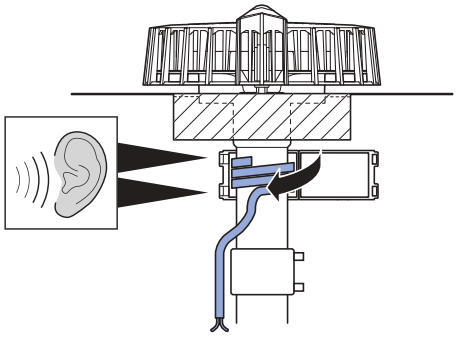
2 Remove the mains cable from the housing.



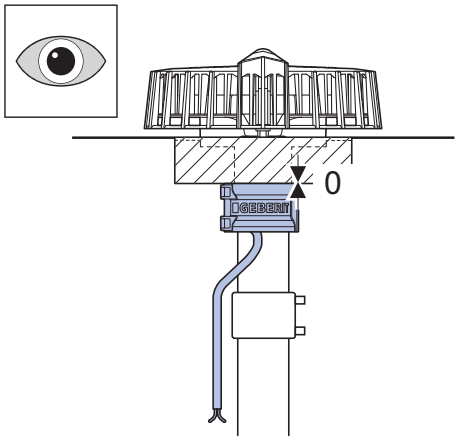
3 Wind the mains cable around the straight connector.



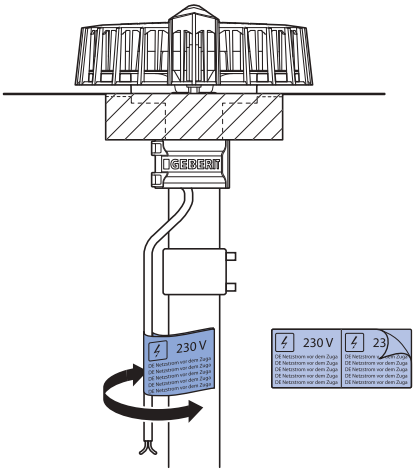
4 Attach and close the heating element housing.



5 Slide the heating element into place so that it is flush with the anticondensation insulation.

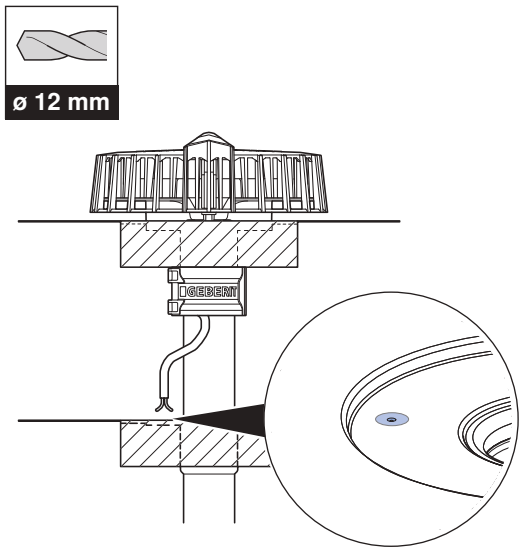


6 Attach a notice sticker to the mains cable.

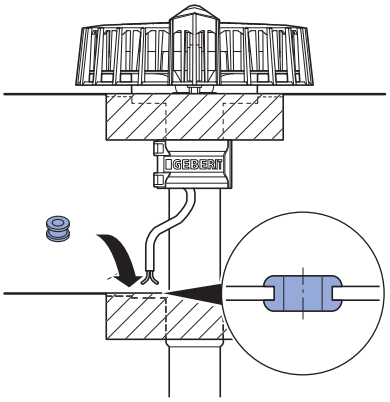


Installing the heating element for Geberit Pluvia roof outlets 12 l standard with vapour barrier

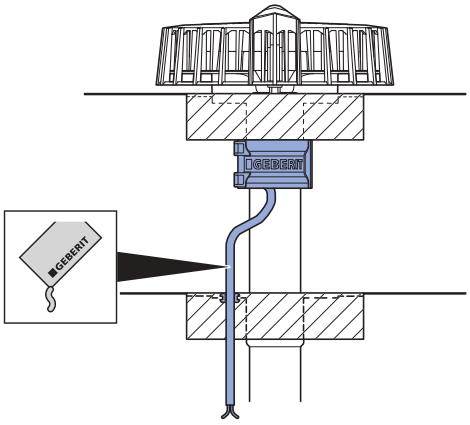
1 Create a hole for the heating element mains cable.



2 Fit seal of mains cable in hole.

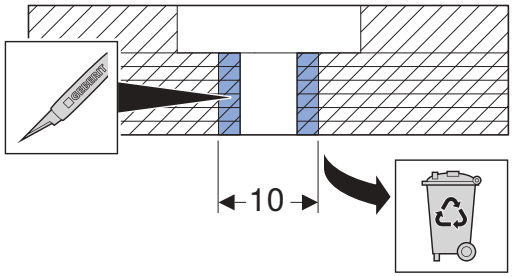


3 Guide mains cable through seal.

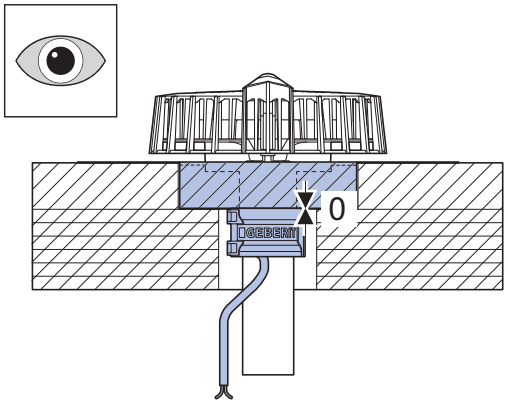


Installing the heating element for Geberit Pluvia roof outlets 12 l standard with thermal insulation

