

**Geberit HDPE
Geberit Silent-db20**

 **GEBERIT**

Application Technique

**Waste and Drainage Systems
Valid from 1 September 2013**

**KNOW
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1 System

1.1 System description

1.1.1 Geberit HDPE

Geberit HDPE is the state of the art in drainage systems and is a real alternative to systems made of conventional materials. It combines flexibility with robustness and reliability. Geberit HDPE is the complete solution for all types of drainage, both above and below ground and also with regard to chemical waste. The system is manufactured from high density polyethylene, a material with inherent characteristics which offer numerous advantages compared to conventional piping systems. For this reason, HDPE has become the preferred material across Europe. Thanks to Geberit HDPE, contractors and installers are fully flexible regarding laying pipes over and in the ground. Thanks to the material characteristics, pipes and fittings made of Geberit HDPE are break-proof, resistant to abrasion and shock-proof as well as temperature resistant. As well as the flexibility to be able to use several different connection technologies and the option of waste water prefabrication away from the building site, Geberit HDPE also offers considerable potential savings with regard to material and labour.

1.1.2 Geberit Silent-db20

Geberit Silent-db20 is a drainage system for buildings with increased sound insulation values. Its excellent sound-absorbing characteristics are achieved through:

- Patented high density material which has been developed especially for this purpose
- Fittings with ribs to further improve sound insulation close to impact zones
- Non-compressible sound-absorbing brackets gummed to the inside to reduce the transmission of solid-borne sound by isolating the stack from the structure

1.1.3 Application range

Table 1: Application range

Application	Geberit HDPE	Geberit Silent-db20
Pump pressure pipes	✓ ¹⁾	✓ ¹⁾
Conventional rainwater pipes	✓	✓
Rainwater pipes Pluvia	✓	✗
Buried underground pipes	✓	✗
Bridge drainage	✓	✗
Industrial drainage	✓	✗

¹⁾ Without mechanical load max. 1.5 bar internal pressure at max 30 °C, 10 a, DN 30–150 (ø 32–160)

1.1.4 Characteristics

System characteristics

Characteristic	Geberit HDPE	Geberit Silent-db20
Hot water resistance	Geberit HDPE can be used in the outlet sector, where temperatures of up to 80 °C occur in an unpressurised state. Without mechanical load, temperatures of up to 100 °C can be managed for short periods of time*. Information about possible applications for industrial plants where permanent loads with temperatures ≥ 80 °C occur, can be obtained from Geberit. *Short term without mechanical, chemical and static load, up to 100 °C, whereas the duration of such a peak cycle must not exceed 1 minute. Then the pipe must be allowed to return to its normal ambient or operating temperature. The peak cycles described are permitted no more than 400 x per year. This will affect the service life. All connections must be created tension resistant.	The product material db20 and application engineering are created for temperatures of 60 °C. Short-term peak temperatures from common household appliances are permitted in an unpressurised state.
Resistance to cold	Geberit HDPE is virtually unbreakable at room temperature. At extremely low temperatures (down to around -40 °C), the impact resistance is very high and is therefore sufficient in the drainage sector. Pipes filled with water and frozen pipes remain intact even after thawing thanks to the high elasticity of the material.	
Expansion	The thermal expansion of Geberit HDPE and Geberit Silent-db20 pipes totals 0.17 mm/m·K. As a rule of thumb, 1 cm/m of pipe can be assumed for a 50 K temperature differential.	
Thermal accrual	The safest method of preventing unavoidable thermal accrual (shortening of dimensions) on the plastic pipe after thermal loading involves anticipating it during production. This process raises the reliability of the connections as there is no fear of them having to be removed as a result of subsequent shortening. The thermal accrual of Geberit pipes is max. 1 cm/m (DIN standard 3 cm/m).	
Thermal conductivity	Thermal conductivity (Lambda I) 0.43 W/m·K.	
Fire behaviour	According to DIN EN 13501-1, HDPE belongs to building material class E (normally inflammable).	

Characteristic	Geberit HDPE	Geberit Silent-db20
Material removal	Drainage systems are increasingly becoming disguised waste disposal units. Particularly in connection, collecting, and underground pipes, the question of resistance to abrasion is of increasing importance. Geberit HDPE and Geberit Silent-db20 have a high resistance to abrasion. Additional safety is provided by its extra thick walls.	
Density	955 kg/m ³	1700 kg/m ³
Flexibility / Impact resistance	The high flexibility of the Geberit drainage material can be an important criterion in certain situations if pipelines must pass through expansion joints or if excessive traffic vibrations affect the component.	
Electrical conductivity	Both systems are dielectric. In the electrical industry, plastics have proven themselves to be the best isolators. Geberit HDPE cable conduits, casting resins, insulating varnishes, etc.	
Tightness of connections	Very good long-standing experience (over 50 years) in butt welding. The welding joints are round inside and do not pose any danger of blockages.	
Sealing materials	All seals of the non-welded connections are made of EPDM.	
Chemical characteristics	Due to its paraffin structure, Geberit HDPE has very good chemical resistance which is characterised as follows: Geberit HDPE is insoluble in all organic and inorganic solvents at 20 °C. Geberit HDPE is only soluble in aliphatic and aromatic hydrocarbons and their chlorination products at temperatures above 90 °C. The material is affected by strongly oxidising media (concentration HNO ₃ , concentration H ₂ SO ₄ etc.) at room temperature and under long-term exposure.	The composite material db20 has good chemical resistance suitable for the "domestic waste water" range of applications.
UV resistance	The product material is largely protected against ageing and becoming brittle due to solar radiation by the addition of approx. 2 % soot.	

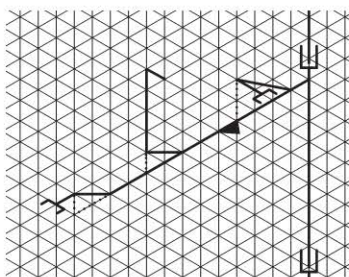
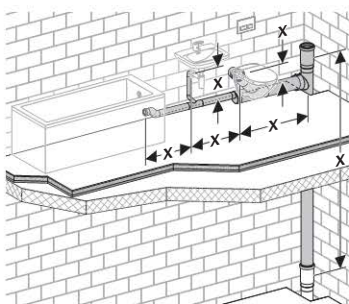
Characteristic	Geberit HDPE	Geberit Silent-db20
Sound		
Airborne sound	Airborne sound should be encapsulated. It is encapsulated with Geberit Isol or building measures.	The composite material db20 has excellent airborne sound insulation values which are perfectly implemented in thick walls and sound insulation ribs.
Solid-borne sound	Only low levels of sound stimulation are passed on due to the modulus of elasticity of Geberit Silent-db20 and Geberit HDPE. Solid-borne sound can also be further reduced by maintaining consistent separation from the building structure using pipe brackets with insulation inserts and insulating sleeves.	
Internal pressure – general	The resistance to pressure is 3 bar for brief periods (see chapter 2.3.1 "Permitted internal pressure" on page 14).	
Internal pressure DN 30–150 (ø 32–160) pump pressure pipes	Geberit HDPE and Geberit Silent-db20 can be used for pump pressure pipes without mechanical and chemical load. The maximum permitted internal pressure is 1.5 bar at a maximum of 30 °C, 10 a. All connections must be tension resistant.	

1.2 Prefabrication

The good characteristics of Geberit HDPE offer an easy way to prefabricate entire pipe sections in the workshop. This not only saves a lot of time at the building site, but also provides the opportunity for economically efficient series production.

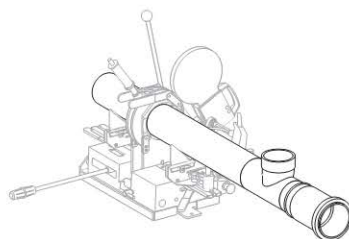
Performing prefabrication with the x-dimension method

- 1 Create isometric drawing of the pipe section.



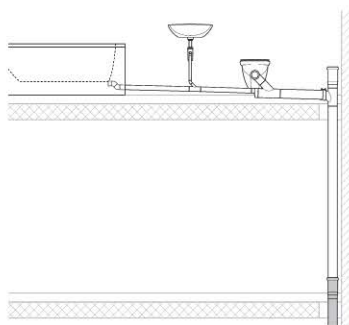
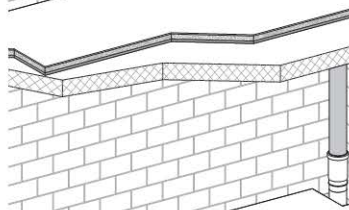
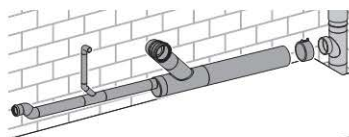
- 2 Transfer all necessary information (distances between axes, slopes, levels) from the plan to the isometric drawing.
- 3 Calculate missing measurements.
- 4 Dimension the pipes.
- 5 Select the fittings.
- 6 Select the x-dimensions of the fittings from the catalogue.
- 7 Calculate the pipe lengths (see 1.2.1 "X-dimension method", page 9).

- 8 Cut the pipes to size and weld them together.



- 9 Prefabricate as many of the intermediate parts as possible (the only limits to the size are the transport options and the space requirements at the building site).

- 10 Assemble the pipes at the building site with electrofusion sleeve couplings or expansion sockets.



1.2.1 X-dimension method

Complex sections of pipes can be calculated using the x-dimension method. This ensures simple prefabrication.

Example: Pipe with branch fitting and bend 90°

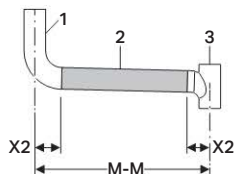
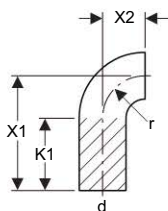


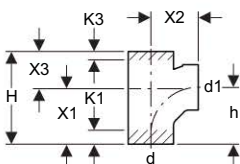
Figure 1: Example of calculating the length of pipe

- 1 Geberit HDPE bend 90° long
- 2 Geberit HDPE pipe
- 3 Geberit HDPE branch fitting 88.5°, swept-entry
- M-M Centre to centre measure
- X2 Leg length bend 90° long
- X2 Leg length branch fitting 88.5°, swept-entry

When it is certain which branch fittings are to be used, the corresponding x-dimensions can be taken from the catalogue:



Article no.	dø [mm]	DN	r [cm]	X1 [cm]	X2 [cm]	K1 [cm]
367.055.16.1	110	100	10	27	10	17



Article no.	dø [mm]	d1ø [mm]	X1 [cm]	X2 [cm]	X3 [cm]	H [cm]	h [cm]	K1 [cm]	K3 [cm]
367.163.16.1	110	110	13.5	11.5	9	22.5	13.8	3.5	3.5

The following x-dimensions are used according to Figure 1:

- Geberit HDPE bend 90° long: X2 = 10 cm
- Geberit HDPE branch fitting 88.5°, swept-entry: X2 = 11.5 cm

The effective pipe length can be calculated using the following calculation formula:

Pipe length = Centre to centre measure – x-dimensions + welding loss

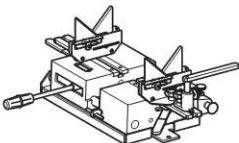
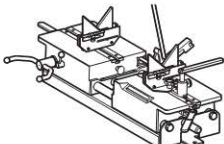
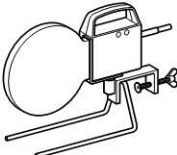
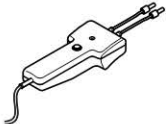
In this example:

Pipe length = 85 cm – (10 cm + 11.5 cm) + (2 · 0.5 cm) = 64.5 cm



The K-dimensions determine the largest possible reduction of the fitting.

1.3 Overview of tools

 Geberit welding machine Media	Butt welding of $\varnothing$ 40–315 mm can be performed with the Geberit welding machines Media and Universal: • Media: $\varnothing$ = 40–160 mm • Universal: $\varnothing$ = 40–315 mm
 Geberit welding machine Universal	
 Geberit welding plate	For Geberit welding machines Media and Universal , or separately
 Geberit electrofusion machine ESG 40/200	The Geberit electrofusion machine ESG 40/200 is only intended for welding Geberit HDPE pipes and fittings or Geberit Silent-db20 pipes and fittings with: • Electrofusion sleeve couplings $\varnothing$ 40–160 mm • Electrofusion tapes $\varnothing$ 50–315 mm Voltage range: 230 V
 Geberit electrofusion wel- ding machine ESG T2	The Geberit electrofusion welding machine ESG T2 is only intended for welding Geberit HDPE pipes and fittings with • Electrofusion couplings with integrated thermal fuses $\varnothing$ 200–315 mm Voltage range: 230 V



Geberit electrofusion machine ESG 3

The Geberit electrofusion machine ESG 3 is for welding Geberit HDPE pipes and fittings or Geberit Silent-db20 pipes and fittings with:

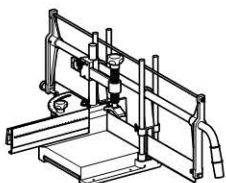
- Electrofusion sleeve couplings $\varnothing$ 40–160 mm
- Electrofusion couplings with integrated thermal fuses $\varnothing$ 200–315 mm (only 230 V)
- Electrofusion tapes $\varnothing$ 50–315 mm

Voltage range: 110–230 V



Repair tool

The repair tool is only intended for repairing Geberit HDPE / Geberit Silent-db20 pipes and fittings $\varnothing$ 40–160 mm and for Geberit concealed cisterns made of HDPE. The maximum size of the repair location is 20 x 20 mm or $\varnothing$ 20 mm.



