Geberit Mapress
Geberit Mepla

GEBERIT

Installation Guide

Supply Systems
Valid from 1 June 2014

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Supply Systems Installation Guide

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1 System technology

1.1 Introduction

Geberit Mapress is one of the leading pressfitting systems worldwide and has proven its performance over the past 40 years. It offers a complete supply piping system with pressfittings, pipe, valves, tools and accessories completing the range.

With systems manufactured from Stainless Steel, Carbon Steel, Copper and CuNiFe*, Geberit Mapress can be used for an extensive range of applications, from domestic potable water and heating systems to industrial and marine uses.

1.2 System overview

Geberit Mapress comprises the pressfitting systems:

- Geberit Mapress Stainless Steel
- Geberit Mapress Carbon Steel
- Geberit Mapress Copper

Geberit Mapress comprises the pipe dimensions, Ø 12 – 108mm, depending on the material used.

Geberit Mapress comprises the system components:

- Geberit Mapress pressfittings
  - Geberit Mapress Stainless Steel
  - Geberit Mapress Carbon Steel
  - Geberit Mapress Copper
  - Geberit MapressCuNiFe*
- Geberit Mapress system pipes
  - Geberit Mapress Stainless Steel
  - Geberit Mapress Carbon Steel
  - Geberit MapressCuNiFe*
- Geberit Mapress system valves
- Geberit Mapress pressing tools
  - ACO 102 [1]
  - ACO 202, ECO 202 [2]
  - EFP 202 [2]
  - ECO 301 [3]
  - HCPS
- Geberit Mapress accessories

* For information on Geberit MapressCuNiFe, please see ‘Geberit MapressCuNiFe Product and Installation Guide’.

1.2.1 Geberit Mapress press connection

When the system pipe is pressed together with the pressfitting, a permanent, tight-fitting connection is established which withstands longitudinal and axial forces.

Pressing

The pressfitting and system pipe are compressed in two planes:

1 Strength: The pipe and fitting are deformed into a hexagonal (Ø 12 – 35mm) or lemon-shaped (Ø 42 – 108mm) profile which provides strength and resistance to longitudinal and axial forces.

2 Tightness: The seal ring housing is compressed onto the pipe to provide a permanently tight joint. The profile is controlled by the design of the fitting and pressing tools to provide maximum seal-to-pipe contact area.

Figure 1: Geberit Mapress press connection before pressing

Figure 2: Geberit Mapress press connection after pressing

The Geberit Mapress CIIR black butyl rubber seal rings within the fittings incorporate patented technology which ensures that the fitting will clearly leak if it has not been pressed, yet seal perfectly after pressing. This feature allows unpressed fittings to be detected immediately, eliminating time-consuming checking for errors.

The unique pressing indicator also visually shows any connections that have not been pressed.

1.2.2 Geberit Mapress pressing profile

The press connection is established with pressing jaws or pressing collars depending on the pipe dimension. This results in different pressing contours. The pipe dimensions Ø 12 - 35mm are pressed with pressing jaws which form a hexagonal pressing contour.

The pipe dimensions Ø 42 - 108mm are pressed with pressing collars and the corresponding adaptor jaws which form a pressing contour which is referred to as a “lemon shaped contour”.

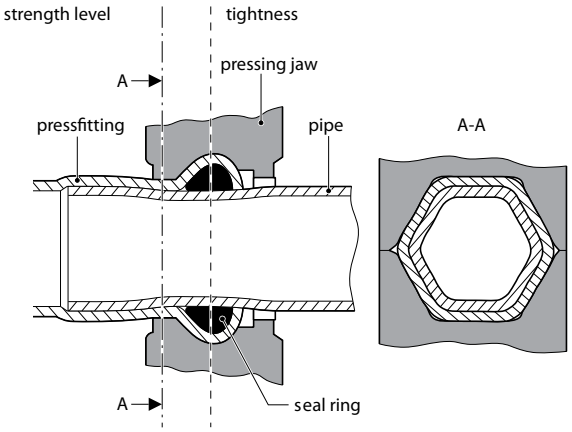


Figure 3: Cross-section of a Geberit Mapress press connection with applied pressing jaw Ø 12 - 35mm and hexagonal pressing contour

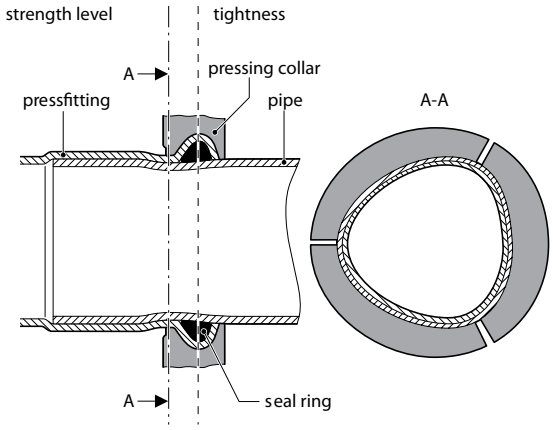


Figure 4: Cross-section of a Geberit Mapress press connection with applied pressing collar Ø 42 - 108mm and lemon shaped contour

1.2.3 Approvals

Table 1: Approvals for Geberit Mapress

System	Application	Testing guidelines / Codes of practice
Geberit Mapress Stainless Steel Ø 15 - 108mm	Potable water Extinguishing water Rainwater Treated water Heating water Open and closed water circuits Compressed air Solar (seal ring FKM blue) Heating oil EL (seal ring FKM blue)	WRc (WRAS) cert. no 1206333 DVGW W 534 SVGW W/TPW 132 TRbF 231 DVGW W 270 FM LPCB
Geberit Mapress Carbon Steel Ø 12 - 108mm	Closed water heating systems Closed water circuits Dry compressed air Heating oil EL (seal ring FKM blue) Extinguishing water	DVGW W 534 TRbF 231 FM VdS VdTUV DIBt LPCB
Geberit Mapress Stainless Steel Gas Ø 15 - 108mm	Natural gases Liquefied gases	BSi (UK) DVGW VP 614 OVGW G1-TR Gas
Geberit Mapress Copper Ø 15 - 108mm	Potable water Heating water Open and closed water circuits Compressed air	WRc (WRAS) cert. no 1206334 DVGW W 540 DVGW W 270
Geberit Mapress Copper Gas Ø 15 - 54mm	Natural gases Liquefied gases	BSi (UK) DVGW VP 614

1.3 Geberit Mapress system components

1.3.1 Geberit Mapress system pipe

System overview

Geberit Mapress system pipes are provided in the following versions:

- Geberit Mapress Stainless Steel system pipes (1.4401 / BS316 and 1.4301 / BS304)
- Geberit Mapress Carbon Steel system pipes (plastic-coated, galvanised on the outside, galvanised on the inside and outside)
- Geberit Mapress CuNiFe

All Gebrit Mapress system pipes are BS-EN / DVGW approved and certified system pipes.

Works standards guarantee additionally increased requirements of:

- The quality of the weld seam
- Dimensional precision
- Surface quality
- Bending capability
- Resistance to corrosion

All Geberit Mapress system pipes are checked for tolerance in the factory. Geberit Mapress stainless steel pipes are delivered with protection plugs to prevent contamination. Geberit Mapress carbon steel pipes are delivered without protection plugs to allow any condensation which may form in the pipes to dry, thus avoiding corrosion risk.

Transport and storage

The information on the transport and storage of Geberit Mapress system pipes is used for quality assurance by Geberit. The observance of these rules does not release the forwarding agent, stock keeper and all other parties involved in the transport from observing all local specific health and safety regulations and accident prevention regulations when handling long goods and pipes.

Do not throw Geberit Mapress system pipes around. Protect them against damage and dirt. Transport and store Geberit Mapress system pipes in the original packaging. The original packaging protects the pipe ends from damage and ensures a safe handling of the pipes. If the pipes cannot be transported and stored in the original packaging, they must be protected in another way. Protect Geberit Mapress system pipes against moisture and the influence of weather. The temperature must not drop below the dew point.

Do not pull Geberit Mapress system pipes over the loading area or over the loading sill. The pipe surface may thereby be soiled or damaged. Secure Geberit Mapress system pipes against shifting during transport. If the pipes hit the front or rear wall of the loading area during transport, the pipe ends may be damaged or the protection plugs pressed into the pipe. Always transport Geberit Mapress system pipes on closed loading areas.

Store Geberit Mapress system pipes in a dry and well ventilated storage area. Do not protect Geberit Mapress system pipes against dirt or moisture with foils, as foils promote the formation of condensation. An exception is the plastic jacketed Geberit Mapress Carbon Steel system pipe, which is delivered with a foil hose to protect the plastic jacket against dust. Store Geberit Mapress system pipes on cantilever type shelves or dry squared timbers. Plan for at least three support points in doing so. Thanks to the support points, air can circulate around the pipes, which means the moisture dries more quickly on the pipe surface. Protect the pipes from deflection. Do not store Geberit Mapress system pipes directly on the ground, as otherwise the pipe surface may be scratched or damaged. Store Geberit Mapress system pipes separately by pipe dimensions to avoid confusion. If the pipes cannot be stored separately by pipe dimensions, always store the smaller pipe dimensions on the larger pipe dimensions. Excessive weight may deform the pipes. Store Geberit Mapress Stainless Steel system pipes and Geberit Mapress Carbon Steel system pipes separately to avoid contact corrosion. Open mixed pallets after transport and store by kind.

1.3.2 Geberit Mapress pressfittings

System overview

The basic element for the press connection is that of a permanently deformed pressfitting. Geberit Mapress pressfittings are provided in the following versions:

- Geberit Mapress Stainless Steel
- Geberit Mapress Stainless Steel Silicone Free
- Geberit Mapress Stainless Steel Solar and Industry
- Geberit Mapress Stainless Steel Gas
- Geberit Mapress Carbon Steel
- Geberit Mapress Carbon Steel Solar and Industry
- Geberit Mapress Copper Solar and Industry
- Geberit Mapress Copper
- Geberit Mapress Copper Gas
- Geberit Mapress CuNiFe
- Geberit Mapress CuNiFe Solar and Industry

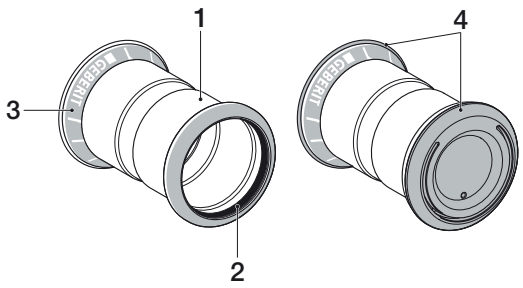


Figure 5: Construction of Geberit Mapress pressfitting

1 Pressfitting
2 Seal ring
3 Pressing indicator
4 Protection plug

Transport and storage

The pressfittings are appropriately packed in plastic bags in the factory to protect against contamination during transportation and storage.

Pressing Indicator

The fitting beads are provided with a pressing indicator in the factory. The pressing indicator has the following functions:

- Indicates to the plumber before the pressure test that there are unpressed connections
- Displays the dimensions of the fittings in the unpressed status
- Indicates the material of the fitting by its colour:
  - Blue for stainless steel
  - Red for carbon steel
  - White for copper, gunmetal and brass
  - Black for CuNiFe
- Clearly identifies the fitting as a Geberit product

The pressing indicator is destroyed by the pressing procedure and is subsequently manually removed by the plumber.

Protection Plug

All Geberit Mapress fittings now feature a protection plug for each fitting end. The protection plug has the following functions:

- Protects the seal ring as well as the plain end from dirt and dust
- Indicates the diameter of the pressfitting
- Colour indicates the seal ring used and the application range
  - Clear: Standard application with black CIIR seal ring
  - Anthracite: Special application with blue or white seal ring
  - Yellow: Gas application with seal ring HNBR yellow

The protection plug can be reused or recycled.

Substances that constrain from painting

All system pipes and pressfittings are always supplied free of substances that constrain from painting (silicone-free).

To prevent contamination, Geberit Mapress Stainless Steel silicone-free fittings are individually bagged to guarantee they are silicone-free.

1.3.3 Mixing Geberit Mapress materials in one system

Geberit Mapress materials can be combined in one system provided that the different materials are all suitable for the application. They can always be connected using threaded adapters.

The table below shows which fittings and pipes can be directly pressed together:

Table 2: Geberit Mapress pipe and fitting combination

	Geberit Mapress Stainless Steel Fitting	Geberit Mapress Carbon Steel Fitting	Geberit Mapress Copper Fitting	Geberit Mapress Gunmetal Fitting	Geberit Mapress Brass Fitting
Geberit Mapress Stainless Steel System Pipe	✓	✓ Heating and chilled applications	✗ Threaded connection only	✓	✗ Threaded connection only
Geberit Mapress Carbon Steel System Pipe	✓ Heating and chilled applications	✓	✗ Threaded connection only	✓	✓
Suitable copper pipe in accordance with BS EN 1057	✗ Threaded connection only	✗ Threaded connection only	✓	✓	✓

Connection to Geberit Mepla is via dedicated adapters found in the Geberit Mepla range or through threaded adapters.

1.3.4 Geberit Mapress Stainless Steel system pipes

The delivery condition of the external and internal surfaces of the Geberit Mapress Stainless Steel system pipes are:

- Free from annealing colours
- Metallically bright
- Free from oil/grease
- Free from corrosion-promoting/unhygienic substances

When required, paint coatings or priming coats can be applied to the Geberit Mapress Stainless Steel system pipes. The Geberit Mapress Stainless Steel system pipes (1.4401) are also used with Geberit Mapress Stainless Steel Gas pressfittings.

Geberit Mapress Stainless Steel system pipe (1.4401 / BS316 S 33)

Table 3: Material of Geberit Mapress Stainless Steel system pipe (1.4401 / BS316 S 33)

Material Designation	Abbreviation (BS EN 10088-2)	Material no.	
		EN	AISI
Austenitic Stainless Steel	X5CrNiMo17-12-2	1.4401	316

Table 4: Physical characteristics of Geberit Mapress Stainless Steel system pipe (1.4401 / BS316 S 33)

Designation	Value	Unit
Thermal expansion coefficient α at 20-100°C	0.0165	mm/(m·K)
Thermal conductivity λ at 20°C	15	W/(m·K)
Specific thermal capacity c at 20°C	500	J/(kg·K)
Pipe roughness k	0.0015	mm

Geberit Mapress Stainless Steel system pipes (1.4401) are non-combustible pipes. The assignment to material classes is based on country specific regulations.

Table 5: Mechanical characteristics of Geberit Mapress Stainless Steel system pipe (1.4401 / BS316 S 33)

Heat treatment condition: solution annealed and quenched.

Designation	Value	Unit
Tensile strength R_m	510-710	N/mm^2
0.2% - Expansion limit $R_{p0.2}$	≥ 220	N/mm^2
Breaking elongation A_5	> 40	%

Table 6: Technical data of Geberit Mapress Stainless Steel system pipe (1.4401 / BS316 S 33)

Nominal width DN	Pipe dimension d x s (mm)	Internal diameter di (mm)	Pipe weight m (kg/m)	Water volume V (l/m)
12	15 x 1.0	13	0.351	0.133
15	18 x 1.0	16	0.426	0.201
20	22 x 1.2	19.6	0.626	0.302
25	28 x 1.2	25.6	0.806	0.515
32	35 x 1.5	32	1.260	0.804
40	42 x 1.5	39	1.523	1.195
50	54 x 1.5	51	1.974	2.043
65	76.1 x 2.0	72.1	3.715	4.083
80	88.9 x 2.0	84.9	4.357	5.661
100	108 x 2.0	104	5.315	8.495

Pipes are supplied in 6m lengths.

Bending

Geberit Mapress Stainless Steel pipes can be bent by hand up to r>5·d and by a commercially available bending tool up to r>3.5·d. The regulations of the bending tool manufacturer must also be observed for the suitability of the bending tool and the bending radii. Geberit Mapress Stainless Steel system pipes must not be heated for bending.

Marking

Geberit Mapress Stainless Steel system pipes are marked on the surface. The following table explains the marks using a Ø 54mm pipe as an example. Please note Geberit Mapress Stainless Steel pipes are WRAS approved for use in the UK even though this is not on the markings.

Table 7: Marking of Geberit Mapress Stainless Steel system pipe (1.4401/BS 316 S 33)

Marking	Explanation
GEBERIT Geberit Mapress	Geberit trademark
090201–II	Date of production and shift (01.02.2009, afternoon shift)
S	Manufacturer's mark as agreed
325420	Melt number according to 3.1 acceptance test certificate
54 x 1.5	Pipe dimension (mm)
1.4401 / 316	Material number EN / AISI
MPA NRW	Inspection authority
DVGW DW-8501AT2552	
DVGW DG-4550BL0118 GAS	DVGW test mark with registration number
67-768 ATEC 14/02-768	CSTB and ATEC marks (approval in France)
KIWA K7304	KIWA mark (approval in the Netherlands)
ATG 2495	ATG mark (approval in Belgium)
SITAC 14223571/90	SITAC mark (approval in Sweden)
OVGW W 1.088 – 16 bar / 95°C – TW	OVGW mark (approval in Austria)
WMKA20008	SAI-Global Watermark (approval in Australia)
TUV AR 271-02	VdTUV component mark
◁ FM ▷	FM mark (approval USA, Ø 22 - 108mm)

Geberit Mapress Cr-Ni Stainless Steel system pipe (1.4301 / BS304 S 31)

Table 8: Material of Geberit Mapress Cr-Ni Stainless Steel system pipe (1.4301 / BS304 S 31)

Material Designation	Abbreviation (BS EN 10088-2)	Material no.	
		EN	AISI
Austenitic Stainless Steel	X5CrNi18–10	1.4301	304

Table 9: Physical characteristics of Geberit Mapress Cr-Ni Stainless Steel system pipe (1.4301 / BS304 S 31)

Designation	Value	Unit
Thermal expansion coefficient α at 20 – 100°C	0.016	mm/(m·K)
Thermal conductivity at λ 20°C	15	W/(m·K)
Specific thermal capacity c at 20°C	500	J/(kg·K)
Pipe roughness k	0.0015	mm

Geberit Mapress Cr-Ni Steel system pipes (1.4301) are non-combustible pipes. The assignment to material classes is based on specific national regulations.

Table 10: Mechanical characteristics of Geberit Mapress Cr-Ni Stainless Steel system pipe (1.4301 / BS304 S 31)

Heat treatment condition: solution annealed and quenched.

Designation	Value	Unit
Tensile strength R_m	500-700	N/mm
0.2% - Expansion limit $R_{p0.2}$	≥ 220	N/mm^2
Breaking elongation A_5	> 40	%

Table 11: Technical data of Geberit Mapress Cr-Ni Stainless Steel system pipe (1.4301 / BS304 S 31)

Nominal width DN	Pipe dimension d x s (mm)	Internal diameter di (mm)	Pipe weight m (kg/m)	Water volume V (l/m)
12	15 x 1.0	13	0.348	0.133
15	18 x 1.0	16	0.422	0.201
20	22 x 1.2	19.6	0.620	0.302
25	28 x 1.2	25.6	0.798	0.515
32	35 x 1.5	32	1.247	0.804
40	42 x 1.5	39	1.508	1.195
50	54 x 1.5	51	1.955	2.043
65	76.1 x 1.5	73.1	2.777	4.083
80	88.9 x 1.5	85.9	3.254	5.661
100	108 x 2.0	104	5.262	8.495

Pipes are supplied in 6m lengths.

Bending

Geberit Mapress Stainless Steel pipes can be bent by hand up to r>5·d and by a commercially available bending tool up to r>3.5·d. The regulations of the bending tool manufacturer must also be observed for the suitability of the bending tool and the bending radii. Geberit Mapress Stainless Steel system pipes must not be heated for bending.

Marking

Geberit Mapress Cr-Ni Stainless Steel system pipes are marked on the surface. The following table explains the marks using a Ø 54mm pipe as an example.

Table 12: Marking on Geberit Mapress Stainless Steel system pipe (1.4301/BS 304 S 31)

Marking	Explanation
GEBERIT Geberit Mapress	Geberit trademark
090201–II	Date of production and shift (01.02.2009, afternoon shift)
S	Manufacturer's mark as agreed
325420	Melt number according to 3.1 Acceptance test certificate
54 x 1.5	Pipe dimension (mm)
1.4301 / 304	Material number EN / AISI
Red stripe	For heating use only – not suitable for potable water

1.3.5 Geberit Mapress Stainless Steel pressfitting

Table 13: Material of Geberit Mapress Stainless Steel pressfitting (1.4401/BS316 S 33)

Material Designation	Abbreviation (BS EN 10088-2)	Material no.	
		EN	AISI
Austenitic Stainless Steel	X5CrNiMo17-12-2	1.4401	316

Table 14: Product material of Geberit Mapress pressing indicator

Material Designation	Abbreviation	Recycling code
Multi-layer film	PET-PS-PET	01 PET

Table 15: Product material of Geberit Mapress protection plug

Material Designation	Abbreviation	Recycling code
Polyethylene low density	PE-LD	04 PE-LD

Marking

Geberit Mapress Stainless Steel pressfittings are marked on the surface. The following table explains the marks using a Ø 28mm fitting as an example. Please note Geberit Mapress Stainless Steel pressfittings are WRAS approved for use in the UK even though this is not on the markings.

Table 16: Marking on Geberit Mapress Stainless Steel pressfitting

Marking	Explanation
Ⓜ	Logo Geberit Mapress
Blue pressing indicator	The pressing indicator indicates unpressed connections. The colour “blue” indicates the product material “stainless steel”. The indicator is removed once the fitting is pressed.
DVGW	DVGW approval
28	Outside diameter (mm)
◁ FM ▷	FM mark (approval USA, Ø 22 - 108mm)
VdS	VdS approval Ø 22 - 108mm
BF	Production code

Geberit Mapress Stainless Steel pressfittings also come with a clear protection plug which protects the fitting from dirt and dust. Adapters and adapter unions are fitted with an EPDM flat gasket.

Geberit Mapress Stainless Steel Solar and Industry pressfittings come with an anthracite protection plug which protects the fitting from dirt and dust. Adapters and adapter unions are fitted with an FKM green flat gasket.

Geberit Mapress Stainless Steel Silicone-free pressfitting

Table 17: Material of Geberit Mapress Stainless Steel Silicone-free pressfitting (1.4401/BS316 S 33)

Material Designation	Abbreviation (BS EN 10088-2)	Material no.	
		EN	AISI
Austenitic Stainless Steel	X5CrNiMo17-12-2	1.4401	316

Table 18: Product material of Geberit Mapress pressing indicator

Material Designation	Abbreviation	Recycling code
Multi-layer film	PET-PS-PET	

Table 19: Product material of Geberit Mapress protection plug

Material Designation	Abbreviation	Recycling code
Polyethylene low density	PE-LD	

Marking

Geberit Mapress Stainless Steel Silicone-free pressfittings are marked on the surface. The following table explains the marks using a Ø 28mm fitting as an example.

Table 20: Marking on Geberit Mapress Stainless Steel Silicone-free pressfitting

Marking	Explanation
Ⓜ	Logo Geberit Mapress
Blue pressing indicator	The pressing indicator indicates unpressed connections. The colour “blue” indicates the product material “stainless steel”. The indicator is removed once the fitting is pressed.
DVGW	DVGW approval
28	Outside Ø (mm)
◁ FM ▷	FM mark (approval USA, Ø 22 - 108mm)
VdS	VdS approval Ø 22 - 108mm
BF	Production code

Geberit Mapress Stainless Steel Silicone-free pressfittings are packed individually and therefore do not come with a protection plug. Adapters and adapter unions are fitted with an EPDM flat gasket.

Geberit Mapress Stainless Steel Gas pressfitting

Table 21: Material of Geberit Mapress Stainless Steel Gas pressfitting (1.4401/BS316 S 33)

Material Designation	Abbreviation (BS EN 10088-2)	Material no.	
		EN	AISI
Austenitic Stainless Steel	X5CrNiMo17-12-2	1.4401	316

Table 22: Product material of Geberit Mapress pressing indicator

Material Designation	Abbreviation	Recycling code
Multi-layer film	PET-PS-PET	

Table 23: Product material of Geberit Mapress protection plug

Material Designation	Abbreviation	Recycling code
Polyethylene low density	PE-LD	

Marking

Geberit Mapress Stainless Steel Gas pressfittings are marked on the surface. The following table explains the marks using Ø 28mm fitting as an example. Please note Geberit Mapress Stainless Steel Gas pressfittings hold BSi (formerly British Gas) approval for use in gas installations in the UK even though this is not on the markings.

Table 24: Marking on Geberit Mapress Stainless Steel Gas pressfitting

Marking	Explanation
Ⓜ	Logo Geberit Mapress
Yellow colour marking	Only for gas installations
Blue pressing indicator	The pressing indicator indicates unpressed connections. The colour “blue” indicates the product material “stainless steel”. The indicator is removed once the fitting is pressed.
DVGW	DVGW approval
28	Outside diameter (mm)
GT / 5	HTB approval up to 5 bar
PN 5	Maximum operating pressure 5 bar
BF	Production code

Geberit Mapress Stainless Steel Gas pressfittings also come with a yellow protection plug to clearly show it can be used in gas installations. This also protects the fitting from dirt and dust. Adapters and adapter unions are fitted with a Centellen® - HD 3822 flat gasket.

1.3.6 Geberit Mapress Carbon Steel system pipe

Geberit Mapress Carbon Steel system pipe, externally galvanised

Table 25: Material of Geberit Mapress Carbon Steel system pipe, externally galvanised

Material	Abbreviation	Material no.	
Designation	(BS EN10305)	EN	AISI
Non-alloy steel	E195	1.0034	1009

Table 26: Galvanising characteristics of Geberit Mapress Carbon Steel system pipe, externally galvanised

Type of galvanisation	Layer version BS EN ISO 2081	Layer thickness (µm)
Galvanically zinc-plated, blue passivated	FeZn8	8

Table 27: Physical characteristics of Geberit Mapress Carbon Steel system pipe, externally galvanised

Designation	Value	Unit
Thermal expansion coefficient α at 20–100°C	0.012	mm/(m·K)
Thermal conductivity λ at 20°C	60	W/(m·K)
Specific thermal capacity c at 20°C	500	J/(kg·K)
Pipe roughness k	0.01	mm

Geberit Mapress Carbon Steel system pipes, externally galvanised, are non-combustible pipes. The assignment to material classes is based on country specific regulations.

Table 28: Mechanical characteristics of Geberit Mapress Carbon Steel system pipe, externally galvanised

Designation	Value	Unit	d (mm)
Tensile strength R_m	290 - 420		≤ 22
	310 - 440	N/mm²	≥ 28
Expansion limit R_{eH}	< 260		≤ 22
	260 – 360	N/mm²	≥ 28
Breaking elongation A_5	> 25	%	-

Table 29: Maximum allowable bending moment of Geberit Mapress Carbon Steel system pipe, externally galvanised

Designation	Value	Unit	d x s (mm)
Maximum allowable bending moment	80	Nm	12 x 1.2
Maximum allowable bending moment	100	Nm	15 x 1.2
Maximum allowable bending moment	160	Nm	18 x 1.2
Maximum allowable bending moment	300	Nm	22 x 1.5

Table 30: Technical data of Geberit Mapress Carbon Steel system pipe, externally galvanised

Nominal width DN	Pipe dimension d x s (mm)	Internal diameter di (mm)	Pipe weight m (kg/m)	Water volume V (l/m)
10	12 x 1.2	9.6	0.320	0.072
12	15 x 1.2	12.6	0.408	0.125
15	18 x 1.2	15.6	0.497	0.191
20	22 x 1.5	19	0.758	0.284
25	28 x 1.5	25	0.980	0.491
32	35 x 1.5	32	1.239	0.804
40	42 x 1.5	39	1.498	1.195
50	54 x 1.5	51	1.942	2.043
-	66.7 x 1.5	63.7	2.412	3.187
65	76.1 x 2.0	72.1	3.655	4.083
80	88.9 x 2.0	84.9	4.286	5.661
100	108 x 2.0	104	5.228	8.495

Pipes are supplied in 6m lengths.

Bending

Geberit Mapress Carbon Steel pipes, externally galvanised can be bent by hand up to r>5·d and by bending tool up to r>3.5·d. Specialist bending equipment will be required above 54mm diameter. Geberit Mapress Carbon Steel pipes, externally galvanised must not be heated for bending. Observe the instructions of the bending tool manufacturer for suitability of the bending tool and determination of the bending radii.

Marking

Geberit Mapress Carbon Steel system pipes, externally galvanised are marked on the surface in red text. The following table explains the marks using a Ø 54mm pipe as an example.

Table 31: Marking of Geberit Mapress Carbon Steel system pipe, externally galvanised

Marking in red	Explanation
■GEBERIT Geberit Mapress	Geberit trademark
090201–II	Date of production and shift (01.02.2009, afternoon shift)
S	Manufacturer's mark as agreed
325420	Melt number according to 3.1 Acceptance test certificate
54 x 1.5	Pipe dimension (mm)
1.0034 / 1009	Material number EN / AISI
◁ FM ▷	FM mark (USA approval, Ø 22 – 54mm)
NPW	Non Potable Water

Geberit Mapress Carbon Steel system pipe, plastic coated

Table 32: Material of Geberit Mapress Carbon Steel system pipe, plastic coated

Material Designation	Abbreviation (BS EN 10305)	Material no.	
		EN	AISI
Non-alloy steel	E195	1.0034	1009

Table 33: Characteristics of the plastic coating of Geberit Mapress Carbon Steel system pipe

Characteristic	Value	Unit
Material	Polypropylene	-
Density ρ	0.95 (non porous, waterproof)	g/cm³
Thermal conductivity	0.22	W/(m·K)
Operating temp (max)	120	°C
Colour	RAL 9001 cream	-

Geberit Mapress Carbon Steel system pipes, plastic coated, can be painted using a standard etch primer for plastic.

Table 34: Physical characteristics of Geberit Mapress Carbon Steel system pipe, plastic coated

Designation	Value	Unit
Thermal expansion coefficient α at 20-100°C	0.012	mm/(m·K)
Thermal conductivity λ at 20°C	60	W/(m·K)
Specific thermal capacity c at 20°C	500	J/(kg·K)
Pipe roughness k	0.01	mm

Geberit Mapress Carbon Steel system pipes, plastic coated, are combustible pipes. The plastic coating of these pipes burns without dripping.

Table 35: Mechanical characteristics of Geberit Mapress Carbon Steel system pipe, plastic coated

Designation	Value	Unit	d (mm)
Tensile strength R_m	290 - 420		≤ 22
	310 - 440	N/mm²	≥ 28
Upper elastic limit R_{eH}	< 260		≤ 22
	260 – 360	N/mm²	≥ 28
Breaking elongation A_5	>25	%	-

Table 36: Maximum allowable bending moment of Geberit Mapress Carbon Steel system pipe, plastic coated

Designation	Value	Unit	d x s (mm)
Maximum allowable bending moment	80	Nm	12 x 1.2
Maximum allowable bending moment	100	Nm	15 x 1.2
Maximum allowable bending moment	160	Nm	18 x 1.2
Maximum allowable bending moment	280	Nm	22 x 1.5
Maximum allowable bending moment	300	Nm	28 x 1.5

Table 37: Technical data of Geberit Mapress Carbon Steel system pipe, plastic coated

Nominal width DN	Pipe dimension d x s (mm)	Outside diameter (with plastic jacket) di(mm)	Inside diameter di (mm)	Pipe weight m (kg/m)	Water volume (l/m)
10	12 x 1.2	14	9.6	0.338	0.072
12	15 x 1.2	17	12.6	0.434	0.125
15	18 x 1.2	20	15.6	0.536	0.191
20	22 x 1.5	24	19	0.824	0.284
25	28 x 1.5	30	25	1.052	0.491
32	35 x 1.5	37	32	1.320	0.804
40	42 x 1.5	44	39	1.620	1.195
50	54 x 1.5	56	51	2.098	2.043

Pipes are supplied in 6m lengths.

Bending

Geberit Mapress Carbon Steel pipes, plastic coated can be bent by hand up to r>5·d and by bending tool up to r>3.5·d, down to -10ºC. Geberit Mapress Carbon Steel pipes, plastic coated must not be heated for bending. Observe the instructions of the bending tool manufacturer for suitability of the bending tool and determination of the bending radii.

Marking

Geberit Mapress Carbon Steel system pipes, plastic coated, are marked on the surface. The following table explains the marks using a Ø 54mm pipe as an example.

Table 38: Marking of Geberit Mapress Carbon Steel system pipe, plastic coated

Marking	Explanation
■GEBERIT Geberit Mapress	Geberit trademark
090201–II	Date of production and shift (01.02.2009, afternoon shift)
54 x 1.5	Pipe dimension (mm)

Geberit Mapress Carbon Steel system pipes, internally and externally galvanised for sprinkler application

Mapress Carbon Steel pipe, internally and externally galvanised, cannot be used for potable water or heating installations. It must only be used for sprinkler or compressed air applications. If using in a sprinkler system, it must be for wet sprinklers, not dry. If a dry sprinkler system is required, Geberit Mapress Stainless Steel must be used. If in doubt please contact Geberit on 0800 077 8365 for technical support.

Table 39: Material of Geberit Mapress Carbon Steel system pipe, internally and externally galvanised

Material Designation	Abbreviation (BS EN 10305)	Material no.	
		EN	AISI
Non-alloy steel	E220	1.0215	1009

Table 40: Galvanising characteristics of Geberit Mapress Carbon Steel system pipe, internally and externally galvanised

Type of galvanisation	Layer version (BS EN 10346)	Layer thickness (µm)
Hot-dip coating	Z275	20

Table 41: Physical characteristics of Geberit Mapress Carbon Steel system pipe, internally and externally galvanised

Designation	Value	Unit
Thermal expansion coefficient α at 20-100°C	0.012	mm/(m·K)
Thermal conductivity λ at 20°C	60	W/(m·K)
Specific thermal capacity c at 20°C	500	J/(kg·K)
Pipe roughness k	0.01	mm

Geberit Mapress Carbon Steel system pipes, internally and externally galvanised, are non-combustible pipes.
The assignment to material classes is based on country specific regulations.

Table 42: Mechanical characteristics of Geberit Mapress Carbon Steel system pipe, internally and externally galvanised Heat treatment condition: unannealed

Designation	Value	Unit
Tensile strength R_m	> 310	N/mm²
Breaking elongation A_5	> 25	%

Table 43: Technical data of Geberit Mapress Carbon Steel system pipe, internally and externally galvanised

Nominal width DN	Pipe dimension d x s (mm)	Internal diameter di (mm)	Pipe weight m (kg/m)	Water volume V (l/m)
20	22 x 1.5	19	0.758	0.284
25	28 x 1.5	25	0.980	0.491
32	35 x 1.5	32	1.239	0.804
40	42 x 1.5	39	1.498	1.195
50	54 x 1.5	51	1.942	2.043
-	66.7 x 1.5	63.7	2.412	3.187
65	76.1 x 2.0	72.1	3.655	4.083
80	88.9 x 2.0	84.9	4.286	5.661
100	108 x 2.0	104	5.228	8.495

Pipes are supplied in 6m lengths.

Bending

Geberit Mapress Carbon Steel pipes, internally and externally galvanised can be bent by hand up to r>5·d and by bending tool up to r>3.5·d. Specialist bending equipment will be required above 54mm diameter. Geberit Mapress Carbon Steel pipes, internally and externally galvanised must not be heated for bending. Observe the instructions of the bending tool manufacturer for suitability of the bending tool and determination of the bending radii.

Marking

Geberit Mapress Carbon Steel system pipes, internally and externally galvanised, are marked on the surface in black text. The following table explains the marks using a Ø 54mm pipe as an example.

Table 44: Marking on Geberit Mapress Carbon Steel system pipe, internally and externally galvanised

Marking in black	Explanation
■GEBERIT Geberit Mapress	Geberit trademark
060201–II	Date of production and shift (01.02.2006, afternoon shift)
S	Manufacturer's mark as agreed
325420	Melt number according to 3.1 Acceptance test certificate
54 x 1.5	Pipe dimension (mm)
1.0215	Material number EN
◁ FM ▷	FM mark (USA approval, Ø 22 - 54mm)
VdS G 4030020	VdS approval Ø 22 - 54mm (sprinkler)
VdS G 4070025	VdS approval Ø 76.1 - 108mm (sprinkler)

1.3.7 Geberit Mapress Carbon Steel pressfitting

Table 45: Material of Geberit Mapress Carbon Steel pressfitting

Material Designation	Abbreviation (BS EN 10305)	Material no.	
		EN	AISI
Non-alloy steel	E195	1.0034	1009

Table 46: Product material of Geberit Mapress pressing indicator

Material Designation	Abbreviation	Recycling code
Multi-layer film	PET-PS-PET	

Table 47: Product material of Geberit Mapress protection plug

Material Designation	Abbreviation	Recycling code
Polyethylene low density	PE-LD	

Table 48: Galvanising characteristics of Geberit Mapress Carbon Steel pressfitting

Type of galvanisation	Layer version (BS EN ISO 2081)	Layer thickness (µm)
Galvanically zinc-plated, blue passivated	FeZn8	8

Marking

Geberit Mapress Carbon Steel pressfittings are marked on the surface. The following table explains the marks using a Ø 28mm fitting as an example.

Table 49: Marking on Geberit Mapress Carbon Steel pressfitting

Marking	Explanation
Ⓜ	Logo Geberit Mapress
Red pressing indicator	The pressing indicator indicates unpressed connections. The colour “red” indicates the product material “carbon steel”. The indicator is removed once the fitting is pressed.
28	Outside diameter (mm)
◁ FM ▷	FM mark (USA approval, Ø 22 - 54mm)
VdS	VdS approval Ø 28 - 54mm
BF	Production code

Geberit Mapress Carbon Steel pressfittings also come with a clear protection plug which protects the fitting from dirt and dust. Adapters and adapter unions are fitted with an EPDM flat gasket.