1 Enlarge the recess in the thermal insulation.



2 Slide the heating element into place so that it is flush with the anticondensation insulation.



3.13.2 Subsequent gravelling

If the flat roof is gravelled later on, the minimum dimensions of the gravel types as well as the maximum gravelling height must be complied with.

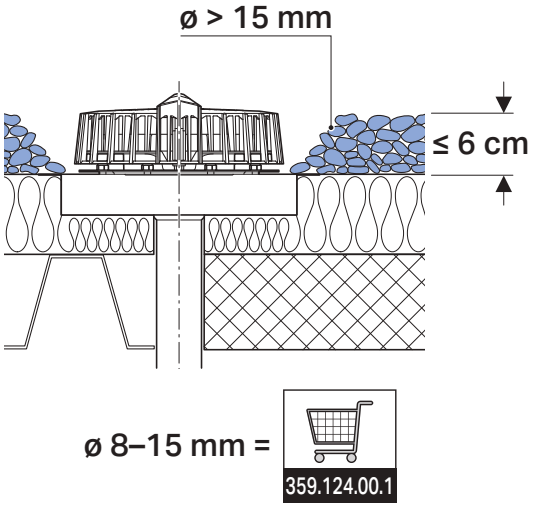


Figure 92: Geberit Pluvia roof outlets 12 l and 25 l with roof gravelling

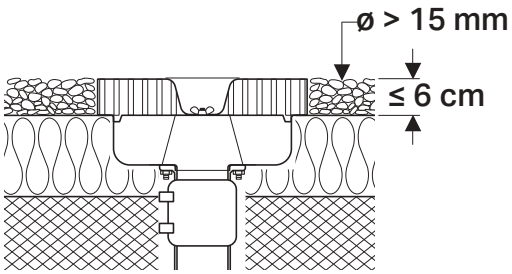


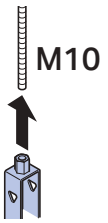
Figure 93: Geberit Pluvia roof outlets 45–100 l with roof gravelling

3.14 FASTENING THE RAINWATER PIPE

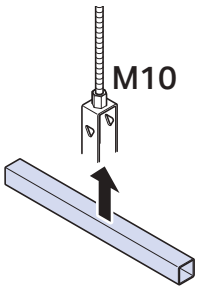
3.14.1 Horizontal fastening for pipes d40–200 with Geberit Pluvia fastening system

Installing support rails

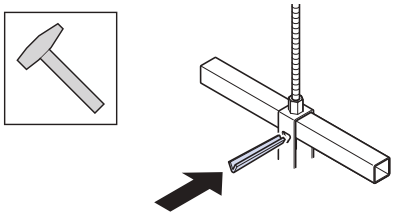
1 Screw suspension element firmly on to threaded rod.



2 Insert support rail into suspension element.

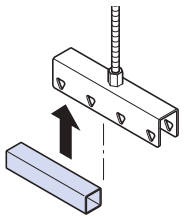


3 Drive in tension wedge.

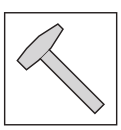


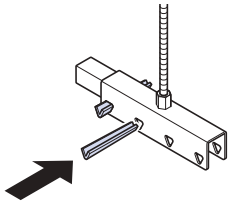
Install the connection element

1 Insert the support rail into the left half of the support rail connection element.

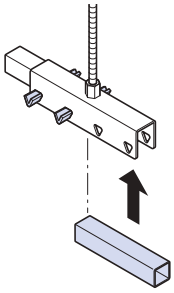


2 Fix the support rail with two tension wedges.

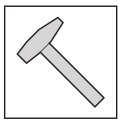


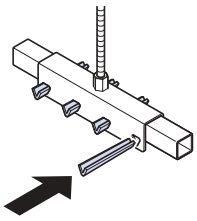


3 Insert the support rail into the right half of the support rail connection element.



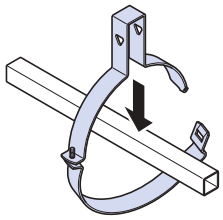
4 Fix the support rail with two tension wedges.