Geberit hand mitre saw

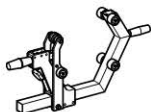
Geberit hand mitre saw with angle setting

Cutting height 170 mm



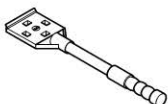
Geberit HDPE pipe cutter

For cutting Geberit HDPE and Geberit Silent-db20 pipes $\varnothing$ 6–168 mm



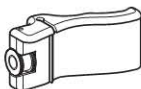
Geberit HDPE pipe cutter

For cutting Geberit HDPE pipes $\varnothing$ 200–315 mm



Geberit pipe scraper

The Geberit handheld pipe scraper is used for removing the oxide coating on Geberit HDPE and Geberit Silent-db20 pipes and fittings as preparation for electrofusion welding



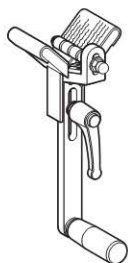
Geberit handheld pipe scraper

The Geberit handheld pipe scraper is used for removing the oxide coating on Geberit HDPE (ø 56–125 mm) and Geberit Silent-db20 (ø 56–135 mm) pipes and fittings as preparation for electrofusion welding



Geberit lubricant

For lubricating the seals of push-fit connections



Geberit pipe chamfering tool

For chamfering Geberit HDPE pipes ø 32–160 mm

2 Geberit HDPE

2.1 System components

The complete proven and practical product range consists of:

- Pipes
- Fittings
- Connections
- Fastenings

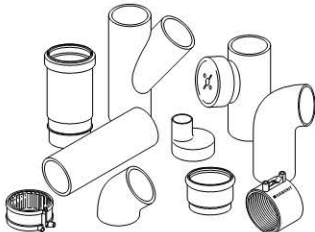


Figure 2: Geberit HDPE product range

2.2 Chemical resistance list

Geberit HDPE can be used from pH 0 to pH 14 without hesitation.

The behaviour of the fitting seal ring (EPDM) relating to the chemical resistance is different to Geberit HDPE.

Resistance list

For the chemical resistance list, see www.international.geberit.com under "Download centre".

2.2.1 Determining the chemical resistance

The following information is always required for calculating the chemical resistance:

- Conveyed medium (composition, chemical designation)
- Proportion (concentration in %)
- Temperature in °C
- Information about the duration of exposure, frequency, flow rate
- Other conveyed media

Template

For a template for resistance queries, see www.international.geberit.com under "Download centre".

2.3 Technical data

2.3.1 Permitted internal pressure

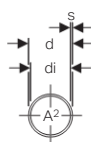
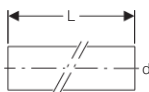
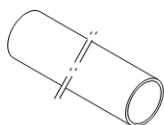
The Geberit HDPE product range was essentially designed for drainage systems. Geberit has configured the maximum permitted load values for the low pressure range (e.g. pump pressure pipes) to ensure a service life of 10 years.

Pressure max. 1.5 bar, up to dimension
ø 160

Temperature 30 °C, 10 a

All connections must be made tension resistant.

Geberit HDPE system



DN	dø	di	L [m]	A [cm ²]	s	S ¹⁾	Permitted internal negative pressure ²⁾ [bar]	Weight per m		Article no.
								empty [kg]	full [kg]	
30	32	26	5	5.3	3	12.5	1.0	0.24	0.77	379.000.16.0
40	40	34	5	9	3	12.5	0.96	0.33	1.23	360.000.16.0
50	50	44	5	15.2	3	12.5	0.47	0.46	1.98	361.000.16.0
56	56	50	5	19.6	3	12.5	0.33	0.48	2.44	363.000.16.0
60	63	57	5	25.4	3	12.5	0.23	0.61	3.15	364.000.16.0
70	75	69	5	37.3	3	12.5	0.13	0.73	4.46	365.000.16.0
90	90	83	5	54.1	3.5	12.5	0.12	0.96	6.37	366.000.16.0
100	110	101.4	5	80.7	4.3	12.5	0.12	1.49	9.56	367.000.16.0
125	125	115.2	5	104.5	4.9	12.5	0.13	1.90	12.35	368.000.16.0
150	160	147.6	5	171.1	6.2	12.5	0.11	3.00	20.11	369.000.16.0
200	200	187.6	5	276.4	6.2	16	0.06	3.62	31.26	370.000.16.0
250	250	234.4	5	431.5	7.8	16	0.06	5.48	48.63	371.000.16.0
300	315	295.4	5	685.3	9.8	16	0.06	9.66	78.19	372.000.16.0

¹⁾ Pipe line in acc. with DIN EN 1519-1

²⁾ Pressure at max. 20 °C and 50 years' service life with a safety factor of 2.0

2.4 Connection types

The numerous Geberit connection technologies offer solutions for every situation and every connection type.

Table 2: Connection types

Connection type		Tension resistant		Non-tension resistant
		removable	unremovable	removable
	Butt welding DN 30–300 (ø 32–315 mm)		✓	
	Electrofusion sleeve coupling DN 40–150 (ø 40–160 mm)		✓	
	Electrofusion coupling with integrated thermal fuse DN 200–300 (ø 200–315 mm)		✓	
	Expansion socket DN 30–300 (ø 32–315 mm)			✓
	Ring seal socket DN 30–150 (ø 32–160 mm)			✓
	Flange DN 50–300 (ø 50–315 mm)	✓		
	Screw connection without flange bushing DN 30–100 (ø 32–110 mm)			✓
	Screw connection with flange bushing DN 30–100 (ø 32–110 mm)	✓		
	Clamp DN 50–250 (ø 50–274 mm)			✓

2.5 Installation rules

2.5.1 HDPE pipes embedded in concrete

For pipelines which are firmly welded and completely embedded in concrete, the expansion on heating and shrinkage on cooling of HDPE is absorbed by the material itself, due to its high elasticity. The forces which apply when expansion is prevented are considerable for large dimensions.

The fittings must withstand these forces alone as the pipe does not absorb any adhesive force with the concrete. The fittings should therefore be embedded in concrete in a particularly compact manner.

- Reduced branch fittings must be secured by installing electrofusion sleeve couplings or flange bushings before shearing
- The fittings should be embedded in concrete in a compact manner
- Connections must be made with butt welding or electrofusion sleeve couplings
- Geberit HDPE pipes and fittings should be inserted in such a way that they are held in position when embedding in concrete, e.g. by fastening on to the formwork.

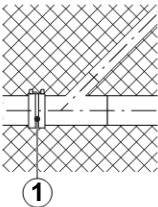


Figure 3: Design with electrofusion sleeve coupling
1 Electrofusion sleeve coupling

Reduced branch discharge pipes from main pipes must be secured by installing flange bushings or electrofusion sleeve couplings.

Do not install any expansion sockets.

Design for an anchor point on a pipe section embedded in concrete in a straight line:

- Electrofusion sleeve coupling
- Flange bushing
- Equal branch fitting embedded in concrete.

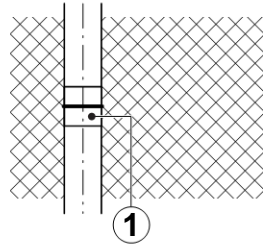


Figure 4: Design with flange bushing
1 Flange bushing

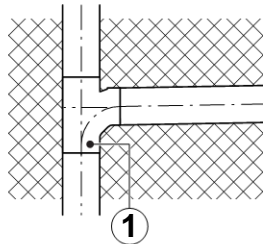


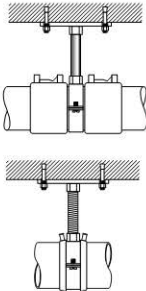
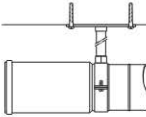
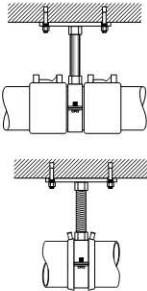
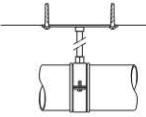
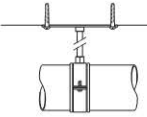
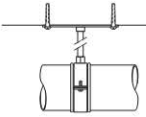
Figure 5: Design with equal branch fitting embedded in concrete
1 Equal branch fitting

2.5.2 Overview of fastening

The thermal expansion or shrinkage caused through temperature differences is 0.2 mm/mK for HDPE.

The thermally caused change in length is controlled by the type of fastening. A distinction is drawn between the **rigid installation** and **sliding installation** fastening types.

Table 3: Overview of pipe fixation

Conventional rigid installation	Sliding installation	
	Fastening with expansion socket	Fastening with deflection leg
The forces imposed which counteract the thermally caused change in length must be absorbed. The anchor point transfers the forces imposed to the building.	The thermally caused changes in length must be taken into consideration during installation. The sliding point is used for routing the pipe. It prevents the pipeline from being deflected.	
Application: Horizontal and vertical pipe-lines	Application: Horizontal and vertical pipe-lines	Application: Horizontal and vertical pipe-lines
 Anchor point F, constructed with electrofusion sleeve couplings or electrofusion tape	 Anchor point F	 Anchor point F, constructed with electrofusion sleeve couplings or electrofusion tape
 Sliding point G	 Sliding point G	 Sliding point G



Geberit recommends fastening with expansion socket.

2.5.3 Fastening with expansion socket

Forces involved in installing and operating the expansion socket

The installation force is the force which must be expended when entering the bevelled pipe into the expansion socket. The sliding resistance is the force with which the expansion socket must be held so that the thermally caused changes in the length of the pipeline can occur in the expansion socket.

Table 4: Forces involved in installing and operating the expansion socket

Dimension dø		Installation force	Sliding resistance during operation
DN	mm	In N	In N
50	50	190	100
56	56	200	100
60	63	230	110
70	75	250	120
90	90	300	200
100	110	400	300
125	125	550	400
150	160	800	700
200	200	1200	1000
250	250	1800	1500
300	315	2600	2200

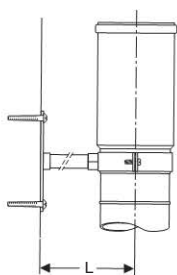


Figure 6: Anchor point

Geberit HDPE expansion socket

i The change in length of the pipes and fittings must be controlled in the expansion socket. Anchor points and sliding points must be used for this form of installation type.

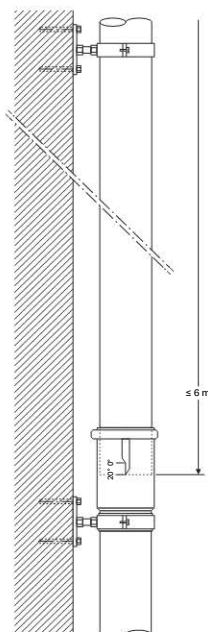


Figure 7: The expansion socket is assigned a pipe length of max. 6 m.

Geberit HDPE expansion socket insertion depth



The slide-in length depends on the installation temperature. At an installation temperature of 20 °C, the slide-in depth is 10.5 m, at 0 °C, it is only 8 cm.

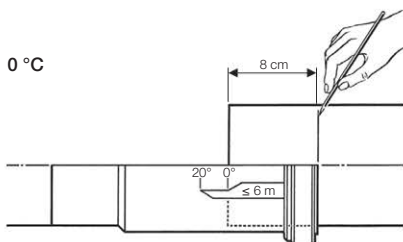


Figure 8: The insertion depth of the expansion socket depends on the temperature

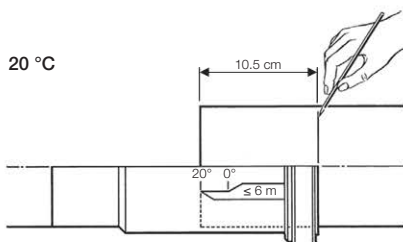
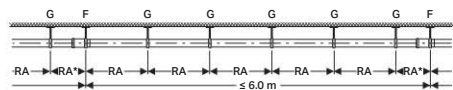


Figure 9: The insertion depth of the expansion socket depends on the temperature

Table 5: Insertion depths

dø	-10 °C	±0 °C	+10 °C	+20 °C
50-160	6.0	8.0	9.0	10.5
200-315	17.0	18.0	19.0	20.5

Sliding and anchor points when fastening on the ceiling

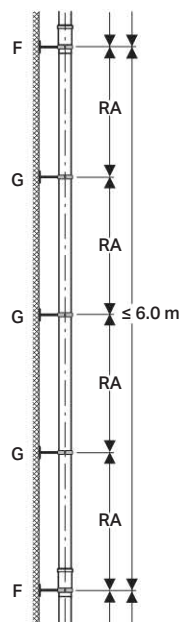


- G Sliding point
- F Anchor point
- RA Distance between pipe brackets
- RA* Distance of anchor point to next sliding point

Table 6: Fastening distances on ceilings

DN	dø	RA [m]	RA* [m]
40	40	0.8	0.4
50	50	0.8	0.4
56	56	0.8	0.4
60	63	0.8	0.4
70	75	0.8	0.4
90	90	0.9	0.5
100	110	1.1	0.6
125	125	1.3	0.7
150	160	1.6	0.8
200	200	2.0	1.0
250	250	2.0	1.0
300	315	2.0	1.0

Sliding and anchor points when fastening on the wall



G Sliding point

F Anchor point

RA Distance between pipe brackets

Table 7: Fastening distances on walls

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

Anchor point when fastening on the ceiling

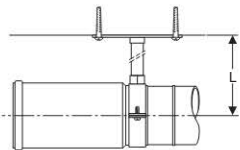


Table 8: Anchor point when fastening on the ceiling, fastening with expansion sockets

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

Anchor point when fastening on the wall

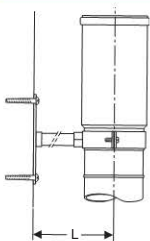


Table 9: Anchor point when fastening on the wall, fastening with expansion sockets

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



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

Sliding point when fastening on the ceiling

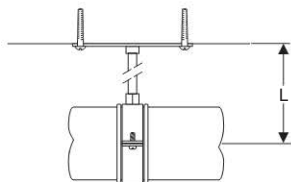


Table 10: Sliding point when fastening on the ceiling

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

Sliding point when fastening on the wall

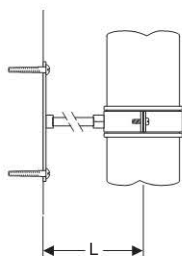


Table 11: Sliding point when fastening on the wall

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

2.5.4 Fastening with deflection leg

Pipe laying with deflection leg

- The thermally caused change in length is controlled by the type of fastening on the deflection leg.
- The pipe must be routed in the area of the deflection leg with pendulum suspension.
- The deflection leg must be calculated for each pipe section which branches off or changes direction.