Geberit Mapress Carbon Steel Solar and Industry pressfittings come with an anthracite protection plug which protects the fitting from dirt and dust. Adapters and adapter unions are fitted with an FKM green flat gasket.

1.3.8 Selection of pipes for Geberit Mapress Copper

Geberit Mapress Copper must be installed using pipes conforming to BS EN 1057 (installation pipes). Hardness values of R220 (soft), R250 (semi-hard) and R290 (hard) can be used depending on pipe size.

Table 50: Physical characteristics of Copper pipe, defined by BS EN 1057

Characteristic	Value			Unit
	Ø 12 - 22 mm R220 (soft)	Ø 12 - 28mm R250 (semi-hard)	Ø 12 - 108mm R290 (hard)	
Tensile strength R_m	220	250	290	N / mm²
Breaking elongation A_5	> 40	> 20	> 3	%
Thermal expansion coefficient α at 20–100°C	16.6·10-6	16.6·10-6	16.6·10-6	m/(m·K)
Thermal conductivity λ at 20°C	305	305	305	W/(m·K)
Specific thermal capacity c at 20°C	386	386	386	J/(kg·K)
Pipe roughness k	0.001	0.001	0.001	mm

Table 51: Pipe data of copper pipes in accordance with BS EN 1057

Nominal width DN	Pipe dimension d x s (mm)	Inside diameter di (mm)	Strength BS EN 1173		
			R220 (annealed)	R250 (half hard)	R290 (hard)
12	15 x 0.7	13.6	-	x	-
	15 x 1.0	13	x		
20	22 x 0.9	20.2	x	x	-
	22 x 1.2	19.6			
25	28 x 0.9	26.2	-	x	x
	28 x 1.2	25.6	x		
32	35 x 1.0	33	-	-	x
	35 x 1.2	32.6		x	
	35 x 1.5	32		-	
40	42 x 1.0	40	-	-	x
	42 x 1.2	39.6		x	
	42 x 1.5	39		-	
50	54 x 1.0	52	-	-	x
	54 x 1.2	51.6		x	
	54 x 1.5	50		-	
60	66.7 x 1.2	64.3	-	-	x
	66.7 x 2.0	62.7			
65	76.1 x 1.5	73.1	-	-	x
	76.1 x 2.0	72.1			
100	108 x 1.5	105	-	-	x
	108 x 2.5	103			

1.3.9 Geberit Mapress Copper pressfitting

Table 52: Material of Geberit Mapress Copper pressfitting

Material Designation	Abbreviation (BS EN 1057)	Material no.	
		EN	UNS
Copper	Cu-DHP	CW024A	C12200
Gunmetal	CuSn5Zn5Pb2-c	CC499K	Not standardised
DR Brass	CuZn36Pb2As	CW602N	C35330
Brass	CuZn40Pb2	CW617N	C38000

Table 53: Product material of Geberit Mapress pressing indicator

Material Designation	Abbreviation	Recycling code
Multi-layer film	PET-PS-PET	

Table 54: Product material of Geberit Mapress protection plug

Material Designation	Abbreviation	Recycling code
Polyethylene low density	PE-LD	

Marking

Geberit Mapress Copper pressfittings are marked on the surface. The following table explains the marks using a Ø 28mm fitting as an example.

Table 55: Marking on Geberit Mapress Copper pressfitting

Marking	Explanation
Ⓜ	Logo Geberit Mapress
White pressing indicator	The pressing indicator indicates unpressed connections. The colour “white” indicates the product materials “copper”, “gunmetal” and “brass”. The indicator is removed once the fitting is pressed.
28	Outside diameter (µm)
DVGW	DVGW approval
BF	Production code

Geberit Mapress Copper pressfittings also come with a clear protection plug which protects the fitting from dirt and dust. Adapters and adapter unions are fitted with an EPDM flat gasket.

Geberit Mapress Copper Solar and Industry pressfittings come with an anthracite protection plug which protects the fitting from dirt and dust. Adapters and adapter unions are fitted with an FKM green flat gasket.

Geberit Mapress Copper Gas pressfitting

Table 56: Material of Geberit Mapress Copper Gas pressfitting

Material Designation	Abbreviation (BS EN 1057)	Material no.	
		EN	UNS
Copper	Cu-DHP	CW024A	C12200
Gunmetal	CuSn5Zn5Pb2-C	CC499K	Not standardised

Marking

Geberit Mapress Copper pressfittings are marked on the surface. The following table explains the marks using a Ø 28mm fitting as an example. Please note Geberit Mapress Copper Gas pressfittings hold BSi (formerly British Gas) approval for use in gas installations in the UK even though this is not on the markings.

Table 57: Marking on Geberit Mapress Copper Gas pressfitting

Marking	Explanation
Yellow colour marking	Only for gas installations
Ⓜ	Logo Geberit Mapress
White pressing indicator	The pressing indicator indicates unpressed connections. The colour “white” indicates the product materials “copper”, “gunmetal” and “brass”. The indicator is removed once the fitting is pressed.
28	Outside diameter (mm)
GT/1	HTB approval up to 1 bar
PN 5	Maximum operating pressure 5 bar
DVGW	DVGW approval
BF	Production code

Geberit Mapress Copper Gas pressfittings also come with a yellow protection plug to clearly show it can be used in gas installations. This also protects the fitting from dirt and dust.

1.3.10 Geberit Mapress system seal rings

Table 58: Technical data and applications of the Geberit Mapress seal rings

	Seal ring CIIR black	Seal ring HNBR yellow	Seal ring FKM blue	Seal ring FKM white
Technical abbreviation	CIIR[1]	HNBR	FKM	FKM
Material	Butyl rubber	Hydrogenated acrylontrile-Butadiene rubber	Fluorocarbon rubber	Fluorocarbon rubber
Minimum operating temperature[2]	-30°C	-20°C	-25°C (solar) -20°C (industry)	5°C
Maximum operating temperature[2]	120°C	70°C	220°C (solar) – see pg 34 for details 180°C (industry)	155°C (short term 180°C)
Maximum operating pressure	16 bar[3]	5 bar	16 bar[3]	-
Tests	• WRAS • KTW recommendation • VdS Approval for wet systems • VdTUV Approval • LPCB	• BSi • HTB test for high thermal loads	• VdTUV Approval	
Geberit Mapress Pressfitting System	• Mapress Stainless Steel • Mapress Carbon Steel • Mapress Copper[4]	• Mapress Stainless Steel Gas • Mapress Copper Gas (≤ 54mm)	• Mapress Stainless Steel Solar and Industry • Mapress Carbon Steel Solar and Industry • Mapress Copper Solar and Industry (≤ 54mm)	• Mapress Stainless Steel
Applications	• Potable water • Fire protection • Rainwater • Treated water • Water heating systems • Water circuits • Oil-free compressed air • Inert gases (non-toxic/non-explosive)	• Gas installations with natural gases (NG) and liquefied gases (LPG)	• Solar systems • Oil-free and oiled compressed air • Technical liquids • Fuels • Mineral oil • Heating oil EL	• Saturated steam – contact Geberit for details
Other media or applications	Upon request		Upon request	Upon request

1 Leak path in seal if not pressed
2 If using adapters or adapter unions, observe temperature ratings of flat seals (EPDM black 0-100°C, FPM green -30 - 180°C , Centellen-HD 3822 -20 - +70°C)
3 Higher pressures possible upon consultation with Geberit
4 Geberit Mapress Copper Ø 66.7 – 108mm uses EPDM black seal ring

Tested and approved water additives

Water additives like corrosion, anti-freeze, cooling and disinfection agents must always be checked for suitability of use with the various seal rings. For the use of such agents, the instructions of the manufacturer should always be followed. The following tables contain the water additives tested and approved by Geberit.

For media not yet tested, please send the following information to our Technical Support Department (technical@geberit.co.uk):

- Product and Safety Data Sheet for the additive to be tested
- Expected working temperature and working pressure.
- Concentration
- Application

It is possible that a sample may be required.

Table 59: Antifreeze agents without corrosion protection for Geberit Mapress

Additive	Seal Ring Material			Test Conditions	Manufacturer
	CIIR	EPDM[a]	FKM Blue[b]	Concentration (%)	
Ethylene glycol (antifreeze basis)	X	X	X	Concentration for use, see manufacturer's information	Various manufacturers
Propylene glycol (antifreeze basis)	X	X	-	Concentration for use, see manufacturer's information	Various manufacturers

a EPDM flat gasket (0-100°C).
b FKM seal ring and FPM green flat gasket.
X Tested and approved, concentrations or temperatures other than given values must be clarified with Geberit
- Not tested or approved, application must be clarified with Geberit.

Finished antifreeze agents based on glycol contain further additives. The compatibility of the seal rings with these water additives must be tested.

Table 60: Tested and approved corrosion-protection agents for Geberit Mapress

Additive	Seal Ring Material			Test Conditions		Manufacturer
	CIIR Black	EPDM[a]	FKM Blue	Concentration (%)	Temperature (°C)	
Castrol Zwipro III	X	X	X	100	20	Castrol
Hydrazine	X	X	-	Concentration for use, see manufacturer's information		Lanxess, Leverkusen
Levoxin 64	X	X	-	100	120	Lanxess, Leverkusen
Kebocor 213	X	-	X	0.5	20	Kebo Chemie, Düsseldorf
Sodium diethyldithiocarbamate	X	X	-	0.07	20	Various manufacturers
Sodium sulphite	X	X	-	Concentration for use, see manufacturer's information		Various manufacturers
P3-ferrolix 332	X	X	X	0.5	20	Henkel AG, Düsseldorf
ST-DOS K-375	X	-	X	0.5	20	Schweitzer Chemie, Freiberg/N.
Thermodus JTH-L	X	X	-	1	90	Judo, Waiblingen
Tri-sodium phosphate	X	X	-	Concentration for use, see manufacturer's information		Various manufacturers

a EPDM flat gasket (0-100°C).

X Tested and approved, concentrations or temperatures other than given values must be clarified with Geberit

- Not tested or approved, application must be clarified with Geberit.

Approval must be obtained from Geberit for non-listed agents. The manufacturer's instructions for use must also be observed.

Table 61: Antifreeze agents with corrosion protection for Geberit Mapress

Additive	Seal Ring Material			Test Conditions		Manufacturer[1]
	CIIR Black	EPDM[a]	FKM Blue[b]	Concentration (%)	Temperature (°C)	
Kuhlerschutz ANF	X	X	X	100	20	Eurolub, Eching (Nr. Munich)
Antifreeze	X	-	-	100	60	Aral
Antifrogen N	X	X	X	100	120	Clariant
Antifrogen L	X	X	-	100	120	Clariant
Antifrogen SOL	-	-	X	100	120	Clariant
Glysantin G 30	X	X	-	67	120	BASF
Pekasol L	X	X	-	50	120	Prokühlsole, Alsdorf
	X	X	X	50	20	
Solarliquid[c]	X	X	X	50	130	Staub Chemie, Nuremberg
Tyfocor	-	-	X	40	130	Tyforop Chemie, Hamburg
Tyfoxit F20[c]	-	-	X	100	130	Tyforop Chemie, Hamburg
Tyfocor L	-	-	X	40	170	Tyforop Chemie, Hamburg
Tyfocor LS	X	X	X	40	130	Tyforop Chemie, Hamburg

a EPDM flat gasket (0-100°C).
b FKM seal ring and FPM Green flat gasket.
c Not suitable for Geberit Mapress Carbon Steel
X Tested and approved, concentrations or temperatures other than given values must be clarified with Geberit
- Not tested or approved, application must be clarified with Geberit.

Approval must be obtained from Geberit for non-listed agents. The manufacturer's instructions for use must also be observed.

1.4 Geberit Mapress pressing tools

System overview

Geberit Mapress pressing tools are provided in the following versions:

- ACO 102 (12V battery)
- ACO 202 (18V battery)
- ECO 202, ECO 301 (115V / 230V mains)
- EFP 202 (115V / 230V mains)
- MFP 2 (manual)
- HCPS (115V / 230V mains)

General information

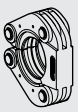
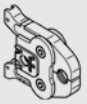
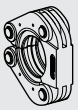
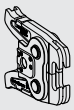
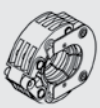
All Geberit Mapress pressfitting systems (Geberit Mapress Stainless Steel, Carbon Steel, Copper and CuNiFe) are pressed using the range of Geberit Mapress pressing tools, pressing jaws, collars and adaptors. Ø 12 – 35mm are pressed with pressing jaws, while Ø 42 – 108mm are pressed using pressing collars with the corresponding adaptor. A pressing collar is also available for 35mm pressfittings, which is for use for sprinkler systems.

Pressing devices, pressing jaws, pressing collars and adaptors for pressing collars all have a compatibility class 1, 2 or 3. The Geberit Mapress pressing jaws, collars and adaptors must only be used with pressing tools with the corresponding compatibility code.

1.4.1 Pressing equipment

Geberit Mapress pressing tools are provided in the following versions:

Table 62: Geberit Mapress available pressing tools

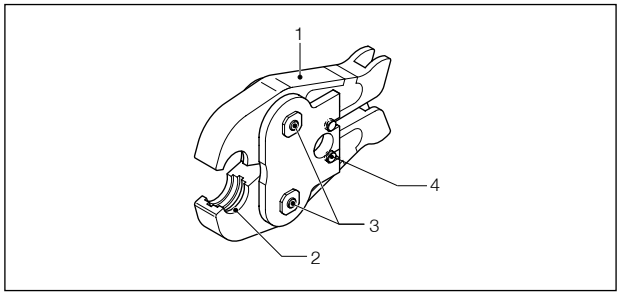
Compatibility class	Pressing devices	Pressing jaws/pressing collars		Adaptors for pressing collars	
1	ACO 102		Ø 12 – 35mm		—
2	MFP 2, EFP 202, ECO 202, ACO 202		Ø 12 – 35mm		—
2	MFP 2, EFP 202, ECO 202, ACO 202		Ø 35 – 66.7mm		ZB 203
3	ECO 301		Ø 12 – 35mm		—
3	ECO 301		Ø 35 – 66.7mm		ZB 303
3	ECO 301		Ø 76.1 – 88.9mm		ZB 321
3	ECO 301		Ø 108mm		ZB 321 + ZB 322
–	HCPS		Ø 76.1 – 108mm		—

1) For more details see Geberit Supply Systems Tooling Product Guide and Price List
Only use pressing devices which have been approved by Geberit.

Geberit Mapress pressing jaw up to Ø 35mm

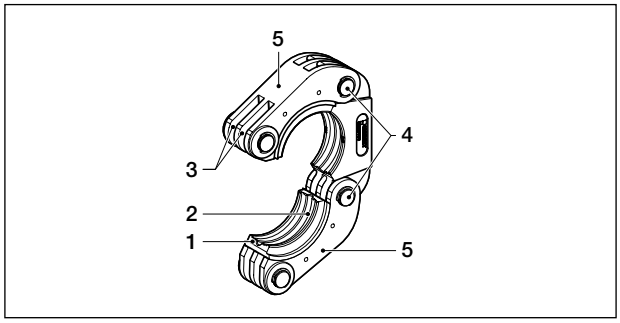
1 Jaw lever
2 Pressing contour
3 Jaw pivot points
4 Electronic contacts (compatibility 3 jaws only)

The appearance can vary depending on the size and design.



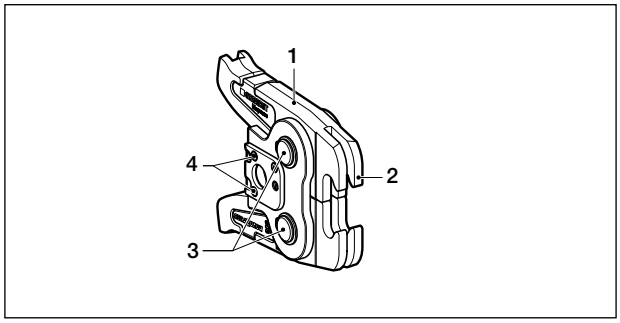
Geberit Mapress pressing collar Ø 35 – 66.7mm

1 Sliding segments
2 Pressing contour
3 Grooves
4 Joints
5 Shells



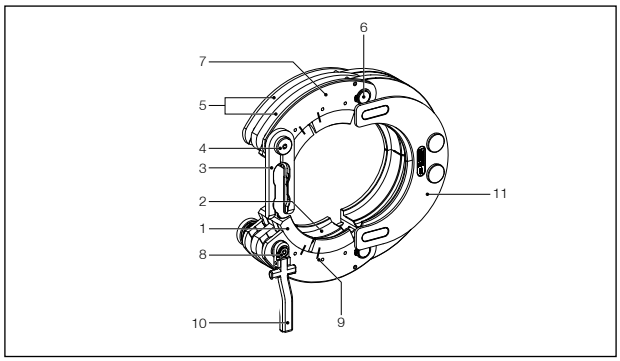
Geberit Mapress adaptor jaw for Ø 35 – 66.7mm

1 Jaw lever
2 Claw
3 Jaw joints
4 Electrical contacts
(only with adaptor jaw ZB 303)



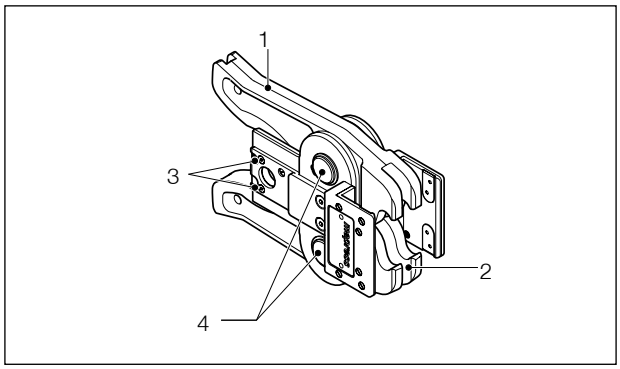
Geberit Mapress pressing collar Ø 76.1 – 108mm

1 Sliding segments
2 Pressing contour
3 Locking lug
4 Pins with contact
5 Grooves
6 Joints
7 Shells
8 Locking pins with contact
9 Marks
10 Release lever (only with Ø 108mm)
11 Centring plate



Geberit Mapress adaptor for pressing collar Ø 76.1 – 108mm

1 Jaw lever
2 Claw
3 Contacts
4 Jaw joints



The appearance can vary depending on size and design.

2 Applications

2.1 Building services applications

Table 63: Building services applications. Geberit Mapress is suitable for the following applications:

Medium	Seal Ring	Mapress Stainless Steel BS316	Mapress Stainless Steel Gas	Mapress Carbon Steel	Mapress Copper	Mapress Copper Gas	Max pressure (bar)	Temp (°C)	Comments
Potable water	CIIR black	X			X		16	0-100	
Well water	CIIR black	X			X		16	0-100	
Ultrapure water	CIIR black	X					16	0-100	Not approved for pharmaceutical water.
Service water e.g. rainwater, surface water, or treated water	CIIR black	X			X		16	0-100	Observe limit values for chloride, fluoride and hydrocarbons. Geberit approval must be obtained for Geberit Mapress Copper with service water.
Extinguishing water	CIIR black	X			X		16	0-100	Observe all conditions of relevant approvals.
District heating									
Secondary circuit	CIIR black	X		X	X		16	<=120	
Primary circuit	FKM blue	X					16	<=140	
Heating water	CIIR black	X		X[1)]	X		16	0-100	Only used approved inhibitors.
Condensate from gas burners	CIIR black	X					16	Max 120	
Chilled water without anti-freeze	CIIR black	X		X[1)]	X		16	0-100	Appropriate corrosion protection required for carbon steel.
Chilled water with anti-freeze	CIIR black	X[2)]		X[1) 2)]	X[2) 3)]		16	-30-40	For approved anti-freezes.
Thermal media for solar systems	FKM blue	X		X	X		16	-25-180	For approved anti-freezes.

1) Closed heating/chilled systems only with Geberit Mapress Carbon Steel
2) Flat gaskets must be Centellen R3825, no EPDM flat gaskets
3) Geberit Mapress Copper up to 54mm only

Medium	Seal Ring	Mapress Stainless Steel BS316	Mapress Stainless Steel Gas	Mapress Carbon Steel	Mapress Copper	Mapress Copper Gas	Max pressure (bar)	Temp (°C)	Comments
Heating Oil EL	FKM blue	X		X	X		10	Room temp	
Natural Gas	HNBR yellow		X			X	5	-20-70	
LPG	HNBR yellow		X			X	5	-20-70	Only in the gas phase. Observe all standards regulations and norms. No underground installation
Methane	HNBR yellow		X			X	5	-20-70	
Ethane	HNBR yellow		X			X	5	-20-70	
Propane	HNBR yellow		X			X	5	-20-70	
Butane	HNBR yellow		X			X	5	-20-70	

2.1.1 Potable water installation

The following Geberit Mapress pressfitting systems can be used for potable water installations:

- Geberit Mapress Stainless Steel 1.4401/BS316 S33
- Geberit Mapress Copper

Both systems are approved by WRAS for this purpose.

The applications comprise:

- Cold water pipes
- Hot water pipes
- Circulation pipes

2.1.2 Treated water

Geberit Mapress Stainless Steel 1.4401 / BS316 S 33 and Geberit Mapress Copper with the CIIR / EPDM black seal ring are suitable for all types of treated water such as partially desalinated (descaled, decarbonised) and fully desalinated (deionised, demineralised and distilled) up to highest-grade water with a conductivity less than 0.1 µ S/cm and are absolutely corrosion-resistant.

All water treatment methods such as ion exchange or reverse osmosis etc. can be used.

Geberit Mapress is not suitable for highest-grade water, pharmaceutical water or similar that has increased purity requirements exceeding the potable water quality.

2.1.3 Heating installation

The following Geberit Mapress pressfitting systems can be used for heating installations:

- Geberit Mapress Stainless Steel
- Geberit Mapress Carbon Steel
- Geberit Mapress Copper

Geberit Mapress Stainless Steel and Geberit Mapress Copper

Geberit Mapress Stainless Steel and Geberit Mapress Copper can be used for all closed and open hot water water heating systems that have a maximum operating temperature of 100°C without restriction. For temperatures between 100 and 120°C they can be used if any EPDM flat gaskets in adapters and unions are replaced by Centellen R3825 gaskets.

Geberit Mapress Carbon Steel

Geberit Mapress Carbon Steel can be used for all closed hot water heating systems that have a maximum inlet flow temperature (sustained temperature) of 100°C. Prevent atmospheric oxygen from entering the heating water. For temperatures between 100 and 120°C it can be used if any EPDM flat gaskets in adapters and unions are replaced by Centellen R3825 gaskets.

Geberit Mapress Carbon Steel is not suitable for open heating systems as oxygen ingress may cause corrosion.

Additives in the heating water must be checked to ensure that they are compatible with the seal rings and flat gaskets.

2.1.4 District heating installation

Principles

A remote heating network is a pipe which distributes heat (heating water) over a long distance from a central heat source to consumers.

Local heating networks have short distribution distances between the heat source and the consumers.

Remote and local heating pipes are sub-divided as follows:

- Primary circuit: The primary circuit is the pipe layout from the heat source to the transition point (building inlet)
- Secondary circuit: The pipe layout inside the building of the consumer (house network) is referred to as the secondary circuit.

Connection of the secondary circuits to the primary circuits in remote and local heating networks can be either direct or indirect.

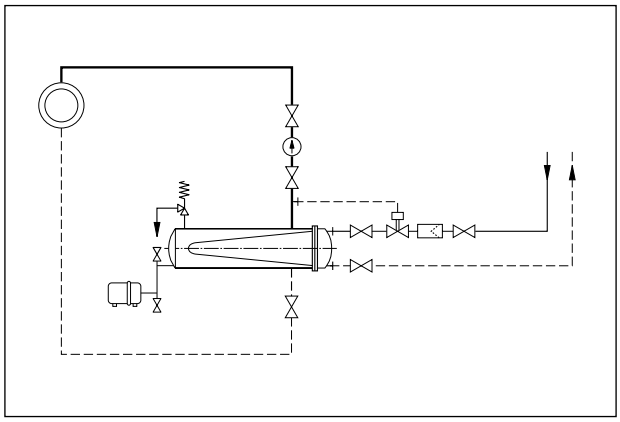


Figure 6: House station with indirect connection of the heating system to the remote heating network.

Geberit Mapress pressfitting systems

The following Geberit Mapress pressfitting systems can be used in remote and local heat installations:

- Geberit Mapress Stainless Steel
- Geberit Mapress Carbon Steel (closed systems)
- Geberit Mapress Copper

The following operational conditions apply:

Table 64: Operational conditions for Geberit Mapress in remote and local heat installations

Mapress seal ring	Operating temperature$_{max}$ [°C]	Remarks
CIIR black	120	Only in secondary circuit
FKM blue	140	—

2.1.5 Heat pump installation

The heat pump uses the reverse of the principle of operation of a cooling system (e.g. refrigerator):

- As the result of vaporisation (expansion) of a refrigerant, the heat is removed from the energy source (air, water, ground)
- In the compressor the temperature level of the vaporised refrigerant is increased by compression
- The generated heat is transferred to the heating circuit in the condenser.

Geberit Mapress pressfitting systems

The following Geberit Mapress pressfitting systems can be used for installing heat pumps:

- Geberit Mapress Stainless Steel 1.4401/BS316 S 33
- Geberit Mapress Carbon Steel

Geberit Mapress Stainless Steel 1.4401/BS316 S 33

Geberit Mapress Stainless Steel 1.4401 / BS316 S 33 can be used for heat pump systems that have a maximum operating temperature of 100°C.

Geberit Mapress Stainless Steel 1.4401 / BS316 S 33 can be used to connect the ground connector or serve as a ground connector.

The installation of Geberit Mapress Stainless Steel 1.4401 / BS316 S 33 system pipes as a heat exchanger coil with a cooling base for recovering the stored solar energy from the ground or air is also possible using heat collector fences or heat collector branches.

Geberit Mapress Carbon Steel

Geberit Mapress Carbon Steel can be used for closed heat pump systems that have a maximum operating temperature of 100°C.

Prevent atmospheric oxygen from entering the heating water.

2.1.6 Chilled water installation

Principles

There are open-circuit and closed-circuit chilled water systems. The difference in temperature between the inlet flow and the return flow should be as great as possible, so that a large quantity of heat is carried away with a small quantity of circulating water.

Geberit Mapress pressfitting systems

The following Geberit Mapress pressfitting systems can be used in chilled water installations:

- Geberit Mapress Stainless Steel 1.4401 / BS316 S 33
- Geberit Mapress Carbon Steel
- Geberit Mapress Copper

Cooling liquids in the pressing circuit must be checked with Geberit prior to use.

Geberit Mapress Stainless Steel 1.4401 / BS316 S 33

Geberit Mapress Stainless Steel 1.4401 / BS316 S 33 can be used for all open and closed chilled water systems with an operating temperature of 0 - 100°C, and for chilled water with antifreeze -30-+40°C if EPDM flat gaskets in adapters and unions are replaced with Centellen R3825 gaskets..

The content of water-soluble chloride ions in chilled water should not exceed 250 mg/l.

Table 61 on page 27 provides an overview of the tested and approved antifreeze agents with corrosion protection.

Geberit Mapress Carbon Steel

Geberit Mapress Carbon Steel can be used for closed chilled water systems with an operating temperature of 0 - 100°C , and for chilled water with antifreeze -30-+40°C if EPDM flat gaskets in adapters and unions are replaced with Centellen R3825 gaskets..

The non-alloy steel is not suitable for open chilled water systems as oxygen ingress may cause corrosion.

Table 61 on page 27 provides an overview of the tested and approved antifreeze agents with corrosion protection.

In chilled water systems, due to the high risk of condensation on the outside of the pipe, additional external corrosion protection must be provided (see Section 3.1.2).

Geberit Mapress Copper

Geberit Mapress Copper can be used for open and closed chilled water systems with an operating temperature of 0 - 100°C , and for chilled water with antifreeze -30-+40°C for Geberit Mapress Copper up to 54mm if EPDM flat gaskets in adapters and unions are replaced with Centellen R3825 gaskets.

2.1.7 Solar heating installation

Principles

The collector and absorber surface absorbs the solar energy (also diffusely). The absorbed thermal energy is routed to the heat storage tank by a solar liquid, normally a water and antifreeze mixture.

The main application is hot water heating: subsequent heating is performed with a heating boiler.

Geberit Mapress pressfitting system

The following Geberit Mapress pressfitting systems can be used for closed solar installations:

- Geberit Mapress Stainless Steel Solar and Industry
- Geberit Mapress Copper Solar and Industry
- Geberit Mapress Carbon Steel Solar and Industry (note below restrictions)

The following restrictions must be observed:
Fluid: Water / glycol mix

Minimum temperature:	-25°C
Maximum temperature:	180°c for 200 hours/year 200°c for 180 hours/year 220°c for 500 hours during the life of the system.

Table 61 on page 27 provides an overview of the tested and approved antifreeze agents with corrosion protection.

Ready to use antifreezes based on glycol always contain other additives. All additives must be checked for compatibility with the seal rings and approved by Geberit.

Temperatures up to 200 °C can occur in the connection area of the collector. As a result of these high temperatures, the first one to two metres of the piping system must be implemented with a corrugated stainless steel pipe and the collector must be connected to the corrugated stainless steel pipe with a metal clamping joint.

Geberit Mapress Carbon Steel outside galvanised is an economical alternative to Mapress Stainless Steel and Geberit Mapress Copper, especially in the case of large pipe dimensions. However, when Geberit Mapress Carbon Steel outside zinc-plated is used, the following restrictions must be observed:

- Solar thermal systems are generally designed as closed circuits. Exceptions are solar systems with a solar thermal drainback system. These solar systems are operated without antifreeze agents in the thermal medium, since they automatically empty when there is a danger of frost. During this process, oxygen enters the solar system, which can lead to internal corrosion with Geberit Mapress Carbon Steel outside galvanised. Geberit Mapress Carbon Steel outside galvanised must therefore not be used for solar thermal systems with a solar thermal drainback system.

- Installation outdoors is subject to increased requirements for the resistance of the piping system to external corrosion. The zinc layer of the Geberit Mapress Carbon Steel system pipe outside galvanised as with a correctly implemented thermal insulation do not provide sufficient corrosion protection for installation outdoors. Geberit Mapress Carbon Steel outside galvanised is therefore not recommended for outdoor use. Geberit recommends that Geberit Mapress Stainless Steel can be installed outdoors with the solar system and Mapress Carbon Steel outside galvanised indoors.

Before the solar system is commissioned, a visual inspection must be carried out to recognize unpressed connections early on and prevent the thermal medium from leaking. The collector must not heat up during commissioning. In practice, it has proven worthwhile to cover the collector for this purpose. The commissioning must be carried out before the thermal insulation is attached and the chased wall channels and ceiling openings are closed.

In order to ensure a safe and long-lasting operation of the solar system, the piping system must be thoroughly rinsed. The thermal medium should be used as the rinsing medium, since it cannot be ruled out that a residual amount of the rinsing medium remains in the piping system during rinsing. If water is used as the rinsing medium, there is a risk that the thermal medium will be diluted and lose its effect.

The solar system must be filled with a fresh thermal medium after rinsing. The thermal medium used for rinsing is not suitable for filling the solar system, since it has been soiled during rinsing.

After the solar system has been filled, a pressure test must be performed.

2.1.8 Sprinkler systems

The following Geberit Mapress pressfitting systems can be used for sprinkler systems:

- Geberit Mapress Stainless Steel
- Geberit Mapress Carbon Steel (internally and externally galvanised pipe)
- Geberit Mapress Copper

Sprinkler system water pipes are categorised as follows:

- “Wet” extinguishing water pipes: The riser pipe is wet and constantly filled with potable water
- “Dry” extinguishing water pipes: The riser pipe is dry and if necessary, is filled and operated with non-potable water by the fire brigade
- “Wet / dry” extinguishing water pipes: The riser pipe is dry and if necessary, is filled and operated with water from the potable water network via remote actuation of taps.

Geberit Mapress Stainless Steel and Geberit Mapress Copper are suitable for all systems, with operating pressure up to 16 bar. Geberit Mapress Carbon Steel internally and externally galvanised pipes can only be used for wet systems with non-potable water (up to 16 bar).

Geberit Mapress holds the following approvals for sprinkler systems:

LPCB: (please see separate ‘Sprinkler Systems Installation Guide’ for installation conditions)

- Geberit Mapress Stainless Steel 1.4401 with black CIIR seal ring for wet systems 22-108mm
- Geberit Mapress Carbon Steel internally and externally galvanised pipe for wet systems with black CIIR seal ring 22-108mm

VdS:

- Geberit Mapress Stainless Steel 1.4401 with black CIIR seal ring for wet systems 22-108mm
- Geberit Mapress Carbon Steel internally and externally galvanised wet systems with black CIIR seal ring 22-108mm

The approval includes the fire protection classes LH, OH1, OH2, OH3 and select risks of OH4 (theatres, cinemas and concert halls).

FM:

- Geberit Mapress Stainless Steel 1.4401 with black CIIR seal ring for wet/dry systems 22-108mm
- Geberit Mapress Carbon Steel internally and externally galvanised wet systems with black CIIR seal ring 22-54mm

Various approvals for shipbuilding are also held – contact us for details.

2.1.9 Natural Gas and liquefied gas installation

Geberit Mapress pressfitting systems

The following Geberit Mapress pressfitting systems can be used for gas installations:

- Geberit Mapress Stainless Steel Gas (natural gas and liquefied gas)
- Geberit Mapress Copper Gas (natural gas and liquefied gas)

Geberit Mapress Stainless Steel Gas and Geberit Mapress Copper Gas have been checked and certified for gas installations according to the requirements of the following testing guidelines:

- BSi prEN 1254-7 (formerly British Gas)
- DVGW VP 614
- ÖVGW G1 TR Gas (A)

Geberit Mapress Stainless Steel Gas and Geberit Mapress Copper Gas are approved and certified for the following media:

- Natural gases
- LPG vapour phase

Table 65: Application range of Geberit piping systems for natural gas and LPG vapour phase

Medium		Mapress Stainless Steel silicone free	Mapress Stainless Steel Gas	Mapress Copper Gas	Seal ring	Remark
Natural gas	–	–	x	x	HNBR yellow	No underground installation
Methane	CH_4	–	x	x	HNBR yellow	No underground installation
Ethane	C_2H_6	–	x	x	HNBR yellow	No underground installation
Ethene (ethylene)	C_2H_4	–	x	x	HNBR yellow	No underground installation
Propane	C_3H_8	–	x	x	HNBR yellow	No underground installation
n-butane	C_4H_{10}	–	x	x	HNBR yellow	No underground installation
Biogases	–	–	x	x	HNBR yellow	No landfill gases No underground installation

Note

Geberit Mapress Stainless Steel system pipe 1.4401 / BS316 S 33 should always be used with Geberit Mapress Stainless Steel Gas pressfittings in gas supply installations.

The pressfittings are factory pre-mounted with a yellow seal ring HNBR made of hydrogenated acrylonitrile-butadiene rubber. The marking is displayed in Table 24, “Marking of Geberit Mapress Stainless Steel Gas pressfitting”, on page 14 and Table 57, “Marking of Geberit Mapress Copper Gas pressfittings” on page 23.

Laying

Geberit Mapress Stainless Steel Gas is HTB approved (PHTB, max = 5 bar) and can be laid on the wall as well as concealed in the wall.[1]

Geberit Mapress Stainless Steel Gas is installed as an above ground pipeline within buildings (with HTB) and outside buildings (without HTB). There is no approval for installations underground.

An additional protection against corrosion with concealed installations is not necessary due to stainless steel's outstanding resistance against corrosion.

The properties of the copper mean that additional corrosion protection may be necessary when laying under plaster and building materials containing gypsum, ammonia or nitrite. Connections to commercially available gas fittings and components made from gunmetal, brass, die cast aluminium as well as ductile grey cast iron are made using pressfittings with thread or flange connections.

In case of repairs, the connection to the system pipe made of stainless steel or copper is established through material-specific adaptor components of Geberit Mapress Stainless Steel Gas or Geberit Mapress Copper Gas pressfittings, or through commercially available adaptors.

Such off-system adaptors must be implemented with the utmost care. Special care must be taken to ensure that the outer surface of the system pipe is correctly prepared and not damaged.

Approvals

The governing law for gas installations is the Gas Safety In Use Regulations.

Other standards which exist are BS 6891 (domestic installations to EN 1254 parts 1-5, so does not cover press fittings), BS EN 1775 covers press fittings to prEN 1254-7.

prEN1254-7 has not been adopted therefore an equivalent British Standard for copper has been developed (BS 8537:2010), to which Geberit Mapress Copper is manufactured. A European standard for stainless steel press fittings is being developed, but has not yet been adopted.

There is also a code of practice IGEM UP/2 which restricts the use of press fitting to below 100 mbar.

As part of its BSi approval, we can confirm that Geberit Mapress gas systems are subjected to onerous static flexural strength/bending moment, assembly methods, leak and fire resistance testing. By comparison other jointing systems such as unions and threads do not have to pass such tests and thus Geberit systems demonstrate "similar or better performance" over such systems with respect to both safety and performance.

In addition, Geberit Mapress jointing systems also meets the vibration requirements of BS8537 based on our approval under the German standard DVGW W 534 making them suitable for direct connection to most appliances.

On this basis, Geberit Mapress can be used with confidence as a suitable alternative to most mechanical jointing systems when installed in accordance with our own installation guidelines and those in IGEM UP/2.

2.1.10 Oil supply installation

Mineral oil

Today mineral oil is used as a fuel and a lubricant. Due to its versatility, mineral oil is very much in demand, for example as a fuel for industrial, commercial and domestic use, as a lubricant or base material in the chemical industry.

Heating oil EL

Heating oil EL (extra light) is often used in households as a fuel for heat generation. In addition to heating oil EL, there is also heating oil S for large-scale plants. Heating oil S must be heated for transport, as it is a more viscous fluid.