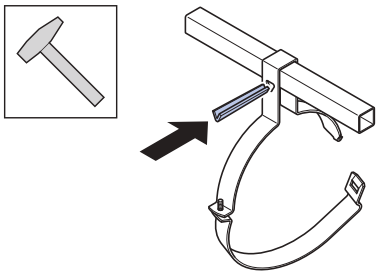


Install the pipe brackets

1 Slide pipe bracket over support rail.

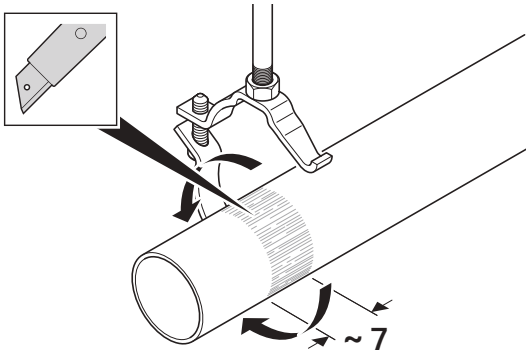


2 Use tension wedge to fix pipe bracket.

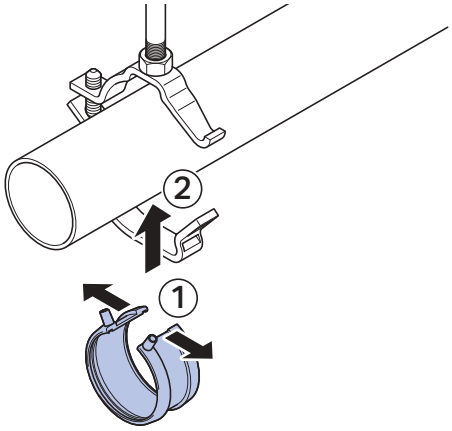


Installing the anchor point

1 Remove oxide layer from pipe surface.

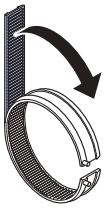


2 Wind electrofusion tape for anchor point around pipe.

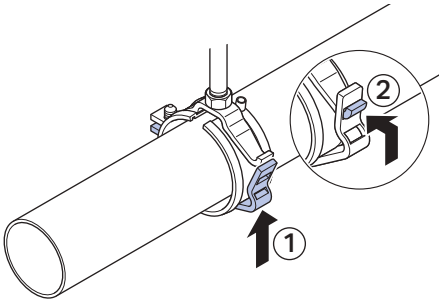


3 Note on the pre-bending of large electrofusion tapes.

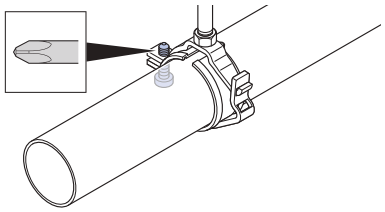
ø 200/250 mm



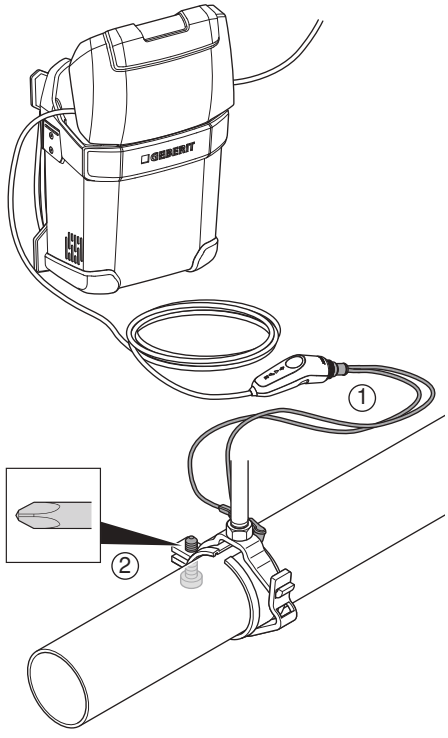
4 Hook anchor bracket into outside position.



5 Secure anchor bracket.



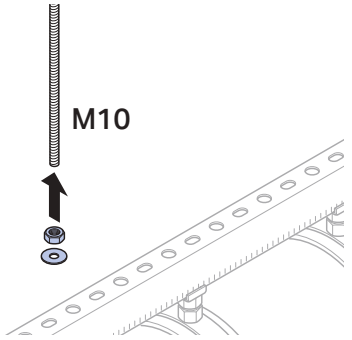
6 Weld electrofusion tape for anchor point.



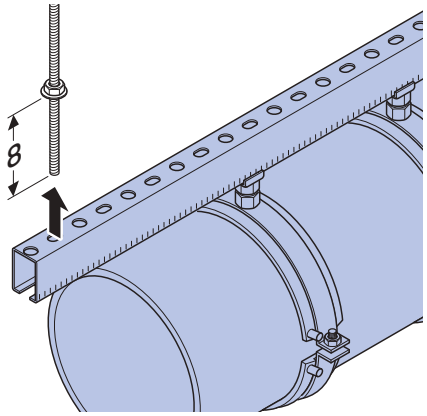
3.14.2 Horizontal fastening for pipes d250-315 with Geberit Pluvia fastening system

Installing support rails

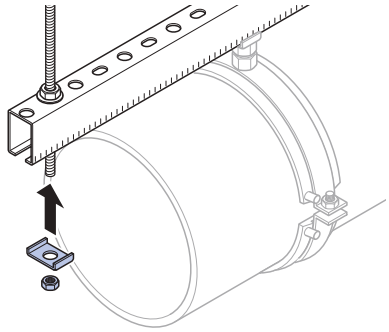
1 Secure the stopper nut and washer on the threaded rod.