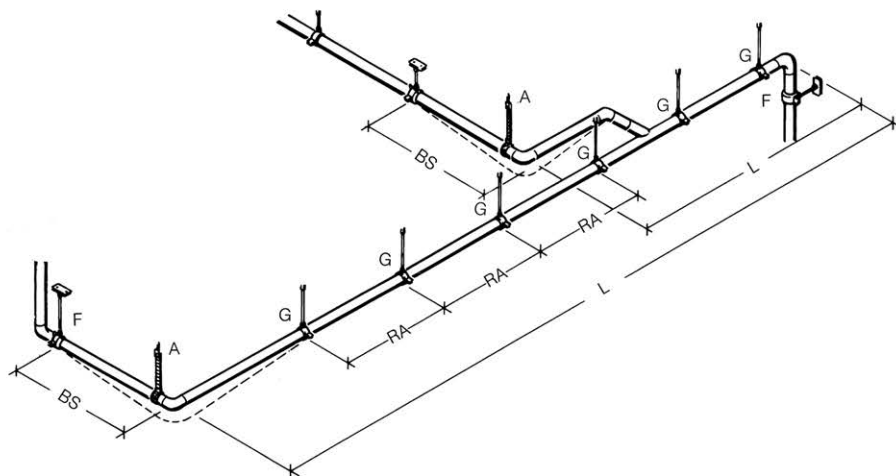


Figure 10: Pipe laying with deflection leg

F Anchor point

A Suspension, pipe strap

G Sliding point

RA Distance between pipe brackets

BS Deflection leg

L Pipe section in which a change in length can occur

Calculating the deflection leg

1. Determining the thermal expansion

The thermal expansion can be determined using figure 11 on page 24:

Given

Maximum temperature = 80 °C
 Installation temperature = 20 °C
 Temperature differential $\Delta t = 60$ K
 Pipe length DS = 4 m

Result

Thermal expansion $\Delta L = 4.8$ cm

2. Calculating the deflection leg

The deflection leg can be determined using figure 12 on page 25 or as follows:

Given

Thermal expansion $\Delta L = 4.8$ cm at $\varnothing = 110$ mm

Calculation

$$BS = 10 \cdot \sqrt{4,8 \text{ cm} \cdot 11 \text{ cm}} = 73 \text{ cm}$$

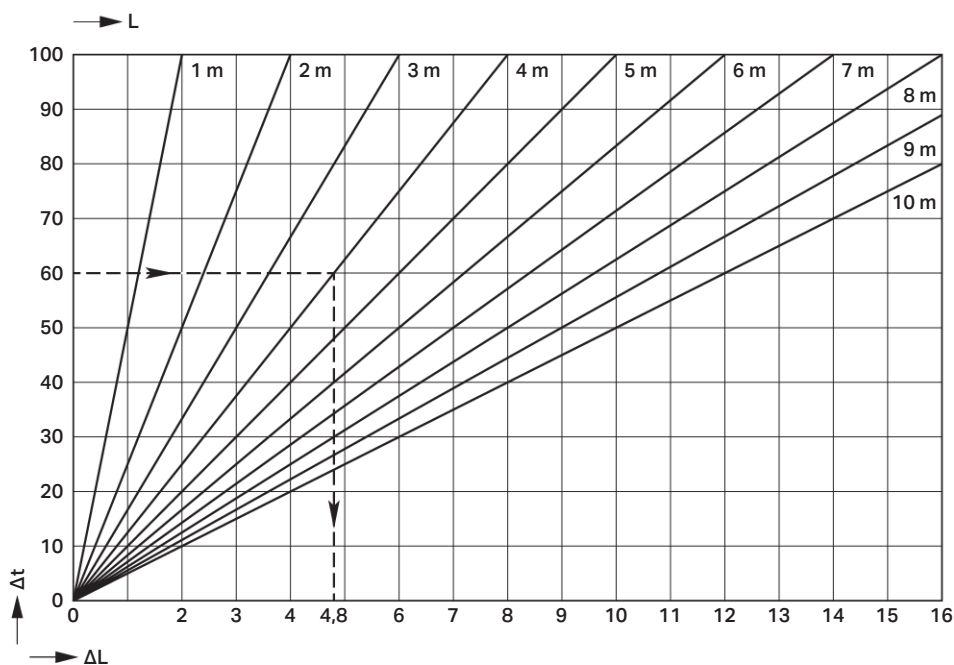


Figure 11: Determining the thermal expansion for HDPE (average linear expansion coefficient: 0.2 mm/m°C)

L Pipe length

Δt Temperature differential [°C]

ΔL Linear expansion or shrinkage [cm]

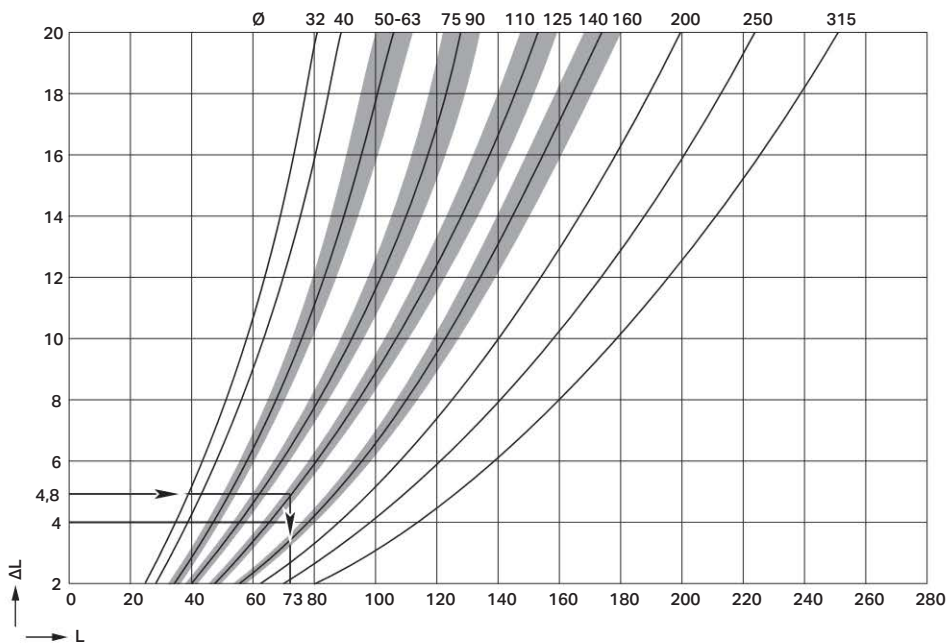


Figure 12: Determining the deflection leg for HDPE

Ø Outer diameter

ΔL Change in length of the expansion leg [cm]

L Deflection leg length in [cm]

Sliding point when fastening on the ceiling

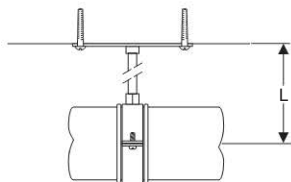


Table 12: Sliding point when fastening on the ceiling

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

Sliding point when fastening on the wall

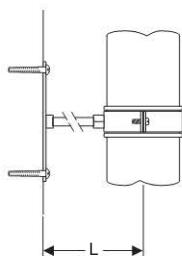


Table 13: Sliding point when fastening on the wall

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

Anchor point with Geberit electrofusion sleeve coupling or electrofusion tape

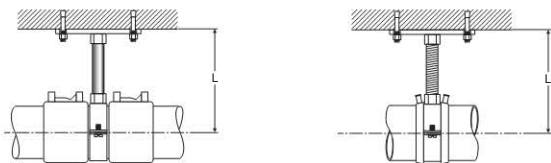


Table 14: Anchor point on ceilings, fastening with deflection leg

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

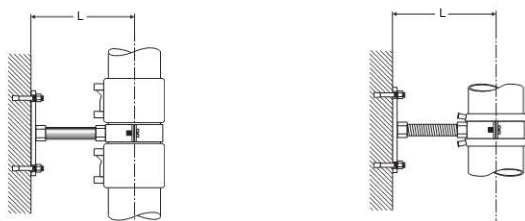


Table 15: Anchor point on walls, fastening with deflection leg

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

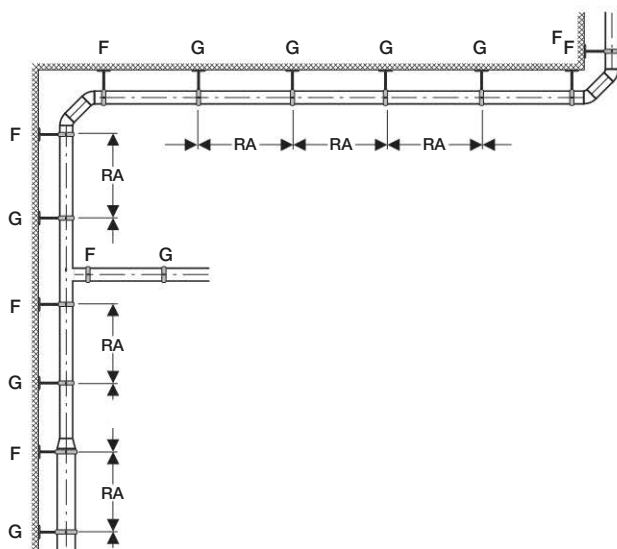


Commercially available products can be used to create the anchor points.

2.5.5 Conventional rigid installation

For rigid installation, pipe brackets with appropriate struts must be used on the building structure after the forces have been calculated. It is important to ensure that the fastening screws withstand the forces imposed.

- Rigid installation is used for horizontal and vertical pipelines
- Rigid installation is recommended up to DN 125 (ø 125)
- The expansion forces which are produced from thermally caused changes in length are transferred to the building
- The specific transfer of force takes place at the anchor points



G Sliding point

F Anchor point

RA Distance between pipe bracket

dø [mm]	32	40	50	56	63	75	90	110	125	160	200	250	315
RA [m]	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1.1	1.3	1.6	2.0	2.0	2.0

Routing guidelines

- An anchor point must be attached immediately before and after each branch fitting and at each outlet from a branch fitting
- An anchor point must be attached immediately before and after each reducer

Sliding point when fastening on the ceiling

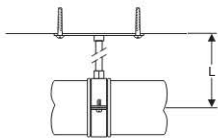


Table 16: Sliding point when fastening on the ceilings

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

Sliding point when fastening on the wall

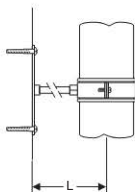


Table 17: Sliding point when fastening on the wall

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

Anchor point with Geberit electrofusion sleeve coupling or electrofusion tape

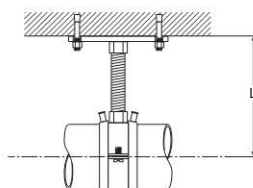
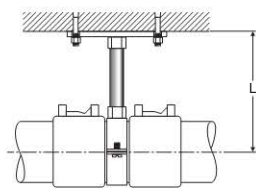


Table 18: Anchor points on ceilings, conventional rigid installation

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

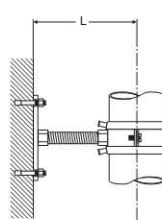
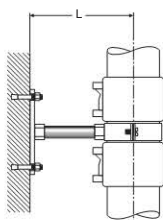


Table 19: Anchor points on walls, conventional rigid installation

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



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

2.5.6 Industry expansion socket

i On the industry expansion socket, the sliding surface is made of stainless steel and is constructed in such a way that abrasive components such as glass fragments and the like cannot damage the seal of the pipe. The industry expansion socket is assigned a maximum pipe length of 6 m.