Geberit Mapress pressfitting systems

The following Geberit Mapress pressfitting systems can be used for oil supply installations without restriction:

- Geberit Mapress Stainless Steel Solar and Industry
- Geberit Mapress Carbon Steel Solar and Industry

[1] HTB: High Thermal Loads (proven tightness of the connection at 650 °C and PN 5/PN 1 over a period of 30min).

2.2 Special applications

2.2.1 Condensate drains for boilers

Principles

In these appliances in addition to the thermal energy in the waste gas, the evaporation enthalpy of the steam contained in the waste gas is utilised. In gas applications the condensing boiler is used for heating and hot water (dewpoint approximately 55°C). The occurring condensate must be routed to the sewer through a condensate drain. The pH value of the condensate is between 3.5 and 5.2.

In addition to gas condensing boilers, there are also versions which run with heating oil EL (dewpoint approx. 50°C). The pH value of the condensate in this case is between 2.5 and 3.5 and it can contain sulphurous acid.

The condensate of the condensing boilers only contains a low concentration of fluorocarbons. Fluorocarbons promote corrosion in the heating section of the device and in the waste gas pipes and condensate pipes. If there is an emission source of fluorocarbons directly nearby, the installation room or combustion air supply of the device must be selected so that these contaminants are not supplied to the condensate with the combustion air.

Geberit Mapress pressfitting systems

The following Geberit Mapress pressfitting systems can be used for condensate discharge:

- Geberit Mapress Stainless Steel

Geberit Mapress Stainless Steel is resistant against the condensate of gas burners and can be used for this type of condensate drain. Geberit Mapress Stainless Steel cannot be used for condensate drains from condensing boilers.

2.2.2 Disinfectant solutions

The following Geberit Mapress pressfitting systems can be used for disinfectant solutions:

- Geberit Mapress Stainless Steel

Geberit Mapress Stainless Steel can be used in swimming baths or hospitals for surface disinfection and for preventing athletes foot using disinfectant solutions. The following table provides an overview of the tested and approved disinfectants.

Table 66: Tested and approved disinfectants for Geberit Mapress Stainless Steel

Additive [1]	Seal ring material CIIR	Application / Concentration	Manufacturer [2]
NÜSCOSEPT	X	0.5 – 2% solution	Dr. Nüsken Chemie
HEXAQUART S	X	0.5 – 3% solution	B. Braun & Meslungen AG
MULTIDOR	X	0.25 – 1% solution	Henkel Hygiene
MYXAL S	X	0.1 – 2% solution	Physioderm GmbH
QUATAMON MED	X	1.0 – 2% solution	S. & M. Schülke & Mayr GmbH
TERRALIN	X	0.25 – 2% solution	S. & M. Schülke & Mayr GmbH

1 Used in swimming pools, hospitals etc. for surface disinfection.
2 The manufacturer's instructions for use must always be observed.

2.3 Industrial applications

As well as building services applications, the Geberit Mapress system is suitable for many industrial uses.

The country-specific regulations and guidelines must be observed in the following descriptions for industry applications.

2.3.1 Compressed air installation

The following Geberit Mapress pressfitting systems can be used for compressed air installations:

- Geberit Mapress Stainless Steel
- Geberit Mapress Carbon Steel
- Geberit Mapress Copper

* with a maximum working pressure of 16 bar.

Geberit Mapress Carbon Steel can only be used in dry compressed air systems, otherwise any humidity and air contained in the installation system may lead to corrosion.

We recommend moistening the seal ring with soap solution or water before installing so as to improve the lubrication effect of the seal ring and ensure optimum sealing of the connection for compressed air.

In addition to the compressor system, the downstream piping system also affects the compressed air quality through material abrasion. The material abrasion depends on the product material used in the piping system and therefore must be taken into account when selecting the piping system.

If high-quality compressed air is required, product materials should be used which are as abrasion resistant as possible (e.g. stainless steel).

Geberit Mapress seal rings

Residual oil exists in most compressed air systems to lubricate tools and reduce corrosion. Compressed air is categorised depending on the amount of oil present in the system.

If there is a residual oil content of > 1mg/m³, the FKM blue seal ring should be used due to its higher oil resistance.

Table 67: Suitable Geberit Mapress seal rings for compressed air lines with residual oil content according to ISO 8573-1 2001

Compressed air categories	≤ Residual oil quantity/max [mg/m³]	Mapress seal ring
1	0.01	CIIR black / FKM blue
2	0.10	CIIR black / FKM blue
3	1.00	CIIR black / FKM blue
4	5.00	FKM blue

Table 68: Maximum operating pressure of Geberit Mapress for compressed air installations.

Operating pressure max. (bar)	Mapress Stainless Steel 1.4401 Ø (mm)	Mapress Carbon Steel[a,b] Ø (mm)	Mapress Copper Ø (mm)
12	88.9 – 108[b]	76.1 – 108	15 – 108
16	76.1	35 – 54	-
25	12 – 54	12 – 28	-

[a] Geberit Mapress Carbon Steel system pipes outside zinc-plated and Geberit Mapress Carbon Steel system pipes plastics-coated are only suitable for dry compressed air.

[b] Higher pressures on request.

2.3.2 Vacuum lines

The following Geberit Mapress pressfitting system can be used for vacuum lines up to 200mbar absolute (reduction of the ambient air pressure from 1 bar to 0.2 bar at room temperature):

- Geberit Mapress Stainless Steel
- Geberit Mapress Carbon Steel (internally and externally galvanised)
- Geberit Mapress Copper

2.3.3 Saturated steam applications

The following Geberit Mapress pressfitting systems can be used for saturated steam applications with operating temperatures up to max. 180°C, including cyclic steam systems.

- Geberit Mapress Stainless Steel

Please consult Geberit before installing Geberit Mapress for saturated steam applications to confirm suitability. Either the black CIIR seal ring, blue FKM seal ring or white FKM seal ring will be advised based on the exact operating conditions of the installation.

2.3.4 Fuels and oils of hazard category A III

The following Geberit Mapress pressfitting systems can be used when transporting fuels, engine oils and transmission oils of hazard category A III:

- Geberit Mapress Stainless Steel Solar and Industry
- Geberit Mapress Carbon Steel Solar and Industry

2.3.5 Technical Gases

See Table 69 for a list of technical gases which are compatible with Geberit Mapress.

Table 69: Application range and operating conditions for Geberit piping systems for technical gases (including pure gases)

Medium	Chemical Symbol	Purity ≥	Mapress Stainless Steel silicone free	Mapress Stainless Steel Gas	Mapress Copper Gas	Seal ring	Operating pressure max. [bar]	Operating temperature [°C]
Acetylene[1]	C_2H_2	2.6	x	–	–	CIIR black	Depending on the type of gas and the pipe dimensions Please contact Geberit to obtain data	Ambient temperature
Ammonium	NH_3	3.8	x	–	–	CIIR black		
Argon	Ar	6.0	x	–	–	CIIR black		
Nitrous oxide	N_2O	1.8	x	–	–	CIIR black		
Helium	He	6.0	x	–	–	CIIR black		
Carbon dioxide	CO_2	4.5	x	–	–	CIIR black		
Carbon monoxide	CO	3.7	x	–	–	FKM blue		
Krypton	Kr	4.0	x	–	–	CIIR black		
Neon	Ne	4.0	x	–	–	CIIR black		
Propene (propylene)	C_3H_6	2.5	x	–	–	FKM blue		
Oxygen[1]	O_2	4.5	x	–	–	CIIR black		
Sulphur dioxide	SO_2	3.0	x	–	–	CIIR black		
Nitrogen	N_2	6.0	x	–	–	CIIR black		
Hydrogen[1]	H_2	6.0	x	–	–	CIIR black		
Xenon	Xe	4.0	x	–	–	CIIR black		
Shielding gases BS EN 439	–	–	x	–	–	CIIR black		
Synthetic air	–	–	x	–	–	CIIR black		
Vacuum	–	–	x	–	–	CIIR black		

Other gases, purities and notes on possible applications or material compatibilities are available on request.

Unsuitable Gases

Geberit piping systems must not be used for the following gases:

- Gases in accordance with the requirements of the European Pharmacopeia
- Gases approved as proprietary medicinal products in accordance with pharmaceutical regulations, e. g. anaesthetic gases, medical oxygen, medical carbonic acid.

The gas tightness of Geberit Mapress Stainless Steel was demonstrated in the helium leak test with a resulting leak rate < $1x10^{-5}$ mbar.l/s

[1] Pipes must be cut with a saw, not a pipe cutter, to prevent any deformation of the pipe ends

2.3.6 Other applications

Geberit Mapress Stainless Steel can be used for breathing air, methanol, ethanol and propanol at room temperature up to 16 bar. BS 316 pipes and CIIR black seal rings should be used.

Geberit Mapress is also suitable for many other applications, please consult Geberit technical support for advice.

3 Planning

3.1 Corrosion resistance

The Geberit Mapress systems must be protected against corrosion.

Planners and fitters are responsible for planning and implementing corrosion protection.

A variety of factors influence the probability of corrosion of metallic materials.

According to BS EN 12502-1:2004, these factors are:

- Product material characteristics
- Water quality
- Planning and implementation
- Leakage test and commissioning
- Operating conditions

This document describes only the influence of the product material characteristics on corrosion behaviour.

Protection against external corrosion must meet the following requirements:

- Waterproof
- Free of pores
- Resistant to heat and ageing
- Undamaged

Coatings or corrosion protection sleeves can be used to provide protection against external corrosion, for example.

Hoses or felt wrapping is not permissible, as felt retains absorbed moisture for prolonged periods and therefore promotes corrosion.

Closed-cell insulation does not provide adequate corrosion protection for chilled water installations involving Geberit Mapress Carbon Steel.

Further information by material is given below.

3.1.1 Corrosion – Geberit Mapress Stainless Steel

Internal corrosion

Potable water

Corrosion-resistant steels do not react with potable water due to their protective chrome oxide layer. This means that Geberit Mapress Stainless Steel is resistant to corrosion upon contact with potable water and ensures a high level of potable water quality.

Local corrosion effects such as pitting or crevice corrosion can only occur with potable water or water which is similar to potable water with unduly high chloride content. Unduly high chloride contents occur if too much disinfectant containing chlorine is added when disinfecting potable water pipes. Therefore, the specifications for the duration of application and concentration for use must be strictly observed (see pages 92-93).

The content of water-soluble chloride ions in potable water and water which is similar to potable water should not exceed 250 mg/l.

Treated water

All water treatment methods such as ion exchange or reverse osmosis can be used with Geberit Mapress Stainless Steel. No additional measures to protect against corrosion are necessary.

Geberit Mapress Stainless Steel is resistant to corrosion with treated water such as:

- Softened/decarbonised water
- Fully desalinated water (deionised, demineralised, distilled and pure condensates)
- Ultrapure water with a conductivity of < 0.1 µS/cm

External corrosion

Geberit Mapress Stainless Steel is resistant to corrosion. External corrosion can occur through contact with corrosive construction materials or by installation in aggressive atmospheres.

In cases such as these, suitable corrosion protection measures should be implemented to safeguard the Geberit Mapress Stainless Steel (see page 44).

Geberit Mapress Stainless Steel Gas must also be protected against external corrosion if direct or indirect contact with electrical current cannot be completely ruled out.

Bimetallic corrosion

The corrosion behaviour of Geberit Mapress Stainless Steel is not influenced by the direction of flow of the water through mixed installations (no-flow rule). In potable water installations, Geberit Mapress Stainless Steel can thus be combined with all non-ferrous heavy metals (gunmetal, copper, brass).

If Geberit Mapress Stainless Steel is directly connected to galvanised steel pipes, bimetallic corrosion will occur on the galvanised steel pipes. This can be prevented by taking the following measures:

- Installation of distance pieces (length L > 50mm surface in contact with water)
- Installation of a shut-off valve made of non-ferrous heavy metals.

Colouring caused by deposits of other corrosive products does not indicate any risk of corrosion.

Influence of operational conditions and processing

Electrical trace heaters

Electrical trace heaters can be used.

To prevent unacceptable increases in pressure caused by heating, blocked pipe sections must not be heated.

Bending Geberit Mapress Stainless Steel system pipes

Geberit Mapress Stainless Steel system pipes must not be heated for bending. Heating changes the material structure and increases the probability of intercrystalline corrosion.

Geberit Mapress Stainless Steel system pipes can be bent by hand to r > 5 • d and with commercially available bending tools to r> 3.5 • d.

Influence of pipe laying

In special areas of application, e.g. sprinkler systems, pipes of stainless Cr-Ni-Mo steel (material no. 1.4401) can be installed in concrete without any special thermal or acoustic insulation requirements.

During installation it must be ensured that the pipe is fully embedded in the concrete without formation of cavities.

Influence of sealing and insulating materials

Insulation materials used for the thermal insulation of stainless steel pipes may contain chlorides. If they are subsequently exposed to moisture, chlorides may be released into a layer of moisture on the pipe and pitting and/or stress corrosion cracking may result.

Chloride levels on the surface of the pipe in localised parts can become elevated due to ingress of water with high chloride content or by evaporation.

A combination of moisture, a low level of oxygen, chloride concentration and temperature beneath the thermal insulation can lead to pitting corrosion. Stress corrosion cracking is not likely to be a factor at temperatures below 50 °C, but could be a significant feature in the temperature range 50 °C to 150 °C.

Stainless steel pipes which are not exposed to moisture, eg. internal, warm and dry conditions, do not require a corrosion barrier, however if the insulation could become moist a corrosion barrier should be applied to the pipe.

Either a suitable high temperature silicone paint or 0.06mm thick aluminium foil can be used. See also BS 5970 - Code of practice for thermal insulation of pipework and equipment.

When fitting corrosion protection the following rules must be observed:

- Before fitting the corrosion protection, perform a pressure test / leak test
- The cut surfaces and joints of the insulation hoses must be carefully bonded so that they are waterproof
- Always observe the manufacturer's recommendations and instructions for use
- Hoses or felt wrapping should not be used, as felt retains absorbed moisture for prolonged periods and therefore promotes corrosion.

Sealing tape and materials made of Teflon® which contain watersoluble chloride ions are not suitable for sealing stainless steel threaded connections, as they can cause crevice corrosion in potable water pipes.

Suitable sealing materials are:

- Hemp sealing
- Plastic sealing tape and threads

Solder / welding of stainless steel pipelines

We do not recommend solder joints with stainless steel pipelines for aqueous media due to the type of danger caused by knife-line corrosion.

We do not recommend that stainless steel pipelines in potable water installations are welded on the construction site using inert gas shielded arc welding. Even professional WIG / inert gas shielded arc welding cannot prevent annealing colours (oxide layers) resulting in the area of the weld seam.

3.1.2 Corrosion – Geberit Mapress Carbon Steel

Corrosion of heating and other closed circuit installations

Internal corrosion

Geberit Mapress Carbon Steel is corrosion-resistant in heating systems and other closed circuits.

There is a higher probability of corrosion if oxygen is allowed into the circuit.

Oxygen, which causes corrosion, can enter the circuit via glands, screw connections or quick-action air bleeds in cases where there is insufficient overpressure in relation to the atmospheric pressure.

The oxygen that enters the circuit when it is being filled and topped up with water does not pose a risk of corrosion, as the quantities involved are so small.

Adhering to the following values minimises the risk of internal corrosion:

Electrical conductivity (at 25°C)	(µS/cm)	Low-saline	Saline
		< 100	100-1500
Appearance	-	Free from sedimenting substances	
pH Value (at 25°C)	-	8.2-10.0[1]	
Oxygen	(mg/l)	<0.1	<0.02

1) The pH range is smaller for aluminium and aluminium alloy components such as radiators. The manufacturer's documentation should be followed.

Concentrations of oxygen greater than 0.1 g/m3 indicate an increased probability of corrosion.

Geberit Mapress Carbon Steel is not corrosion-resistant to the condensate drain of oil condensing boilers. The condensate in these systems has a pH value of 2.5 – 3.5 and can also contain sulphuric acid.

The following measures delay the generation of corrosion:

- Adding inhibitor to the circulating water
- Setting the pH value to 8.2 - 10.0 necessary for carbon steel
- Only use water additives that have been tested and approved by Geberit
- Observe the manufacturers' instructions for use.

If Geberit Mapress Carbon Steel is being installed in stages, we recommend not to pressure test with water in stages due to a higher risk of corrosion. If pressure testing with air or inert gas cannot be performed, then any section which has been pressure tested with water should be left full with all air bled out of the system. No system should be left partially full for a period of more than 7 days. Once the system has been tested and left full, there is no set time limit on when the system must be commissioned with additives. However, the system must remain 'closed' during this time with no oxygen entering the system.

In compressed air installations, Geberit Mapress Carbon Steel is only corrosion-resistant with dry compressed air.

External corrosion

Normally the outer surfaces of a pipe installation in buildings does not come into contact with watery corrosive media. Therefore, with Geberit Mapress Carbon Steel, external corrosion can only occur after being exposed to unintended corrosive media over longer periods (e.g. penetration of rainfall, moisture in the walls, condensation, leaking, splash or cleaning water).

Geberit Mapress Carbon Steel should never be installed in permanently damp rooms or outside where it is exposed to rainfall. In the case of concealed or underfloor installation, Geberit Mapress Carbon Steel must be safeguarded using a suitable form of corrosion protection (see "Protection against external corrosion" on page 43).

- **Geberit Mapress Carbon Steel system pipe, externally galvanized and Geberit Mapress Carbon Steel fittings:**
  The 8µm thick zinc coating meets the requirements of stress stage 1 in accordance with BS EN ISO 2081. For this reason, the pipes and fittings are suitable for installation in warm and dry atmospheres. The zinc layer provides protection against the short term effect of moisture if the pipe surface can dry quickly.

- **Geberit Mapress Carbon Steel system pipe, plastic coated:**
  The plastic coating that is fitted onto the carbon steel system pipes from the factory provides good protection against external corrosion. However, additional measures are required to protect the connection points against external corrosion.

- **Geberit Mapress Carbon Steel system pipe, internally and externally galvanised:**
  Geberit Mapress Carbon Steel system pipes, internally and externally galvanised, are made from hot-dip galvanised band. The zinc coating is approximately 20 µm thick and meets the requirements of stress stage 2 in accordance with BS EN ISO 2081.
  This makes the pipes suitable for installation in rooms where condensation is allowed to occur.

When fitting corrosion protection, the following rules must be observed:

- Before fitting the corrosion protection, perform a pressure test / leak test
- The cut surfaces and joints of the insulation hoses must be carefully bonded so that they are waterproof, also taking care that they are free of pores and all gaps are waterproof
- Always observe the instructions for use of the manufacturer

Protection against external corrosion must meet the following requirements:

- Waterproof
- Free of pores
- Resistant to heat and aging
- Undamaged

Coatings or corrosion protection sleeves can be used to provide protection against external corrosion, for example. Hoses or felt wrapping is not permissible, as felt retains absorbed moisture for prolonged periods and therefore promotes corrosion.

Closed-cell insulation does not provide adequate corrosion protection for cooling water installations involving Geberit Mapress Carbon Steel.

Resistance against bimetallic corrosion

Geberit Mapress Carbon Steel can be combined with all product materials in any sequence with closed water circuits.

3.1.3 Corrosion – Geberit Mapress Copper

Internal corrosion – potable water systems

Geberit Mapress Copper is resistant to corrosion when used for potable water installations if the potable water meets the following chemical parameters:

- pH value > 7.4 or
- 7.4 > pH value > 7.0 and TOC < 1.5 g/m^3

Note: TOC = total organic carbon content in water.

Salt content is limited by the Drinking Water Directive as follows:

- Sulphate ions < 240 mg/l
- Nitrate ions < 50 mg/l
- Sodium ions < 200 mg/l

Internal corrosion – heating systems

Geberit Mapress Copper is resistant to corrosion in open and closed water heating and chilled water systems.

External corrosion

Geberit Mapress Copper is resistant to atmospheric corrosion.

External corrosion can occur in the following situations:

- Due to contact with corrosive construction materials (e.g. construction materials containing sulphides, nitrites and ammonium)
- Due to installation in aggressive atmospheres

In cases such as these, suitable corrosion protection measures should be implemented to protect Geberit Mapress Copper

The probability of corrosion is increased by contact with corrosion-promoting construction materials or by installation in corrosive atmospheres.

In such situations, suitable corrosion protection measures should be implemented.

Protection against external corrosion must meet the following requirements:

- Waterproof
- Non-porous
- Resistant to heat and aging
- Undamaged

Protection against external corrosion is ensured, for example, by:

- Coatings
- Plastic binders
- Corrosion protection sleeves

Hoses or felt wrapping is not permissible as felt retains absorbed moisture for prolonged periods and therefore promotes corrosion.

Bimetallic corrosion

Geberit Mapress Copper can be combined with all materials in any sequence for the following installations:

- Closed-circuit water heating systems
- Water circuits without risk of internal corrosion

In these cases Geberit Mapress Copper can be combined with Geberit Mapress Stainless Steel or Geberit Mapress Carbon Steel.

If Geberit Mapress Copper is combined with galvanised steel pipes in potable water installations or open water systems, the flow rule must be observed due to the different voltage potentials of these materials.

Flow rule: Copper must always be installed downstream of components made of galvanised steel.

Stress corrosion cracking in copper-zinc alloys (bronze)

For water distribution systems, under BS EN 12502-2:2004, stress can be applied to components that can cause stress corrosion cracking in combination with corrosive media.

When working with brass threaded joints, it is important to make sure not to apply too much stress to threaded joints, such as by overtightening them.

Planners and fitters are responsible for planning and implementing corrosion protection.

3.2 Equipotential bonding

Metallic gas and water supply pipelines must be integrated into the equipotential bonding of the building as per IEE regulations, 17th edition.

Equipotential bonding must be provided for all electrically conductive pipelines. The person installing the electrical system is responsible for the equipotential bonding. The following pipelines are electrically conductive and must be integrated into the equipotential bonding:

- Geberit Mapress Stainless Steel
- Geberit Mapress Stainless Steel Gas
- Geberit Mapress Carbon Steel, zinc-plated on the outside
- Geberit Mapress Carbon Steel, zinc-plated on the inside and outside
- Geberit Mapress Copper

Piping systems with Geberit Mapress Carbon Steel system pipes, plastic coated, are not electrically conductive and do not have to be integrated into the main equipotential bonding. Therefore they are not suitable for the additional equipotential bonding.

The person installing the electrical system is responsible and accountable for the equipotential bonding.

3.3 Geberit Mapress pipe dimensioning

There are various methods for pipe dimensioning described for example in BS EN 806-3 and BS 8558.

Geberit Mapress equivalent pipe lengths, pressure loss coefficients (ζ values), and pressure loss tables are available from the Geberit Technical Support department or can be downloaded from our website www.geberit.co.uk

3.4 Expansion compensation

Expansion compensation in general

Pipes expand differently due to thermal effects depending on the material.

Therefore, the following should be considered when installing:

- Creation of expansion space
- Installation of expansion compensators
- Positioning of anchor points and sliding points

The bending and torsional stress occurring during the operation of a pipe are reliably absorbed when the expansion compensation is taken into account.

The following affect the expansion compensation:

- Product material
- Building conditions
- Operating conditions

Slight changes in the length of pipes can be absorbed through the elasticity of the piping system or through insulation.

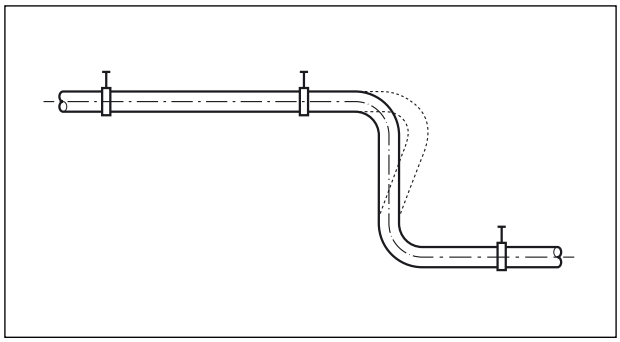


Figure 7: Absorption of change in length through the elasticity of the piping system

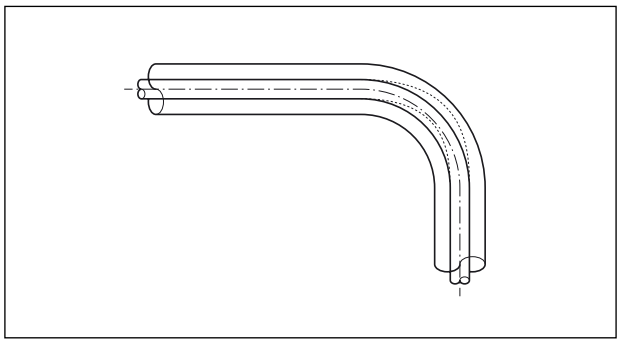


Figure 8: Absorption of a change in length through insulation

The following rule of thumb applies for the determination of the insulation thickness:

Insulation thickness = 1.5 change in length

If the calculated insulation thickness is less than the minimum insulation thickness defined in the regulations, the minimum insulation thickness defined in the regulations must be used.

Expansion compensators used are:

- Pipe leg
- U bend
- Compensators

The following figures show the principle assembly of the pipe leg and U bend.

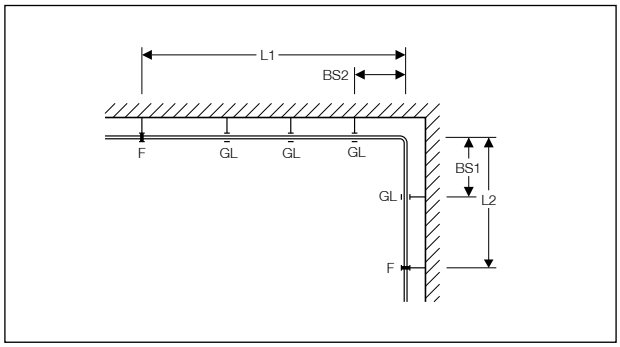


Figure 9: Expansion compensation by pipe leg

BS Bending leg
F Fixed point
GL Sliding point
L Pipe length

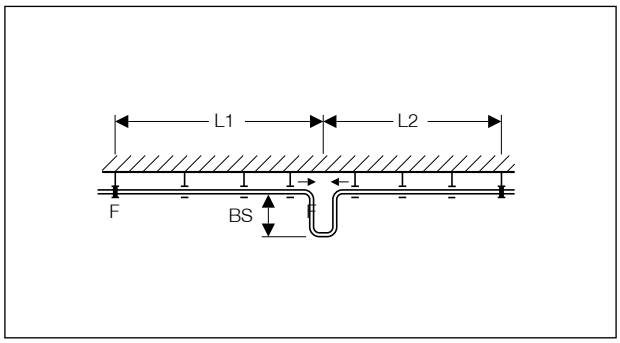


Figure 10: Expansion compensation by U bends

BS Bending leg
F Fixed point
L Pipe length

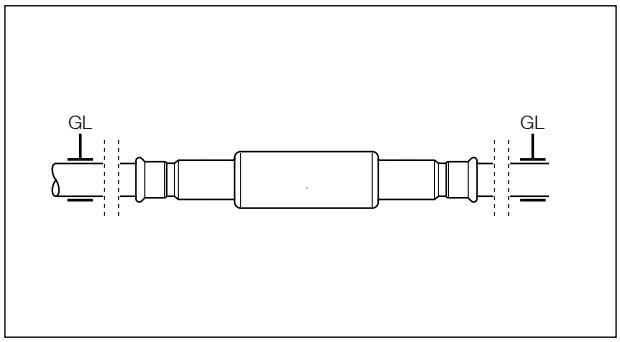


Figure 11: Geberit Mapress axial compensator

The figure above shows the Geberit Mapress axial expansion fitting which can be used to absorb the pipe expansion. Other axial expansion fittings are commercially available.

On riser pipes which run through several floors and therefore have more anchor points, the change in length between the individual anchor points must be absorbed by bending legs or axial expansion fitings.

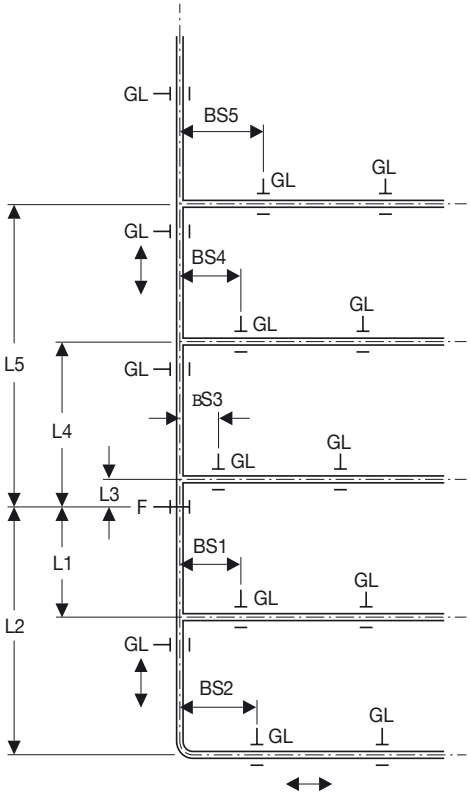


Figure 12: Expansion compensation by bending leg with anchor point in middle floor.

BS Bending leg
F Anchor point
GL Sliding point
L Pipe length

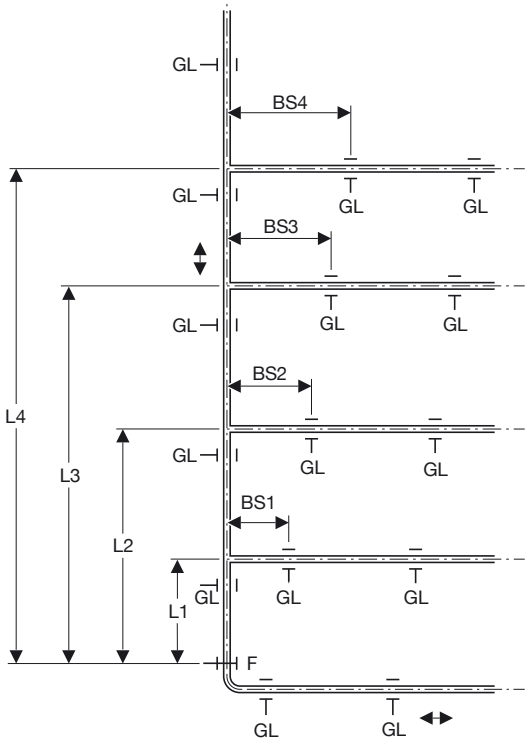


Figure 13: Expansion compensation by bending leg with anchor point in bottom floor.

BS Bending leg
F Anchor point
GL Sliding point
L Pipe lengt

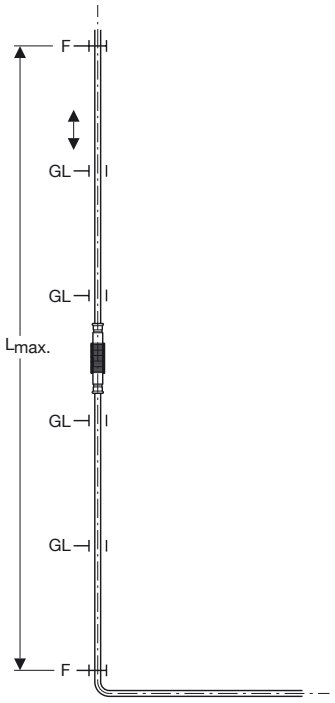


Figure 14: Expansion compensation by axial expansion fitting in riser pipe.

F Anchor point
GL Sliding point
L Pipe length

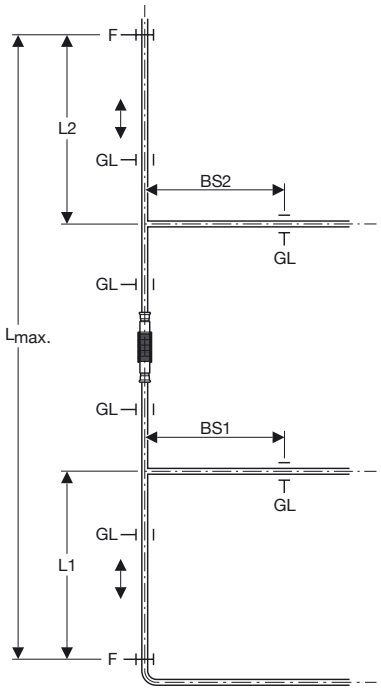


Figure 15: Expansion compensation by axial expansion fitting with anchor point in bottom floor.

BS Bending leg
F Anchor point
GL Sliding point
L Pipe length

Intended use of axial expansion fittings

Geberit Mapress axial expansion fittings may only be used for the compensation of axial expansions in straight pipe sections.

Installation of axial expansion fittings

- Do not stress the axial expansion fitting by twisting
- Do not use swing suspensions between fixed points
- Firmly mount fixed and sliding points before conducting a pressure test
- The sliding points must be designed as pipe guides
- Only one axial expansion fitting may be mounted between two fixed points

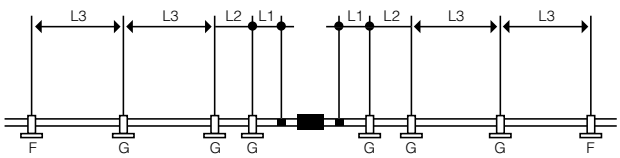


Figure 16: Installation of axial expansion fittings

G Sliding point
F Fixed point

Table 70: Bracket spacing for axial expansion fittings (see Fig 17)

Ø (mm)	L1 (cm)	L2 max. (cm)	L3 max. (cm)
15	3.0	95	135
18	3.5	105	155
22	5.5	120	175
28	6.0	140	200
35	7.0	155	225
42	9.0	175	250
54	11.0	195	280
76.1	15.0	225	320
88.9	18.0	250	355
108	22.0	280	400

3.4.1 Expansion compensation – Geberit Mapress Stainless Steel bending leg

The expansion of pipes also depends on the type of product material. Material dependent settings must be considered when calculating the length of the bending leg. The following table lists the parameters for Geberit Mapress Stainless Steel.

Table 71: Material dependent parameters for calculating the bending leg length of Geberit Mapress Stainless Steel

Material of pipe	System pipe	Coefficient of thermal expansion α (mm/m·K)	Material Constant C	U
Cr-Ni-Mo steel material no. 1.4401 (BS 316)	Geberit Mapress Stainless Steel	0.0165	60	34
Cr-Ni steel material no. 1.4301 (BS 304)	Geberit Mapress Cr-Ni Steel	0.0160	58	33

The calculation of the bending leg length comprises of the following steps:

- Calculation of the change in length Δl
- Calculation of the bending leg length

The following section shows example values for calculating the bending leg length L_B and L_U for Geberit Mapress Stainless Steel.