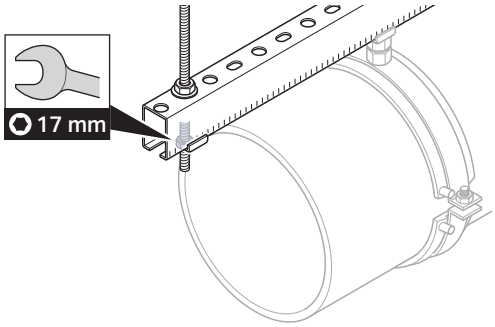
2 Slide the support rail into the threaded rod.



3 Fasten the suspension element firmly on to the threaded rod.

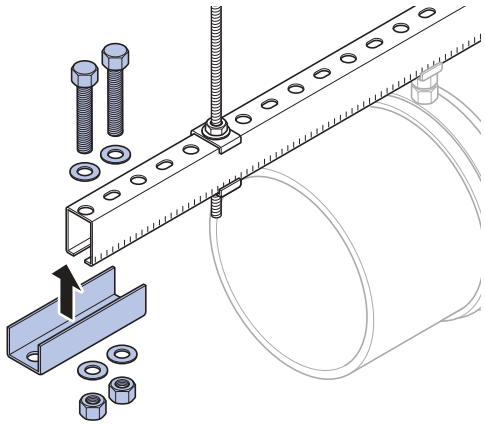


4 Secure the suspension element.

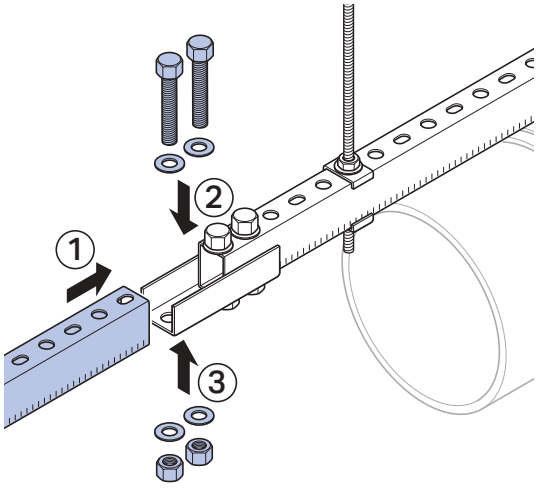


Installing the connection element

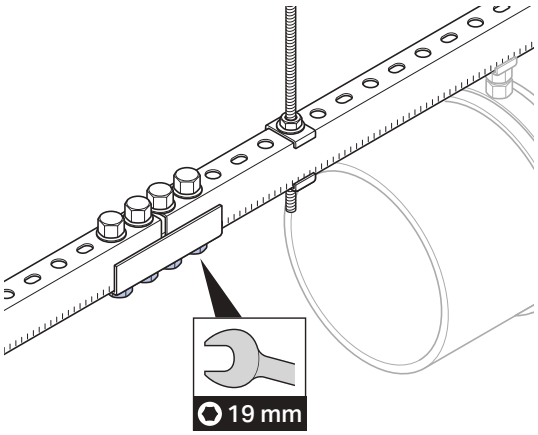
1 Insert connection element into support rail and fasten.