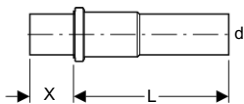


Figure 13: Geberit HDPE expansion socket with sealing protection

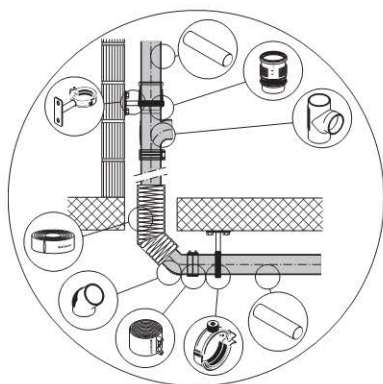
Table 20: Length X at specified installation temperature

dø	-10 °C	0 °C	+10 °C	+20 °C
110–160	15	14	13	11.5
200–315	20	19	18	16.5

3 Geberit Silent-db20

3.1 System components

In order to comply with the required sound levels for sanitary installations, it is necessary to install the building drainage with the Geberit Silent-db20 system.



The Geberit Silent-db20 pipe prevents airborne sound propagation



The Geberit Silent-db20 fastening system guarantees solid-borne sound isolation



The Geberit Silent-db20 insulation hose prevents sound bridges



Geberit Isol additionally reduces airborne and solid-borne sound



The use of Geberit connections with electrofusion sleeve couplings and expansion sockets fulfils the high sound insulation requirements

3.1.1 Geberit Silent-db20 pipes and fittings

Structure

- Thick-walled pipes and fittings made of composite material HDPE
- Fittings with patented sound insulation ribs

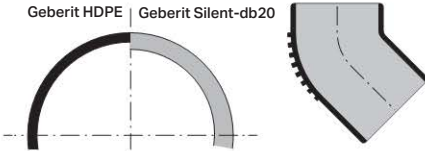


Figure 14: Geberit Silent-db20 pipes and fittings

Characteristics

- Sound-absorbing
- Can be welded with the Geberit electrofusion sleeve coupling or butt welding
- Resistant to chemicals for domestic waste water
- UV-resistant
- Compatible with Geberit HDPE

Geberit Silent-db20 connections

High sound insulation requirements



Figure 15: Electrofusion sleeve coupling (left) and Geberit Silent-db20 expansion socket (right)

Low sound insulation requirements

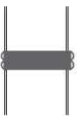


Figure 16: Butt welding

i We recommend using the electrofusion sleeve coupling or the expansion socket on stacks.

Geberit Silent-db20 fastenings

Characteristics

- Excellent solid-borne sound insulation
- Defined contact pressure on the Geberit Silent-db20 pipe



Figure 17: Geberit Silent-db20 pipe bracket with insulation insert



Figure 18: Threaded pipe with female thread 1/2"



Figure 19: Light and heavy base plates

Geberit Silent-db20 insulations

Characteristics

- Excellent sound insulation
- Robust design
- Simple processing



Figure 20: Geberit Silent-db20 insulation hose made of HDPE foam with protective foil



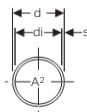
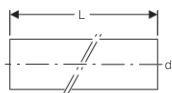
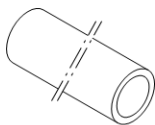
Figure 21: Geberit Silent-db20 tape with adhesive and protective foil



Figure 22: Geberit Isol sound insulation mat and pre-cut mat for pipes

3.1.2 Technical data

Straight lined Geberit Silent-db20 pipe



DN	dø	diø	L	A [cm ²]	s	Weight per m empty [kg]	Weight per m full [kg]	Article no.
56	56	49.6	3	19.3	3.2	0.9	2.83	305.000.14.1
60	63	56.6	3	25.1	3.2	1.02	3.53	306.000.14.1
70	75	68	3	36.1	3.6	1.37	4.97	307.000.14.1
90	90	79	3	49	5.5	2.48	7.38	308.000.14.1
100	110	98	3	75.4	6	3.33	10.87	310.000.14.1
125	135	123	3	118.7	6	4.13	16.00	312.000.14.1
150	160	146	3	167.4	7	5.80	22.50	315.001.14.1

3.2 Installation rules

3.2.1 Laying principles

Branch discharge pipes in the prewall installation

Branch discharge pipes should be designed using Geberit Silent-db20 and must be isolated from the building structure. Geberit electrofusion sleeve couplings or butt weldings are used for the connections.

Feed-throughs in the prewall installation

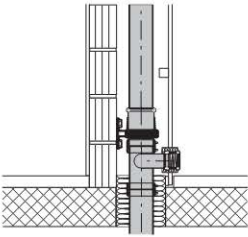


Figure 23: The feed-throughs must be isolated from the building structure with the Geberit Silent-db20 insulation hose, the Geberit Silent-db20 tape or with a permanently elastic kit joint

Design of Geberit Silent-db20 pipelines embedded in concrete

- Tension resistant connections (Geberit electrofusion sleeve couplings or butt weldings) must be used on Geberit Silent-db20 pipelines which are embedded in concrete. The entire pipeline must be isolated from the building structure with the Geberit Silent-db20 insulation hose, the Geberit Silent-db20 tape or with Geberit Isol.
- Reduced branch fittings must be secured by installing Geberit electrofusion sleeve couplings with anchor points before shearing.
- Geberit Silent-db20 pipes and fittings should be inserted in such a way that they are held in position when embedding in concrete, e.g. by fastening on to the formwork and bottom reinforcement.

Branch discharge pipes inserted

Inserted branch discharge pipes in Geberit Silent-db20

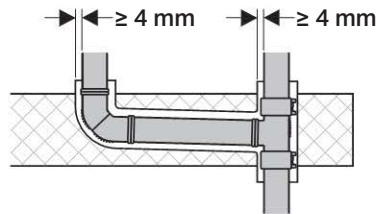


Figure 24: All inserted pipelines must be insulated to absorb the thermal expansion

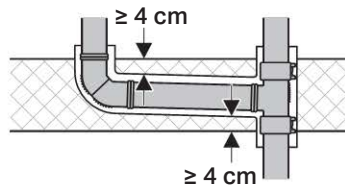


Figure 25: The all-round concrete covering must be at least 4 cm in order to achieve the sound levels

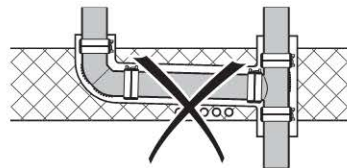


Figure 26: Crossovers with embedded water pipes or electrical pipes should be avoided. They increase the sound levels by 3–10 dB(A), depending on the construction situation

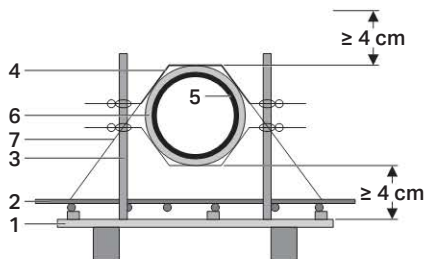


Figure 27: Insertion pipe bracket detail

- 1 Formwork
- 2 Bottom reinforcement
- 3 Insertion pipe bracket
- 4 Pipe bracket clip over insulation
- 5 Geberit Silent-db20 pipe
- 6 Geberit insulation hose
- 7 Retainer to prevent lifting

Inserted branch discharge pipes in Geberit HDPE

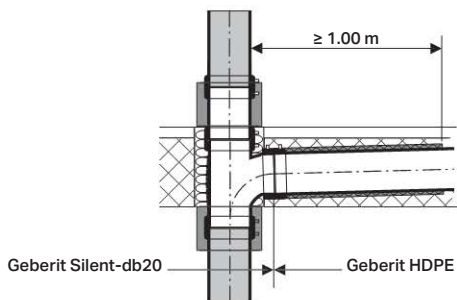


Figure 28: Connection to the stack detail

Only equal Geberit Silent-db20 branch fittings should be used.

Geberit HDPE branch discharge pipes within 1 m from the stack must be insulated using an insulation hose or Geberit Isol to prevent shearing.

Stack in the prewall installation with expansion socket

Stacks belong in ducts and must be isolated from the building structure with regard to solid-borne sound.

Changes in direction can be a maximum of 45°; changes in direction with 2 x 45° bends, unshortened.

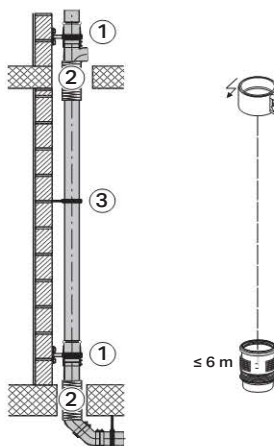


Figure 29: Stack in the prewall installation with expansion socket

- 1 Expansion socket for absorbing the change in length with Geberit Silent-db20 anchor point – expansion socket, pipe joints with electrofusion sleeve coupling, floor height maximum 6 m
- 2 Feed-throughs must be isolated from the building structure with an insulation hose, tape or Geberit Isol
- 3 Pipe routing with Geberit Silent-db20 sliding point

3.2.2 Fastening with expansion socket

To control the thermally caused change in length on Geberit Silent-db20 expansion sockets, corresponding anchor points must be inserted. The pipe bracket for the expansion socket must be selected one DN larger than the actual pipe diameter.

Anchor point in vertical pipelines

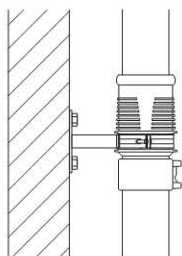


Figure 30: Sound-absorbing anchor point on the Geberit Silent-db20 expansion socket

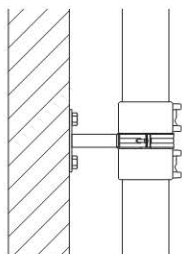


Figure 31: Sound-absorbing anchor point on the Geberit Silent-db20 with 2 Geberit electrofusion sleeve couplings.

Anchor point in horizontal pipelines

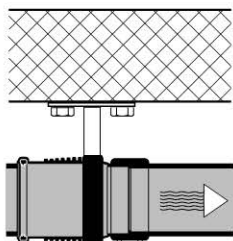


Figure 32: Sound-absorbing anchor point on the Geberit Silent-db20 expansion socket

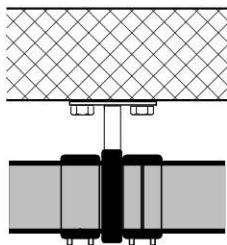


Figure 33: Sound-absorbing anchor point on the Geberit Silent-db20 with 2 Geberit electrofusion sleeve couplings

Insertion depth

i The slide-in length depends on the installation temperature. At an installation temperature of 20 °C, the slide-in depth is 6.5 cm, at 0 °C, it is only 4 cm.

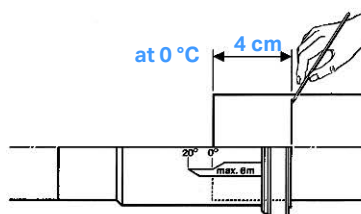


Figure 34: The insertion depth of the expansion socket depends on the temperature

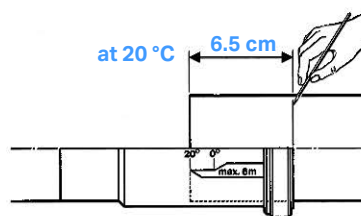


Figure 35: The insertion depth of the expansion socket depends on the temperature

Table 21: Insertion depth depending on the installation temperature

Installation temperature [°C]	Insertion depth [cm]
-10	3.0
±0	4.0
+10	5.2
+20	6.5

Fastening distances on ceilings and walls

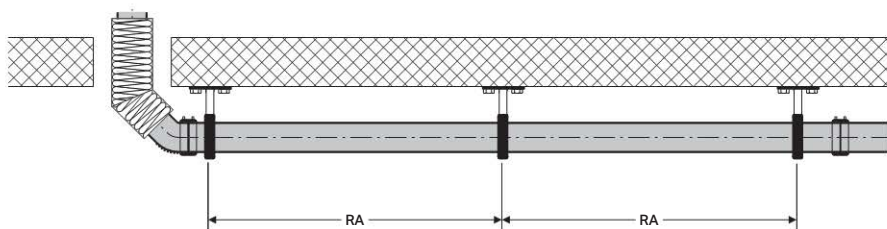


Figure 36: Horizontal fastening distances

Table 22: Horizontal fastening distances

DN	Ø	Pipe brackets distance
		RA [m]
56	56	0.80
60	63	0.80
70	75	0.80
90	90	0.90
100	110	1.10
125	135	1.40
150	160	1.70

Table 23: Vertical fastening distances

DN	Ø	Pipe brackets distance
		RA [m]
56	56	1.50
60	63	1.50
70	75	1.50
90	90	1.50
100	110	1.70
125	135	1.90
150	160	2.40

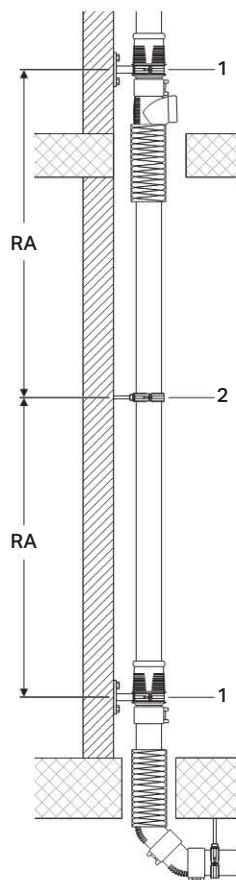


Figure 37: Vertical fastening distances

- 1 Expansion socket with anchor point
- 2 Sliding point

Anchor points

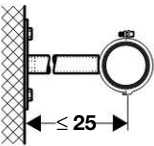


Figure 38: The anchor points are designed at up to 25 cm from the ceiling or wall with pipe bracket fastening 1/2" and the base plate (DN 150 = 3/4")

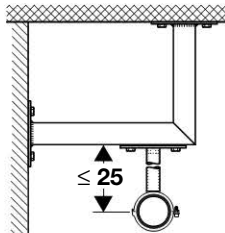
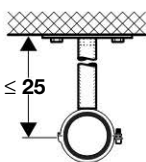
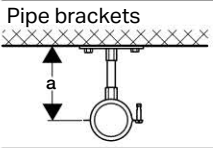


Figure 39: For greater wall or ceiling distances from the anchor points, we recommend installing support fastenings

Sliding points

The type of fastening for sliding points depends on the ceiling or wall distance.