Calculation of the change in length Δl

The change in length is determined with the following formula:

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

Δl Change in length [m]
L Pipe length [m]
ΔT Temperature differential (operating temperature – ambient temperature at time of installation) [K]
α Coefficient of thermal expansion mm/[m·K]

Given:

- Material: Cr-Ni-Mo steel material no. 1.4401 (BS 316)
- α = 0.0165 mm/[m·K]
- L = 35 [m]
- ΔT = 50 [K]

Required:

- Change in length Δl of the pipe (mm)

Solution:

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

$$\Delta l = 35m \cdot 0.0165 \ \frac{mm}{(m \cdot K)} \cdot 50K$$

$$\Delta l = 29mm$$

Table 72: Change in length ΔI (mm) for Geberit Mapress Stainless Steel system pipe

Pipe length L (m)	Temperature differential ΔT (K)									
	10	20	30	40	50	60	70	80	90	100
1	0.17	0.33	0.50	0.66	0.83	0.99	1.16	1.32	1.49	1.65
2	0.33	0.66	0.99	1.32	1.65	1.98	2.31	2.64	2.97	3.30
3	0.50	0.99	1.49	1.98	2.48	2.97	3.47	3.96	4.46	4.95
4	0.66	1.32	1.98	2.64	3.30	3.96	4.62	5.28	5.94	6.60
5	0.83	1.65	2.48	3.30	4.13	4.95	5.78	6.60	7.43	8.25
6	0.99	1.98	2.97	3.96	4.95	5.94	6.93	7.92	8.91	9.90
7	1.16	2.31	3.47	4.62	5.78	6.93	8.09	9.24	10.40	11.55
8	1.32	2.64	3.96	5.28	6.60	7.92	9.24	10.56	11.88	13.20
9	1.49	2.97	4.46	5.94	7.43	8.91	10.40	11.88	13.37	14.85
10	1.65	3.30	4.95	6.60	8.25	9.90	11.55	13.20	14.85	16.50

Calculation of the bending leg length: Stainless Steel

The calculation of the bending leg length depends on the type of bending leg:

- Expansion compensation through pipe leg / for branch pipe: Calculation of the bending leg length L_B
- Expansion compensation by U bends: Calculation of the bending leg length L_U

Calculation of the bending leg length L_B

The bending leg length L_B to be calculated is defined as follows with expansion compensation by pipe legs and for branch pipes:

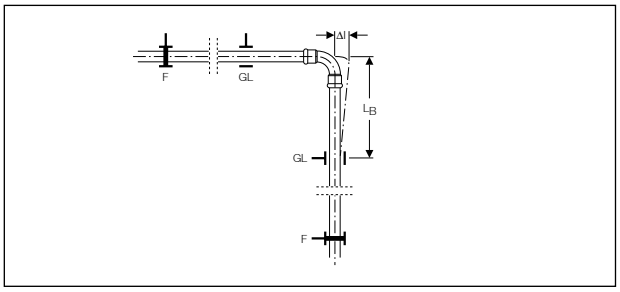


Figure 17: Expansion compensation by pipe leg

F Fixed point
GL Sliding point
L_B Length of the bending leg

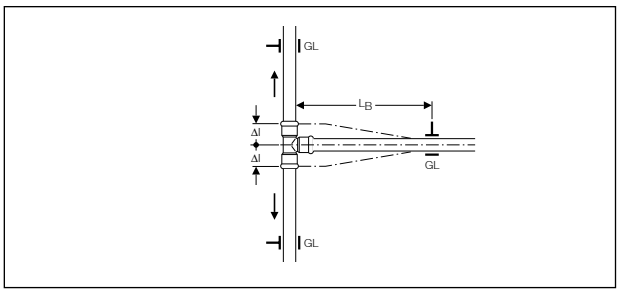


Figure 18: Expansion compensation for branching pipe

F Fixed point
GL Sliding point
L_B Length of the bending leg

The bending leg length L_B is determined with the following formula:

$$L_B = C \cdot \sqrt{d \cdot \Delta l}$$

L_B Length of the bending leg [m]
d Outside pipe diameter [mm]
Δl Change in length [m]
C Material constant (refer to Table 71 “Material dependant parameters for calculating the bending leg length of Geberit Mapress Stainless Steel” on page 52).
L Pipe length [m]

Given:

- Material: Cr-Ni-Mo steel material no. 1.4401 (BS 316)
- C = 60
- d = 54mm
- Δl = 0.029m

Required:

- L_B (m)

Solution:

$L_B = C \cdot \sqrt{d \cdot \Delta l}$ $\quad [\sqrt{m \cdot m} = m]$

$L_B = 60 \cdot \sqrt{0.054 \cdot 0.029}$
$L_B = 2.37m$

Calculation of the bending leg length L_U

The bending leg length L_U to be calculated is defined with the following formula:

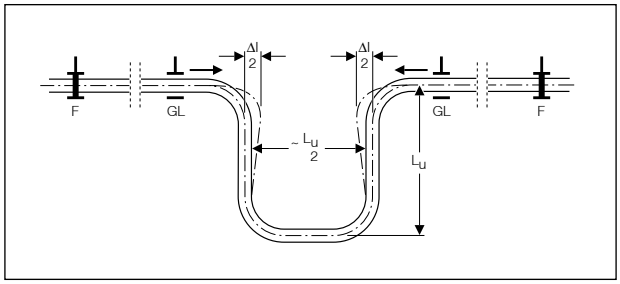


Figure 20: U bend expansion compensation from bent pipe

F Fixed point
GL Sliding point
L_U Length of the bending leg

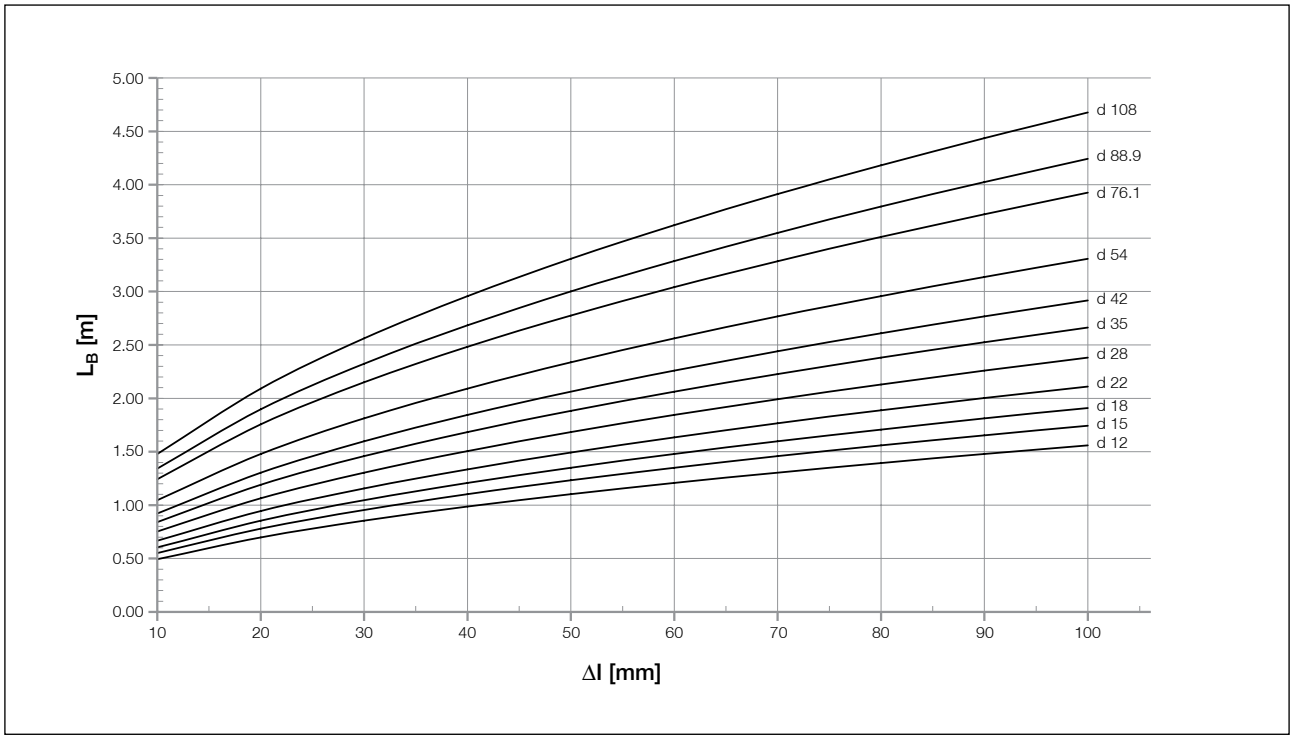


Figure 19: Determination of the bending leg length L_B for Geberit Mapress Stainless Steel

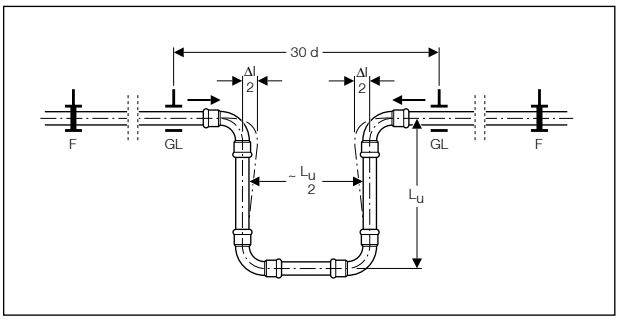


Figure 21: U bend expansion compensation with pressfittings

F Fixed point
GL Sliding point
L_U Length of the bending leg

The bending leg L_U is determined with the following formula:

$$L_U = U \cdot \sqrt{d \cdot \Delta l}$$

L_U Length of the bending leg [m]
D Outside pipe diameter [mm]
Δl Change in length [m]
U Material constant (refer to Table 71 “Material dependant parameters for calculating the bending leg length of Geberit Mapress Stainless Steel” on page 52).
L Pipe length [m]

Given:

- Material: Cr-Ni-Mo steel material no. 1.4401 (BS 316)
- U = 34
- d = 54mm
- Δl = 0.030m

Required:

- L_U [m]

Solution:

$L_U = U \cdot \sqrt{d \cdot \Delta l}$ $\quad [\sqrt{m \cdot m} = m]$

$L_U = 34 \cdot \sqrt{0.054 \cdot 0.030}$

$L_U = 1.37m$

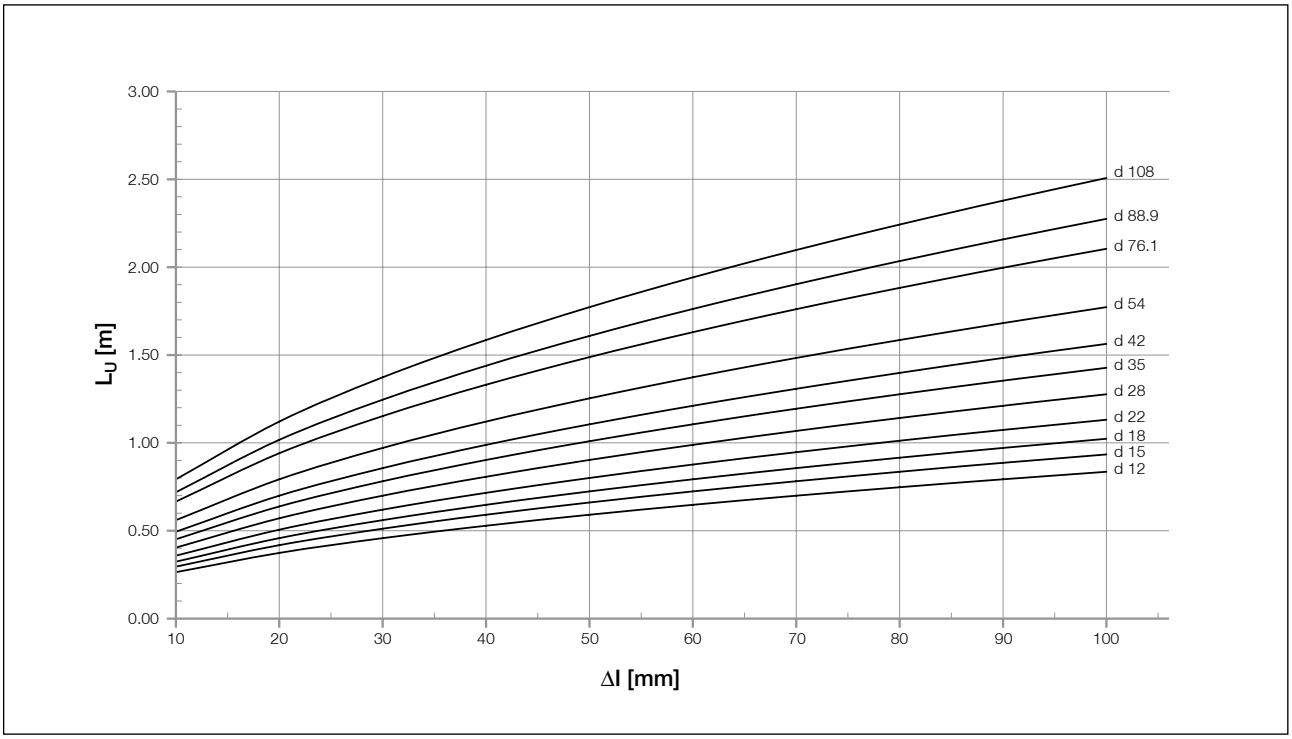


Figure 22: Determination of the bending leg length L_U for Geberit Mapress Stainless Steel

3.4.2 Expansion compensation – Geberit Carbon Steel bending leg

The expansion of pipes also depends, amongst others, on the type of product material. Material dependent parameters must be considered when calculating the length of the bending leg. The following table lists the parameters for Geberit Mapress Carbon Steel.

Table 73: Material dependent parameters for calculating the bending leg length of Geberit Mapress Carbon Steel

Material of pipe	System pipe	Coefficient of thermal expansion α (mm/m·K)	Material Constant C	U
Non-alloy steel, material no. 1.0034	Geberit Mapress Carbon Steel	0.012	55	31

The calculation of the bending leg length comprises of the following steps:

- Calculation of the change in length Δl
- Calculation of the bending leg length L_B

The following section shows example values for calculating the bending leg length L_W and L_U for Geberit Mapress Carbon Steel.

Calculation of the change in length Δl

The change in length is determined with the following formula:

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

Δl Change in length [m]
L Pipe length [m]
ΔT Temperature differential (operating temperature – ambient temperature at time of installation) [K]
α Coefficient of thermal expansion mm/[m·K]

Given:

- Material: Non-alloy steel material no. 1.0034
- α = 0.0120 m/[m·K]
- L = 35 [m]
- ΔT = 50 [K]

Required:

- Change in length Δl of the pipe [mm]

Solution:

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

$$\Delta l = 35m \cdot 0.012 \quad \frac{mm}{(m \cdot K)} \cdot 50K$$

$$\Delta l = 21mm$$

Table 74: Change in length ΔI (mm) for Geberit Mapress Carbon Steel system pipe

Pipe length L (m)	Temperature differential ΔT (K)									
	10	20	30	40	50	60	70	80	90	100
1	0.12	0.24	0.36	0.48	0.60	0.72	0.84	0.96	1.08	1.20
2	0.24	0.48	0.72	0.96	1.20	1.44	1.68	1.92	2.16	2.40
3	0.36	0.72	1.08	1.44	1.80	2.16	2.52	2.88	3.24	3.60
4	0.48	0.96	1.44	1.92	2.40	2.88	3.36	3.84	4.32	4.80
5	0.60	1.20	1.80	2.40	3.00	3.60	4.20	4.80	5.40	6.00
6	0.72	1.44	2.16	2.88	3.60	4.32	5.04	5.76	6.48	7.20
7	0.84	1.68	2.52	3.36	4.20	5.04	5.88	6.72	7.56	8.40
8	0.96	1.92	2.88	3.84	4.80	5.76	6.72	7.68	8.64	9.60
9	1.08	2.16	3.24	4.32	5.40	6.48	7.56	8.64	9.72	10.80
10	1.20	2.40	3.60	4.80	6.00	7.20	8.40	9.60	10.80	12.00

Calculation of the bending leg length: Carbon Steel

The calculation of the bending leg length depends on the type of bending leg:

- Expansion compensation through pipe leg / for branch pipe: Calculation of the bending leg length L_B
- Expansion compensation by U bends: Calculation of the bending leg length L_U

Calculation of the bending leg length L_B

The bending leg length L_B to be calculated is defined as follows with expansion compensation through pipe legs and for branch pipes:

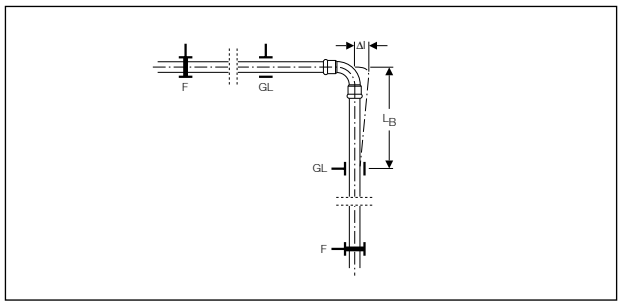


Figure 23: Expansion compensation by pipe leg

F Fixed point
GL Sliding point
L_B Length of the bending leg

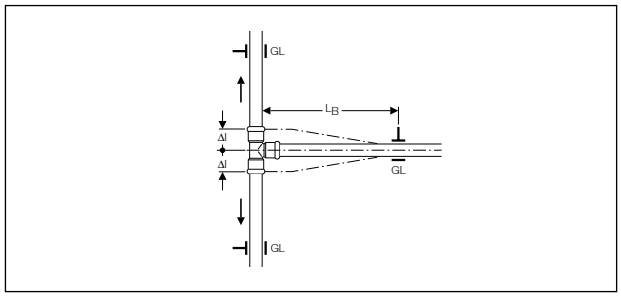


Figure 24: Expansion compensation for branching pipe

F Fixed point
GL Sliding point
L_B Length of the bending leg

The bending leg length L_B is determined with the following formula:

$$L_B = C \cdot \sqrt{d \cdot \Delta l}$$

L_B Length of the bending leg [m]
d Outside pipe diameter [mm]
Δl Change in length [m]
C Material constant (refer to Table 73 “Material dependent parameters for calculating the bending leg length of Geberit Mapress Carbon Steel” on page 56).
L Pipe length [m]

Given:

- Material: Non-alloy steel material no. 1.0034
- C = 55
- d = 54 [mm]
- Δl = 0.021 [m]

Required:

- L_B [m]

Solution:

$L_B = C \cdot \sqrt{d \cdot \Delta l}$ $\quad [\sqrt{m \cdot m} = m]$

$L_B = 55 \cdot \sqrt{0.054 \cdot 0.021}$

$L_B = 1.85m$

Calculation of the bending leg length L_U

The bending leg length L_U to be calculated is defined with the following formula:

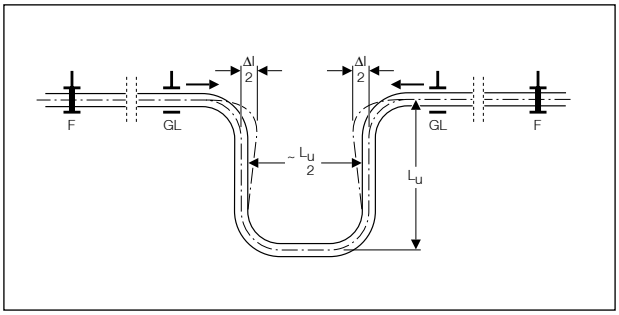


Figure 26: U bend expansion compensation from bent pipe

F Fixed point
GL Sliding point
L_U Length of the bending leg

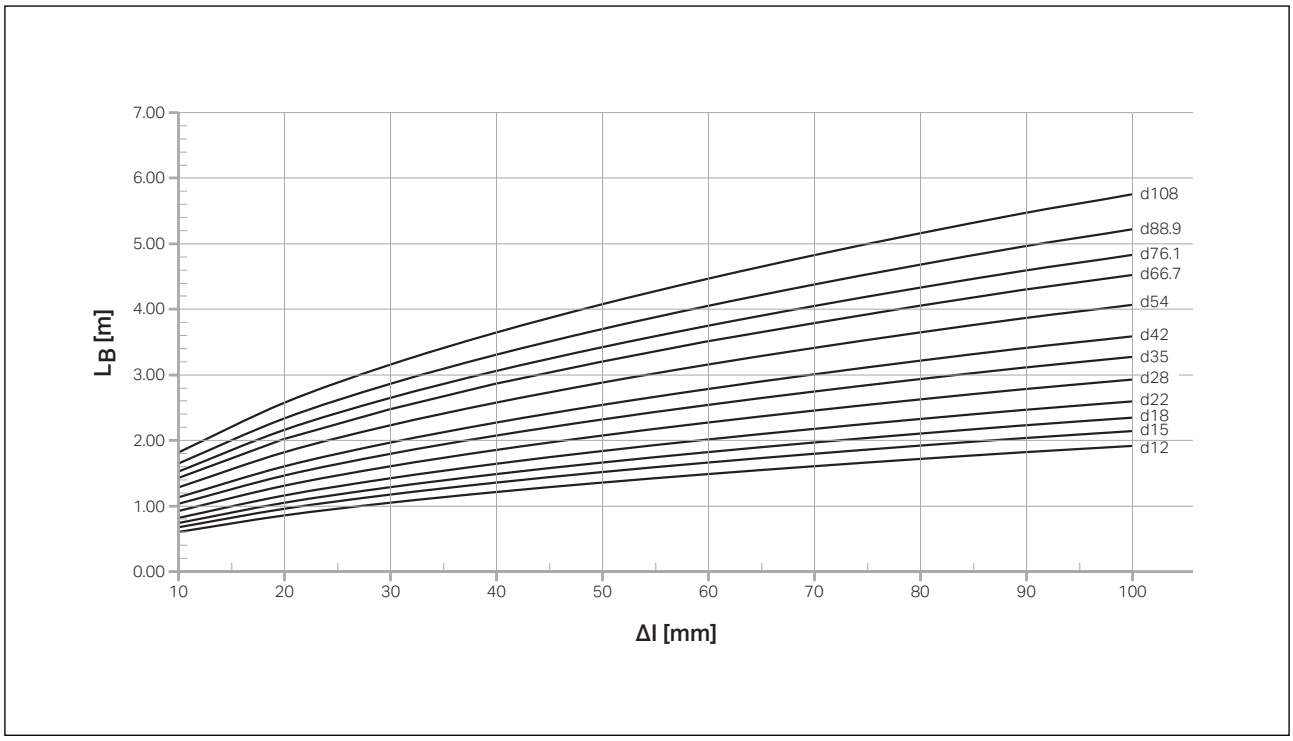


Figure 25: Calculation of the bending leg length L_B for Mapress Carbon Steel system pipe

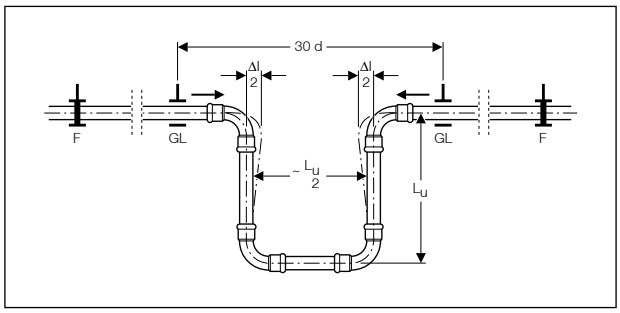


Figure 27: U bend expansion compensation with pressfittings

F Fixed point
GL Sliding point
L_U Length of the bending leg

The bending leg L_U is determined with the following formula:

$$L_U = U \cdot \sqrt{d \cdot \Delta l}$$

L_U Length of the bending leg (m)
D Outside pipe diameter (mm)
Δl Change in length (m)
U Material constant (refer to Table 73 “Material dependant parameters for calculating the bending leg length of Geberit Mapress Carbon Steel” on page 56).
L Pipe length (m)

Given:

- Material: Non-alloy steel material no. 1.0034
- U = 31
- d = 54mm
- Δl = 0.021m

Required:

- L_U (m)

Solution:

$L_U = U \cdot \sqrt{d \cdot \Delta l}$ $\quad [\sqrt{m \cdot m} = m]$

$L_U = 31 \cdot \sqrt{0.054 \cdot 0.021}$

$L_U = 1.04m$

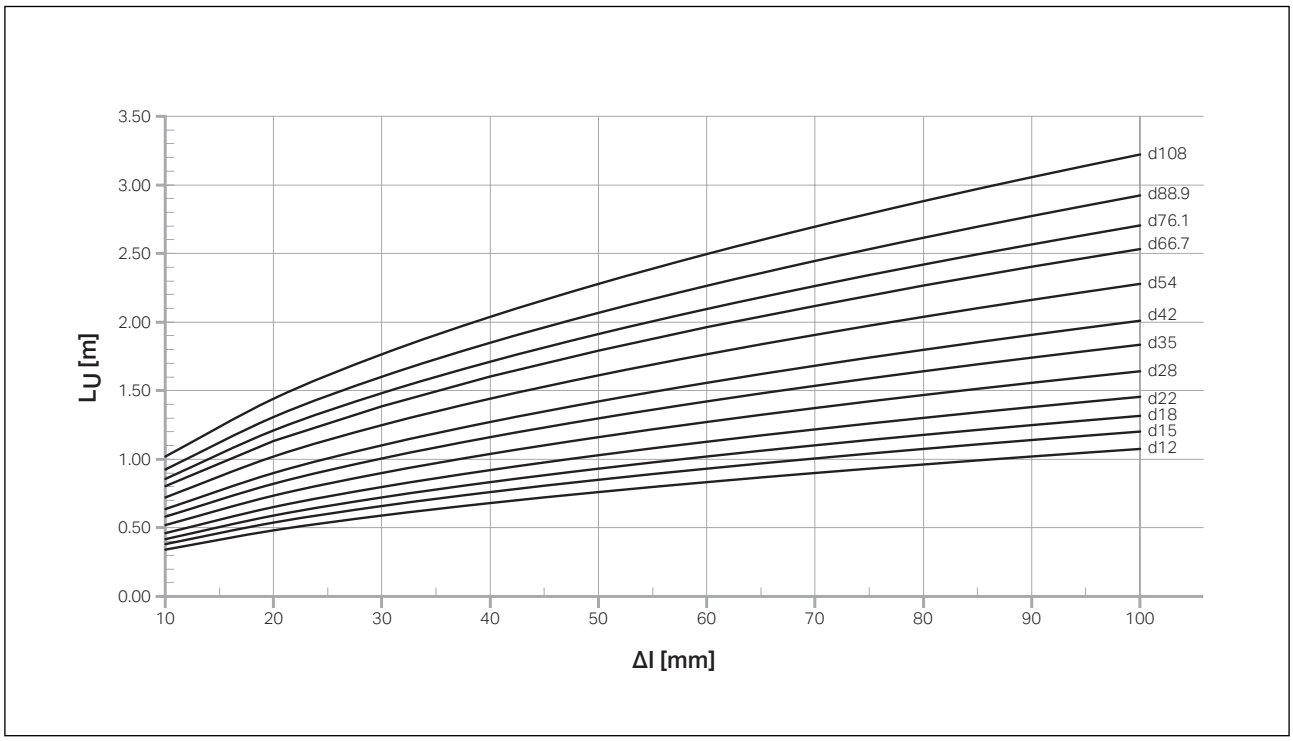


Figure 28: Calculation of the bending leg length L_U for Mapress Carbon Steel system pipe

3.4.3 Expansion compensation through the copper to BS EN 1057 bending leg

The expansion of pipes depends, on the product material. Material dependent parameters must be considered when calculating the length of the bending leg. The following table lists the parameters for copper.

Table 75: Material dependent parameters for calculating the bending leg length of copper to BS EN 1057

Material of pipe	Coefficient of thermal expansion α (mm/m·K)	Material Constant C	U
Copper to BS EN 1057 (R250/R290)	0.0166	52	29

The calculation of the bending leg length comprises of the following steps:

- Calculation of the change in length Δl
- Calculation of the bending leg length L_B

The following section shows example values for calculating the bending leg length L_W and L_U for Geberit Mapress Copper.

Calculation of the change in length Δl

The change in length is determined with the following formula:

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

Δl: Change in length [m]
L: Pipe length [m]
ΔT: Temperature differential (operating temperature – ambient temperature at time of installation) [K]
α: Coefficient of thermal expansion [mm/(m·K)]

Given:

- Material: Copper
- α = 0.0166 mm/(m·K)
- L = 35m
- ΔT = 50 K

Required:

- Change in length Δl of the pipe [mm]

Solution:

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

$$\Delta l = 35m \cdot 0.0166 \frac{mm}{(m \cdot K)} \cdot 50K$$

$$\Delta l = 29mm$$

Table 76: Change in length ΔI (mm) for Copper pipe

	Temperature differential ΔT (K)									
Pipe length L (m)	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
1	1.7	3.3	5.0	6.6	8.3	10.0	11.6	13.3	14.9	16.6
2	3.3	6.6	10.0	13.3	16.6	19.9	23.2	26.6	29.9	33.2
3	5.0	10.0	14.9	19.9	24.9	29.9	34.9	39.8	44.8	49.8
4	6.6	13.3	19.9	26.6	33.2	39.8	46.5	53.1	59.8	66.4
5	8.3	16.6	24.9	33.2	41.5	49.8	58.1	66.4	74.7	83.0
6	10.0	19.9	29.9	39.8	49.8	59.8	69.7	79.7	89.6	99.6
7	11.6	23.2	34.9	46.5	58.1	69.7	81.3	93.0	104.6	116.2
8	13.3	26.6	39.8	53.1	66.4	79.7	93.0	106.2	119.5	132.8
9	14.9	29.9	44.8	59.8	74.7	89.6	104.6	119.5	134.5	149.4
10	16.6	33.2	49.8	66.4	83.0	99.6	116.2	132.8	149.4	166.0

Calculation of the bending leg length: Copper

The calculation of the bending leg length depends on the type of bending leg:

- Expansion compensation through pipe leg / for branch pipe: Calculation of the bending leg length L_B
- Expansion compensation by U bends: Calculation of the bending leg length L_U

Calculation of the bending leg length L_B

The bending leg length L_B to be calculated is defined as follows with expansion compensation through pipe legs and for branch pipes:

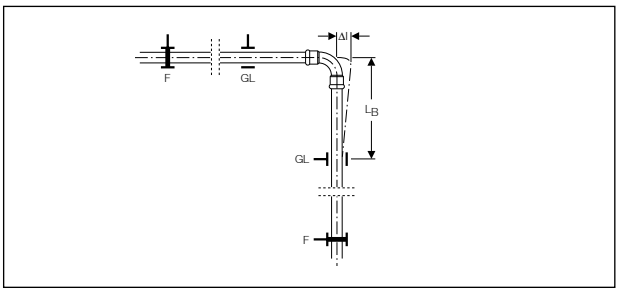


Figure 29: Expansion compensation by pipe leg

F Fixed point
GL Sliding point
L_B Length of the bending leg

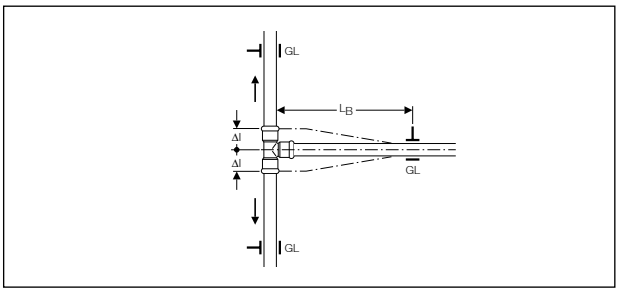


Figure 30: Expansion compensation for branching pipe

F Fixed point
GL Sliding point
L_B Length of the bending leg

The bending leg length L_B is determined with the following formula:

$$L_B = C \cdot \sqrt{d \cdot \Delta l}$$

L_B Length of the bending leg [m]
d Outside pipe diameter [mm]
Δl Change in length [m]
C Material constant (refer to Table 75 “Material dependent parameters for calculating the bending leg length of copper to BS EN 1057” on page 60).
L Pipe length [m]

Given:

- Material: Copper
- C = 52
- d = 54mm
- Δl = 0.029m

Required:

- L_B [m]

Solution:

$$L_B = \frac{C \cdot \sqrt{d \cdot \Delta l}}{1000} \quad \left[\frac{\sqrt{mm \cdot mm}}{\frac{mm}{m}} = m \right]$$

$$L_B = \frac{61 \cdot \sqrt{0.054 \cdot 0.029}}{1000}$$

$L_B = 2.06m$

Calculation of the bending leg length L_U

The bending leg length L_U to be calculated is defined with the following formula:

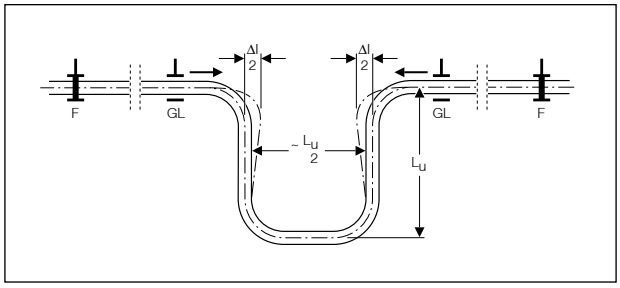


Figure 32: U bend expansion compensation from bent pipe

F Fixed point
GL Sliding point
L_U Length of the bending leg

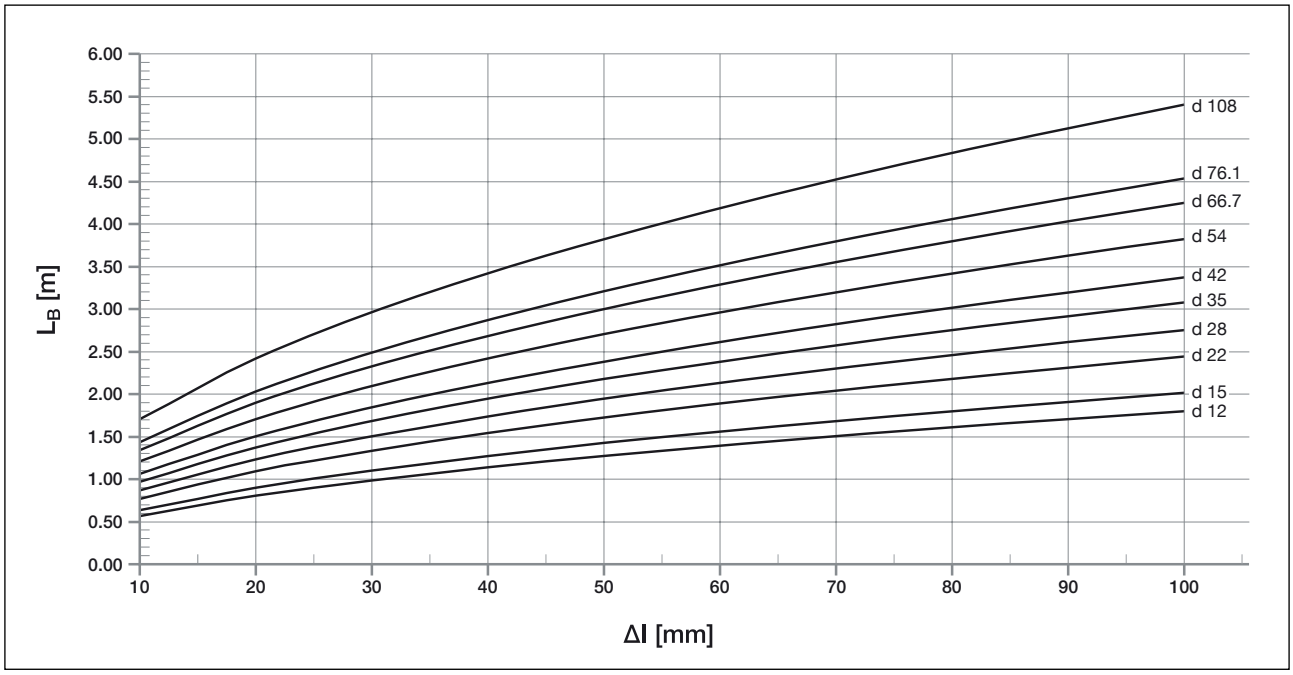


Figure 31: Calculation of the bending leg length L_B for copper pipes in accordance with BS EN 1057

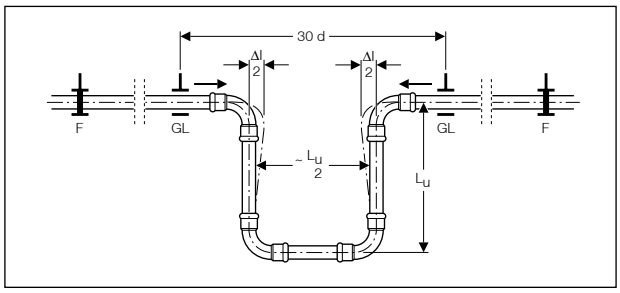


Figure 33: U bend expansion compensation with pressfittings

F Fixed point
GL Sliding point
L_U Length of the bending leg
The bending leg L_U is determined with the following formula:

$$L_U = U \cdot \sqrt{d \cdot \Delta l}$$

L_U Length of the bending leg [m]
D Outside pipe diameter [mm]
Δl Change in length [m]
U Material constant (refer to Table 75 “Material dependant parameters for calculating the bending leg length of copper to BS EN 1057” on page 60).
L Pipe length [m]

Given:

- Material: Copper
- U = 29
- d = 54mm
- Δl = 29m

Required:

- L_U [m]

Solution:

$$L_U = \frac{U \cdot \sqrt{d \cdot \Delta l}}{1000} \quad \left[\frac{\sqrt{mm \cdot mm}}{\frac{mm}{m}} = m \right]$$

$$L_U = \frac{29 \cdot \sqrt{0.054 \cdot 0.029}}{1000}$$

$$L_U = 1.15m$$

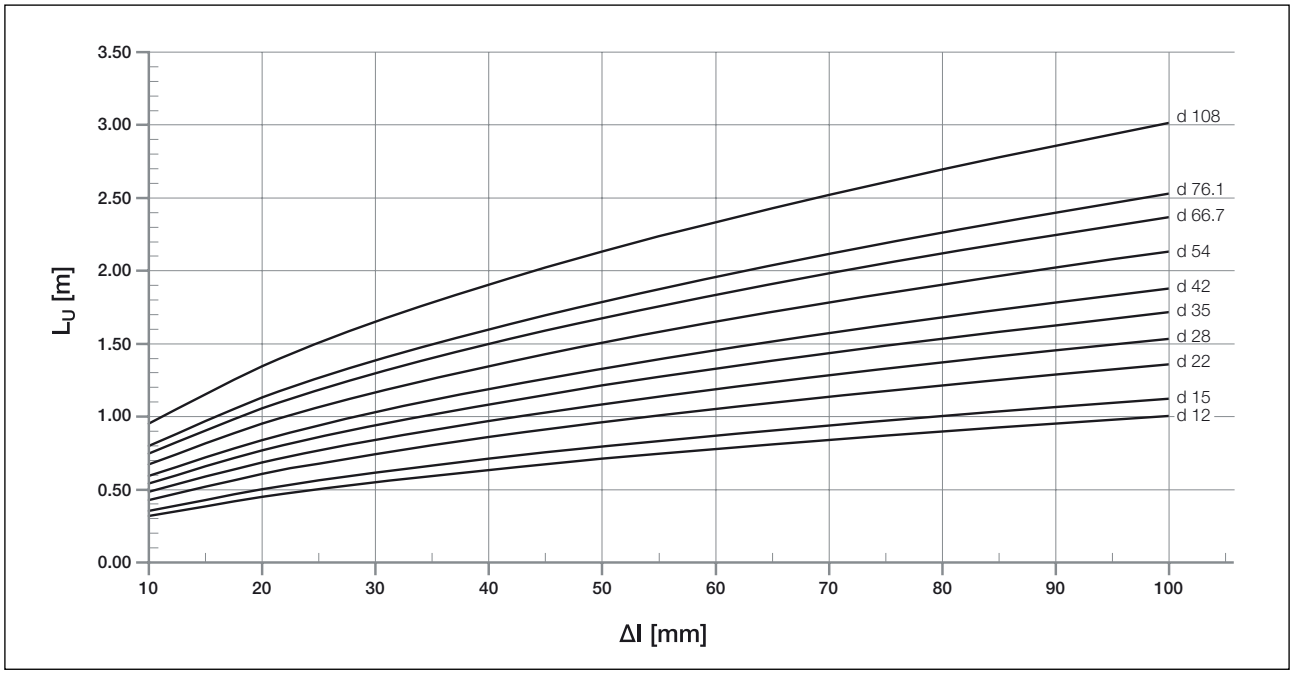


Figure 34: Calculation of the bending leg length L_U for copper pipes in accordance with BS EN 1057

3.5 Heat emission

3.5.1 Heat emission, general

In addition to transporting the thermal medium (water, steam, etc.), pipes also emit heat due to physical laws. This effect can also be reversed.

Pipes can therefore be used for heat emission (underfloor heating, heated ceilings, heated walls etc.), and also for thermal absorption (chilled water systems, geothermal heat storage etc.).