2 Insert support rail into connection element and fasten.

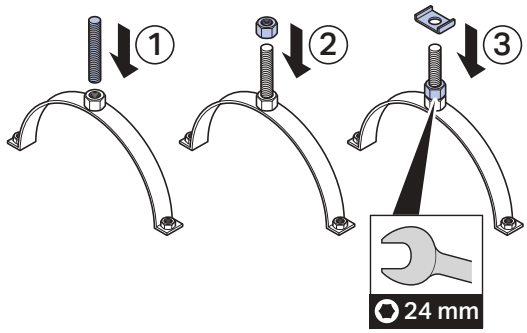


3 Secure connection element.

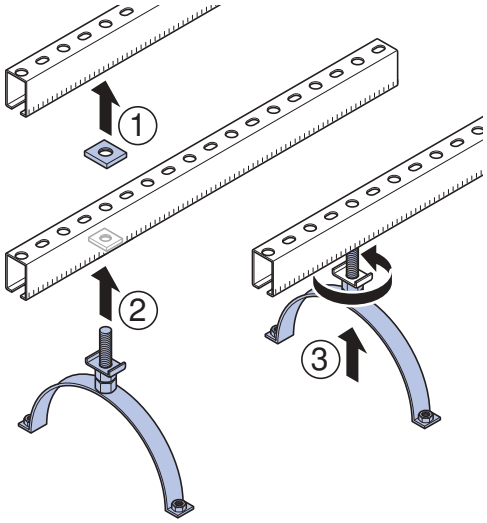


Installing the pipe brackets

1 Prefabricate pipe bracket with fastening material.

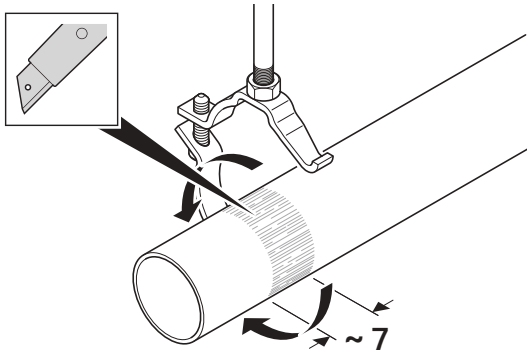


2 Place T-slot nut in support rail and secure pipe bracket.

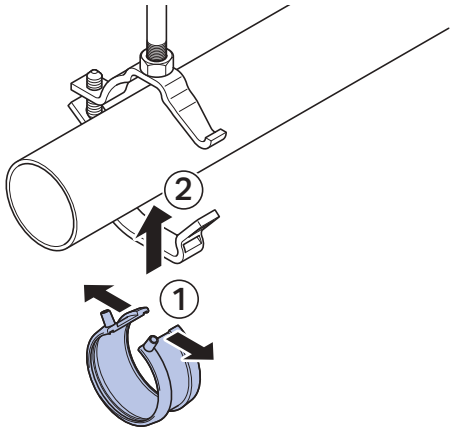


Installing the anchor point

1 Remove oxide layer from pipe surface.

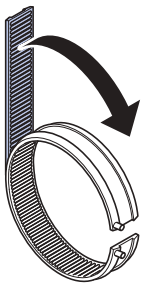


2 Wind electrofusion tape for anchor point around pipe.

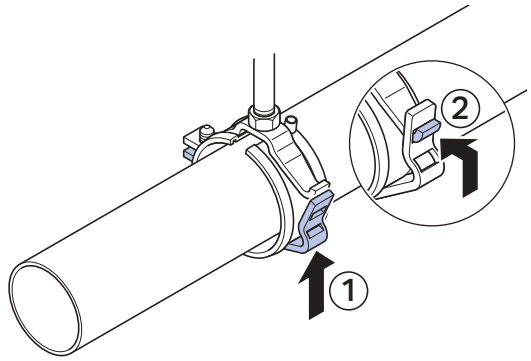


3 Note on the pre-bending of large electrofusion tapes.

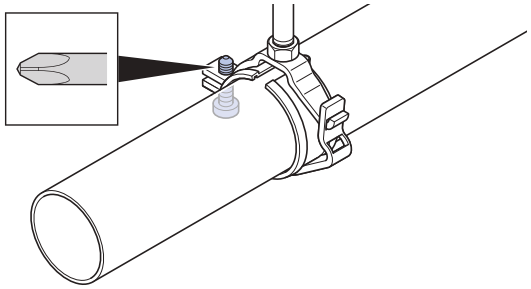
ø 200/250 mm



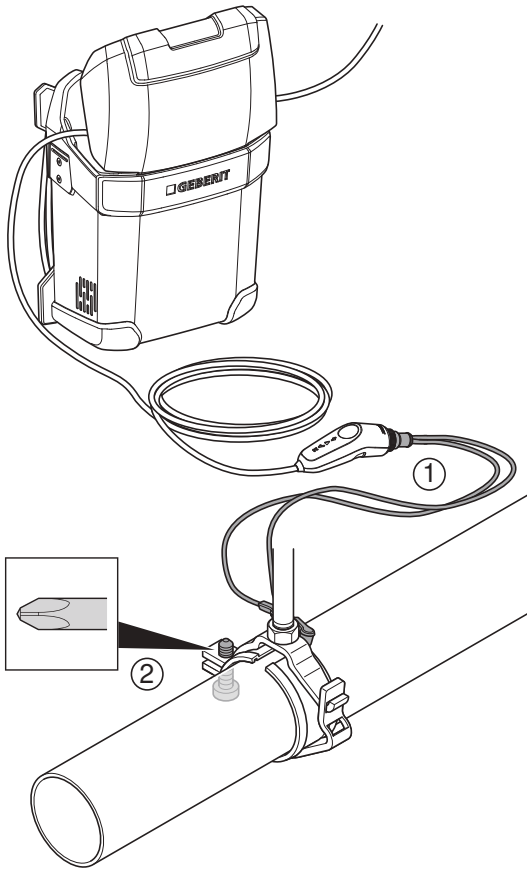
4 Hook anchor bracket into outside position.



5 Secure anchor bracket.



6 Weld electrofusion tape for anchor point.



3.15 COMMISSIONING

3.15.1 Initial commissioning

Check points:

- Check the configured system with the configuration plans and the configuration calculation.

  In particular:
  - the roof area effectively exposed to rain
  - capacity factor
  - the arrangement, configuration and correct installation of the Geberit Pluvia roof outlets and the corresponding protection against flushing in of substrate. The operating parts must be completely present and the outlet grating must be firmly attached to the roof outlet.
  - the pipe layout and pipe dimensions
  - the design of the transition from the complete to the partial filling 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 that the emergency overflows are correctly and completely arranged.
- Clean the roof area before commissioning it. Ensure that no residue of packaging or insulation material remains on the roof area.
- Flush all roof drainage pipes.

3.15.2 Geberit Pluvia leak test

Leak tests are an integral part of quality assurance on drainage systems. This also applies tor Geberit Pluvia systems. Escaping water in the event of leakage can lead to major material damage.

Geberit recommends the following procedures for performing the leak test:

The Geberit Pluvia pipes must not be completely filled during this building phase.

1. During the building phase, immediately after the pipe installation and connection of the outlet elements:
   – Rinse all pipes with a water hose. Start this test on the roof outlet furthest away from the discharge stack.
   – Then test all other roof outlets.
2. After completing the roof sealing work and the installation of the complete Geberit Pluvia system, the following leak test should be carried out:
   – Fill the roof with water up to a height of 5–15 cm. The statics of the roof must be taken into account for the head of water.
   – A suitable replacement gasket must be inserted in the roof outlet in order to keep the roof outlets closed during the test phase. Then insert a pipe with the diameter of the connection pipe into the roof outlet. In order not to exceed the maximum load bearing capacity of the roof, the length of the pipe should correspond to the planned head of water.