Table 24: Determining the suitable pipe bracket fastening

Pipe brackets	Pipe dimension	DN	56	60	70	90	100	125	150
		ø	56	63	75	90	110	135	160
	Distance a [cm]	up to 50 cm ¹⁾	M10	M10	M10	M10	M10	1/2"	1/2"

¹⁾ We recommend installing support fastenings when fastening pipelines with greater wall or ceiling distances

Use of expansion sockets

The thermal expansion is absorbed with Geberit Silent-db20 expansion sockets. The anchor and sliding points must be arranged accordingly for this purpose.

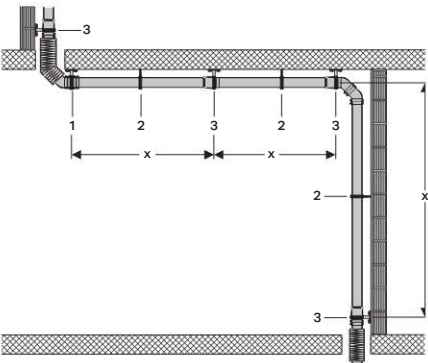


Figure 40: With Geberit Silent-db20 expansion sockets

- 1 Anchor point with 2 Geberit electrofusion sleeve couplings
- 2 Sliding point
- 3 Expansion socket with anchor point
- x Distance of expansion socket max. 6 m

3.3 Geberit Isol

3.3.1 Overview

Geberit Isol lead-free

Geberit Isol lead-free can be used for sound insulation and anti-condensation insulation.



Figure 41: Sound insulation mat

L	Length = 118 cm
B	Width = 78 cm
	Area = 0.92 m ²



Figure 42: Pre-cut mat for pipes ø 56–135

Installation

Sound insulation mats must be applied to a dry underlying surface that is free from grease and dust.

Overlapping

There must be a material overlap of at least 3 cm.

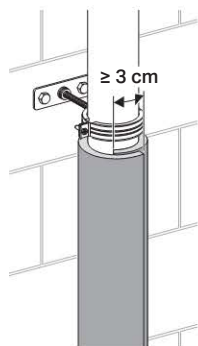


Figure 43: Geberit Isol pre-cut mat for pipes overlap

Fastening

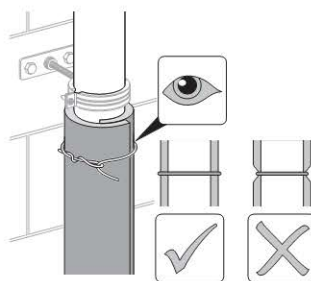


Figure 44: Geberit Isol pre-cut mat for pipes fastening

The sound insulation mats and pre-cut mats for pipes are fastened with commercially available binding wire (ø 0.25 mm) and must not be too tightly bound. The effect of the wire cutting into the mat compresses the semi open-cell acoustic foam. This has a negative effect on the sound insulation. The distance between the fastenings should be 10–15 cm.

Insulation of fittings

The sound insulation mat can be precut for insulating the most commonly used fittings, with the help of the installation manual which accompanies it.

Moisture protection

Anti-condensation insulation for rainwater pipes

Rainwater pipes must generally be provided with insulation to prevent the formation of condensation.

Moisture protection is achieved for the conditions described below using Geberit Isol for both openly routed and hidden roof drainage pipes.

- Rain water temperature 0 °C
- Room temperature < 25 °C
- Moisture < 60 %

When Geberit Isol lead-free is used as insulation against condensation, all edges must be taped off using a suitable adhesive tape (ideal taping width 7 cm or greater) as follows:

- Axial edge parallel to the axis of the pipe
- Radial edge
- For fittings, all outer edges

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

4 Special applications

4.1 Pipe laying outside of buildings

4.1.1 Pipe laying in the ground

When laying HDPE pipes and fittings in the ground, the local regulations and standards must be observed and applied. We refer to the standards listed below for reference:

- DIN EN 1610
- DIN EN 12056
- DIN 1986-3-4-30-100
- DIN EN 752

It is important that the pipeline zone is correctly designed so that it can withstand the load capacity of the Geberit HDPE pipes and fittings in the ground.

The pipeline zone is the filling in the area of the Geberit HDPE pipe and consists of bedding, side filling and the covering zone.

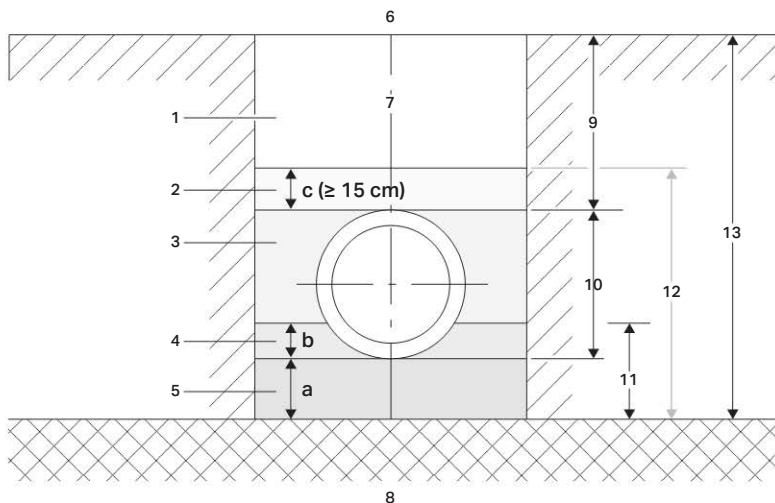


Figure 45: Pipeline zone

- | | |
|---|---------------------|
| 1 | Main filling |
| 2 | Covering zone |
| 3 | Side filling |
| 4 | Upper bedding layer |
| 5 | Lower bedding layer |
| 6 | Surface |

- | | |
|----|-----------------------|
| 7 | Trench walls |
| 8 | Trench floor |
| 9 | Depth of cover |
| 10 | Pipe outside diameter |
| 11 | Bedding |
| 12 | Pipeline zone |
| 13 | Trench depth |

The pipeline zone must be designed in accordance with the planning requirements and the static calculation. It must be ensured that the load capacity, stability or position of the pipeline zone is not changed by:

- Removing the trench lining
- Influence of ground water
- Other neighbouring excavations

During the installation of the pipeline zone up to 30 cm above the apex of the pipe, the direction and the elevation of the pipe must not change. It is also important to ensure that no cavities occur under the pipe.

Building materials for the pipeline zone

The building materials for the pipeline zone must not contain any components which are larger than:

- 22 mm for $DN \leq 200$
- 40 mm for $DN > 200$

As a rule, frozen material must not be used and the Geberit HDPE pipe must not be negatively affected by the building materials.

Design of the bedding

The bedding consists of lower and upper bedding layers.

The width of the bedding must be the same as the width of the trench.

In the case of pipelines under banks, the width of the bedding must be four times the outer diameter unless specified otherwise.

A distinction is drawn between three types with respect to bedding as per DIN EN 1610:

Bedding type 1 may be used for any pipeline zone. Unless specified otherwise, the lower bedding layer a must be at least

- 100 mm for normal ground conditions
- 150 mm for rocky or consolidated ground.

The laid Geberit HDPE pipe must lie flush along the entire length.

The upper layer thickness b is determined by the static calculation.

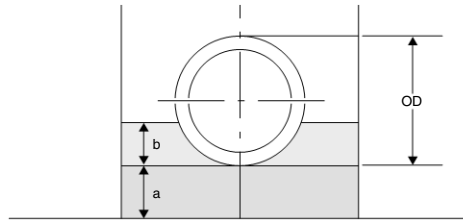


Figure 46: Bedding type 1

On even, relatively loose, fine-grained ground, bedding type 2 can be used, and for relatively fine-grained ground bedding type 3.

The Geberit HDPE pipe can be laid directly on the trench floor for both of these types. The pipe must rest along the entire length.

The thickness b must correspond to the static calculation.

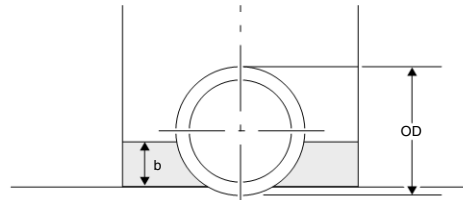


Figure 47: Bedding type 2

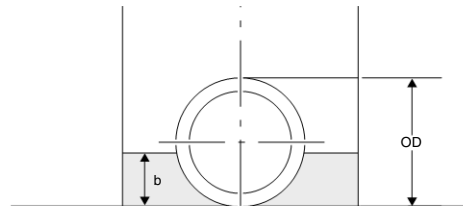


Figure 48: Bedding type 3

Special design for bedding or supporting structure

If the trench floor has a low load capacity for the pipe bedding (e.g. turf, quicksand), special designs are required, e.g.:

- Replacing the ground with different building materials
- Supporting the pipe using stakes, etc.

These designs must only be used if their suitability has been proven with a static calculation.

Main filling

The main filling must be implemented according to the planning requirements.

Compression

The degree of compression must correspond to the data from the static calculation for the pipe.

The cover directly above the pipe should, if required, be compressed by hand. Mechanical compression should only be used when a minimum thickness of 30 cm above the apex of the pipe has been filled in.

Static calculation

A static calculation of buried HDPE pipes and fittings is not required for laying depths of 0.8 to 6 m without groundwater influence and without live loads.

The specifications of DIN EN 1610 must be observed when laying the waste water system.

In the case of live loads or other factors influencing requirements, the general requirements for the static calculation of buried pipes according to DIN EN 1295, part 1, must be taken into consideration. The static calculation itself must be carried out according to ATV datasheet A 127.

The parameters resulting from the static calculation must be adhered to when the pipes are laid.

4.1.2 Pipe feed-through for building connection

i According to DIN EN 12056, load on a discharge pipe due to different levels of subsidence of the building must be avoided using suitable measures. Geberit HDPE absorbs different levels of subsidence due to the flexibility of the material. In addition, insulation must be applied which is thicker than the expected subsidence.

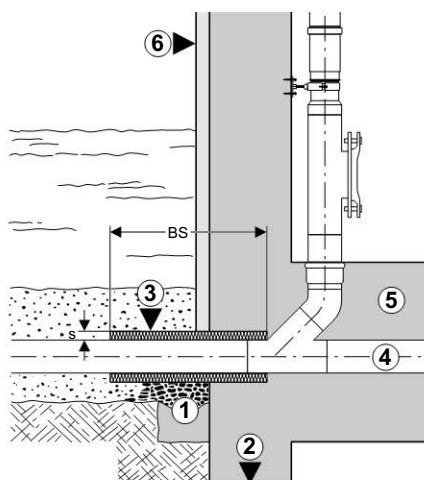


Figure 49: Pipe feed-through for building connection

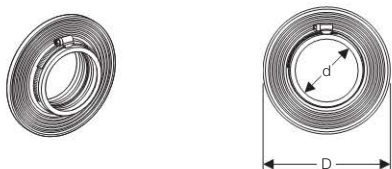
- 1 Seepage water drain pipe
 - 2 Subsidence
 - 3 Insulation against subsidence
 - 4 Geberit HDPE pipe
 - 5 Foundation slab
 - 6 Filter plate
- BS Deflection leg
s Insulation thickness
ΔS Subsidence expected

The deflection leg length (BS) depends on the expected shifting of the terrain (ΔS) and on the diameter of the pipe (DN):

$$BS = 10 \cdot \sqrt{\Delta S \cdot DN}$$

4.1.3 Building connection

In DIN EN 12056, there is a requirement that buried discharge pipes which are routed through outer walls must be designed to be permanently water and gas tight.

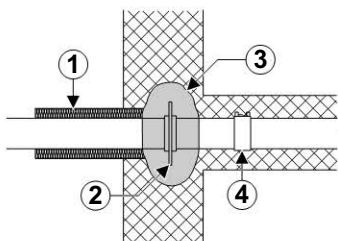


Dimensions

DN	dø [mm]	D [cm]
100	110	21
125	125	22.5
150	160	26

Application range

- For sealing pipes in the walls, ceilings and ground
- Compression proof up to 8 bar
- For protection against moisture
- For Geberit HDPE and Geberit Silent-db20



- 1 Insulation against subsidence
- 2 Geberit puddle flange
- 3 All-round concrete covering min. 8 cm
- 4 Electrofusion sleeve coupling as an anchor point

4.1.4 Moisture protection

Moisture sealing is used everywhere where pipelines are routed through masonry, floors or ceilings, and the penetration of moisture must be prevented.