3.5.2 Heat emission – Geberit Mapress Stainless Steel

The calculation to determine the heat emissions comprises of the following steps:

- Calculation of the thermal transfer coefficient K_r
- Calculation of the thermal emission Q_R

Calculation of the thermal transfer coefficient K_r

Assumptions for the general calculation:

- Surface mounted
- Stationary air

The thermal transfer coefficient K_r is determined in the general calculation with the following formula:

$$K_r = \frac{\pi}{\frac{1}{\alpha_i \cdot d_i} + \frac{1}{2 \cdot \lambda} \cdot \ln\left(\frac{d_a}{d_i}\right) + \frac{1}{\alpha_a \cdot d_a}}$$

α_i : Heat transfer coefficient, inside [(W/m²·K)]
α_a : Heat transfer coefficient, outside [(W/m²·K)]
d_a : Outside diameter (mm)
d_i : Inside diameter (mm)
λ : Thermal conductivity [(W/m·K)]

Values for Geberit Mapress Stainless Steel:

- α_i =23.2 W/(m²·K)
- α_a = 8.1 W/(m²·K)
- λ = 15 W/(m·K)

Simplified calculation of the thermal transfer coefficient K_r

Assumptions for the simplified calculation:

- Surface mounted
- Stationary air
- Radiant proportion not taken into account

The thermal transfer coefficient K_r is determined in the simplified calculation with the following formula:

$$K_r = \frac{\pi}{\frac{1}{\alpha_a \cdot d_a}}$$

α_a: Heat transfer coefficient, outside [W(m²·K)]

Value for Geberit Mapress Stainless Steel:

- α_a = 8.1 W/(m²·K)

Calculation of the thermal emission Q_R

The thermal emission is determined with the following formula:

$$Q_R = (T_i - T_a) \cdot K_r$$

Q_R : Heat flow for 1m pipe [W/m]
K_r : Heat transfer coefficient [W/m·K)]
T_i : Water temperature in the pipe
T_a : Room temperature

Tabulation calculation of the heat emission

The values of the thermal flow Q_R in the following table are based on the general calculation of the thermal transfer coefficients K_r.

Table 78: Heat emission – Geberit Mapress Stainless Steel

Temperature differential ΔT (K)										
d x s (mm)	10	20	30	40	50	60	70	80	90	100
	Heat flow QR [W/m]									
15 x 1.0	3.2	7.4	12.2	17.4	22.9	28.7	34.8	41.2	47.7	54.5
18 x 1.0	3.7	8.6	14.1	20.1	26.5	33.2	40.3	47.6	55.2	63.1
22 x 1.2	4.3	10.0	16.5	23.5	31.0	38.9	47.2	55.8	64.7	73.9
28 x 1.2	5.2	12.2	20.0	28.5	37.5	47.1	57.1	67.5	78.3	89.5
35 x 1.5	6.2	14.5	23.8	34.0	44.8	56.2	68.2	80.7	93.6	107.0
42 x 1.5	7.2	16.8	27.6	39.3	51.8	65.0	78.8	93.3	108.2	123.8
54 x 1.5	9.0	20.8	34.2	48.7	64.3	80.7	97.8	115.8	134.4	153.7
54 x 2.0	8.9	20.8	34.2	48.7	64.2	80.6	97.8	115.7	134.3	153.5
76.1 x 2.0	11.6	26.9	44.2	63.0	83.1	104.3	126.5	149.7	173.9	198.9
88.9 x 2.0	13.1	30.5	50.0	71.3	94.0	118.1	143.2	169.5	196.9	225.3
108 x 2.0	15.4	35.6	58.4	83.3	109.8	137.9	167.4	198.1	230.1	263.3

Graphical calculation of the heat emission

The values of the thermal flow Q_R that can be calculated from the following figure are based on the general calculation of the thermal transfer coefficient K_r.

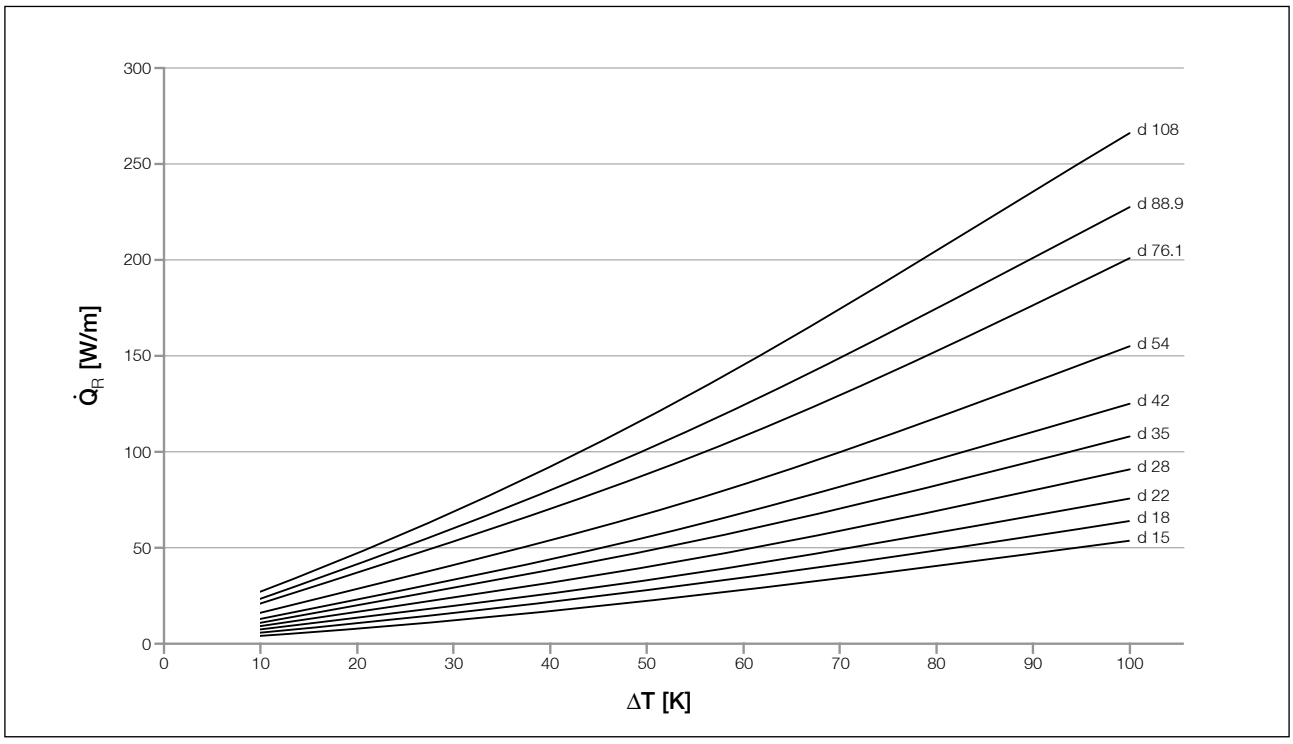


Figure 35: Heat emission – Geberit Mapress Stainless Steel

Q_R Heat flow for 1m pipe

ΔT Temperature differential

3.5.3 Heat emission – Geberit Mapress Carbon Steel

The calculation to determine the heat emissions comprises of the following steps:

- Calculation of the thermal transfer coefficient K_r
- Calculation of the thermal emission Q_R

General calculation of the thermal transfer coefficient K_r

Assumptions for the general calculation:

- Surface mounted
- Stationary air

The thermal transfer coefficient K_r is determined in the general calculation with the following formula:

$$K_r = \frac{\pi}{\frac{1}{\alpha_i \cdot d_i} + \frac{1}{2 \cdot \lambda} \cdot \ln\left(\frac{d_a}{d_i}\right) + \frac{1}{\alpha_a \cdot d_a}}$$

α_i : Heat transfer coefficient, inside [(W/m²·K)]
α_a : Heat transfer coefficient, outside [(W/m²·K)]
d_a : Outside diameter [mm]
d_i : Inside diameter [mm]
λ : Thermal conductivity [(W/m·K)]

Value for Geberit Mapress Carbon Steel:

- α_i =23.2 W/(m²·K)
- α_a = 8.1 W/(m²·K)
- λ = 60 W/(m·K)

Simplified calculation of the thermal transfer coefficient K_r

Assumptions for the simplified calculation:

- Surface mounted
- Stationary air
- Radiation not taken into account

The thermal transfer coefficient K_r is determined in the simplified calculation with the following formula:

$$K_r = \frac{\pi}{\frac{1}{\alpha_a \cdot d_a}}$$

α_a: Heat transfer coefficient, outside [W(m²·K)]

Value for Geberit Mapress Carbon Steel:

- α_a = 8.1 W/(m²·K)

Calculation of the thermal emission Q_R

The thermal emission is determined with the following formula:

$$Q_R = (T_i - T_a) \cdot K_r$$

Q_R : Heat flow for 1m pipe [W/m]
K_r : Heat transfer coefficient [W/m·K)]
T_i : Water temperature in the pipe
T_a : Room temperature

Tabulation calculation of the heat emission

The values of the thermal flow Q_R in the following table are based on the general calculation of the thermal transfer coefficients K_r.

Table 79: Heat emission – Geberit Mapress Carbon Steel

d x s (mm)	Temperature differential ΔT (K)									
	10	20	30	40	50	60	70	80	90	100
	Heat flow QR [W/m]									
12 x 1.2	3.9	8.9	14.5	20.6	27.2	34.2	41.6	49.4	57.6	66.2
15 x 1.2	4.7	10.7	17.5	24.9	32.8	41.2	50.2	59.6	69.5	79.9
18 x 1.2	5.5	12.5	20.4	29.0	38.2	48.1	58.5	69.5	81.1	93.2
22 x 1.5	6.3	14.3	23.3	33.1	43.6	54.8	66.8	79.3	92.6	106.5
28 x 1.5	7.8	17.6	28.7	40.7	53.7	67.5	82.2	97.7	114.0	131.2
35 x 1.5	9.5	21.5	34.9	49.5	65.3	82.1	100.0	118.9	138.8	159.8
42 x 1.5	11.2	25.2	40.8	58.0	76.4	96.1	117.0	139.2	162.5	187.1
54 x 1.5	14.4	32.3	52.5	74.5	98.2	123.6	150.5	178.9	209.0	240.6
66.7 x 1.5	16.8	37.8	61.2	86.8	114.5	144.0	175.4	208.7	243.8	280.9
76.1 x 1.5	19.2	43.1	69.8	99.0	130.5	164.2	200.0	237.9	278.0	320.2
88.9 x 2.0	22.0	49.3	79.9	113.3	149.3	187.8	228.7	272.2	318.1	366.5
108 x 2.0	26.1	58.4	94.6	134.1	176.7	222.2	270.8	322.2	376.7	434.1

Graphical calculation of the heat emission

The values of the thermal flow Q_R that can be calculated from the following figure are based on the general calculation of the thermal transfer coefficient K_r.

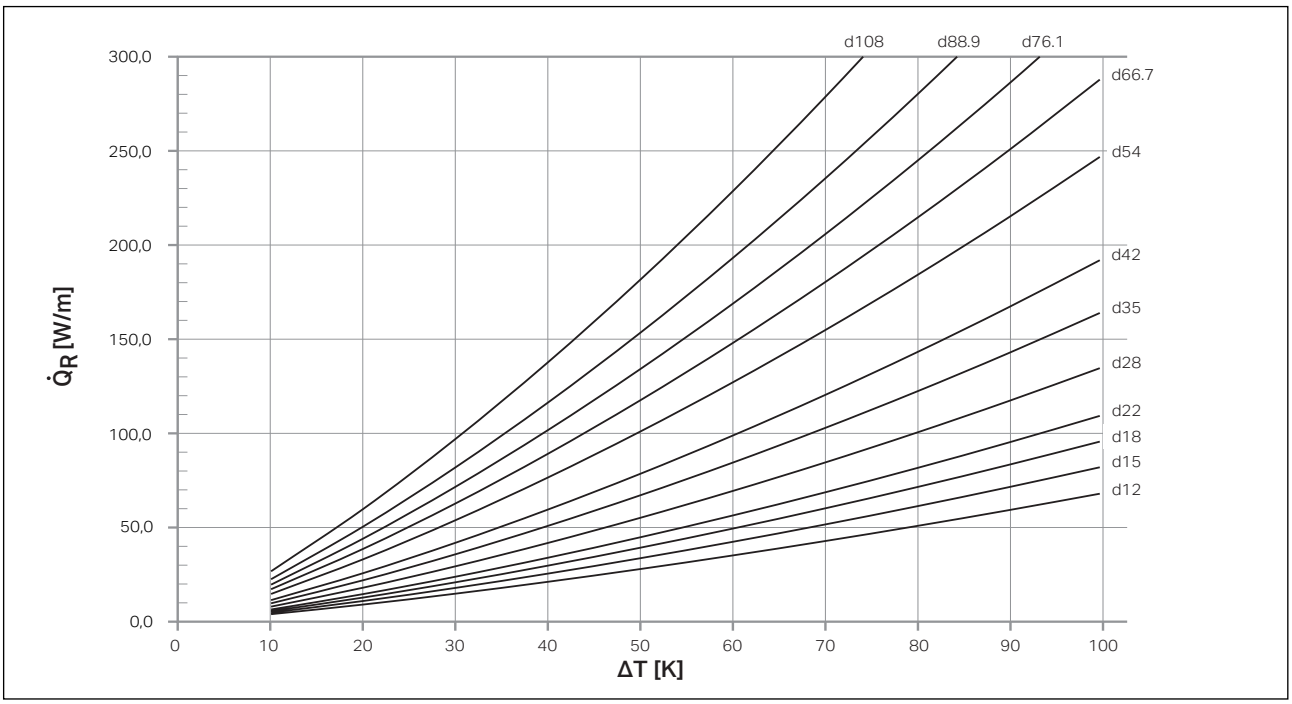


Figure 36: Heat emission – Geberit Mapress Carbon Steel

Q_R Heat flow for 1m pipe

ΔT Temperature differential

3.5.4 Heat emission – Geberit Mapress Copper

The calculation to determine the heat emissions comprises of the following steps:

- Calculation of the thermal transfer coefficient K_r
- Calculation of the thermal emission Q_R

General calculation of the thermal transfer coefficient K_r

Assumptions for the general calculation:

- Surface mounted
- Stationary air

The thermal transfer coefficient K_r is determined in the general calculation with the following formula:

$$K_r = \frac{\pi}{\frac{1}{\alpha_i \cdot d_i} + \frac{1}{2 \cdot \lambda} \cdot \ln\left(\frac{d_a}{d_i}\right) + \frac{1}{\alpha_a \cdot d_a}}$$

α_i: Heat transfer coefficient, inside [(W/m²·K)]
α_a: Heat transfer coefficient, outside [(W/m²·K)]
d_a: Outside diameter [mm]
d_i: Inside diameter [mm]
λ: Thermal conductivity [(W/m·K)]

Value for Geberit Mapress Copper:

- α_i =23.2 W/(m²·K)
- α_a = 8.1 W/(m²·K)
- λ = 305 W/(m·K)

Simplified calculation of the thermal transfer coefficient K_r

Assumptions for the simplified calculation:

- Surface mounted
- Stationary air
- Radiation not taken into account

The thermal transfer coefficient K_r is determined in the simplified calculation with the following formula:

$$K_r = \frac{\pi}{\frac{1}{\alpha_a \cdot d_a}}$$

α_a: Heat transfer coefficient, outside [W(m²·K)]

Value for Geberit Mapress Copper:

- α_a = 8.1 W/(m²·K)

Calculation of the thermal emission QR

The thermal emission is determined with the following formula:

$$Q_R = (T_i - T_a) \cdot K_r$$

Q_R : Heat flow for 1m pipe [W/m]
K_r : Heat transfer coefficient [W/m·K)]
T_i : Water temperature in the pipe
T_a : Room temperature

Tabulation calculation of the heat emission

The values of the thermal flow Q_R in the following table are based on the general calculation of the thermal transfer coefficients K_r.

Table 80: Heat emission of Copper pipes according to BS EN 1057

Temperature differential ΔT (K)										
d	10	20	30	40	50	60	70	80	90	100
	Heat flow QR [W/m]									
15	4.6	10.3	16.8	23.8	31.4	39.4	47.9	56.9	66.3	76.1
22	6.3	14.3	23.2	33.0	43.4	54.5	66.3	78.8	91.8	105.5
28	7.8	17.6	28.5	40.5	53.3	67.0	81.5	96.8	112.9	129.8
35	9.5	21.3	34.5	49.0	64.5	81.1	98.6	117.1	136.7	157.2
42	10.8	24.3	39.4	55.9	73.6	92.5	112.5	133.7	156.1	179.6
54	13.8	30.9	50.1	71.1	93.6	117.7	143.2	170.2	198.6	228.6
66.7	16.6	34.1	60.2	85.3	112.3	141.2	171.8	204.3	238.5	274.6
76.1	18.6	41.6	67.4	95.6	125.9	158.2	192.6	229.0	267.4	307.9
108	25.3	56.5	91.4	129.5	170.5	214.4	261.1	310.5	362.8	417.9

Graphical calculation of the heat emission

The values of the thermal flow Q_R that can be calculated from the following figure are based on the general calculation of the thermal transfer coefficient K_r.

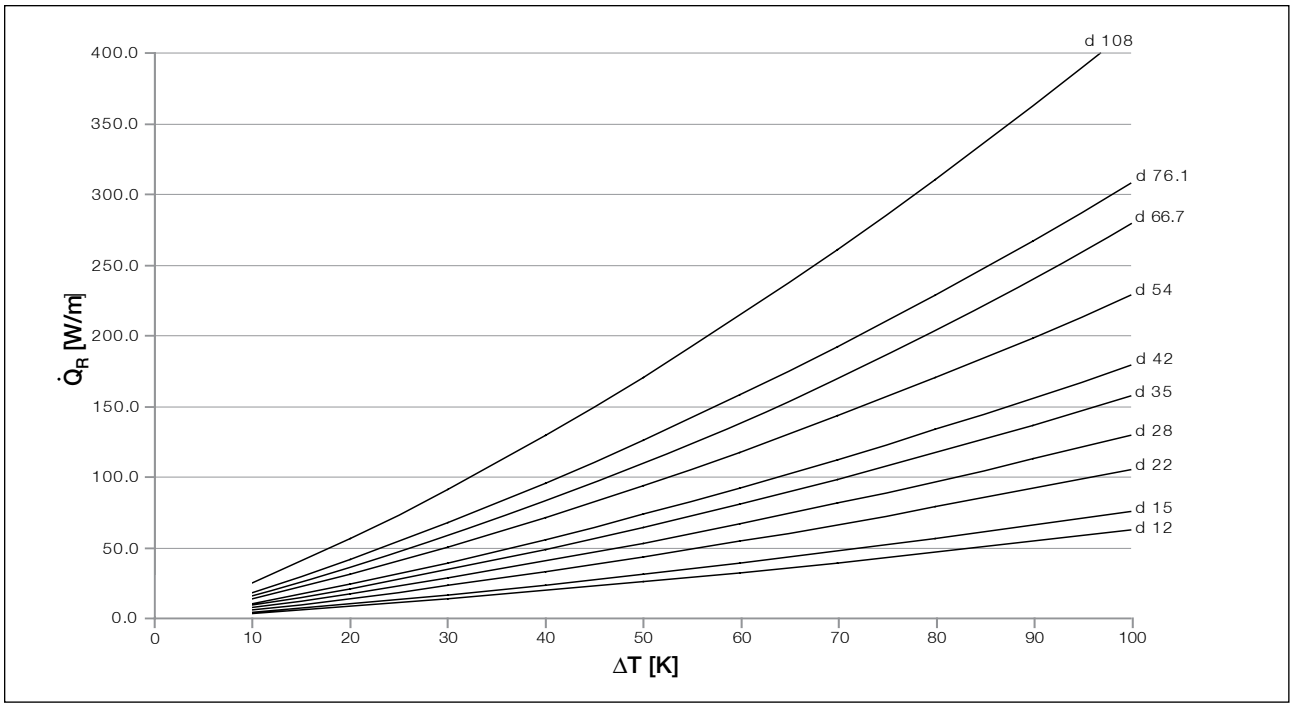


Figure 37: Heat emission of Copper pipes according to BS EN 1057

Q_R Heat flow for 1m pipe

ΔT Temperature differential

4 Geberit tooling operation and maintenance

4.1 Geberit pressing tools

Always use approved Geberit pressing tools. Please contact Geberit if you are unsure if the tool you are using is compatible with Geberit Mapress.

The instructions for use of each pressing tool must always be observed.

4.1.1 Maintenance of Geberit pressing tools

Always follow the service intervals indicated on the operating instructions of the Geberit pressing tool. Check the tool regularly for visible defects and damage that could affect safety, and regularly clean and lubricate it.

The service interval for the tool is indicated by a sticker on the machine. Always service and recalibrate before this date at the latest.

4.2 Geberit Mapress pressing jaw

4.2.1 Basic safety notes

WARNING
Risk of injury from incorrect handling

- Only use the pressing jaw if it is in perfect working order. People without technical training are only allowed to use the pressing jaw provided that they have been instructed by a trained specialist

Danger of crushing by moving parts

- Keep body parts or other objects clear of the pressing jaw and pressfitting during the pressing operation. Do not hold the adaptor or pressing jaw with your hands during the pressing operation

CAUTION
Risk of property damage from incorrect handling

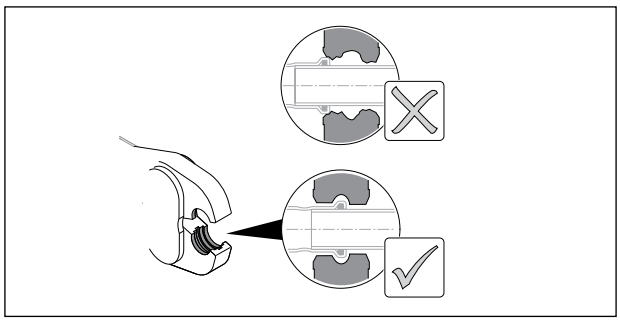
- Replace worn pressing jaw
- Use the transport case for transport and storage, and store the pressing jaw in a dry room
- Have any damage inspected immediately by an authorised specialist workshop
- Observe the safety notes for the cleaning and anti-corrosion protection agents used

4.2.2 Operating the Geberit Mapress pressing jaw

CAUTION
Leaking connection due to incorrect pressing

- Clean away any dirt, chips or other debris from between the pressing jaw and the pressfitting
- Observe recommended preparation procedures prior to pressing operation
- Ensure that the pressing jaw is completely closed after the pressing sequence
- Have any pressing jaw which does not close completely checked for damage

1. Ensure the diameter of the pressfitting matches the diameter of the pressing jaw
2. Press the jaw levers together to open the pressing jaw
3. Place the pressing jaw onto the bead of the pressfitting



4. Release the jaw lever
5. Press the pressfitting (see operating instructions of the pressing tool for correct sequence)
6. Open the pressing jaw and remove the pressfitting
7. If correctly pressed, it will be possible to peel away the pressing indicator foil off the fitting

4.2.3 Maintenance schedule (jaws)

An inspection sticker on the pressing jaw indicates the date when the next calibration is due. For information about Geberit Mapress tool service agents, please contact your local Geberit sales representative or visit www.geberit.co.uk.

Interval	Maintenance work
Regularly, before use at the beginning of the day	• Check the pressing jaw for externally visible defects, damage and signs of wear that could effect safety, and if necessary, take it to an authorised service agent • Clean and lubricate the pressing jaw with general purpose spray lubricant • Check that the jaw levers can move easily
Every year	• Have an authorised service agent check and re-calibrate the tool

4.3 Geberit Mapress pressing collar and adaptor

4.3.1 Basic safety notes

WARNING
Risk of injury caused by flying fragments if used incorrectly or if worn or damaged pressing collars and adaptor jaws are used

- Only use the pressing collar and adaptor jaw if they are in perfect working order
- Take pressing collars and adaptor jaws displaying material cracks out of service immediately and do not continue to use them
- The maintenance schedule and maintenance intervals must be adhered to
- Pressing collars and adaptor jaws may only be used by skilled persons

CAUTION
Danger of crushing by moving parts

- Do not place any parts of your body or other objects in between the pressing collar and the adaptor jaw
- Do not hold the pressing collar or adaptor jaw with your hands during the pressing sequence

4.3.2 Operating the Geberit Mapress pressing collar adaptor

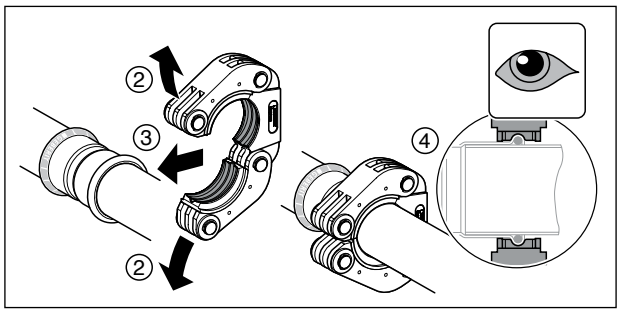
Different adaptors for pressing collars must be used depending on the nominal diameter of the pressfitting.

Nominal diameter	Adaptor for pressing collar	Collar	Pressing tool
35mm 42mm 54mm 66.7mm	ZB 203 (compatibility 2) or ZB 303 (compatibility 3)	691.181.00.1 691.182.00.1 691.183.00.1 691.185.00.1	EFP 202, ECO 202 ACO 202 ECO 301
76.1mm 88.9mm	ZB 321	90671 90672	ECO 301
108mm	ZB 321 and ZB 322	90673	ECO 301

Fitting the pressing collar around the pressfitting

CAUTION
Leaking connection due to failed pressing sequence

- Make sure that the pressing collar is completely closed after the pressing sequence
- Have any pressing collars that have not been closed completely, as well as the adaptor jaw and pressing tool, inspected for damage by an authorised tool service agent
- Replace any connections that have not been pressed correctly and do not attempt corrective pressing
- If there are any burrs on the pressfitting after the pressing sequence, have the pressing collar inspected by an authorised tool service agent

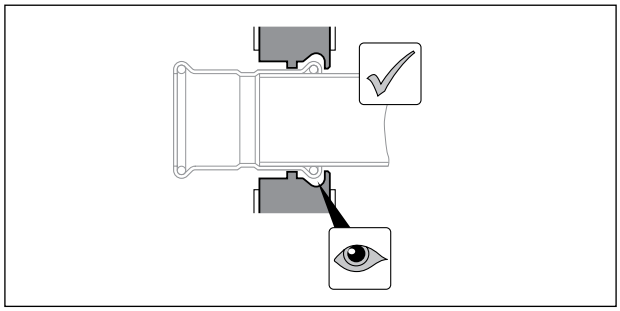


35, 42, 54 and 66.7mm collars

1. Ensure the diameter of the pressfitting matches the diameter of the pressing collar and that the adaptor matches the pressing collar.
2. To open the pressing collar, pull the two shells apart
3. Fit the pressing collar around the pressfitting and make sure that the pressing contour of the pressing collar is correctly positioned on the fitting bead
4. Turn the pressing collar into the pressing position.

76.1 and 88.9mm collars

1. Ensure the diameter of the pressfitting matches the diameter of the pressing collar and that the adaptor matches the pressing collar.
2. To open the pressing collar, depress the locking pin and at the same time, pull the pressing collar apart at the locking lug.
3. With pressing collar Ø 76.1 - 88.9mm: The pressing collar is correctly positioned when the centring plate is pointing towards the pipe. Place the pressing collar around the pressfitting and ensure that the pressing contour of the pressing collar is seated on the fitting bead



4. Slide the locking lug over the locking pin until it snaps into place and the pressing collar firmly surrounds the fitting
5. Turn the pressing collar into the pressing position

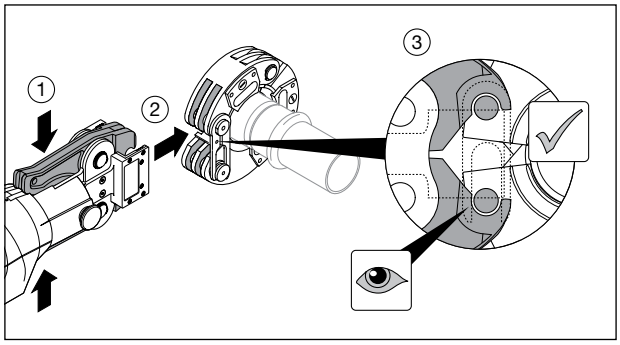
Hooking the adaptor for pressing collar into the pressing collar (up to Ø 88.9mm)

Prerequisites

Pressing collar is positioned.

Adaptor jaws are wearing parts. Frequent pressing will cause the material to become worn; advanced stages of wear will be indicated by cracks in the material. Adaptor jaws that display this kind of wear or are damaged in any other way may break, particularly if they are used incorrectly (e.g. pressing a fitting that is too large, tilting, etc.) or in a way that does not comply with their intended use.

1. To open the adaptor for pressing collar, press the jaw levers together (1)
2. Guide the claws of the adaptor as far as they will go into the grooves of the pressing collar (2) and hook them on the pins. Make sure that the claws completely embrace the pins (3)



3. Release both jaw levers

Pressing the connection (up to Ø 88.9mm)

CAUTION
Risk of injury caused by flying fragments if used incorrectly or if worn or damaged pressing collars and adaptor jaws are used

- If the pressing collar and adaptor jaw have been used incorrectly, do not continue to use them and have them inspected by an authorised tool service agent

1. Press the pressfitting (see operating instructions for the pressing tool)
2. After the pressing sequence has been completed, make sure that the pressing collar is completely closed
3. Open the adaptor jaw and remove it from the pressing collar
4. Open the pressing collar and remove it

CAUTION
Leaking connection due to failed pressing sequence

- Make sure that the pressing collar is completely closed after the pressing sequence
- Have any pressing collars that have not been closed completely, as well as the adaptor jaw and pressing tool, inspected for damage by an authorised tool service agent
- Replace any connections that have not been pressed correctly and do not attempt corrective pressing
- If there are any burrs on the pressfitting after the pressing sequence, have the pressing collar inspected by an authorised tool service agent

5. If correctly pressed, it will be possible to peel away the pressing indicator foil off the pressfitting

Pressing pressfitting Ø 108mm

The pressing sequence consists of two steps:

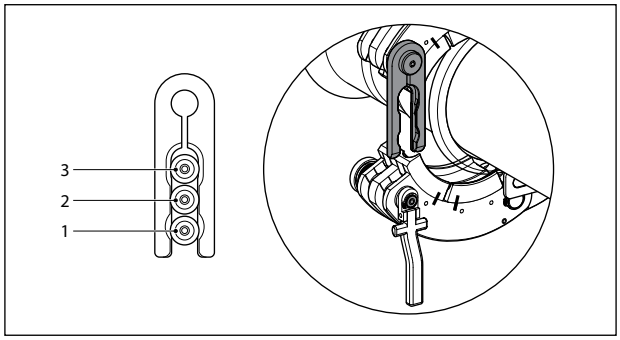
- Preliminary pressing with adaptor for pressing collar ZB 321
- Final pressing with adaptor for pressing collar ZB 322

The position of the locking pin in the locking lug indicates the status of the pressing sequence:

- Position 1: Pressing collar is positioned
- Position 2: After preliminary pressing with adaptor for pressing collar ZB 321
- Position 3: After final pressing with adaptor for pressing collar ZB 322

WARNING
Risk of injury caused by flying fragments if used incorrectly or if worn or damaged adaptor jaws are used

- Make sure that the claws of the adaptor jaw always completely embrace the pins of the pressing collar
- Clean away any dirt, chips or the like between the adaptor jaw and the pressing collar



The Ø 108mm collar cannot be removed until the second press with the ZB 322 adaptor has been completed. If the correct position is not reached after the pressing operation, the pressing must be repeated. See also operating instructions of pressing tool ECO 301.

Fitting the pressing collar around the pressfitting (Ø 108mm)

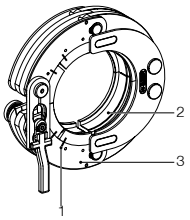
CAUTION
Leaking connection due to failed pressing sequence

- Clean away any dirt, chips or the like between the pressing collar and the pressfitting
- Make sure the pressing collar is positioned correctly on the fitting bead

CAUTION
Damage to pipe due to faulty pressing collar that can no longer be released

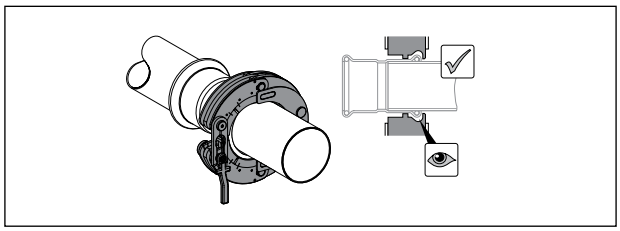
- Make sure the sliding segments can move and give
- Make sure that the sliding segments and shells can be aligned with one another
- Replace the pressing collar if the sliding segments and shells are not functioning

1. Ensure the diameter of the pressfitting matches the diameter of the pressing collar and that the adaptor for pressing collar matches the pressing collar
2. To open the pressing collar, depress the locking pin and, at the same time, pull the pressing collar apart at the locking lug
3. Ensure that the sliding segments move freely and that the marks (1) on the sliding segments (2) and the shells (3) form a line



The pressing collar is correctly positioned when the centring plate is pointing towards the pipe.

4 Fit the pressing collar around the pressfitting and ensure that the pressing contour of the pressing collar is positioned on the fitting bead



5 Slide the locking lug over the locking pin until it snaps into place (position 1) and the pressing collar firmly surrounds the fitting

6 Turn the pressing collar into the pressing position

7 Make sure the release lever and locking lug form a line

Hooking the adaptor for pressing collar ZB 321 into the pressing collar (Ø 108mm)

Prerequisites

Pressing collar is positioned. Locking pin is in position 1.

WARNING
Risk of injury caused by flying fragments if adaptor for pressing collar is used incorrectly

- **Make sure that the claws of the adaptor for pressing collar always completely embrace the pins of the pressing collar**

Repeat the pressing operation if a position of the locking pin is not reached during the pressing operation or the pressing sequence is interrupted. See also operating instructions of the pressing tool.

1 To open the adaptor for pressing collar, press the jaw levers together

2 Guide the claws of the adaptor as far as they will go into the grooves of the pressing collar and hook them on to the locking pins. Make sure that the claws completely embrace the pins

3 Release both jaw levers

Preliminary pressing with adaptor for pressing collar ZB 321 (Ø 108mm)

1 Press the pressfitting; see operating instructions for pressing tool

2 Open the adaptor for pressing collar and remove it from the pressing collar

3 Make sure that the locking pin is in position 2

Result: Preliminary pressing is complete. The pressing collar can no longer be removed. The process of establishing the connection is not completed until the final pressing has been carried out with adaptor for pressing collar ZB 322.

Hooking the adaptor for pressing collar ZB 322 into the pressing collar (Ø 108mm)

Prerequisites

Pressing collar is positioned. Locking pin is in position 2.

WARNING
Risk of injury caused by flying fragments if adaptor for pressing collar is used incorrectly

- **Make sure that the claws of the adaptor for pressing collar always completely embrace the pins of the pressing collar**

Repeat the pressing operation if a position of the locking pin is not reached during the pressing operation or the pressing sequence is interrupted. See also operating instructions of the pressing tool.

1 To open the adaptor for pressing collar, press the jaw levers together

2 Guide the claws of the adaptor as far as they will go into the grooves of the pressing collar and hook them on to the locking pins. Make sure that the claws completely embrace the pins

3 Release both jaw levers

Final pressing with adaptor for pressing collar ZB 322 (Ø 108mm)

Prerequisites

Pressing collar is positioned. Locking pin is in position 2.

CAUTION
Risk of injury caused by pressing collar failing when released

- Hold pressing collar when releasing

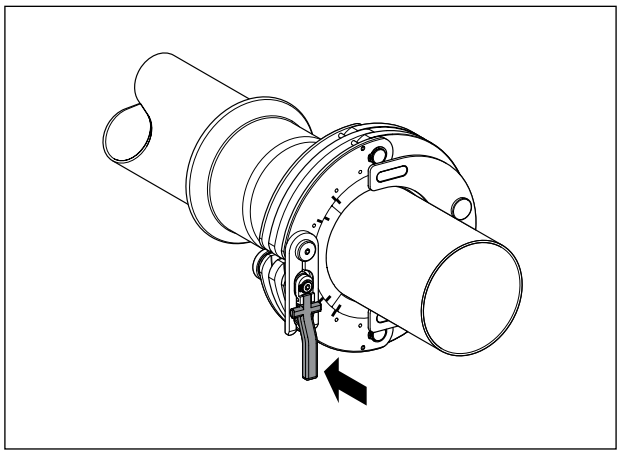
1 Press the pressfitting; see operating instructions for pressing tool

2 Open the adaptor for pressing collar and remove it from the pressing collar

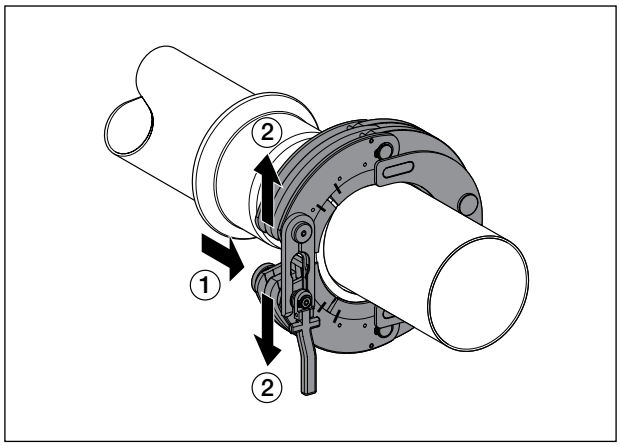
3 Make sure that the locking pin is in position 3

Result: the final pressing completes the pressing sequence.