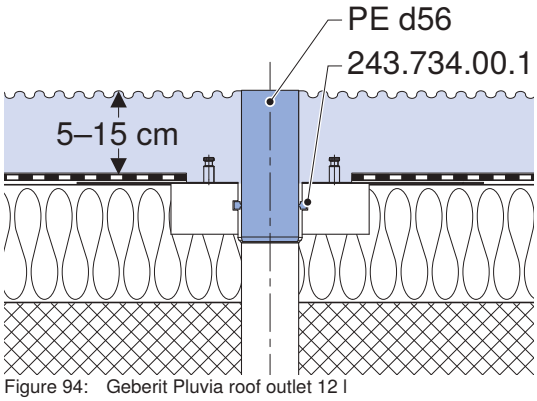


Figure 94: Geberit Pluvia roof outlet 12 l

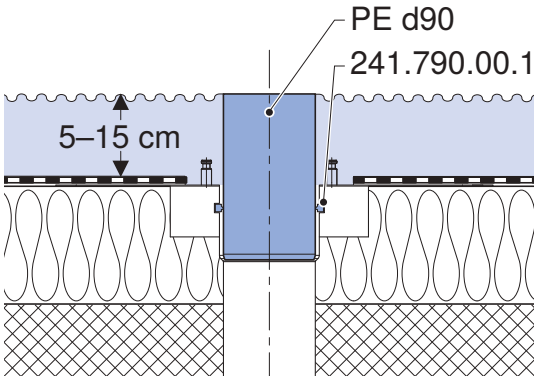


Figure 95: Geberit Pluvia roof outlet 25 l

   – Leave the water on the roof for 1–2 weeks.
3. After the final installation, where the Geberit Pluvia pipe is connected to the underground pipe connection, a simple leak test can be carried out with the system completely filled:
   – By simultaneously removing all damming pipes drain the accumulated water on the flat roof.

This test corresponds only to a simple leak test. This is not a function test of the system, as no function discs are mounted on the outlet elements at this time.

After this leak test, remove the mounted replacement gasket from the Geberit Pluvia roof outlets and insert the Geberit outlet gratings with the function discs.

3.16 CARE AND MAINTENANCE

3.16.1 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 building owner or a skilled person must check the roof drainage system.

Regular maintenance of the flat roof, the drainage gutter and the Geberit Pluvia roof outlets ensures permanently reliable and optimum roof drainage.

3.16.2 Regular maintenance work

- A 50 cm wide zone must be kept free from vegetation around the Geberit Pluvia roof outlet (e.g. with a gravel bed). Contamination, e.g. by leaves or growth must be periodically removed to prevent humus formation or blockage.
- The cleaning must be performed regularly according to the respective environmental influences and also includes flat roof, drainage gutter as well as emergency overflows.
- Contamination and blockage of the pipelines of critical roof structures must be prevented by periodically cleaning the pipes.

3.16.3 Maintenance of Geberit Pluvia in areas with large amounts of sand

In areas with large amounts of sand, further measures must be taken in addition to the general maintenance regulations.

Additional instructions for maintenance in areas with large amounts of sand:

- After a sand storm, the roof drainage system must be checked by the building owner or the skilled person employed by the building owner.
- If the sand on the roof (gutter) is higher than 3 cm, then an area measuring 1 x 1 m around the roof outlet must be completely cleaned and free of sand.
- To ensure that the bended pipe section is free of sand, Geberit recommends filling the roof outlets with water. If the water drains, the roof outlet is clean. If the water backs up, the roof drainage system must be cleaned.

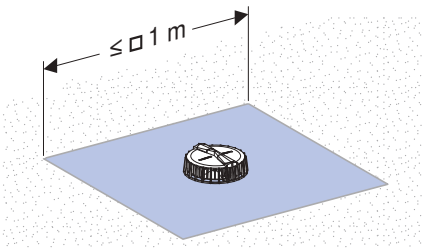


Figure 96: Sand-free area 1 x 1 m

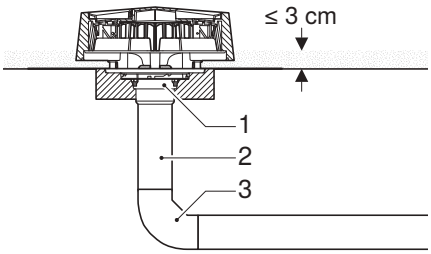


Figure 97: Maximum sand height 3 cm

1 Geberit Pluvia roof outlet
2 Straight connector made of Geberit HDPE
3 Bend

The Geberit Pluvia roof outlet, straight connector made of Geberit HDPE and bend must be free of sand.