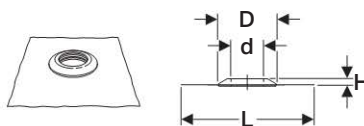


Figure 50: Moisture sealing

Table 25: Dimensions

DN	dø	D	H	L
50	50	13.5	2.5	50
56	56	13.5	2.5	50
70	75	19.5	2.5	50
90	90	19.5	2.5	50
100	110	19.5	2.5	50
125	125	21	2.5	50

Application range	Moisture pressure up to 0.1 bar
Design	• Geberit moisture sealing with Resistit foil • Geberit moisture sealing with Sarnafil foil PVC
Pipe dimensions	DN 50, 56, 70, 90, 100, 125 (ø 50, 56, 75, 90, 110, 125)

Every change in length must be prevented by embedding anchor points (electrofusion sleeve couplings, flange bushings, bends) in concrete or with an appropriate anchor point construction.

Ceiling feed-through with moisture sealing

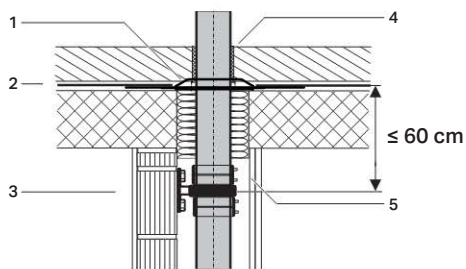


Figure 51: Ceiling feed-through with moisture sealing

- 1 Moisture protection
- 2 Sealing collar
- 3 Anchor point with 2 Geberit electrofusion sleeve couplings
- 4 Insulation hose
- 5 Insulation hose

Wall feed-through with moisture sealing

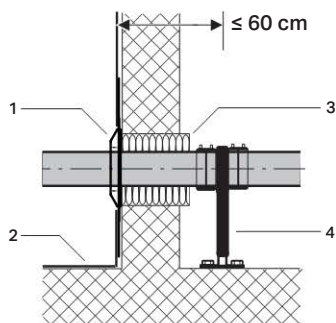


Figure 52: Wall feed-through with moisture sealing

- 1 Moisture protection
- 2 Sealing collar
- 3 Insulation hose
- 4 Anchor point with 2 Geberit electrofusion sleeve couplings

4.1.5 Connections to ducts

i Connection to ducts should only be made using a duct lining or specially prefabricated duct connector. Because subsidence always has to be taken into consideration, the connection must be designed to be flexible.

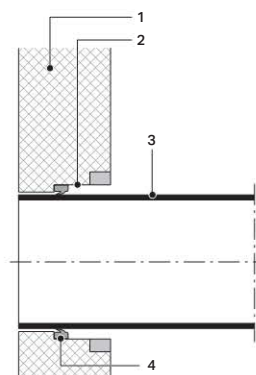


Figure 53: Connection with prefabricated duct connector

- 1 Concrete duct prefabricated
- 2 Recess for seal (using the steel ring fitted in the formwork with the defined outer diameter)
- 3 Geberit HDPE pipe
- 4 EPDM seal

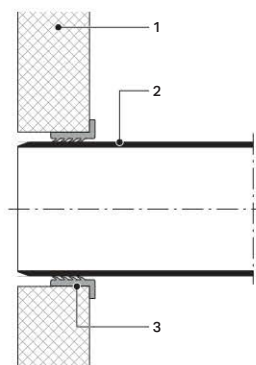


Figure 54: Connection with sealing of connection

- 1 Concrete duct with appropriate core hole
- 2 Geberit HDPE pipe, bevelled, treated with lubricant
- 3 Multi-lip sleeve with stopper inserted into the core hole from outside

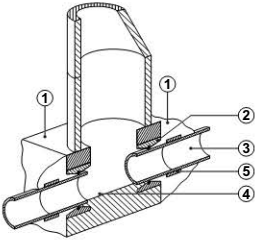


Figure 55: Open guidance bar

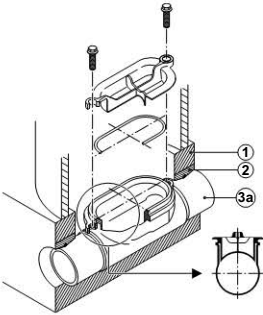


Figure 56: Geberit HDPE access pipe 90° with oval access cover

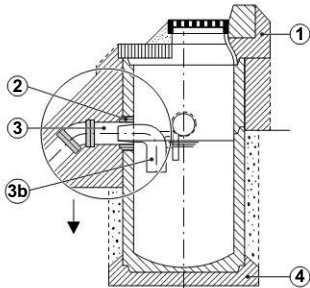


Figure 57: Duct connector with elbow

- 1 Concrete
- 2 Duct lining
- 3 Geberit HDPE
- 3a Access pipe
- 3b Elbow
- 4 Verge
- 5 Anchor point required if necessary

4.2 Fire protection

4.2.1 Geberit fire protection sleeve RS90 Plus

When pipes made of flammable material are routed through components subject to fire protection requirements, precautions have to be taken to prevent the propagation of fire and smoke.



The local regulations and standards must be observed and applied.

A fire resistance duration of 90 minutes is assured for wall and ceiling feed-throughs.

Installation requirements

The Geberit fire protection sleeve RS90 Plus can be installed in the following ceilings and walls:

- Masonry, cement or aerated concrete walls at least 10 cm thick
- Lightweight framework division walls with steel substructure covered with flame-retardant plasterboard panels at least 10 cm thick
- Concrete or aerated concrete ceilings with fire resistance class F 90 according to DIN 4102-22 at least 15 cm thick

Gap sizes for Geberit fire protection sleeve RS90 Plus

The following minimum gap sizes D must be taken into account when installing the Geberit fire protection sleeve RS90 Plus in solid walls or ceilings. Additional insulation, e.g. mineral wool, have not been considered.

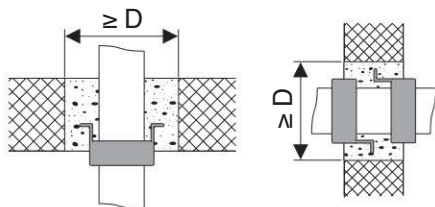


Table 26: Gap sizes for installation in solid walls or ceilings

Article no.	for pipe ø [mm]	min. D [cm]
348.300.00.1	40/50/56	10.0
348.301.00.1	63/75	14.0
348.302.00.1	90	15.0
348.303.00.1	110	17.0
348.304.00.1	135	19.0
348.305.00.1	160	22.0
348.306.00.1	200	25.0

The sleeve fastener is taken into account with all dimensions.

Recommended distances for Geberit fire protection sleeve RS90 Plus

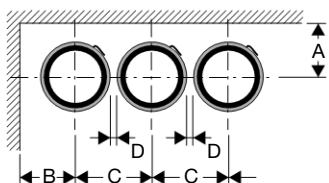


Table 27: Recommended distances for pipelines next to each other in the wall or ceiling

Pipe	A	B	C	D
ø [mm]	[cm]	[cm]	[cm]	[cm]
40	4.0	4.0	9.0	A clearance of $D \geq 0$ cm has been tested and approved.
50/56	4.0	4.0	9.0	
63/75	6.0	6.0	11.0	
90	7.0	7.0	12.5	
110	8.0	8.0	15.0	
125	9.5	9.5	19.0	
135	9.5	9.5	19.0	
160	10.5	10.5	22.0	
200	13.0	13.0	26.0	

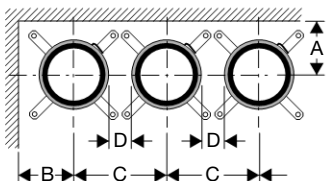
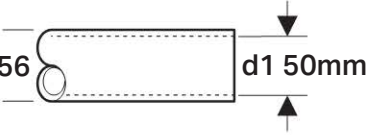
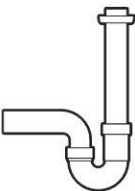
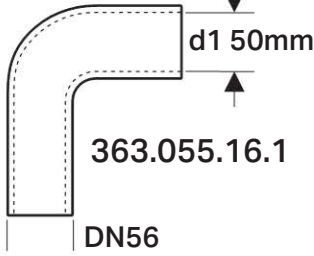


Table 28: Recommended distances for later installation on the wall or ceiling

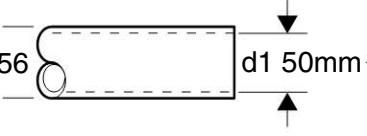
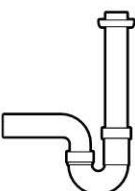
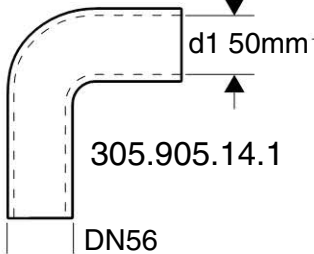
Pipe	A	B	C	D
ø [mm]	[cm]	[cm]	[cm]	[cm]
40	8.0	8.0	15.0	A clearance of $D \geq 0$ cm has been tested and approved. Therefore, the fastening brackets are also allowed to be overlapped arrangement for later installation.
50/56	8.0	8.0	15.0	
63/75	9.0	9.0	17.0	
90	10.0	10.0	19.0	
110	11.0	11.0	21.0	
125	12.0	12.0	24.0	
135	12.0	12.0	24.0	
160	14.0	14.0	28.0	
200	17.0	17.0	32.0	

4.3 Trap connection with Geberit rubber collar

4.3.1 Geberit HDPE

Geberit HDPE pipe section / connection bend	Geberit rubber collar	Trap
 DN56 d1 50mm	 d2 32mm 152.689.00.1	
 363.055.16.1 DN56 d1 50mm	 d2 40mm 152.690.00.1	

4.3.2 Geberit Silent-db20

Geberit Silent-db20 pipe section / connection bend	Geberit rubber collar	Trap
 DN56 d1 50mm	 d2 32mm 152.689.00.1	
 305.905.14.1 DN56 d1 50mm	 d2 40mm 152.690.00.1	

4.4 Transition to other materials

All non tension resistant connections to foreign materials must be secured against being extracted with the use of anchor points.

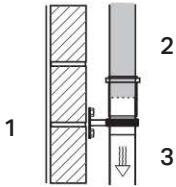


Figure 58: Transition with expansion socket

- 1 Anchor point
- 2 Geberit Silent-db20
- 3 Geberit HDPE

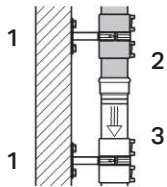


Figure 59: Transition with ring seal socket

- 1 Anchor point
- 2 Geberit Silent-db20
- 3 Geberit HDPE

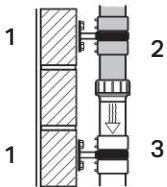


Figure 60: Transition with screw connection

- 1 Anchor point
- 2 Geberit Silent-db20
- 3 Geberit HDPE

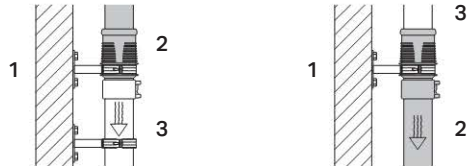


Figure 61: Transition with Geberit Silent-db20 expansion socket

- 1 Expansion socket with anchor point
- 2 Geberit Silent-db20
- 3 Geberit HDPE

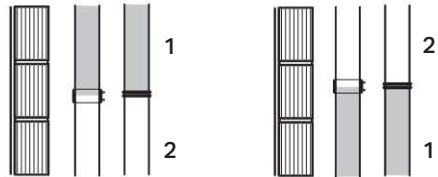


Figure 62: Transition with Geberit electrofusion sleeve coupling or butt welding

- 1 Geberit Silent-db20
- 2 Geberit HDPE



Figure 63: Transition with Geberit clamp, Geberit HDPE always with support ring

- 1 Anchor point
- 2 Geberit Silent-db20
- 3 Geberit HDPE / Cast iron / Steel / Astolan / Fiber cement

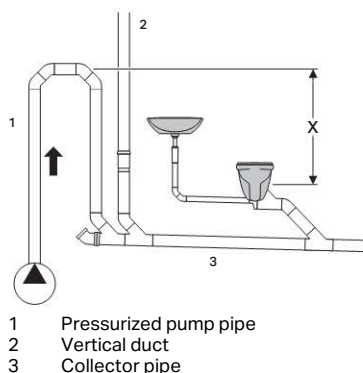
4.5 Low pressure application

Pressure	≤1.5 bar
Temperature	≤ 30 °C
Long-term breaking resistance	10 years

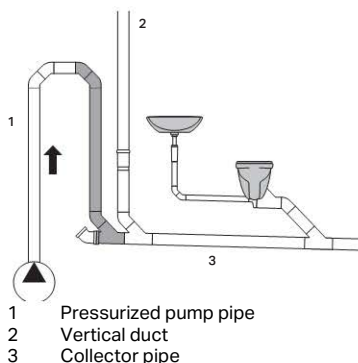
i All connections must be created using butt welding, electrofusion sleeve coupling or flange connection.