4 Push the release lever towards the pressing collar. The locking pin is released and is located in position 1. The pressing collar is loosened.



5 Press in the locking pin (1), pull the pressing collar apart and remove it (2)



6 Check the pressed joint

CAUTION
Leaky connection due to failed pressing sequence

- Ensure that the pressing collar is completely closed after the pressing sequence
- Have any pressing collars that have not closed completely as well as the adaptor for pressing collar and the pressing tool inspected for damage by an authorised tool service agent. Replace any connections that have not been pressed correctly (do not attempt corrective pressing)
- If there are any burrs on the pressfitting after the pressing sequence, have the pressing collar and the adaptor for pressing collar inspected by an authorised tool service agent

7 If correctly pressed, it will be possible to peel away the pressing indicator foil off the fitting

4.3.3 Maintenance schedule (collars and adaptors)

An inspection sticker on the pressing collar and adaptor indicates the date when the next calibration is due.

For information about Geberit Mapress tool service agents, please contact your responsible Geberit sales representative or visit www.geberit.co.uk/toolservice.

Interval	Maintenance work
After 25 pressing operations	• Spray the pressing contour of the pressing collar with a small amount of BRUNOX® Turbo-Spray® or an equivalent lubricant
Regularly, before use at the start of the day	• Check the pressing collar and adaptor jaw for externally visible defects; in particular, damage, material cracks and other signs of wear. If defects are present, do not continue to use the pressing collar and/or adaptor jaw; either replace it/them or have the defects repaired by an authorized repair agent • Spray the pressing contour with BRUNOX® Turbo-Spray® or an equivalent lubricant, leave on for a short period and then remove dirt and deposits with a cloth • Spray the joints and the gap between the sliding segments and shells with BRUNOX® Turbo-Spray® or an equivalent lubricant and manipulate them until they are able to move easily. Wipe off any excess lubricant • Spray the complete pressing collar and adaptor jaw with a small amount of BRUNOX® Turbo-Spray® or an equivalent lubricant • Check that the jaw levers of the adaptor jaw can move easily. If necessary, spray the jaw joints with a small amount of BRUNOX® Turbo-Spray® or an equivalent lubricant • Clean the electrical contacts of the ZB 303 adaptor jaw
Every year (76.1-108mm) or After 3,000 pressing operations or two years at the latest (35-66.7mm and adaptor) - see service sticker on tool for latest date	• Have an authorised service agent check and re-calibrate the tool

5 Installation

5.1 Making a Geberit Mapress press connection

A Geberit Mapress press connection is made as follows:

- Prepare the pipe and fitting for the pressing operation.
- Push pipe into fitting to correct insertion depth.
- Optional: With Ø 54 - 108mm fit the mounting device MH 1.
- Press the fitting.

WARNING
Risk of corrosion

- **Keep cutting tools and deburring tools free from carbon steel chips when cutting Geberit Mapress Stainless Steel**
- **Do not use high-speed cutting wheels to cut the pipe or fittings to length**
- **Only use cutting tools that are suitable for working with steel**

Leaking press connection can be caused by damaged seal ring

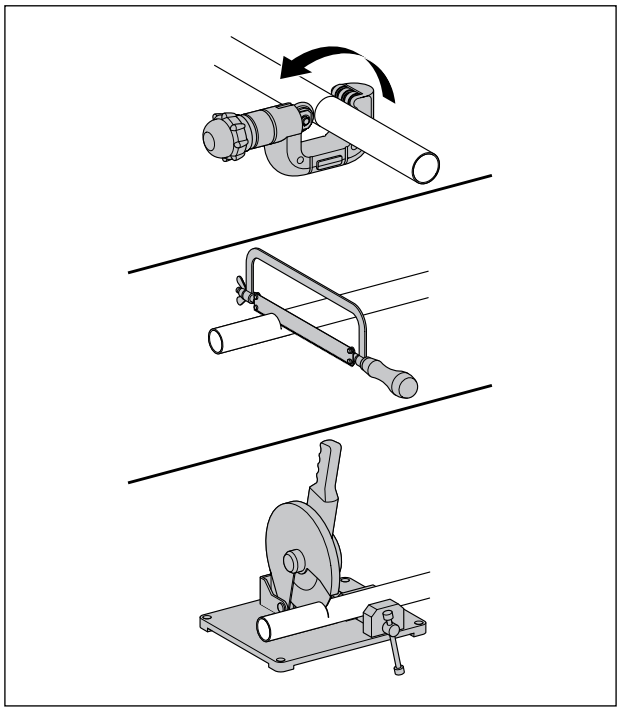
- **Deburr the outside and inside of the pipe ends completely**
- **Remove foreign bodies from the seal ring.**
- **Do not tilt the pipe into the pressfitting.**
- **Push the pressfitting onto the pipe, turning the pipe slightly**
- **Only use lubricants which are free from oil and grease**

5.2 Prepare the pipe and fitting for the pressing operation

1 Check that the pipe and fitting are clean, undamaged and free from scoring or dents.

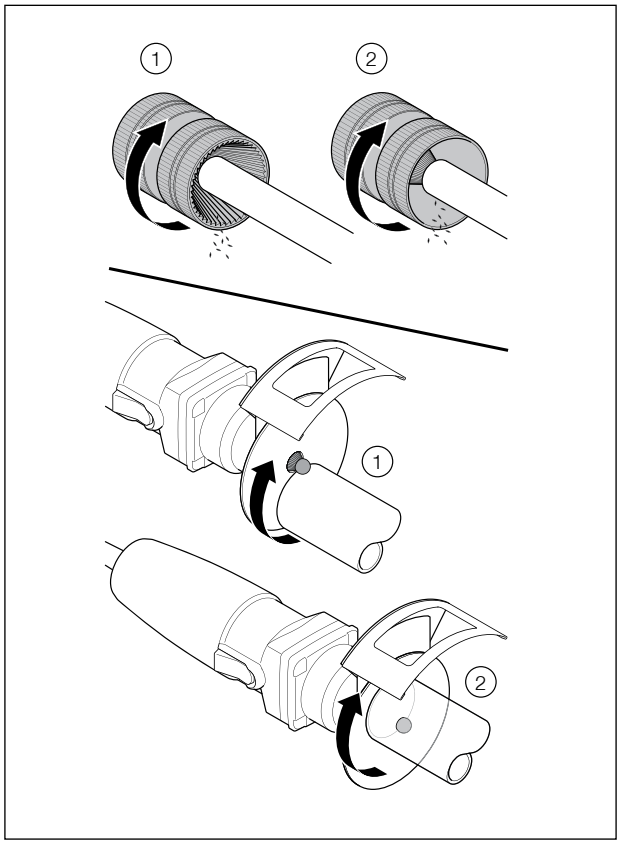
2 Determine the pipe length.

3 Cut the pipe to the correct length.



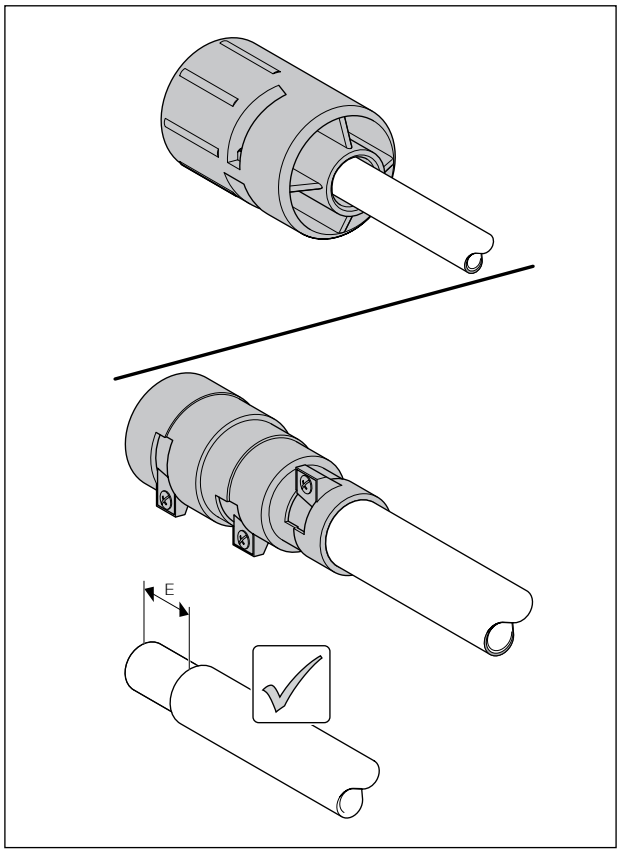
Only shorten the fittings with plain ends up to the maximum permissible shortening dimension k, indicated in the product guide.

4a Deburr the pipe ends, internally and externally.

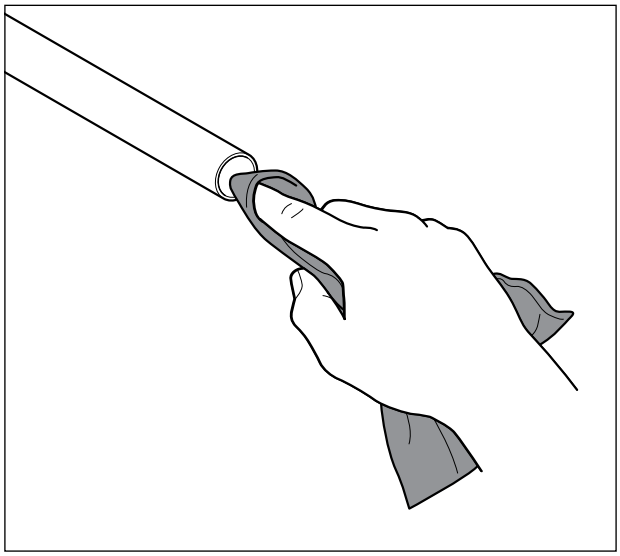


4b The plastic jacket of Geberit Mapress Carbon Steel must be stripped.

If tools other than Geberit Mapress Carbon Steel stripping tools are used, the plastic jacket must be stripped to the insertion distance E.

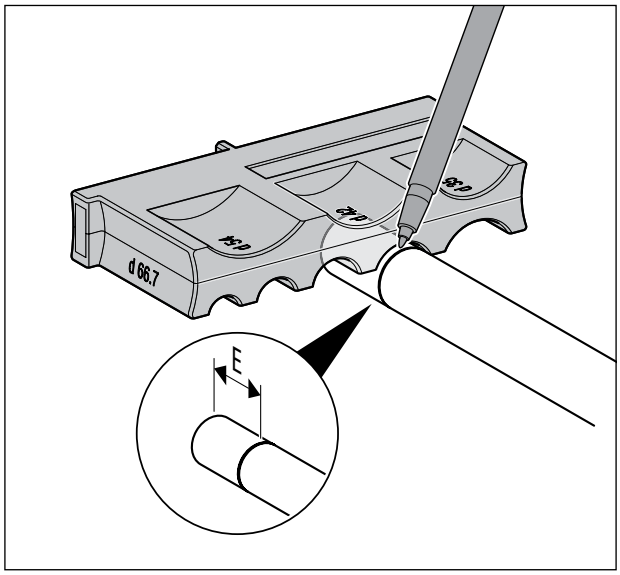


5 Clean chips from the pipe ends.

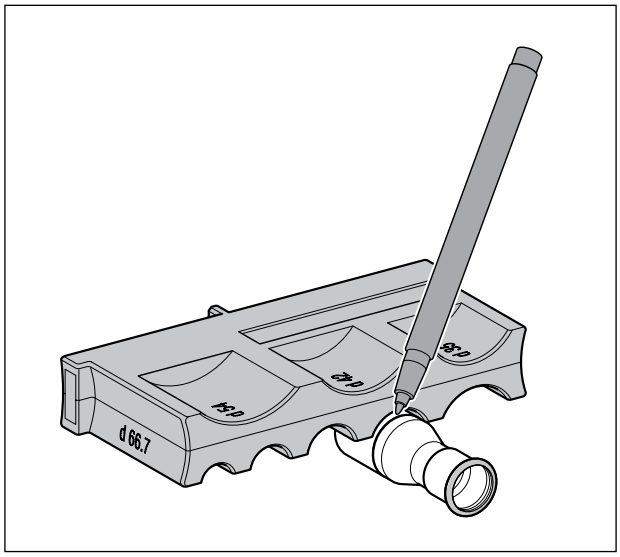


6a Mark the insertion distance.

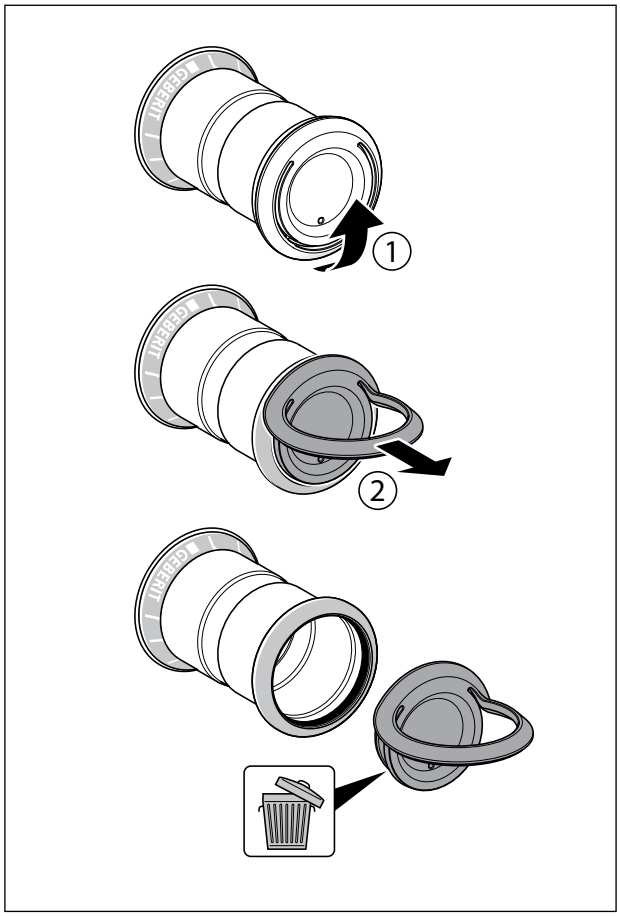
Insufficient mechanical strength if correct insertion depth is not observed.



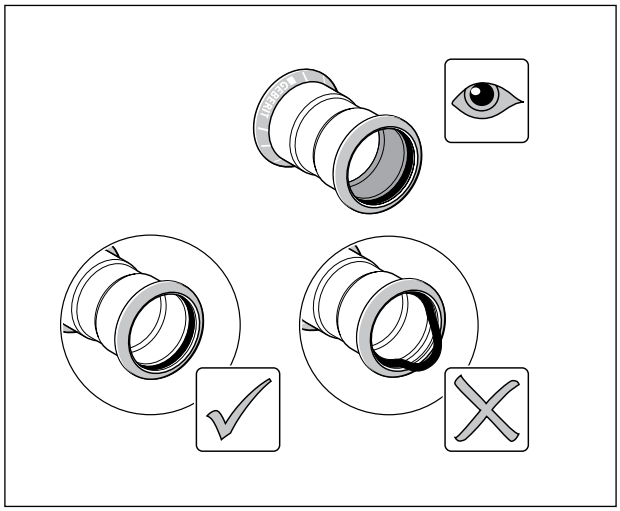
6b On fittings with a plain end, mark the insertion distance on the end.



7 Remove the plug from the fitting.

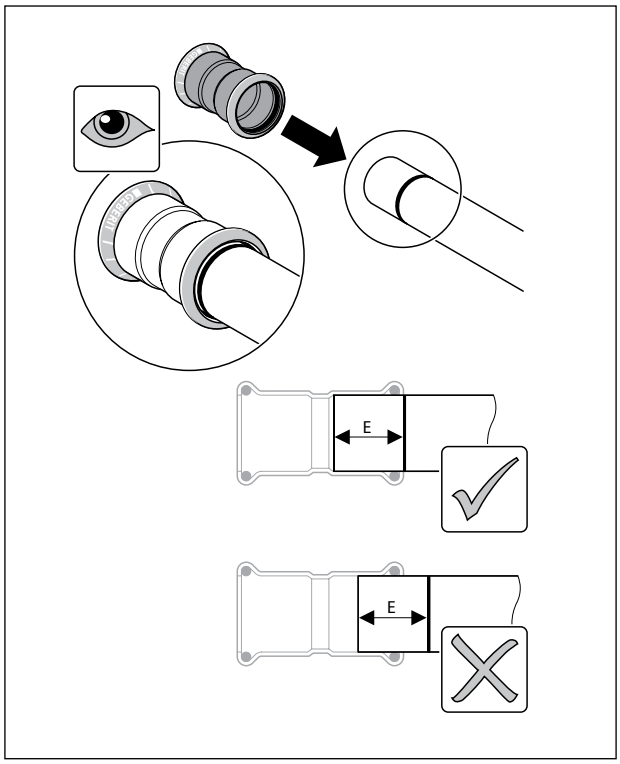


8 Check the seal ring.



9 Push the fitting onto the pipe up to the marked insertion distance.

The fitting can be pushed in more easily if oil and grease-free lubricant is applied or the fitting is immersed in water or soapy water.



10 Align the pipe.

Make the connection with the threaded fitting

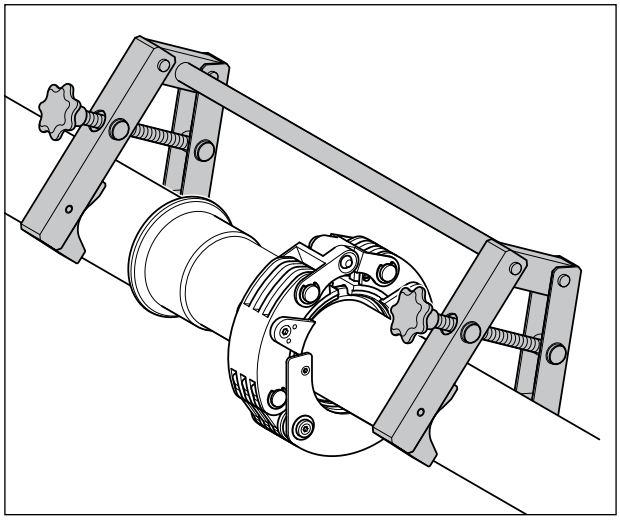
1 Fix the pipe in position.
2 Seal in the threaded connection.
3 Insert the threaded fitting and screw into place, counter holding the threaded fitting.

CAUTION
Leaking connection due to stress corrosion cracking. Do not use Teflon for sealing

Optional: with Ø 54 - 108mm fit the mounting aid MH 1

The installation dimensions are given in the operating instructions of the mounting aid.

- Clamp the pipes with the jaws of the mounting aid.



Press the fitting

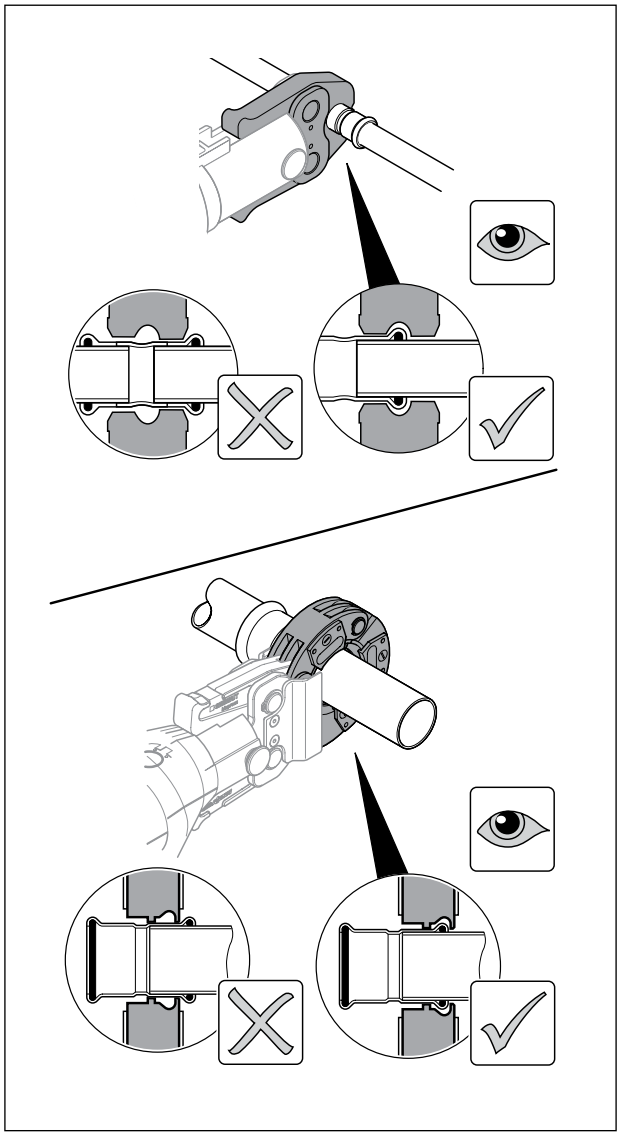
Prerequisites

- The pipe or pre-assembled elements are aligned
- Threaded joints must be sealed in.

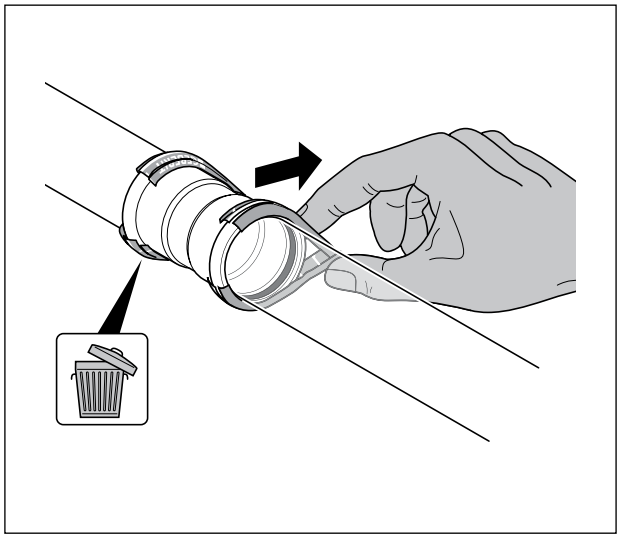
1 Ensure that the diameter of the pressfitting matches the diameter of the pressing jaw or pressing collar: Ø 12 - 35mm use pressing jaw, Ø 42 - 108mm use pressing collar and adaptor.

2 Press the fitting.

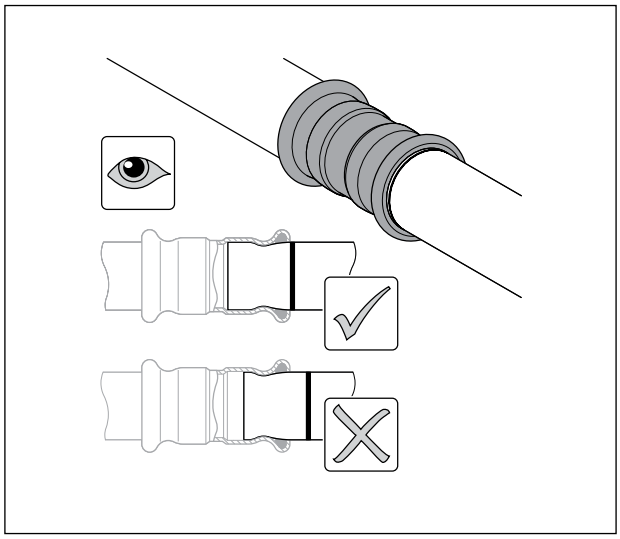
3 Ø 108mm pressfittings must be pressed twice, firstly using the ZB 321 and secondly the ZB 322 adaptor before the collar is removed.



4 Remove pressing indicator from the fitting.



5 Check correct insertion depth has been made.

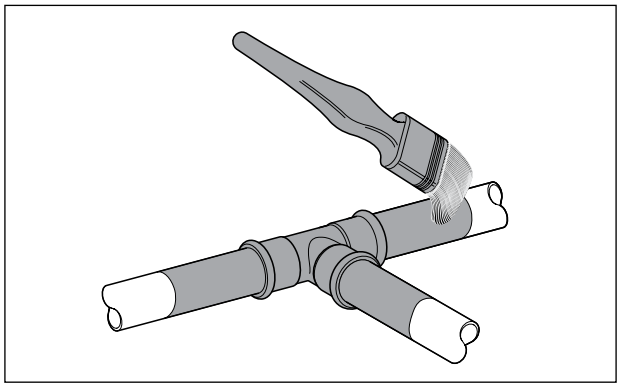


5.3 Geberit Mapress Carbon Steel corrosion protection

1 Clean the pipe and fitting from dirt and moisture.

2 Now apply a coat of primer to the fitting and plastic jacket of the pipe over a length of 20mm.

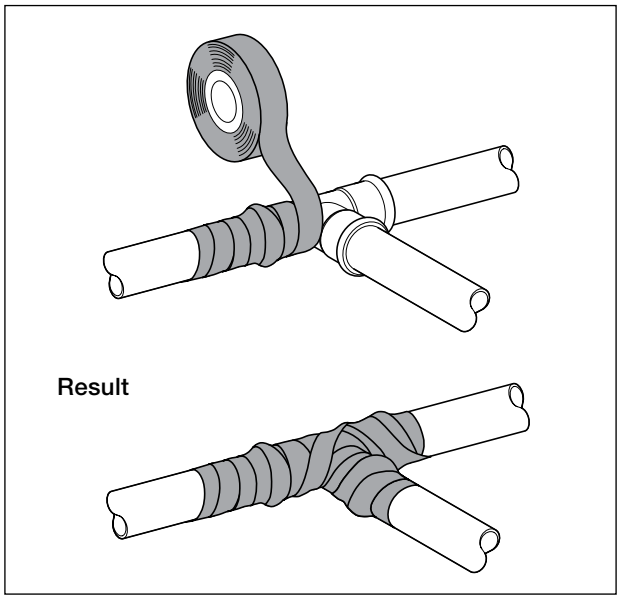
The primer does not have any resistance against corrosion. This is only used as a wash primer for the corrosion protection sleeve.



3 Let the primer dry.

4 Mount the corrosion protection sleeve.

When applying the corrosion protection sleeve, make sure that there is an overlap of at least 15mm and that the prepared part of the plastic jacket is included.



5.4 Perform a pressure test

Completed pipes must be tested for tightness before they are covered or painted. They should be tested with a pressure test. The pressure test can be performed with water or air. The test medium depends on the installed and planned commissioning. If the pipe system is to be left empty after the pressure test, a pressure test with air or inert gas should be performed. The test medium and results should be documented in the test report.

The HVCA Guide to Good Practice TR/6. BS EN 806-4, or guides issued by CIBSE and BSRIA offer recommendations for the site pressure testing of pipework.

The entire system must undergo a visual check prior to the pressure test. During this check, care should be taken to ensure that the pipelines have been installed professionally.

The pressure test consists of two steps:

- Leak test
- Load test

The leak test involves checking the system in terms of its tightness. The load test focuses on checking the system's strength.

If only one section of the system is to undergo a pressure test, care must be taken to ensure that any open pipe ends associated with the section concerned have been sealed by means of caps, plugs or blind flanges. It is also important to ensure that the section has been isolated from the rest of the system using suitable shut-off devices.
If the system or section contains valves and appliances that have not been designed to withstand the test pressures associated with the leak / load test, these components will need to be disassembled and fitting pieces used in their place. The components should not be reinstalled in the system until the pressure test is complete.

If the test medium is supplied via a connection with a higher pressure level than the test pressure, then a water pressure reducing valve (plus a relief valve, if necessary) must be used to prevent the test pressure being exceeded.

Wherever possible, a potable water system should be filled directly from the potable water network. If this is not possible, we recommend that suitable measures be implemented on the grounds of hygiene.

When performing the pressure test with potable water, air bleed devices must be provided at the highest points of the system and the piping system must be fully bled before the test commences.

As a basic principle, Geberit recommends carrying out the pressure test in sections and performing separate tests for different types of piping system. If this is not possible in cases where the pressure test involves different piping systems, the "leaky if unpressed" leak test (Geberit Mepla / Mapress) should be performed first.

Once this has been done, there is a second step to be performed: follow the relevant testing instructions for the other piping systems.

Once the pressure test is complete, the test pressure should be released in a safe manner.

The choice of test medium depends on the piping system, the application and the time when the system is due to be commissioned.

As a basic principle, Geberit recommends carrying out the pressure test with oil-free compressed air or inert gas. This is because:

- The system is not commissioned immediately after a pressure test (microbial contamination through bacteria has to be avoided)
- Water damage due to unpressed joints has to be avoided
- Potential frost damage due to the accumulation of water has to be avoided
- Protection measures must be implemented to prevent internal corrosion at the three-phase limit between air, water and the product material.

5.4.1 Pressure test for potable water installations

In principle, the pressure test for drinking water installations can be performed using the following test media:

- Oil-free compressed air
- Inert gas (e.g. nitrogen)
- Drinking water

Pressure test with air oil-free compressed air or inert gas

The pressure test for potable water installations with compressed air or inert gases is also described in the HVCA Guide to Good Practice TR/6, BS EN 806-4 or guides issued by CIBSE and BSRIA. The below must be understood as a recommendation from Geberit.

For reasons of hygiene and to prevent both corrosion prior to commissioning and frost damage, the leak test and load test can be performed using oil-free compressed air or inert gas.

Due to the compressibility of oil-free compressed air and inert gas, the maximum test pressure for the load test is restricted to 3 bar for safety reasons.

If the test pressure for the load test is above 3 bar, all site health and safety regulations must be adhered to or the load test must be performed using potable water.

The leak test must be performed as follows:

- Test pressure 150 mbar
- Minimum test time with a max. pipe volume of 100 l: 120 min
- The test time increases by 20 min for every additional 100 l of pipe volume
- No pressure drop.

The tightness test is followed by a load test:

- This should take place immediately after the leak test
- The pressure should not be greater than 1.1 times maximum pressure rating
- The pressure should be gradually increased up to the required pressure. If the pressure falls, repeat the leak test
- The test pressure should hold constant for 10 minutes.

CAUTION
Residual water in the pipe can increase the risk of corrosion due to concentration of chlorides

▶ **Leave the Geberit Mapress Carbon Steel pipe full after the pressure test with water**

Pressure test with water

The tightness test with water is described in the HVCA Guide to Good Practice TR/6, BS EN 806-4 or guides issued by CIBSE and WRAS. The below must be understood as a recommendation from Geberit.

The medium for the pressure test with water must be of potable water quality to prevent contamination of the pipe system.

Leak test

Max. test pressure is 3 bar due to the fact that the Geberit Mapress and Geberit Mepla pressfittings will leak when they are not pressed.

Load test

Temperature differential < 10 K

- Apply the test pressure (10 bar or 1.1 times maximum permissable operating pressure)
- Test time: 10 mim
- Temperature differential > 10 K
- Apply the test pressure (10 bar or 1.1 times maximum permissable operating pressure)
- 30 min waiting time (for temperature compensation)
- Test time: 10 min

5.4.2 Pressure test for heating installations

The pressure test in installed pipes is generally performed with water (e.g. in accordance with BS EN 14336). The below must be understood as a recommendation from Geberit.

In principle, the pressure test for heating and water heating systems can be performed using the following test medium:

- Oil-free compressed air
- Potable water (filling water)

Pressure test using oil-free compressed air

Leak test
- Test pressure: 150 mbar
- Minimum test time with a max. pipe volume of 100 l = 120 min
- The test time increases by 20 min for every additional 100 l of pipe volume
- No pressure drop had been identified by the end of the test time

Load test
- Test pressure:
- ≤ d 54 mm / DN 50 test pressure max. 3 bar
- > d 54mm/ DN 50 test pressuremax. 1 bar
- Test time: 10 min
- No pressure drop had been identified by the end of the test time

Pressure test using potable water

As a general rule, potable water can be used for initial filling. However, if there is not potable water connection available, the system should be filled using a filling hose and downstream coarse filter.

The pressure test with water should be performed directly before commissioning for reasons of hygiene and to prevent corrosion. Avoid downtime periods of more than seven days between the pressure test and commissioning. If this is not possible (e.g. with larger building projects), suitable precautions must be taken.

Leak test

- Max. test pressure is 3 bar due to the fact that the Geberit Mapress and Geberit Mepla pressfittings have the potential to leak when they are in the unpressed state
- Apply the test pressure
- No leaks can be detected

Load test

- Apply the test pressure (normally 1.3 x max permissable operating pressure)
- No leaks can be detected in the selected test time

5.4.3 Pressure test for natural gas installations

The pressure test for natural gas installations is performed, for example, according to IGEM UP/1 or UP/1A.
The below must be understood as a recommendation from Geberit.

In principle, the pressure test for gas systems can be performed using the following test media:

- Oil-free compressed air
- Inert gas (e.g. nitrogen)

The type of pressure test depends on the operating pressure. Refer to HVCA TR/20 “Natural Gas” for more information regarding pressure testing of natural gas installations.

Gas system ≤ 100 mbar (low pressure)

The load test must be performed as follows:

- Pipelines with an operating pressure of up to and including 100 mbar must undergo a load test and a leak test
- The measuring instruments used must have a minimum resolution of 100 mbar
- The test pressure is 1 bar
- The test time is 10 minutes

The leak must be performed as follows:

- The test pressure is 150 mbar
- The pipe volume under test must be calculated accurately. The test period is determined using the formulae given in IGEM UP/1 or UP/1A. During the test the pressure should not drop.

Gas system > 100 mbar ≤ 1 bar (medium pressure)

Pipelines with operating pressures ranging from 100 mbar to 1 bar must undergo a combined load and leak test

- A Class 1 pressure recorder and a class 0.6 manometer must be used as measuring instruments for the pressure test

The combined load test and tightness test must be performed as follows:

- The test pressure is 3 bar
- The test time is at least 2 hours after completed temperature compensation of 3 hours
- There should be no drop in test pressure during the test time.

5.4.4 Pressure test for liquid gas installations

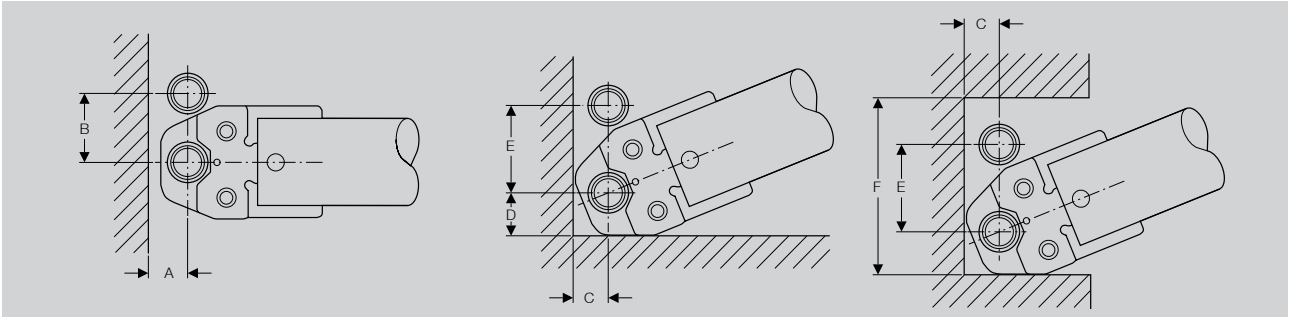
The pressure test for liquid gas installations is performed, for example, in accordance with UKLPG Code of Practice 22 and IGEM UP/1 or UP/1B.

5.5 Minimum distances and space requirements

The minimum distances and space requirements shown in this section are extrapolated from the geometry of the pressing tools, adapters and collars. They do not influence the performance of the pressing connection.