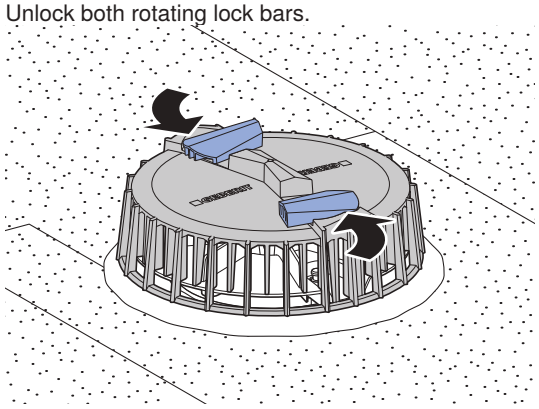
3.16.4 Maintenance intervals and cleaning of Geberit Pluvia roof outlets

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

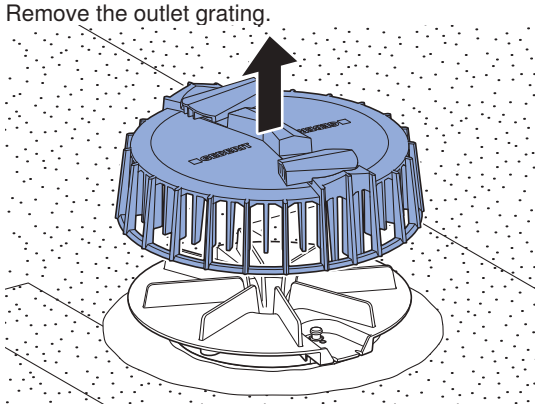
Maintenance work	Maintenance interval
Remove foreign bodies such as dirt, leaves or roof growth.	Select maintenance intervals so that obstruction of the roof outlet is prevented.
Clean the roof outlet and function disc.	Select maintenance intervals so that obstruction of the roof outlet is prevented;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

Cleaning the Geberit Pluvia roof outlets 9 l / 12 l / 25 l

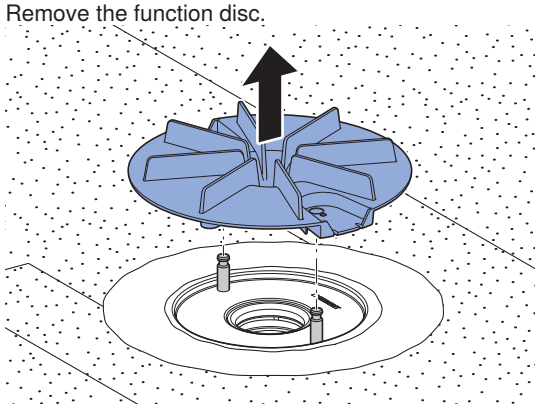
1 Unlock both rotating lock bars.



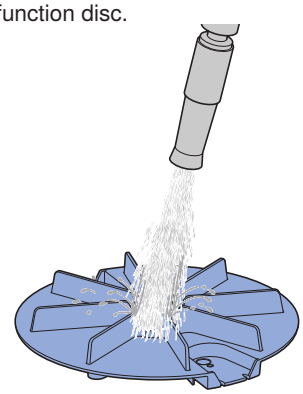
2 Remove the outlet grating.



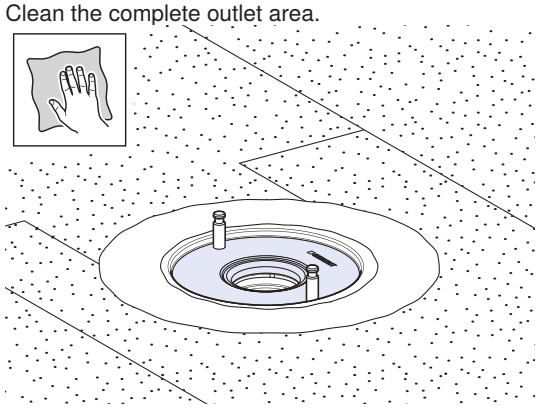
3 Remove the function disc.



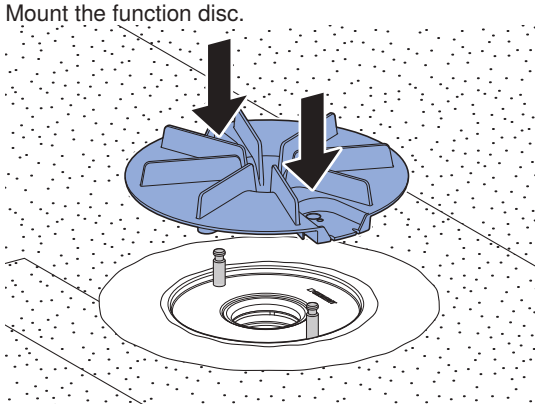
4 Clean the function disc.



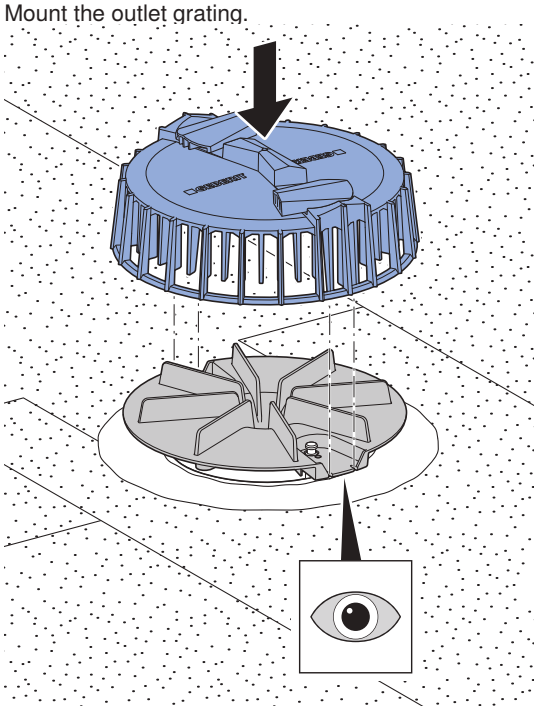
5 Clean the complete outlet area.