The Geberit HDPE product range can also be used for the discharge pipe of a pump assembly. The prerequisite for this is that the mechanical load is low and has only a short duration, and that no thermal medium (such as hot water) is pumped. Bear the following important points in mind when planning discharge pipes for drainage systems:

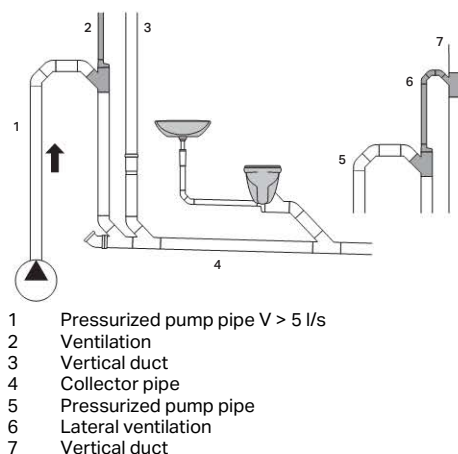
- The discharge pipe must be installed higher than the lowest device using a pipe loop.



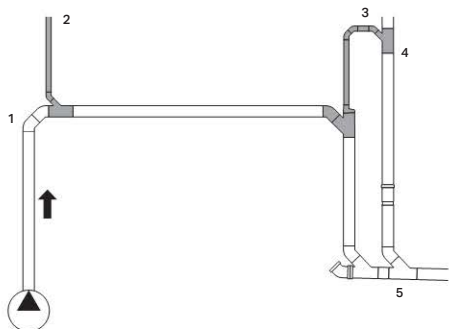
- If the flow rate is less than 5 l/s the vertical section of the pipe loop must be extended.



- If the flow rate is more than 5 l/s the vertical duct must be ventilated with a ventilation pipe with an inside diameter of at least 50 mm.



- Long horizontal collector pipes must be ventilated. The ventilation pipe must have a minimum inside diameter of 57 mm or be two sizes smaller than the discharge pipe. The ventilation pipe must be higher than the delivery height of the pump and must go over the roof.



- 1 Pressurized pump pipe
- 2 Ventilation
- 3 Lateral ventilation
- 4 Vertical outlet duct
- 5 Collector pipe

5 Installation instructions

5.1 Manufacturing pipe joints by welding

5.1.1 Types of welding

Welding joints can be created by various processes:

- Electrofusion sleeve coupling
- Butt welding
- Electrofusion coupling with integrated thermal fuse

General information about welding

Up to $\varnothing = 75$, welding can be done by hand; from $\varnothing = 90$, we recommend welding using the Geberit welding machines Universal or Media.

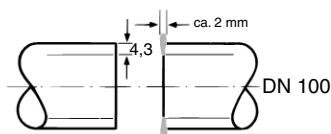
When welding Geberit HDPE pipes and fittings, the quality of the connection is primarily dependent on:

- The material characteristics
- The manufacturing specifications
- The tolerances

This applies particularly to electrofusion welding. The electrofusion sleeve couplings and the pipes and fittings must be matched to the automatic welding control by the electrofusion machine.

i The Geberit electrofusion machine, electrofusion sleeve couplings and fittings are a self-contained manufacturer-specific system, which cannot be replaced with external products. Geberit can therefore only guarantee the suitability of pipes, fittings and electrofusion sleeve couplings for welding if Geberit products are exclusively connected to other Geberit products.

i The welding bead should be about half as thick as the pipe wall thickness.



5.1.2 Creating a butt welding joint

A welding plate is required as a processing tool:

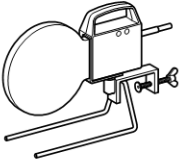


Table 29: Reference values for welding (Geberit Silent-db20 and Geberit HDPE)

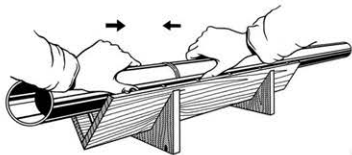
Pipe	Welding allowance per weld seam	Welding allowance per weld seam	Heating up time	Heating up time	Time until full pressure build-up	Welding and cooling time	Welding pressure
	Geberit Silent-db20	Geberit HDPE	Geberit Silent-db20	Geberit HDPE	Geberit Silent-db20 + Geberit HDPE	Geberit Silent-db20 + Geberit HDPE	Geberit Silent-db20 + Geberit HDPE
Ø [mm]	[cm]	[cm]	[s]	[s]	[s]	[min]	[N]
56	0.3	0.3	45	40	4	3	80
63	0.3	0.3	45	40	4	3	90
75	0.4	0.3	50	40	4	4	100
90	0.5	0.4	70	50	5	5	150
110	0.6	0.5	85	63	5	5	220
125	–	0.5	–	71	5	5	280
135	0.6	–	90	–	5	5	280
160	0.8	0.7	110	92	5	5	450
200	–	0.7	–	100	5	5	570
250	–	0.8	–	110	5	5	900
315	–	1.0	–	140	6	6	1400

Prerequisites

- Ambient temperature: –10 °C to +40 °C
- Clean welding plate surface
- Welding plate temperature: 220 °C signal lamp green
- Up to Ø 75 mm the welding can be done by hand. From Ø 90 mm the Geberit welding machines Universal or Media must be used.

Creating butt welding manually

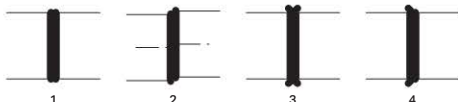
- 1 Cut the pipes to size at right angles to the pipe axis and if necessary clean them.
- 2 Heat the pipe ends.
- 3 Press the pipe ends lightly on the plate.
- 4 Only hold the pipe ends so that heat can flow evenly.
- 5 Immediately push the pipe ends together after welding beads form.
- 6 Increase the welding pressure slowly to the reference value.



i Do not accelerate the cooling process by applying cold items or water.

- 7 Examine the butt welding.

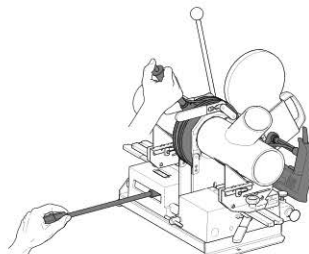
Result



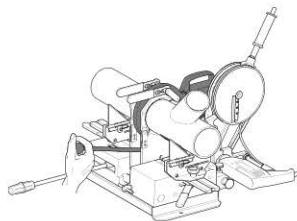
- 1 Correct
- 2 Incorrect, off the axis
- 3 Incorrect, welding pressure too high at the beginning of welding
- 4 Incorrect, uneven welding temperature

Creating butt welding by machine

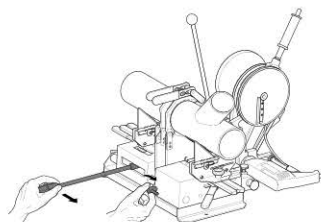
- 1 Align and clamp the fittings or pipe ends which have been cut at right angles and deburred in the welding machine.
- 2 Plane the ends to the required dimensions.



- 3 Press the pipe ends lightly on the plate.
- 4 Only hold the pipe ends so that heat can flow evenly.



- 5 Move the pipe ends onto each other after the welding bead has formed.
- 6 Remove the welding plate.
- 7 Immediately push the pipe ends together.
- 8 Increase the welding pressure slowly to the reference value.



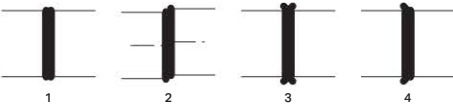
i Do not accelerate the cooling process by applying cold items or water.

- 9 Allow the pipe ends to cool.

10 Unclamp the pipe assembly after the welding and cooling time.

11 Examine the butt welding.

Result



- 1 Correct
- 2 Incorrect, off the axis
- 3 Incorrect, welding pressure too high at the beginning of welding
- 4 Incorrect, uneven welding temperature

5.1.3 Creating an electrofusion sleeve coupling welding joint

- Geberit electrofusion sleeve couplings with integrated thermal fuses are required.



- The Geberit electrofusion welding machine ESG T2 is required as a processing tool.



The Geberit electrofusion welding machine ESG 40/200 is only designated for welding Geberit HDPE pipes and fittings with electrofusion sleeve couplings $\varnothing$ 40–160 mm or electrofusion tapes $\varnothing$ 50–315 mm.

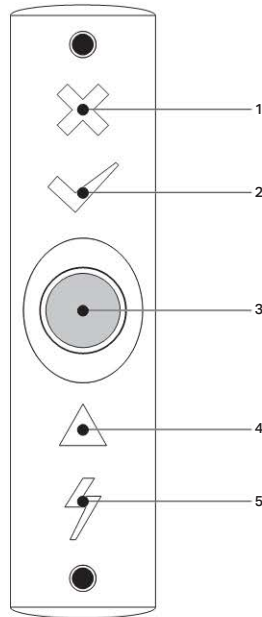


Figure 64: Operating interfaces of the electrofusion machine

- 1 General malfunction display
- 2 Welding complete display
- 3 Start display and actuation
- 4 Ready for welding display
- 5 Mains connection display

Prerequisites

- Permissible ambient temperature: -10°C to $+40^{\circ}\text{C}$
- Mains voltage: 185–265 V / 50–60 Hz, power consumption max. 1100 W
- Fuse: Electronic overflow protection. The machine is equipped with a mechanism which prevents a double weld when a sleeve connection cable is connected
- Operation with emergency generator unit: Minimum power 1500 W



DANGER

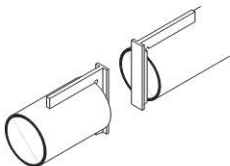
Danger of fatal electric shock

- ▶ Welding must not be carried out.
- ▶ Stop the water flow.
- ▶ Dry pipelines and electrofusion sleeve couplings.

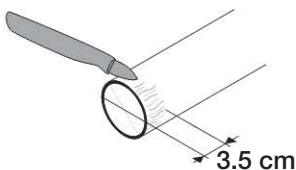
Creating electrofusion sleeve coupling welding joints

i Correctly performed electrofusion weldings must only be carried out 1 x.

- 1 Cut the pipes to size at right angles to the pipe axis and roughly clean dirty surfaces.

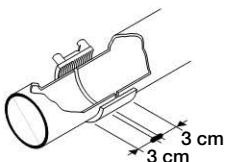


- 2 Scrape the pipe section/fitting surface in the insertion area of the electrofusion sleeve coupling with a blade or commercially available pipe scraper.



i Remove only the uppermost oxide layer evenly and thinly. No recesses must arise.

- 3 Mark clean pipe sections/ittings in the insertion area of the electrofusion sleeve coupling with an insertion depth of 3 cm.



- 4 Insert the pipe sections/ittings into the electrofusion sleeve coupling and examine the insertion depth: The axes of the welding ends must match.

i Only connect the sleeve connection cable with the electrofusion sleeve coupling/electrofusion tape after clean, dry Geberit HDPE pipes or fittings have been inserted.

- 5 Connect the device to the mains voltage. Display ⚡ lights up.
- 6 Connect the sleeve connection cable with electrofusion sleeve coupling/electrofusion tape. Display ▲ lights up.

! DANGER
Risk of burns

▶ Do not touch the pipeline, electrofusion sleeve coupling or electrofusion tape during the welding process or during the cooling-down phase.

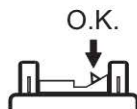
- 7 Press the start button ●. Display ● lights up and display ▲ goes out. Welding is completed after approximately 80 seconds. The start button display ● goes out and the display ✓ lights up.

i Keep the pipeline in an unstressed position during the entire welding procedure.

Result

Welding has been performed correctly and is finished.

Completed welding is indicated by the protruding yellow indicator.

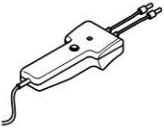


5.1.4 Creating an electrofusion coupling with integrated thermal fuse welding joint

- Geberit electrofusion couplings with integrated thermal fuses and indicators are required



- The Geberit electrofusion welding machine ESG T2 is required as a processing tool



The Geberit electrofusion welding machine ESG T2 is solely intended to be used for welding Geberit HDPE pipes and fittings with 200–315 mm electrofusion couplings with integrated thermal fuses.

Prerequisites

- Permissible ambient temperature: -10°C to $+40^{\circ}\text{C}$
- Mains voltage: 220–240 V / 50 Hz
- Power consumption: 2500 W
- Fuse: The electrofusion couplings with integrated thermal fuses have two fuses that switch off the welding current once the corresponding temperature is reached. The same electrofusion coupling with integrated thermal fuse cannot be welded a second time
- Operation with emergency generator unit: Minimum power 2.5 kW. No other devices can be connected during the welding process. The starter switch voltage under load is at least 200 volts
- Recommendation: Always mount Geberit pressure ring

DANGER

Moisture or water-filled pipelines

– Fatal danger!

- ▶ Welding must not be carried out.
- ▶ Stop the water flow.
- ▶ Dry pipelines and electrofusion couplings with integrated thermal fuses.



An isolation transformer (230 volts / 2.5 kW) must be included in the circuit when carrying out welding work in damp areas.

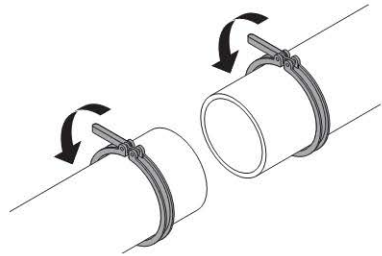
Creating electrofusion coupling with integrated thermal fuse welding joint



Correctly performed electrofusions with integrated thermal fuses must only be carried out 1x.