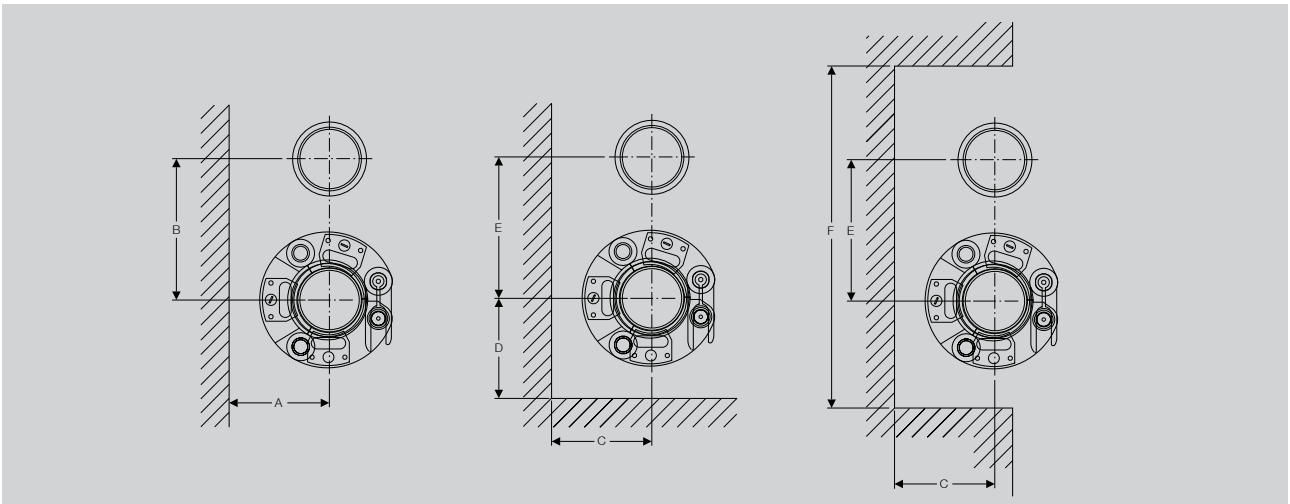
5.5.1 Space requirements when pressing with pressing tools

Table 81: Space requirements when pressing with pressing jaws for mounting on a smooth wall, in corners and in ducts



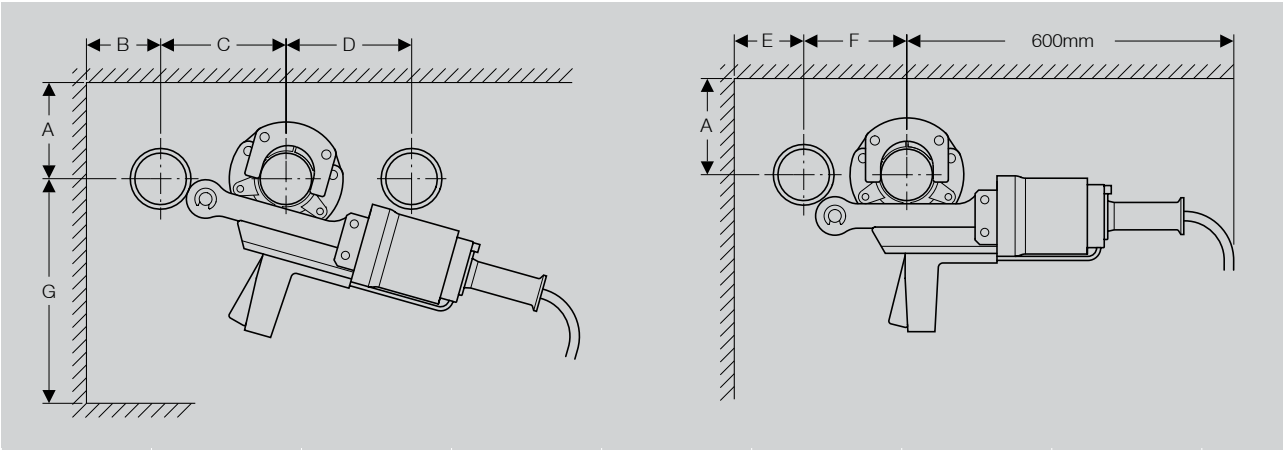
d (mm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)
12-15	20	56	20	28	75	131
18	20	60	25	28	75	131
22	20	65	31	35	80	150
28	25	75	31	35	80	150
35	30	75	31	44	80	170

Table 82: Space requirements when pressing with pressing collars for mounting on a smooth wall, in corners and in ducts



d (mm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)
42	75	115	75	75	115	265
54	85	120	85	85	120	290
67	95	140	95	95	140	330
76.1	110	140	110	110	140	350
88.9	120	150	120	120	150	390
108	140	170	140	140	170	450

Table 83: Space requirements when pressing with a HCPS pressing device with complete pre-assembly and individual assembly of the individual system pipe sections



d (mm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)
76.1	110	200	220	220	160	160	300
88.9	120	200	220	220	160	180	320
108	130	200	230	230	160	200	340

5.5.2 Minimum distances between two pressed joints

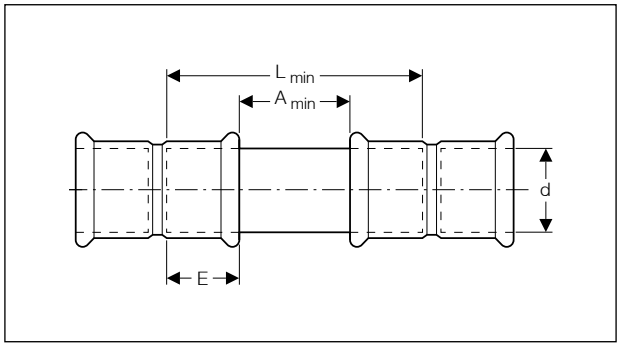


Figure 38: Minimum distance between two pressed joints

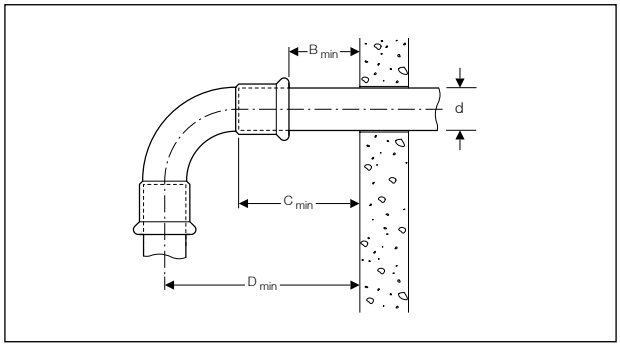


Figure 39: Pipe depths in wall and ceiling outlets

Table 84: Minimum distance between two pressed joints

d x s (mm)	A_{min} (mm)	L_{min} (mm)	E (mm)
12 x 1.2	10	44	17
15 x 1.0/1.2	10	50	20
18 x 1.0/1.2	10	50	20
22 x 1.2/1.5	10	52	21
28 x 1.2/1.5	10	56	23
35 x 1.5	10	62	26
42 x 1.5	20	80	30
54 x 1.5/2.0	20	90	35
66.7 x 1.2	20	120	50
76.1 x 2.0/1.5	20/30[1]	126/136[1]	53
88.9 x 2.0/1.5	20/30[1]	140/150[1]	60
108 x 2.0	20/30[1]	170/180[1]	75

Table 85: Pipe depths in wall and ceiling outlets

d x s (mm)	B_{min} (mm)	C_{min} (mm)	D_{min} (mm)
12 x 1.2	35	52	77
15 x 1.0/1.2	35	55	85
18 x 1.0/1.2	35	55	89
22 x 1.2/1.5	35	56	95
28 x 1.2/1.5	35	58	107
35 x 1.5	35	61	121
42 x 1.5	35	65	147
54 x 1.5/2.0	35	70	174
66.7 x 1.2	30	80	171
76.1 x 2.0/1.5	75	128	223
88.9 x 2.0/1.5	75	135	249
108 x 2.0	75	150	292

[1] Dimension applies for pressing with HCPS pressing tool

5.6 Fixing of pipes

5.6.1 Pipe fixings

When fastening Geberit Mapress piping systems, the following rules must be observed:

- Sliding points must be positioned so that they do not unintentionally become anchor points dusring operation
- Do not attach anchor points or sliding points to pressfittings

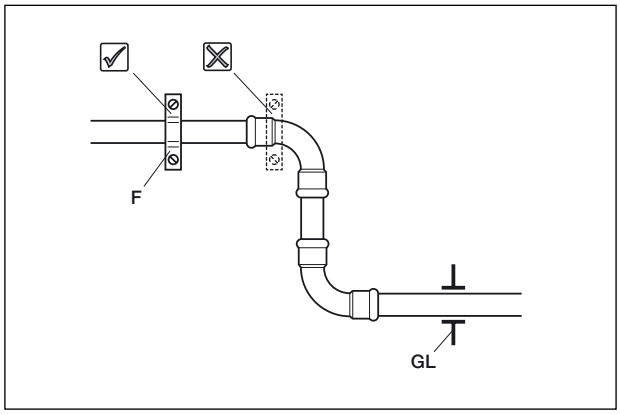


Figure 40: Positioning anchor points: On the pipe, not on the pressfitting

F Anchor point **GL** Sliding point

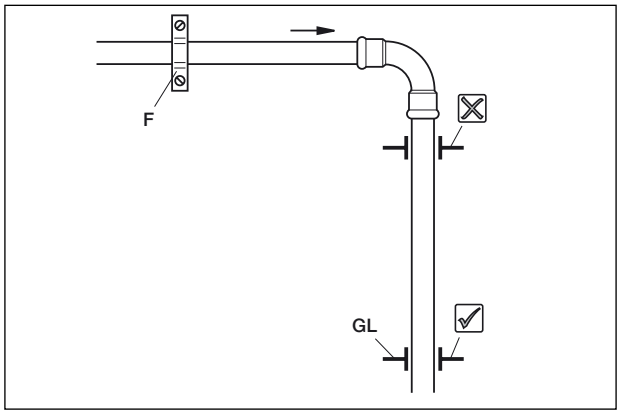


Figure 41: Positioning sliding points: Horizontal pipe should be able to expand freely

F Anchor point **GL** Sliding point

5.6.2 Pipe bracket spacing

Commercially available pipe brackets can be used for fastening the pipes. The necessary pipe bracket spacing is listed in the following table.

Table 86: Pipe bracket spacing according to DIN1988, Part 2 (BS EN 10305) for Geberit Mapress Stainless Steel and Carbon Steel

DN	d x s (mm)	Pipe bracket spacing (m)	Pipe bracket spacing recommended by Geberit (m)[1]
10	12 x 1.2	1.25	1.50
12	15 x 1.2	1.25	1.50
15	18 x 1.2	1.50	1.50
20	22 x 1.2	2.00	2.50
25	28 x 1.5	2.25	2.50
32	35 x 1.5	2.75	3.50
40	42 x 1.5	3.00	3.50
50	54 x 2.0	3.50	3.50
-	66.7 x 1.5	4.00	4.00
65	76.1 x 2.0	4.25	5.00
80	88.9 x 2.0	4.75	5.00
100	108 x 2.5	5.00	5.00

Pipe brackets with rubber liners should be used for acoustically insulating the pipe from the building structure.

[1] The stated values do not apply to riser pipes for fire protection, either dry or wet.

5.7 Flushing pipes

The pipes are flushed before commissioning with potable water or an intermittent mixture of compressed air and water.

More information on flushing potable water pipes is given in BS 8558 and WRAS guidelines.

The medium for flushing the pipes must be of potable water quality to prevent contamination of the pipe system.

Pre-commissioning cleaning of heating and chilled water systems with Geberit Mapress should not normally be necessary if the pipework has been kept clean during installation. If it is deemed to be necessary, it can be done, provided all chemicals used are checked in advance with Geberit for compatibility with seal rings. BSRIA guide BG29/2012 gives advice on this subject.

5.8 Insulation

General

Insulation of Geberit Mapress systems should be to BS 8558, BS 5422, BS 5970 and HVAC TR20 guidelines.

The insulating of the pipelines serves to avoid:

- Heat loss
- Heating of the media to be transported through the surroundings
- Propagation of sound.

Potable water installation

Potable water pipelines must be protected against the formation of condensation and against heating. Potable water pipelines that transport cold water should be installed at a sufficient distance from sources of heat so that the water quality is not affected by heating.

Pipelines for potable water and hot water lines must be insulated against unallowable loss of heat due to energy saving measures and for hygienic reasons.

Heating installations

The insulating of water heating systems is an energy saving measure. This measure for environmental protection serves to reduce the discharge of CO_2. In the private area, energy consumption for heating is the largest individual item with 53%.

Chilled water system

The main task of the cold insulation is to prevent condensation formation and reduce the loss of energy over the complete period of using the cold water pipelines. The safe and permanent prevention of higher energy costs and the dew point temperature can only be achieved by using the correct dimensioning.

Insulation materials / insulating hoses can trigger corrosion attacks on the pipelines. As a result, special care must be made to the suitability of the materials to be used, when selecting them. (See Section 3.1)

5.9 Descaling

Limescale deposits on Geberit Mapress Stainless Steel with the butyl rubber seal ring (CIIR) can be removed if necessary with limescale removers which have been approved by Geberit.

Geberit is unable to make any statements on the effectiveness of the limescale remover. When using the limescale remover the following must be observed:

- Limescale removers must be checked to ensure that they are compatible with the seal ring CIIR black. Approval can be obtained from Geberit
- Always observe the manufacturer's instructions for use.

Table 87: Geberit Mapress Stainless Steel limescale remover

Limescale remover	Chemical formula	Concentration	Temperature for use (°C)	Remarks
Sulfamic acid	H_2NSO_3H	5 – 10% aqueous solution	25	Manufacturer: Hoechst
Citric acid	HO C CH_2 CO_2 H_2 CO_2	25% diluted	20	For slight deposits. For short term use

5.10 Operation of the pipe installations

All applicable regulations must be observed for commissioning of pipe installations. The system installer must brief the owner or manager on the installation. This must be documented by a handover and acceptance report. The system owner or manager must also be given the maintenance and operating instructions for the installed taps and appliances. The owner or manager of pipe installations is obliged to keep the system in correct working order.

6 Disinfection

BS 8558 (2011) requires that potable water pipe systems be disinfected in the following situations:

a in new installations (except private dwellings occupied by a single family);
b where major extensions or alterations have been carried out;
c where underground pipework has been installed (except where localised repairs only have been carried out or junctions have been inserted);
d where it is suspected that contamination may have occurred, e.g. fouling by sewage, drainage, animals or physical entry by site personnel for interior inspection, painting or repairs;
e where a system has not been in regular use and not regularly flushed.

Disinfection of potable water installations is only successful when all sources of contamination have been removed.

The disinfection measures should be recorded in writing.

Methods of Disinfection

Potable water pipes can be thermally or chemically disinfected. In the case of chemical disinfection, a distinction is made between status disinfection (short-term application) and continuous disinfection.

A combined thermal-chemical disinfection is not permitted.

6.1 Thermal disinfection

Geberit piping systems are thermally disinfected as follows:

- The water heater and the entire circulation must be heated up to at least 70°C
- All points of use should be opened step by step or line by line respectively
- Hot water at 70°C must be allowed to run in all points of use for at least three minutes
- The temperatures must not decrease during the disinfection process
- The maximum temperature of 95°C must not be exceeded
- The risk of scalding must be eliminated by taking suitable measures
- The maximum disinfection duration is 150 hours per year.

6.2 Chemical disinfection

6.2.1 Status disinfection

Geberit piping systems are suitable for status disinfection.

Active ingredients, concentrations, temperatures and durations in accordance with Table 88 must be strictly observed by taking the following measures:

- Skilled persons must take specific measuring and control technology precautionary measures
- Specific conditions of the affected potable water installation must be taken into account to avoid increases in concentration
- Concentrations, temperatures and durations should be documented in writing
- Complete a cleaning and disinfection report

For an effective disinfection, the free residual chlorine concentration should be 50ppm (50mg/l) for one hour. The free residual chlorine must be measured at the end of the contact period and if it is less than 30ppm, the disinfection process must be repeated. Measures should be taken to ensure that no potable water is consumed during the disinfection process and the subsequent cleaning phase.

Disinfection measures carried out incorrectly can damage the potable water installation. It is not permitted to use a combination of several chemical disinfectants. After disinfection, the system should be thoroughly flushed with fresh water until the the free residual chlorine is at the level present in the potable water supplied.

Table 88: Disinfectants for status disinfection of Geberit piping systems

Designation	Available as	Storage	Safety instructions [1]	Concentration of use [2] Duration of use
Hydrogen peroxide H_2O_2	Aqueous solution in various concentrations	Not exposed to light Cool. Contamination must be avoided	Protective equipment required for solutions >5%	150 mg/l H_2O_2 max. 24 h max. 25ºC
Sodium hypochlorite NaOCl	Aqueous solution with max. 150 g/l chlorine	Not exposed to light Cool Sealed in a collection tray	Alkaline Corrosive Toxic - Protective equipment required	50 mg/l chlorine max. 24 h max. 25ºC
Calcium hypochlorite $Ca(OCl)_2$	Granulate or tablets approx. 70% Ca(OCl)	Cool Dry Sealed	Alkaline Corrosive Toxic - Protective equipment required	50 mg/l chlorine max. 24 h max. 25ºC
Chlorine dioxide ClO_2	Two components (sodium chloride, sodium peroxodisulphate)	Not exposed to light Cool Sealed	Oxidising Do not inhale chlorine dioxide gas Protective equipment required	6 mg/l ClO2 max. 24 h max. 25ºC

[1] Comply with the corresponding instructions in the manufacturer's safety data sheets
[2] Recommended value

Note: For further information see also the "List of Approved Products" published by the Drinking Water Inspectorate on their website www.dwi.gov.uk.

Refer to BS EN 806 and BS 8558 and AcOP L8 "Legionnaires Disease: Control of Legionella Bacteria in Water Systems" for system disinfection guidelines.

6.2.2 Continuous disinfection

Geberit piping systems are suitable for continuous disinfection.

Continuous disinfection should be kept as short as possible. It should last no longer than it takes for technical modernisation to be completed.

Active ingredients, concentrations and temperatures in accordance with Table 89 must be strictly observed by taking the following measures:

- Skilled persons must take specific measuring and control technology precautions
- Specific conditions of the affected potable water installation must be taken into account to avoid increases in concentration
- Concentrations, temperatures and byproducts must be monitored and documented directly behind the dosing point using measurement technology
- Measure the concentration of the agent in the treated water on a daily basis

Continuous disinfection should be kept as short as possible. It should last no longer than it takes for technical modernisation to be completed.

Geberit Mapress Stainless Steel 1.4401 / BS316 S 33 and Geberit Mapress Copper are also suitable for potable water when chlorine is continually added for disinfection.

Refer to AcOP L8, BS EN 806 and BS 8558 guidelines for more information on disinfection of potable water systems

Table 89: Disinfectants for continuous disinfection of Geberit piping systems for a limited period

Substance name	Max. permissible dosage for treatment[1]	Max concentration for use[2]	Max application temperature[3]	Reaction products to be observed[a]
Calcium hypochlorite	1.2 mg/l free Cl_2	0.3 mg/l free Cl_2	60°C	Trihalomethane (THM), bromate
Sodium hypochlorite	1.2 mg/l free Cl_2	0.3 mg/l free Cl_2	60°C	Trihalomethane (THM), bromate
Chlorine dioxide	0.4 mg/l ClO_2	0.2 mg/l free ClO_{2-}	60°C	Chlorite
Ozone	10 mg/l O_3	0.05 mg/l O_3	60°C	Trihalomethane (THM), bromate

1) Concentration at any point in the drinking water installation
2) Maximum concentration for use at end of treatment (concentration at point of use; water with this concentration is deemed to be drinking water)
3) Different temperature specifications apply in the case of thermal disinfection and status disinfection

Geberit Mepla Installation Guide

Contents

Contents

1 System technology

1.1 Introduction

Geberit Mepla multi-layer pipes embody the best qualities of both metal and plastic pipes in one easy-to-use system. Geberit Mepla system pipes can be used for potable water applications as well as for heating, chilled water and compressed air. The press connection and the multi-layer lined metal pipe meet all requirements of modern non-industrial potable water installations.

Geberit Mepla combines the stability advantages of metal with the corrosion resistance of plastic. The stability of the Geberit Mepla system pipe is ensured by the edge-welded aluminium pipe. The initially flat aluminium sheeting is drawn onto the extruded plastic pipe, rounded and then welded longitudinally on the face.

Geberit Mepla system pipes are flexible and easy to bend, yet retain their form and ease installation work. This innovative pipe does not require any time-consuming measurement and fewer fastenings. The lightweight composite pipe can also be used for surface-mounted installations where appearance is a consideration. The fitting range comprises plastic, gunmetal and brass fittings. The metal fittings are only used when joining to other systems and components (e.g. valves, fittings and taps) making Geberit Mepla a versatile and adaptable system.

Since its introduction in 1990, Geberit Mepla has been subjected to constant further development, and has evolved as a reliable and modern piping system. The latest developments have focused on extending the dimension range to 63 mm and 75 mm as well as complete revision of the fittings to feature an integral leak path to indicate un-pressed joints.

Geberit Mepla has considerable advantages due to the multi-layer lined metal pipe, PVDF, gunmetal and brass fittings, and sophisticated connection technology:

- High stability after installation
- High pipe flexibility during installation
- High level of corrosion resistance
- High chemical resistance
- UV-resistance
- Lightweight
- Fast installation
- High test reliability of the press connection
- Minimal expansion
- Easy to bend
- 100% recyclable
- 100% barrier against diffusion
- Aluminium layer allows installed pipework to be detected by electronic detecting devices
- Minimal commissioning time

1.2 System overview

The Geberit Mepla supply system comprises:

- Geberit Mepla system pipes
  - rough
  - preinsulated
  - with protective tube
- Geberit MeplaTherm system pipes
  - rough
  - preinsulated
  - with protective tube
- Fittings
  - PVDF
  - Gunmetal (Rg)
  - Brass (Ms)
- Fastenings
- Insulation
- Pipe valve fittings
- Pressing tools, jaws and collars
- Pressing accessories

The Geberit Mepla system pipes are interconnected with PVDF, gunmetal and brass fittings. The gunmetal and brass fittings are also suitable for use as adaptors to other systems and components, e.g. valves, appliances and taps. The piping system, including connections, is connected to the building structure using suitable wall fastenings.

1.2.1 Geberit Mepla press connection

When a Geberit Mepla system pipe is inserted onto the fitting, the pipe holding ring and the holding cams ensure that the pipe is held on the fitting even when the connection is unpressed. Due to the recessed O-ring on the pressing nipple, unpressed joints are not tight and can be clearly identified by a standard leak test. To press the system pipe and fitting, position the Geberit Mepla pressing tool with the help of the tool guide rim and carry out the pressing sequence.

During the pressing sequence, the Geberit Mepla system pipe is permanently deformed in the pressing area and pressed onto the fitting. As a result of the pressing sequence, the inner pipe presses onto the O-ring, thus forming a permanently leakproof pressed joint. The twist lock and the retaining grooves on the fitting permanently secure the pipe against being pulled out or turned. The Geberit Mepla pressed joint is permanent.

The corrosion barrier washer of the metallic fittings prevents electrochemical corrosion of the aluminium in the Geberit Mepla system pipe.

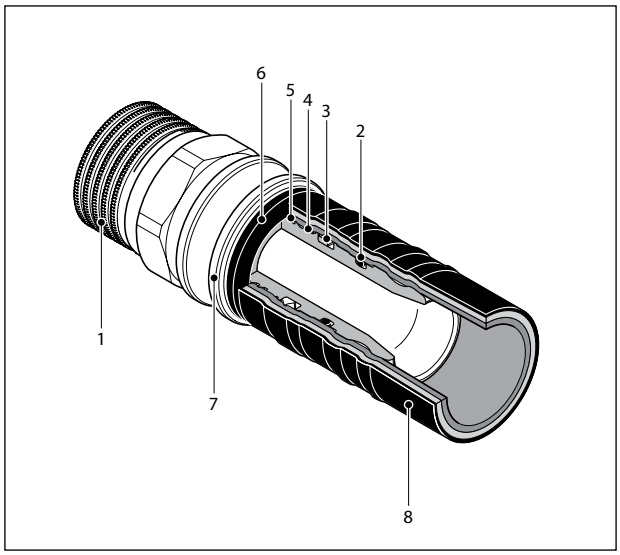


Figure 1: Geberit Mepla pressed joint after pressing

1 Fitting body
2 O-ring
3 Retaining ring
4 Twist lock
5 Retaining grooves
6 Corrosion barrier washer
7 Tool guide rim for pressing jaw
8 Geberit Mepla system pipe

1.2.2 Geberit Mepla system applications

The main applications of Geberit Mepla are:

- Potable water supply pipes for hot and cold water
- Heating
- Chilled water
- Compressed air

Other media and applications upon request.

For other applications, Geberit Mapress can be used (see previous section of the guide).

Geberit Mepla can also be used with the following media:

Table 1: Overview of applications

Applications	Maximum working pressure (bar)	Operating temp. (C°)	Suitable Pipes		Suitable fittings		
			Geberit Mepla	Geberit MeplaTherm	PVDF	Gunmetal	Brass
Potable water	10	0 – 70[1)]	X	-	X	X	X
Heating water (closed circuit systems)	10	0 – 80[2) 3)]	X	X	X	X	X
Service water	10	0 – 40[4)]	X	X	X	X	-
Salt water	10	0 – 70	X	X	X	X	-
Ultrapure water (except pharmaceutical water)	10	0 – 40	X	X	X	-	-
Rainwater with a pH value of >6.0	10	0 – 40	X	X	X	X	-
Extinguishing water	10	0 – 70	X	X	X	X	X
Chilled water with antifreeze agent	10	0 – 70[5)]	X	X	X	X	X
Compressed air (oil purity class 0-3)[6)]	10	0 – 70	X	X	X	X	X
Vacuum	Abs. ≥0.2	0 – 40	X	X	X	X	X
Inert gases (eg nitrogen)	10	0 – 40	X	X	X	X	X

1) Malfunction temperature in accordance with BS EN 806-2: Tmal = 95 °C, total 100 h over the course of the service life

2) Malfunction temperature in accordance with ISO 10508:2006: Tmal = 100 °C, total 100 h over the course of the service life

3) Only use approved inhibitors

4) After Geberit approval

5) Only use approved antifreeze agents

6) Oil purity class in accordance with ISO 8573-1:2010E

Geberit Mepla can also be used for the following water qualities:

- Distilled water - 0.5 and 5 µS/cm at 25 °C
- Demineralised water (deionised water, fully desalinated water)
- Ultrapure water (Gunmetal or brass components must not be used)
  - ≤ 1.1 µS/cm at 20 °C (European Pharmacopoeia)
  - < 0.1 µS/cm at 25 °C (Quality 1 according to ISO 3696)

For water with the highest requirements in terms of organic constituents Geberit Mepla is not suitable without additional measures, e.g. post-rinsing at the point of use.

1.2.3 Approvals

In the UK Geberit Mepla is covered by WRAS certificate 1301065, Scottish Healthcare Authority WRC ref C0513 and BSRIA ACT 5/2002 Data Sheet 1.1.

Additionally Geberit Mepla holds approvals in Germany, Austria, Switzerland, Netherlands, France, Italy, Portugal, Denmark and Spain amongst others.

Geberit Mepla also holds the following marine approvals – ABS, Det Norske Veritas, Germanischer Lloyd, Lloyds Register and RINA.

1.3 Geberit Mepla system components

1.3.1 Geberit Mepla system pipe

Geberit Mepla system pipe consists of three layers:

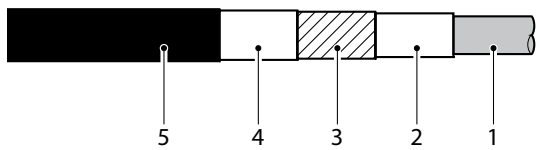
1 Tough, durable plastic outer shell is non-reactive, flexible and corrosion resistant.

2 Laser edge-welded aluminium offers mechanical stability, and provides an effective oxygen barrier to allow use in central heating systems, and allows electronic detection of the pipe after installation.

3 Plastic inner layer resists cracking, ageing and wear. The smooth surface resists limescale and biofilm build up making it ideal for potable water systems.

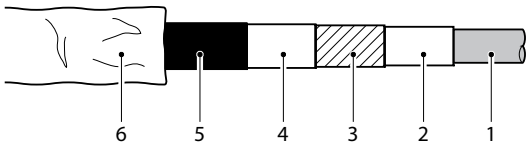
The three layers are bonded together during manufacture to prevent de-lamination during installation and use.

Geberit Mepla system pipe



Item	Description	Product Material
1	Inner pipe	Plastic
2	Bonding agent	
3	Aluminium pipe	Aluminium
4	Bonding agent	
5	Protective jacket	Plastic

Geberit Mepla system pipe, preinsulated



Item	Description	Product Material
1	Inner pipe	Plastic
2	Bonding agent	
3	Aluminium pipe	Aluminium
4	Bonding agent	
5	Protective jacket	Plastic
6	Insulation Protective foil (outside)	Soft PE foam, PE, red or blue

Table 2: Physical characterisitics of Geberit Mepla system pipe

Designation	Value	Unit
Thermal expansion coefficient α at 20-100°C	0.026	mm/(m·K)
Thermal conductivity λ at 20°C	0.43	W/(m·K)
Pipe roughness k	7	µm

Table 3: Pipe data of Geberit Mepla system pipe

Nominal diameter DN	Geberit Mepla Diameter (mm)	Wall thickness s (mm)	Inside diameter d (mm)	Pipe weight (kg/m)	Full pipe weight* (kg/m)	Water volume V (l/m)
12	16	2.25	11.5	0.135	0.239	0.104
15	20	2.5	15.0	0.185	0.362	0.177
20	26	3	20.0	0.300	0.614	0.314
25	32	3	26.0	0.415	0.946	0.531
32	40	3.5	33.0	0.595	1.450	0.855
40	50	4	42.0	0.840	2.225	1.385
50	63	4.5	54.0	1.100	3.400	2.290
75	75	4.6	65.8	1.450	4.830	3.380

*with water, 10ºC

Table 4: Thermal capacity of Geberit Mepla system pipe

Geberit Mepla diameter (mm)	Thermal capacity (J/(K.m))
16	188.76
20	268.43
26	422.00
32	537.95
40	794.76
50	1131.38
63	1604.32
75	1863.75

Table 5: Comparison of Geberit Mepla pipe dimensions and Loading Value (LV)

Nominal diameter DN	Geberit Mepla diameter d (mm) (LV)	Steel pipe diameter d (mm) (LV)	Stainless steel pipe diameter d (mm) (LV)	PB pipe diameter d (mm) (LV)
12	16 (5)	—	15 (6)	16 (6)
15	20 (10)	½" (6)	18 (10)	20 (13)
20	26 (26)	¾" (16)	22 (20)	25 (25)
25	32 (55)	1" (40)	28 (50)	32 (55)
32	40 (180)	1¼" (160)	35 (165)	40 (180)
40	50 (540)	1½" (300)	42 (430)	50 (500)
50	63 (1300)	2" (600)	54 (1050)	63 (1100)
75	75 (2250)	2.5"	76.1 (2100)	-

Pipe supplied in 5m lengths or coils of 50 or 100m.

Geberit Mepla system pipes are marked with yellow lettering on the pipe surface. The following table explains the marking using a Ø 16mm pipe as an example.

Table 6: Marking of Geberit Mepla system pipes

Marking	Explanation
GEBERIT Mepla	Company logo and product name
090101	Manufacturing date
16 x 2.25	Pipe dimension (mm)
PE-Xb/Al/PE-HD	Product Material
SKZ A SSS, DVGW ASXXX	Approval marks for Germany
ÖVGW WXXX	Approval marks for Austria
SVGWXXX	Approval marks for Switzerland
KIWA KXXX	Approval marks for Netherlands
Classe 2 – 10 bar + 70°C	Approval marks for France
Classe 4 – 6 bar + 60°C	Approval marks for France
Classe 2 – 6 bar + 80°C	Approval marks for France
ATEC 14 / 12 – XXX	Approval marks for France
CSTbat 34 - XXX	Approval marks for France
IIP 137, UNI 10954-1	Approval marks for Italy
Tipo A / 1 / S = 20,5	Approval marks for Italy
LNEC DH 654 0 – 70°C	Approval marks for Portugal
VA 1.14 / 19370	Approval marks for Denmark
AENOR N 001 / 471	Approval marks for Spain
UNE 53961 EX, Clases: 1a 5 / 6 bar	Approval marks for Spain

Geberit Mepla pipes are WRAS approved for use in the UK even though this is not on the markings.

Geberit Mepla system pipe, round, preinsulated

Physical characteristics

Table 7: Physical characteristics of Geberit Mepla system pipe, round, preinsulated

Description	Value		Unit
	Insulation 6mm	Insulation 10mm	
Thermal expansion coefficient α at 20-100°C	0.026	0.026	mm/(m·k)
Thermal conductivity λ, pipe at 20°C	0.43	0.43	W/(m·k)
Thermal conductivity λ, insulation at 20°C	0.04	0.04	W/(m·k)
Thermal conductivity λ, pipe and insulation at 20°C	0.065	0.056	W/(m·k)
Pipe roughness k	7	7	µm

Table 8: Thermal capacity of Geberit Mepla system pipe, round, preinsulated

Ø (mm)	Thermal capacity per metre [J/(K·m)]	
	Preinsulated 6mm	Preinsulated 10mm
16	199.82	209.13
20	281.82	292.68
26	438.88	452.07

Pipe data

Table 9: Pipe data for Geberit Mepla system pipe, round, preinsulated, 6mm

Nominal width DN Pipe	Dimension d x s (mm)	Inside diameter di (mm) Outside	Diameter with insulation D (mm)	Pipe weight Mp (kg/m)	Insulation weight ml (kg/m)	Pipe weight with water 10°C mPW (kg/m)	Water volume V (l/m)
12	16 x 2.25	11.5	28	0.148	0.013	0.252	0.104
15	20 x 2.5	15.0	32	0.201	0.016	0.378	0.177
20	25 x 3.0	20.0	38	0.319	0.019	0.633	0.314

Table 10: Pipe data for Geberit Mepla system pipe, round, preinsulated, 10mm

Nominal width DN Pipe	Dimension d x s (mm)	Inside diameter di (mm) Outside	Diameter with insulation D (mm)	Pipe weight Mp (kg/m)	Insulation weight ml (kg/m)	Pipe weight with water 10°C mPW (kg/m)	Water volume V (l/m)
12	16 x 2.25	11.5	36	0.162	0.027	0.266	0.104
15	20 x 2.5	15.0	40	0.216	0.031	0.393	0.177
20	25 x 3.0	20.0	46	0.336	0.036	0.650	0.314

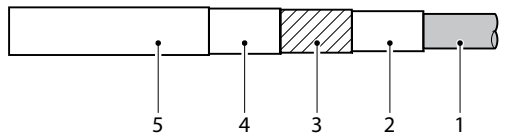
Supplied pipe form:

- Coils of 25 and 50m
- Insulation, red and blue

1.3.2 Geberit MeplaTherm system pipe

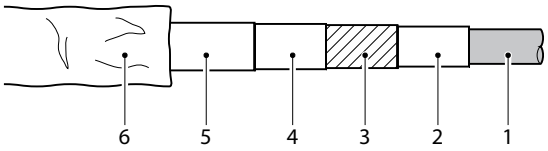
Geberit MeplaTherm system pipe is the same as Geberit Mepla system pipe, except that it is not approved for use with potable water. Geberit MeplaTherm system pipe can be easily distinguished from Geberit Mepla system pipe as it is white where as Geberit Mepla system pipe is black.

Geberit MeplaTherm system pipe



Item	Description	Product Material
1	Inner pipe	Plastic
2	Bonding agent	
3	Aluminium pipe	Aluminium
4	Bonding agent	
5	Protective jacket	Plastic, white

Geberit MeplaTherm system pipe, round, preinsulated



Item	Description	Product Material
1	Inner pipe	Plastic
2	Bonding agent	
3	Aluminium pipe	Aluminium
4	Bonding agent	
5	Protective jacket	Plastic, white
6	Insulation protective foil (outside)	Soft PE foam, closed cell PE, red

Physical characteristics

Table 11: Physical characteristics of Geberit MeplaTherm system pipe

Designation	Value	Unit
Thermal expansion coefficient α at 20-100°C	0.026	mm/(m·k)
Thermal conductivity λ, pipe at 20°C	0.43	W/(m·k)
Pipe roughness k	7	µm

Table 12: Thermal capacity of Geberit MeplaTherm system pipe

Ø (mm)	Thermal capacity per metre [J/(K·m)]
16	188.76
20	268.43
26	422.00

Pipe data

Table 13: Pipe data for Geberit MeplaTherm system pipe

Nominal width DN	Pipe dimension d x s (mm)	Inside diameter di (mm)	Pipe weight Mp (kg/m)	Pipe weight with water 10°C m (kg/m)	Water volume V (l/m)
12	16 x 2.25	11.5	0.135	0.239	0.104
15	20 x 2.5	15.0	0.185	0.362	0.177
20	26 x 3.0	20.0	0.300	0.614	0.314

Supplied pipe form:

- Pipe sections each 5m long
- Coils of 25, 50 or 100m

Marking

Table 14: Marking of Geberit MeplaTherm system pipes

Marking	Explanation
■GEBERIT Mepla Therm C	Company logo and product name
090101 123735	Manufacturing date and manufacturing time
16 x 2.25	Pipe dimension (mm)
PE-Xb/Al/PE-HD type M	Product material and type of pipe
EN ISO 21003 CI 4.5 / 10 bar	Standard, application class and operating pressure
SKZ A XXX	Approval marks for Germany
Tested to ÖNORM EN ISO 21003	Approval marks for Austria
KOMO	Approval marks for the Netherlands
IIP 137, UNI 10954-1, tipo A / 1 / S = 20,5	Approval marks for Italy
[Classe 4: 6 bar, +60 °C]	Approval marks for France
[Classe 5: 6 bar, +80 °C]	”
ATEC 14/12-xxx	”
CSTbat 34-xxx	”

Geberit MeplaTherm system pipe, round, preinsulated

Physical characteristics

Table 15: Physical characteristics of Geberit MeplaTherm system pipe, round, preinsulated

Description	Value		Unit
	Insulation 6mm	Insulation 10mm	
Thermal expansion coefficient α at 20-100°C	0.026	0.026	mm/(m·k)
Thermal conductivity λ, pipe at 20°C	0.43	0.43	W/(m·k)
Thermal conductivity λ, insulation at 20°C	0.04	0.04	W/(m·k)
Thermal conductivity λ, pipe and insulation at 20°C	0.065	0.056	W/(m·k)
Pipe roughness k	7	7	µm

Table 16: Thermal capacity of Geberit MeplaTherm system pipe, round, preinsulated

Ø (mm)	Thermal capacity per metre [J/(K·m)]	
	Preinsulated 6mm	Preinsulated 10mm
16	199.82	209.13
20	281.82	292.68
26	438.88	452.07

Pipe data

Table 17: Pipe data for Geberit MeplaTherm system pipe, round, preinsulated, 6mm

Nominal width DN Pipe	Dimension d x s (mm)	Inside diameter di (mm) Outside	Diameter with insulation D (mm)	Pipe weight Mp (kg/m)	Insulation weight mI (kg/m)	Pipe weight with water 10°C mPW (kg/m)	Water volume V (l/m)
12	16 x 2.25	11.5	28	0.148	0.013	0.252	0.104
15	20 x 2.5	15.0	32	0.201	0.016	0.378	0.177
20	25 x 3.0	20.0	38	0.319	0.019	0.633	0.314

Table 18: Pipe data for Geberit MeplaTherm system pipe, round, preinsulated, 10mm

Nominal width DN Pipe	Dimension d x s (mm)	Inside diameter di (mm) Outside	Diameter with insulation D (mm)	Pipe weight Mp (kg/m)	Insulation weight mI (kg/m)	Pipe weight with water 10°C mPW (kg/m)	Water volume V (l/m)
12	16 x 2.25	11.5	36	0.162	0.027	0.266	0.104
15	20 x 2.5	15.0	40	0.216	0.031	0.393	0.177
20	25 x 3.0	20.0	46	0.336	0.036	0.650	0.314

Supplied pipe form:
- Coils of 25 and 50m
- Insulation, red

1.3.3 Geberit Mepla pressfittings

The following table explains the marking using a d16 mm fitting as an example.