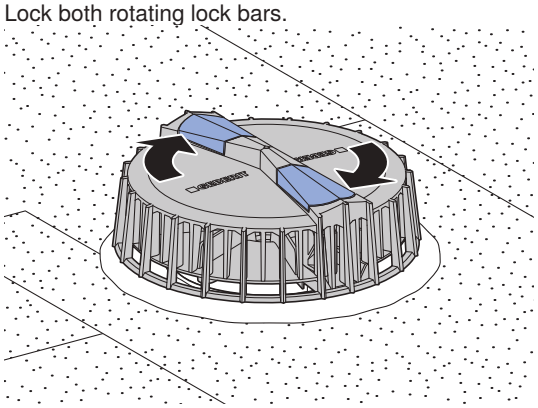
6 Mount the function disc.



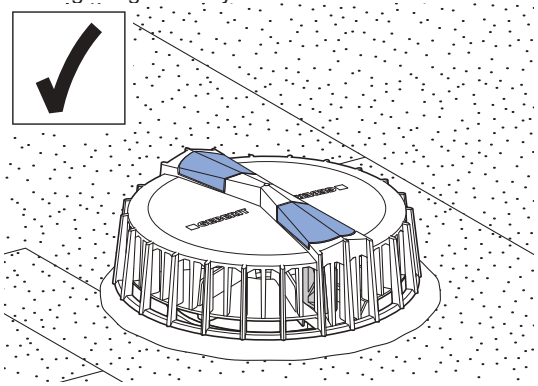
7 Mount the outlet grating.



8 Lock both rotating lock bars.

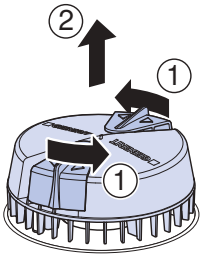


⇨ Outlet grating correctly mounted.

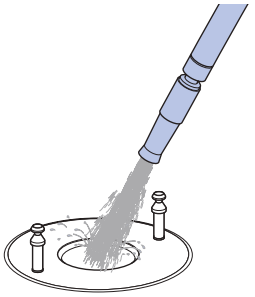


Cleaning the Geberit Pluvia 19 l roof outlet

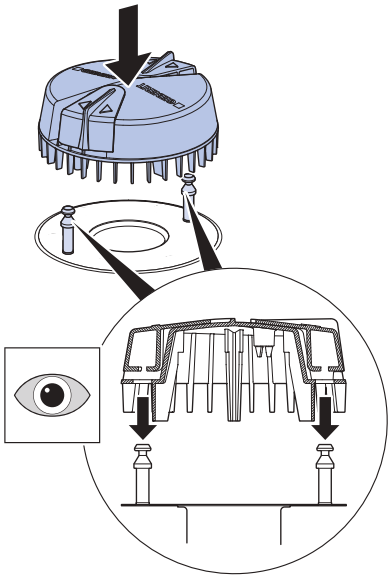
1 Open both rotary latching sliders and remove the outlet grating.



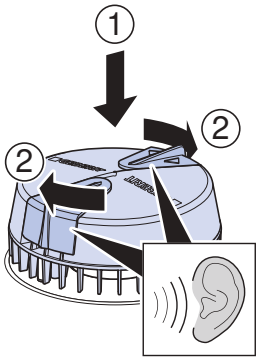
2 Clean the outlet grating and outlet area.



3 Place the outlet grating on the bolts.

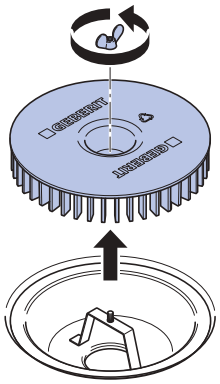


4 Mount the outlet grating and close both rotary latching sliders.

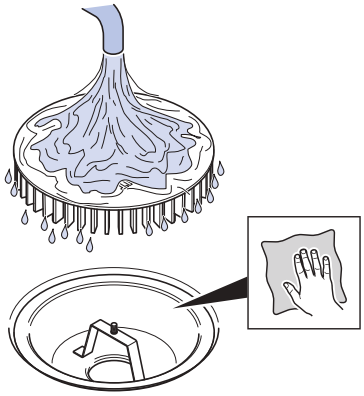


Cleaning the Geberit Pluvia roof outlets 45 l / 60 l / 100 l

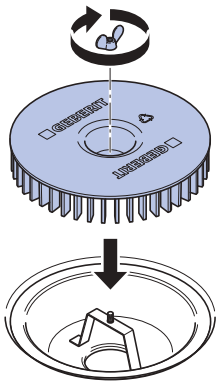
1 Loosen the wing bolt.



2 Clean the outlet grating and outlet area.



3 Mount the outlet grating and fasten the wing bolt.



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