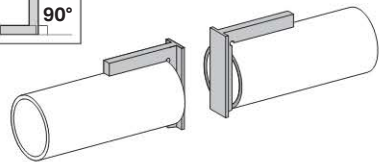
1

Attach pressure rings to oval pipes. Once the welding time has elapsed, the pressure rings must remain mounted for 15 minutes.



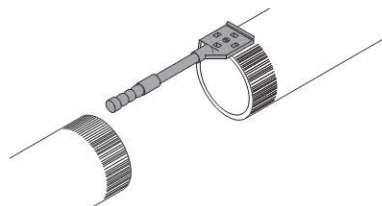
2

Cut the pipes to size at right angles to the pipe axis and roughly clean dirty surfaces.



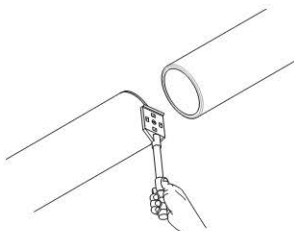
3

Scrape the pipe section/fitting surface in the insertion area of the electrofusion coupling with integrated thermal fuse with the Geberit pipe scraper.

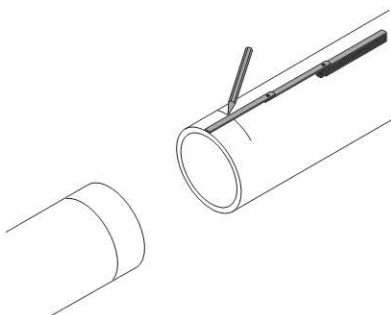


i Remove only the uppermost oxide layer evenly and thinly. No recesses must arise.

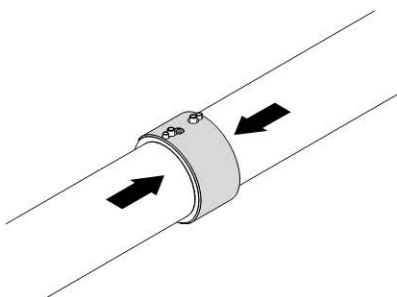
4 Remove any burrs and slightly chamfer the pipe ends.



5 Mark clean pipe sections/fittings in the insertion area of the electrofusion coupling with integrated thermal fuse with an insertion depth of 7.5 cm.



6 Insert the pipe sections/fittings into the electrofusion coupling with integrated thermal fuse and check the insertion depth. The axes of the welding ends must match.



i Do not remove the thermofilm. Only connect the connection cable with the jointing nut after clean, dry Geberit HDPE pipes or fittings have been inserted.

7 Connect device to mains voltage and sleeve connection cable to the electrofusion coupling with integrated thermal fuse.

! CAUTION
Risk of burns

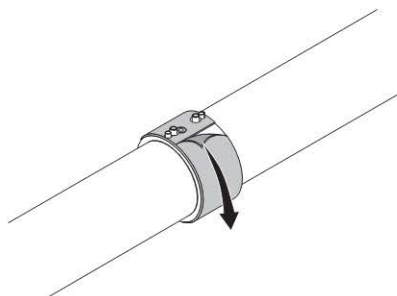
► Do not touch the pipeline and the electrofusion coupling with integrated thermal fuse during the welding process and the cooling down phase.

8 Press the start button briefly. The "weld" signal lamp lights up. Welding current flows through the connected electrofusion coupling with integrated thermal fuse for the next few minutes. The "weld" signal lamp goes out. The welding process is ended.

i Keep the pipeline in an unstressed position during the entire welding process.

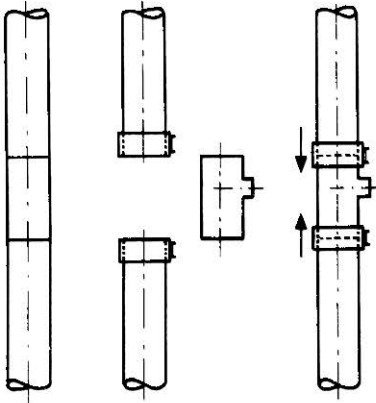
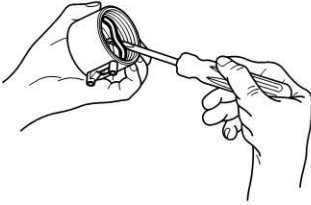
9 Examine the welding: Press the start button briefly. If the lamp goes out when you let go, the welding process has been carried out correctly. If the lamp remains lit up when you let go, the welding time was interrupted and must be repeated once the jointing nut has cooled down.

10 Remove the thermofilm approx. 15 minutes after welding end.



Creating a slide-over electrofusion sleeve coupling

- 1 To change the electrofusion sleeve coupling into a slide-over sleeve, remove the central ring. This process can also be used for repairs.



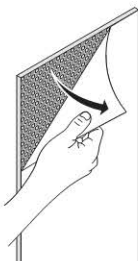
5.2 Geberit Isol sound insulation mat

The following instructions describe the general sequence for installing the Geberit Isol sound insulation mat.

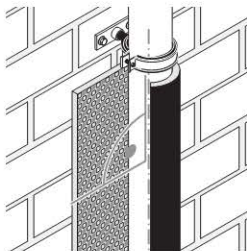
Information on cutting the Geberit sound insulation mat to size for the standard fittings, expansion sockets, electrofusion sleeve couplings and branch fittings can be found in the detailed installation manuals which accompany each product.

Installing the Geberit Isol sound insulation mat

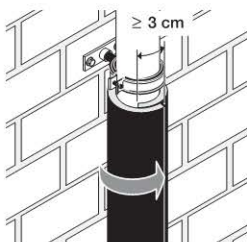
1



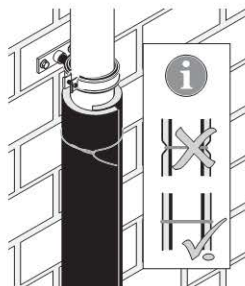
2



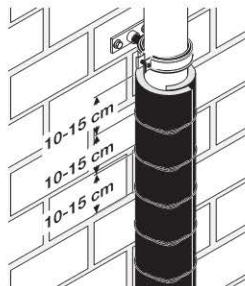
3



4

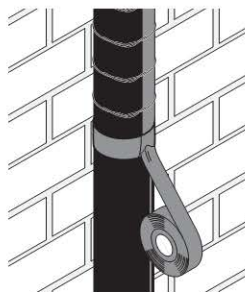


5



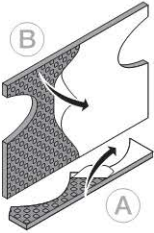
When using as anti-condensation insulation (vapour barrier) on a rainwater pipe in normally loaded rooms, tape off all seams with a suitable adhesive insulation tape (e.g. Coroplast 352 SE, 7 cm width).

6

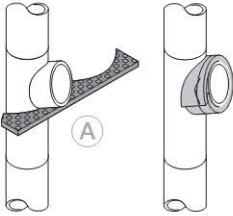


Insulating Geberit branch fitting 45° / 88 1/2°

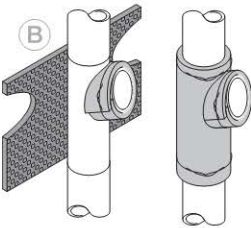
- 1** Remove the adhesive foil.



- 2** Insulate the branch fitting outlet.

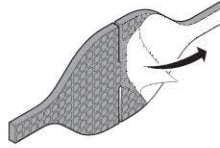


- 3** Completely insulate the branch fitting and fix with binding wire.

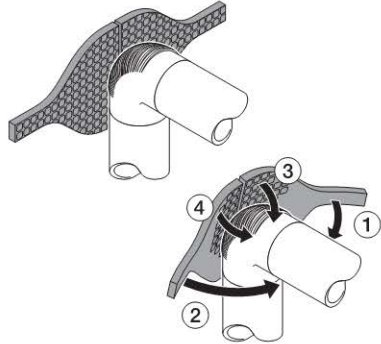


Insulating Geberit bend 45° / 88 1/2°

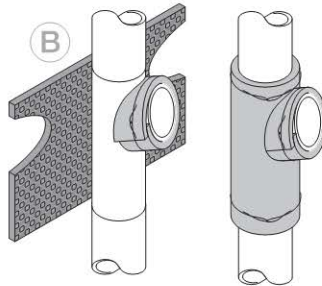
- 1** Remove the adhesive foil.



- 2** Insulate the bend in sequence 1–4.



- 3** Fix the insulation with binding wire.



5.3 Repairing Geberit HDPE and Geberit Silent-db20

5.3.1 Repairing Geberit Silent-db20 / Geberit HDPE or Geberit concealed cisterns made of HDPE

- Geberit repair patches are required.



- The Geberit HDPE repair tool is required as a processing tool.



The repair tool is only intended for repairing Geberit HDPE / Geberit Silent-db20 pipes and fittings 40–160 mm and for Geberit concealed cisterns made of HDPE.

The maximum size of the repair location is 20/20 mm or $\varnothing$ 20 mm.

Prerequisites

- Permissible ambient temperature: -10°C to $+40^{\circ}\text{C}$
- Mains voltage: 230 V / 50–60 Hz
- Power consumption: 180 W
- Fuse: In-built temperature regulator; factory-set to 230°C . To guarantee optimal welding, the adjusting screw must not be adjusted on the repair tool.



WARNING

Moisture, water-filled pipelines or filled concealed cisterns

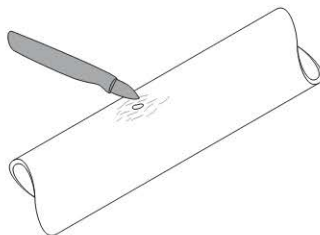
– Fatal danger!

- ▶ Stop the water flow.
- ▶ Empty the concealed cistern.
- ▶ Dry pipelines and cisterns.
- ▶ Only use the repair tool in a dry state.

Preparing the repair location

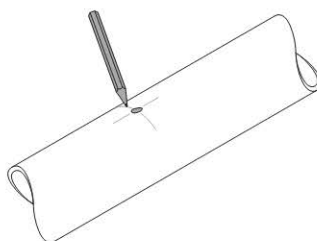
1

Clean the repair location well with scrapers or blades.



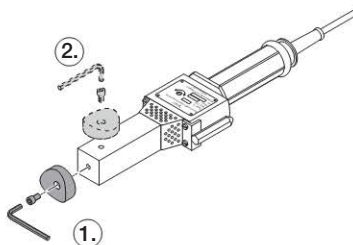
2

Mark the repair location on all sides.



3

Screw the insert which corresponds to the diameter to the front of the tool (for difficult to access locations, can also be on the side).



Performing the repair

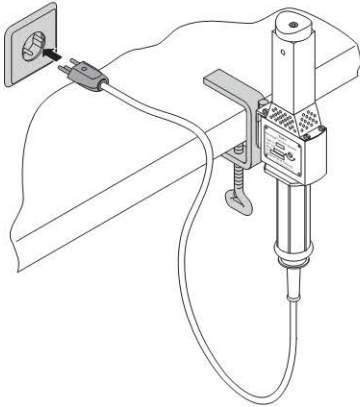


WARNING Risk of burns

- ▶ Do not touch the repair tool during operation or during the cooling-down phase.

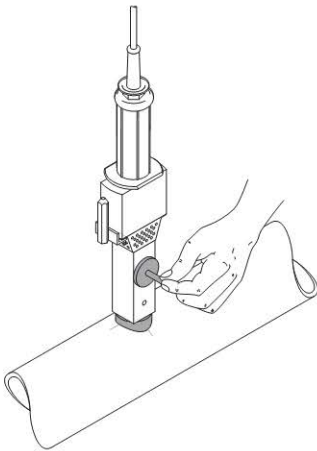
1

Insert the repair tool into the tool holder and connect the mains connection cable to the mains. It takes 15–20 minutes to reach the required welding temperature.



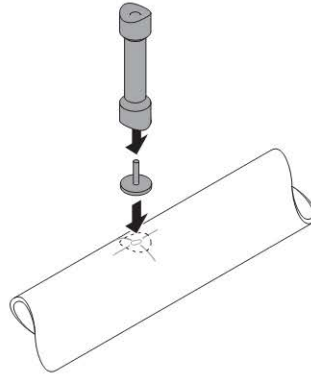
2

At the same time, partially melt the repair location and warm up the repair patch.



3

Press down the melted repair patch quickly with the corresponding side of the patch holder.



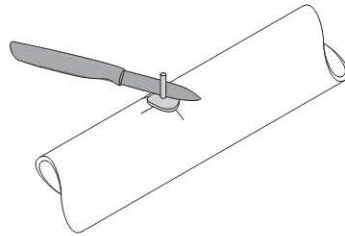
Finishing the repair

1

Allow the repair location to cool down.

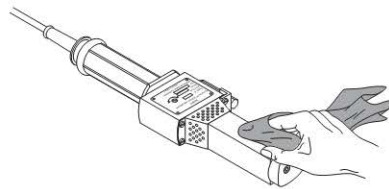
2

Cut the support rods away from the repair patch with a blade.



3

Clean dirty repair tools and inserts with a dry cloth.



Do not use liquid cleaning agents for dirty tools.

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