Table 19: Marking of Geberit Mepla pressfittings

Marking	Explanation
GEBERIT	Company logo
16	Outside pipe Ø (mm)
	Material marking, recyclable
	Manufacturing clock with manufacturing date

1.3.4 Geberit Mepla fittings of PVDF

Geberit Mepla pressfittings are marked on the surface and on the protective cap. Geberit Mepla PVDF fittings are used for connecting to Geberit Mepla system pipe. PVDF is resistant to corrosion and the fittings are supplied with protective caps to prevent contamination prior to installation.

The pipe holding cams of the PVDF fitting ensures that the fitting remains in place in the pipe, even when unpressed.

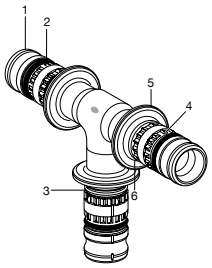


Figure 2: Construction of the PVDF fitting

1	Fitting body (PVDF)
2	O-ring[1] (EPDM)
3	Holding cams
4	Twist lock
5	Holding grooves
6	Tool guide rim for pressing jaws

[1] The O-ring is lubricated with a lubricant containing silicone

1.3.5 Geberit Mepla fittings of gunmetal/brass

Geberit Mepla pressfittings made of gunmetal or brass are marked on the surface and on the protective cap.
The following table explains the marking using a d16 mm fitting as an example.

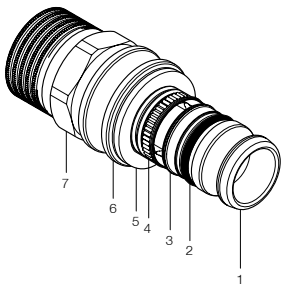


Figure 3: Construction of the fittings in gunmetal/brass

1	Fitting body (Brass CW617N or gunmetal CC499K)
2	O-ring[1] (EPDM)
3	Pipe holding ring
4	Twist lock
5	Holding grooves
6	Corrosion barrier washer
7	Tool guide rim for pressing jaws
8	Pipe wrench profile

[1] The O-ring is lubricated with a lubricant containing silicone

The corrosion barrier washer of the metal fittings prevents electrochemical corrosion of the aluminium on the face of the pipe.

Table 20: Marking of Geberit Mepla fittings made of gunmetal or brass

Marking	Explanation
16 x 2.25	Outer pipe diameter and pipe wall thickness (mm)
YY/MM	Manufacturing date

1.3.6 Pressing tools

Geberit Mepla pressing tools are provided in the following versions:

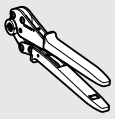
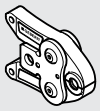
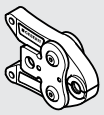
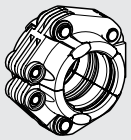
- ACO 102 (12V battery)
- ACO 202 (18V battery)
- ECO 202 (115V / 230V mains)
- EFP 202 (115V / 230V mains)
- MFP 2 (manual)

General information

The Geberit Mepla pressfitting system is pressed using the range of Geberit Mepla hand and mechanical pressing tools, pressing jaws, collars and adaptors. ODs from Ø 16 – 50mm are pressed using pressing jaws, while ODs Ø 63 – 75mm are pressed using pressing collars with the ZB203 adaptor.

Battery powered tools are available with battery chargers suitable for 115V and 230V supply voltages.

Geberit Mepla pressing tools can be used as follows:

Compatibility class	Pressing devices	Pressing jaws/pressing collars	Adaptors for pressing collars
	Hand operated pressing tool	 Ø 16 – 26 mm	–
1	ACO102	 Ø 16 – 40 mm	–
2	MFP 2, EFP 202, ECO 202, ACO 202	 Ø 16 – 50 mm	–
2	MFP 2, EFP 202, ECO 202, ACO 202	 Ø 63 – 75 mm	 ZB 203

Only use pressing devices which have been approved by Geberit.

1.3.7 Geberit Mepla installation tools

Overview

The Geberit Mepla press connection requires suitable tools. The use of Geberit tools or tools of other manufacturers recommended by Geberit is a requirement for the additional Geberit guarantee.

Cutting tools

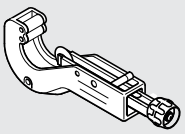
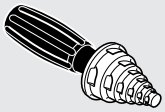
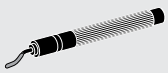
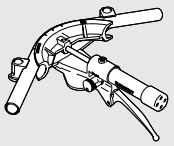
The Geberit Mepla system pipe is cut to length with the following tools:

- Geberit Mepla cutters
- Pipe cutter

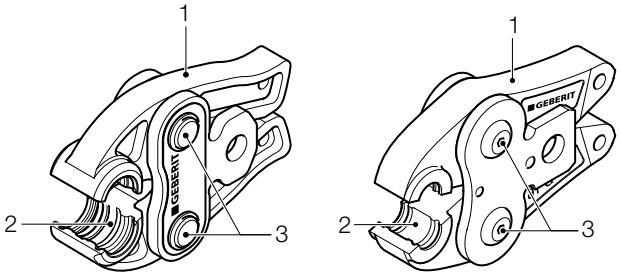
Various cutting tools are available depending on the dimension of the Geberit Mepla system pipe. The use of saws and other tools which could cause chips should be avoided as the O-ring seal could become damaged.

Pipe insulation on pre-insulated pipes can be cut with the following tools:

- Insulation cutter (integrated into handle of Geberit Mepla cutters)
- Pipe cutter

Description	Size range	Article number	Image
Geberit Mepla cutters	Ø 16 – 26mm	690.134.00.1	
Pipe cutter	Ø 16 – 50mm Ø 32 – 75mm	690.112.00.1 690.115.00.1	
Pipe calibration tool	Ø 16 – 50mm	690.211.00.1	
Pipe deburring tool	Ø 63 – 75mm	690.214.00.1	
Pipe bending tool	Ø 16 – 32mm	690.412.00.3	

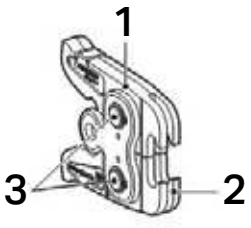
Structure of Geberit Mepla pressing jaws



1 Jaw lever
2 Pressing contour
3 Jaw points

The procedure for inserting the pressing jaw depends on the type of pressing tool and is therefore described in the operating instructions of the respective pressing tool in section 3 of this guide.

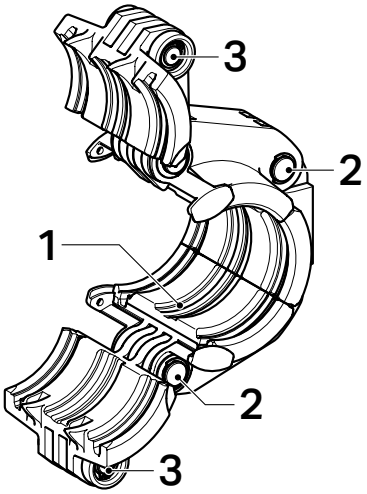
Structure of the Geberit Mepla adaptor for pressing collar



1 Jaw lever
2 Claw
3 Jaw joints

The procedure for inserting the adaptor for pressing collar depends on the type of pressing tool and is therefore described in the operating instructions of the pressing tool.

Structure of Geberit Mepla pressing collar



1 Pressing contour
2 Joints
3 Pin

The appearance can vary depending on the size and design.

2 Planning

2.1 Corrosion Resistance

The Geberit Mepla system pipe is protected against corrosion by an outer plastic layer. Corrosion of the aluminium pipe is only likely to occur if the pipes are laid in an aggressive or permanently damp environment, and only on the open-cut pipe sections. In this case, the corrosion points must be provided with corrosion protection.

Special corrosion protection is necessary in the following corrosive environments (gases, vapours and liquids), e.g.

- Animal facilities
- Dairies
- Cheese dairies
- Storage rooms for chlorine, ammonia etc.
- Swimming pools
- Areas with acids or alkalis
- Permanently damp environments

The front-end connection points of the Geberit Mepla system pipe must be provided with corrosion protection if walls or floors are likely to be penetrated by moisture on a regular basis. Typical examples of this are:
- walls or floors with ground contact
- cellars in the ground water area or in a hillside location

Pipes laid in screed are exposed to permanent moisture if the uncovered concrete floor is designed as a waterproof concrete trough (e.g. involving waterproof concrete or bituminous coats). Regularly accumulating surface water is then stored in the floor construction. Typical examples of this are:
- washing plants
- large kitchens
- rooms associated with high-pressure cleaning
- swimming pools, spa areas, saunas

Rubber collars, sealing tape or other suitable materials can be used for corrosion protection. Measures to protect against corrosion are not required if the pipes are equipped with a continuous anticondensation or thermal insulation and protected from permanent moisture, e.g. in screeds.

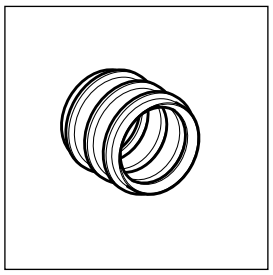


Figure 2: Rubber collar Ø 16 - 26mm, article no. 601.811.00.1, 602.811.00.1, 603.811.00.1.

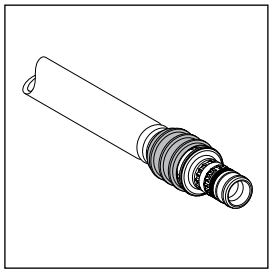


Figure 3: Rubber collar on pipe, is mounted on pipe before pressing

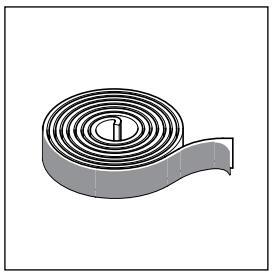


Figure 4: Sealing tape, article no. 601.810.00.1

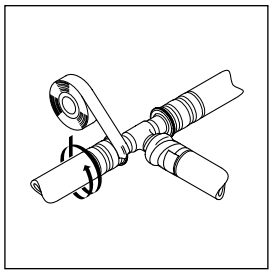


Figure 5: Corrosion protection with sealing tape

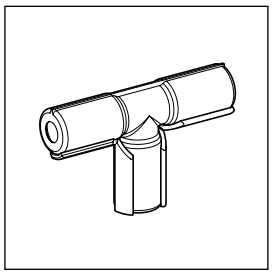


Figure 6: Corrosion protection with termination for t-piece 601.837.00.1, before and after applying the tape

2.2 Trace heating

2.2.1 Pipe attached to pipe circulation

Heat resistant materials must be used for a pipe attached to pipe circulation.

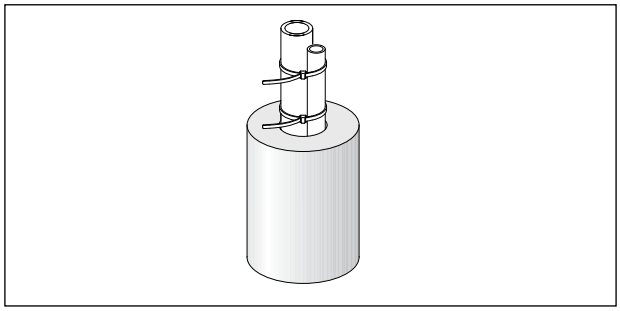


Figure 7: Circulation type pipe attached to pipe

2.2.2 Trace heater

The aluminium core of the Geberit Mepla system pipe ensures even heat distribution around the pipe.

The trace heater band can be fitted directly to the Geberit Mepla system pipe. It must be chosen and fastened in accordance with manufacturer's specifications. At normal indoor temperatures in a building, fastening with cable ties or adhesive tape is sufficient. At ambient temperatures of below 15°C the self-regulating heater band must be secured with self-adhesive aluminium tape. Only self-regulating heating cables with a maximum temperature of 70°C may be used.

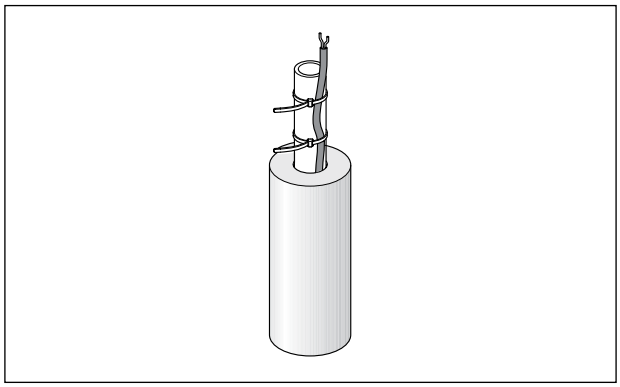


Figure 8: Trace heater band

2.3 Connection to water heater

Direct connection of the Geberit Mepla system pipe without metal intermediate sections is possible if the water heater (circulating heater, small or large tank) does not heat water to a temperature exceeding 70°C.

2.4 Insulation

Table 21: Function of insulation

Function	Potable water supply pipe (cold)	Potable water supply pipe (hot)	Tap connection
Insulation against condensation	✓	✓	✓
Accommodation of expansion	✓	✓	–
Thermal insulation	–	✓	–
Acoustic insulation	✓	✓	✓

2.4.1 Insulation of potable water pipes

Potable water supply pipes must be protected against heating and condensation. It must always be ensured that the water quality is not affected by heating. The following table contains the minimum insulation layer thickness for potable water supply pipes with an assumed water temperature of 10°C.

Insulation of Geberit Mepla systems in the UK should be to BS 8558, BS 5422, BS5970 and HVAC TR20 guidelines.

2.4.2 Acoustic insulation of Geberit Mepla installations

Providing the correct pipe diameter is selected, no flow noises are generated in the pipelines. Tap noises can be isolated from the building structure by providing suitable insulation on pipes and tap connections.

Solid-borne sound insulation prevents sound from being transferred from the piping system to the building structure. Therefore the piping system needs to be decoupled consistently and professionally from the building structure through solid-borne sound insulation. The insulation materials must be laid in such a way that they cannot absorb cement slurry, for example, and thus re-establish direct contact between the pipe and the building structure.

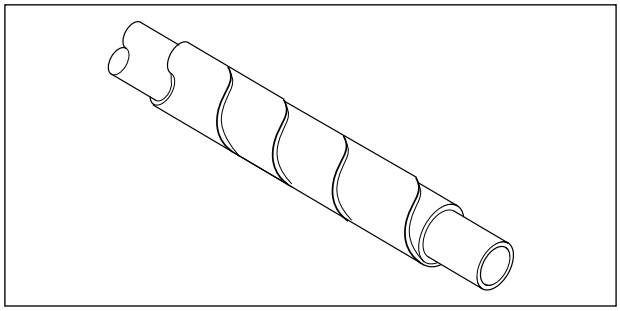


Figure 9: Tape

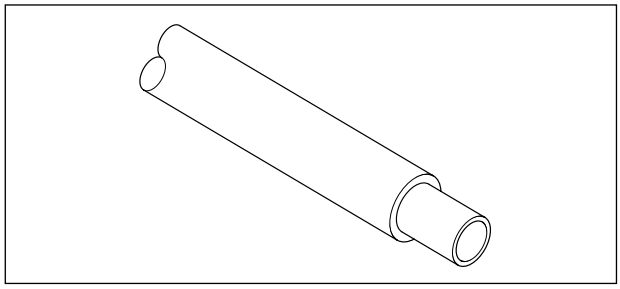


Figure 10: Insulating hose

2.4.3 Sound-absorbing pipe jacketing

Types

Sound-absorbing pipe jacketing such as tape, insulating hoses or half-shells can be used to isolate the piping system from the building structure.

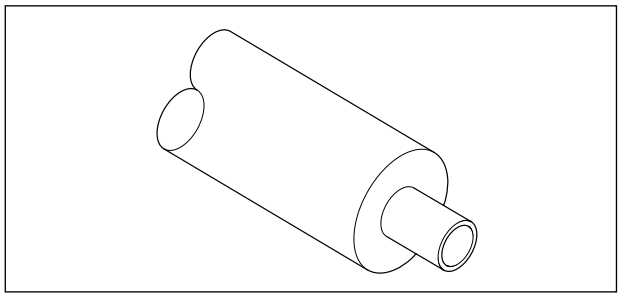


Figure 11: Half-shells with jacketing

Fastening

The pipes which have been insulated with tape or hoses can be secured directly with pipe clips. The previously applied insulation ensures solid-borne noise insulation.

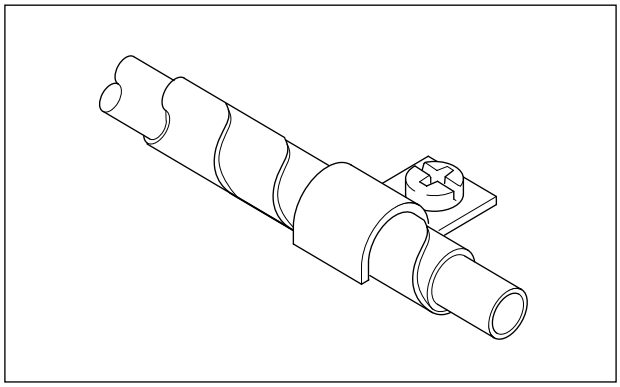


Figure 12: Pipe clip on tape

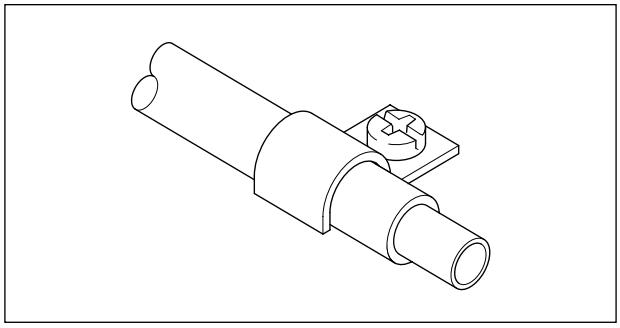


Figure 13: Pipe clip on insulated pipe

2.4.4 Pipe bracket with solid-borne noise insulation

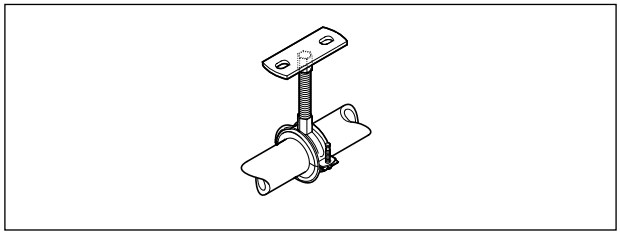


Figure 14: Pipe bracket without lining shell

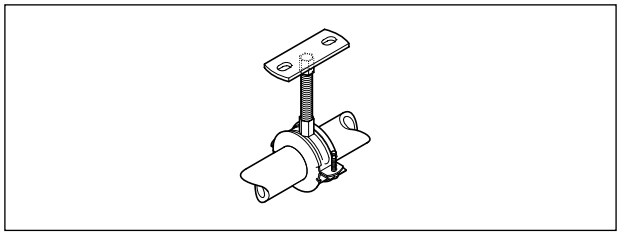


Figure 15: Pipe bracket with lining shell

2.4.5 Acoustic insulation for Geberit Mepla elbow tap connectors

With solid-borne noise insulation on the Geberit Mepla elbow tap connections the tap connections are isolated from both the tap connection plate and also the building structure. In the case of surface-mounting, acoustic insulation is fitted with an acoustic insulation insert between the flange and the elbow tap connector.

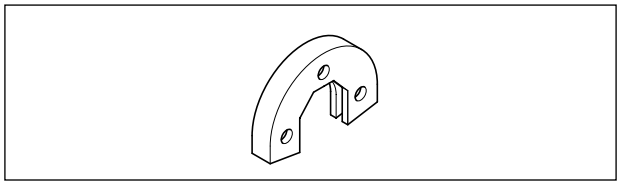


Figure 16: Geberit sound insulation base for single elbow tap connector 90°

In the case of concealed installation, acoustic insulation is achieved with the acoustic insulation set comprising the acoustic insulation insert and an acoustic insulation box.

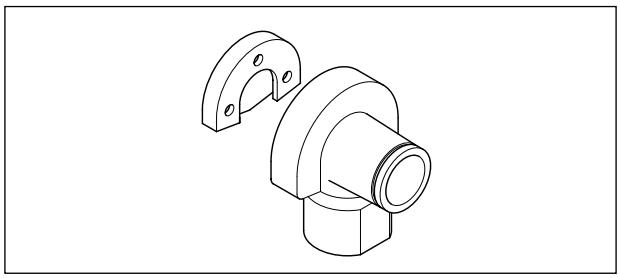


Figure 17: Geberit sound insulation set for single elbow tap connector 90°, art. no. 601.801.00.1

2.5 Fire Protection

2.5.1 Fire protection of Geberit Mepla heating and supply pipes Ø 16 - 75mm

All relevant local standards must be followed with regard to fire protection, for example Building Regulations Part B in England and Wales.

The Geberit Mepla system pipes correspond to fire protection class B2 according to DIN 4102, Part 1 For the Geberit Mepla pipe Ø 16 - 75mm the ceiling and wall penetrations for the fire resistance class up to R90 are established in accordance with the following specifications:

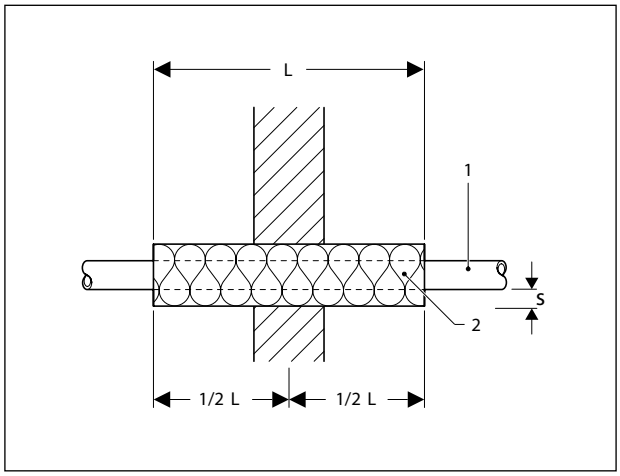


Figure 18: Fire protection, Geberit Mepla Ø 16 - 75mm: Wall penetration, solid wall

L Total length: ≥ 500mm
S Insulation thickness according to Table 28
1 Geberit Mepla system pipe
2 Pipe shell Rockwool RS 800 or equivalent

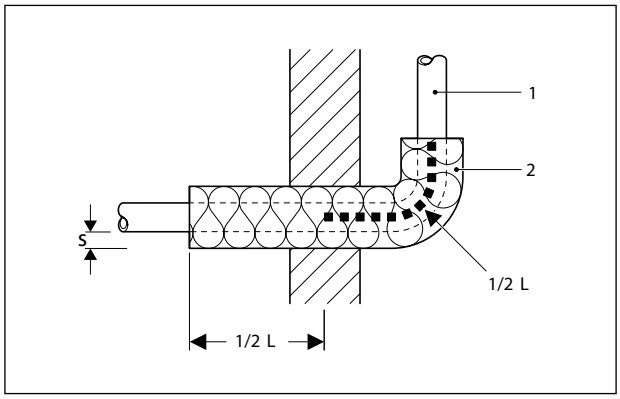


Figure 19: Fire protection Geberit Mepla Ø 16 - 75mm: Wall penetration, solid wall, bend

L Total length: ≥ 500mm
S Insulation thickness according to Table 28
1 Geberit Mepla system pipe
2 Pipe shell Rockwool RS 800 or equivalent

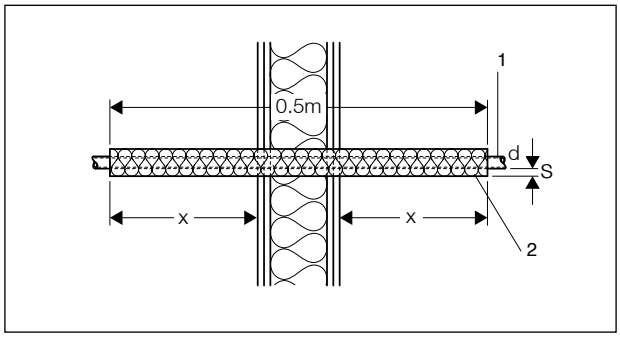


Figure 20: Fire protection Geberit Mepla Ø 16 - 75mm: Wall penetration for drywall installations

L Total length: ≥ 500mm
S Insulation thickness according to Table 28
1 Geberit Mepla system pipe
2 Pipe shell Rockwool RS 800 or equivalent

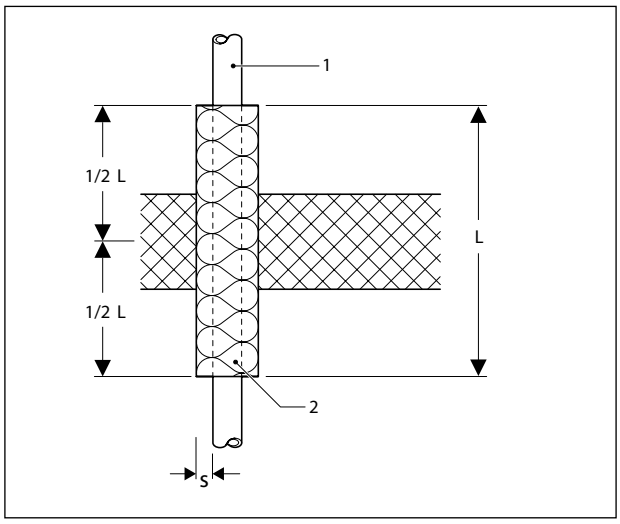


Figure 21: Fire protection, Geberit Mepla Ø 16 - 75mm: Ceiling penetration

L Total length: ≥ 500mm
S Insulation thickness according to Table 28
1 Geberit Mepla system pipe
2 Pipe shell Rockwool RS 800 or equivalent

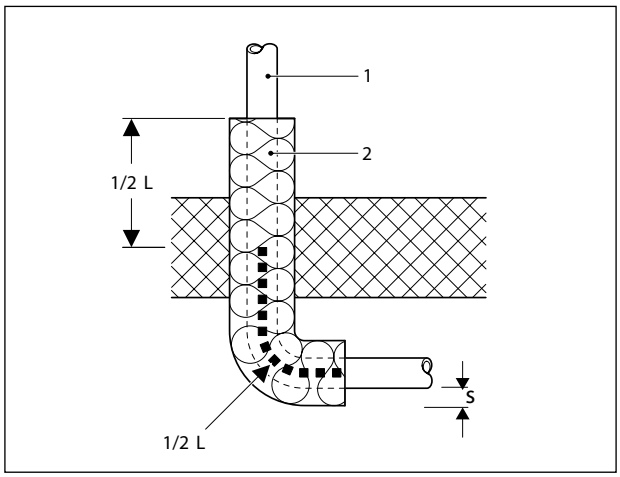


Figure 22: Fire protection Geberit Mepla Ø 16 - 75mm: Ceiling penetration, bend

L Total length: ≥ 500mm
S Insulation thickness according to Table 28
1 Geberit Mepla system pipe
2 Pipe shell Rockwool RS 800 or equivalent

Fire protection of Geberit Mepla heating and supply pipes Ø 16 - 75mm

Table 22: Arrangement of the fire protection shell

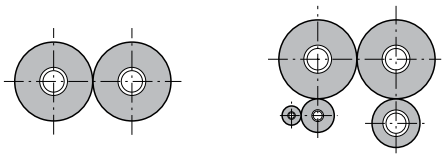
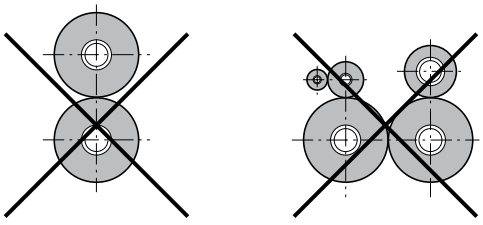
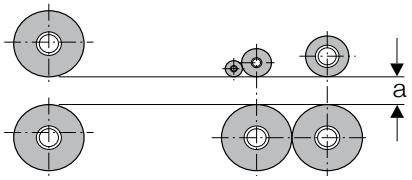
Applications	Geberit Mepla system pipe Ø (mm)								Shell thickness s (mm)
	16	20	26	32	40	50	63	75	
Cold water	✓	✓	✓	✓	✓	✓	✓		20
	–	–	–	–	–	–	–	✓	30
Hot water, heating	✓	✓	✓	–	–	–	–	–	20
	–	–	–	✓	✓	–	–	–	30
	–	–	–	–	–	✓	–	–	40
	–	–	–	–	–	–	✓	–	50
	–	–	–	–	–	–	–	✓	70

Geberit Mepla system pipes and pipe shells must be fed through the existing openings in the components together. For pipe diameters Ø 16 - 63mm, the minimum distance between the individual pipe shells can be 0mm.

When Geberit Mepla system pipes Ø 75mm are used in solid ceilings, the minimum distance between the individual system pipes can be 0mm.

In the case of solid walls, the installation depends on the shell thickness and the arrangement of the pipes in relation to one another.

Table 23: Installation in existing openings in solid walls

Shell thickness	Arrangement
30mm	Minimum distance between pipes 0mm
>30mm	Permissible arrangement with a distance of 0mm  Non-permissible arrangement with a distance of 0mm  Permissible arrangement with the distance a ≥ 50mm 

2.5.2 Product material of the pipe shell

The pipe shell consists of concentrically wound rock wool with net-reinforced aluminium foil and self-adhesive overlapping.

This material has the following properties:
- Building material class A2 conforming to DIN4102 (melting point ≥ 1000°C)
- Thermal conductivity: according to EnEV, Annex 5
- Minimum length: 0.50 m on ceilings, 0.50 m on walls
- Pipe dimension / Shell inside diameter: 16 – 75mm
- Insulation thickness: 20 – 70mm

2.6 Equipotential bonding

The Geberit Mepla supply system is not a conductive pipe system and can therefore not be used for equipotential bonding and also does not require earthing.

A PE-LD corrosion barrier washer is integrated in the connection between the Geberit Mepla system pipe and the fittings so that there is no conductive metal pipe installation between the pipe system and fitting.

2.7 Expansion compensation

Pipes expand differently due to thermal effects depending on the product material.

Therefore, the following should be considered when installing:
- Creation of expansion space
- Installation of expansion compensators
- Positioning of anchor points and sliding points

The bending and torsional stress that occurs during pipe operation are reliably absorbed when the expansion compensation is taken into account.

The following affect the expansion compensation:
- Product material
- Building conditions
- Operating conditions

Slight changes in the length of pipes can be absorbed by means of the elasticity of the piping system or by means of insulation.

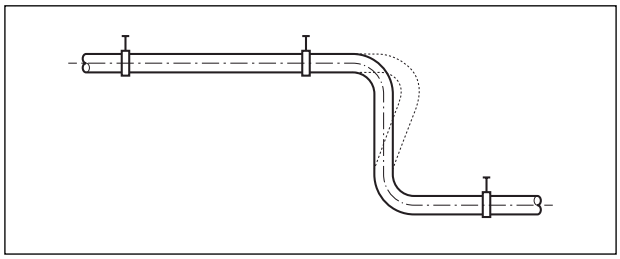


Figure 23: Absorption of a change in length by means of the elasticity of the piping system

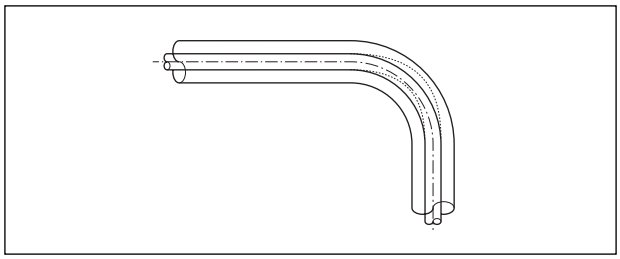


Figure 24: Absorption of a change in length by means of the insulation

The following rule of thumb applies for the determination of the insulation thickness:

Insulation thickness = 1.5 · change in length

If the calculated insulation thickness is less than the minimum insulation thickness defined in the regulations, the minimum insulation thickness defined in the regulations must be used.

2.7.1 Absorption of the thermal expansion by means of anchor points

Anchor points are capable of absorbing slight changes in the length of the piping system. If the forces in the piping system exceed the absorption forces of the anchor points, the thermal expansion must be absorbed by means of expansion compensators.

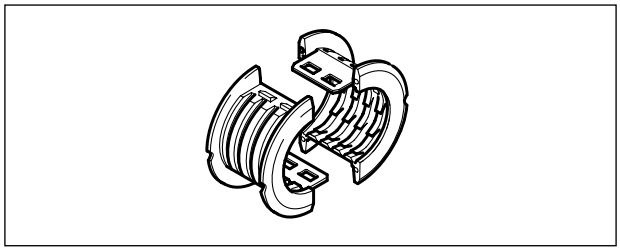


Figure 25: Pipe bracket lining shell, art. no. 603.702.00.1

Anchor points involving pipe brackets are capable of absorbing the following maximum forces:

d [mm]	Force absorption max. [N]
16	–
20	–
26	550
32	1000
40	1400
50	2100
63	3500
70	4100

The maximum force that occurs during the thermal expansion of the pipeline can be calculated using the following formula:

$$F = A \cdot E \cdot \alpha \cdot \Delta T$$

F Force due to thermal expansion of the pipeline [N]

A Annulus of aluminium pipe [mm²]

E Modulus of elasticity of aluminium = 70 kN / mm²

α Thermal expansion coefficient of aluminium = 0.026 mm / (m · K)

Δ**T** Temperature differential (operating temperature – ambient temperature at time of installation) [K]

Example

A temperature differential of 30 K results in the following maximum forces for a Geberit Mepla system pipe:

d [mm]	A [mm²]	Maximum force due to thermal expansion [kN]
16	22.5	1.226
20	34.1	1.836
26	51.7	2.822
32	74.4	4.062
40	116.9	6.381
50	147.3	8.045
63	188.2	10.275
75	283.2	15.483

To calculate the maximum temperature differential up to which the thermal expansion can be absorbed by the anchor points, the formula needs to be rearranged to give the temperature differential.

$$\Delta T = \frac{F}{A \cdot E \cdot \alpha}$$

The maximum force absorption of the anchor points is used for the maximum force.

Example

Given:

d 32mm

F 1 kN

A 74.4mm²

E 70 kN / mm²

α 0.026 mm / (m · K) = 0.026 mm / (1000 · mm · K)

Required:

- Temperature differential ΔT [mm]

Solution:

$$\Delta T = \frac{F}{A \cdot E \cdot \alpha}\left[\frac{kN \cdot mm^2 \cdot 1000 \cdot mm \cdot K}{mm^2 \cdot kN \cdot mm} = K\right]$$

$$\Delta T = \frac{1}{74,4mm^2 \cdot 70\frac{kN}{mm^2} \cdot 0,026\frac{mm}{1000 \cdot mm \cdot K}}$$

$$\Delta T = 7,4K$$

The thermal expansion of a Geberit Mepla d 32 piping system can be absorbed by the Geberit Mepla pipe bracket lining shells up to a temperature differential of 7.4 K. If the temperature differential exceeds 7.4 K, expansion compensators must be provided.

2.7.2 Expansion compensation by deflection leg

In larger piping systems, the thermal expansion must be absorbed using expansion compensators.The advantage of using deflection legs in this context is that they eliminate the additional costs or maintenance costs that would, for example, be incurred by installing axial expansion fittings.

Deflection legs are available in pipe leg or U-bend designs. If a pipe leg is used, the expansion is absorbed by a change of direction in the pipe. If the expansion cannot be absorbed by a change in direction, U-bends must be installed in straight pipe runs.

The following figures show the general construction of a pipe leg and a U-bend:

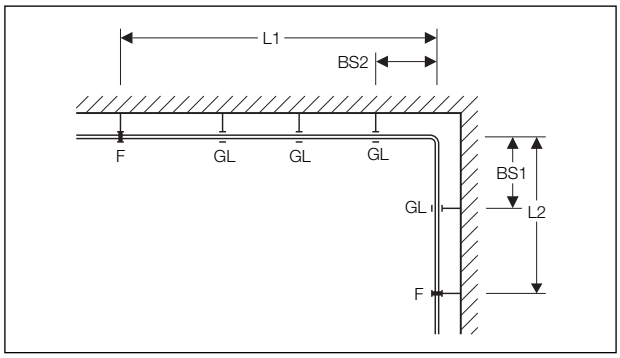


Figure 26: Expansion compensation by change in direction of the pipe

BS Deflection leg
F Anchor point
GL Sliding point
L Pipe length

If changes in length cannot be compensated by changes in direction, expansion compensators (U bends) must be fitted in straight pipe runs.

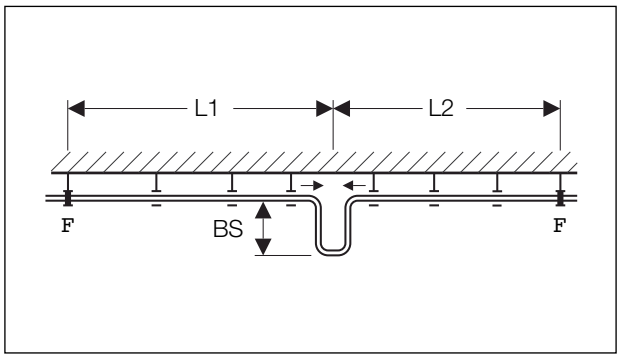


Figure 27: Expansion compensation by U-bend

BS Deflection leg
F Anchor point
L Pipe length

The longer pipe section (L1 or L2) is used as pipe length L to calculate the deflection leg.

On riser pipes which run through several floors and therefore have more anchor points, the change in length between the individual anchor points must be absorbed by deflection legs.

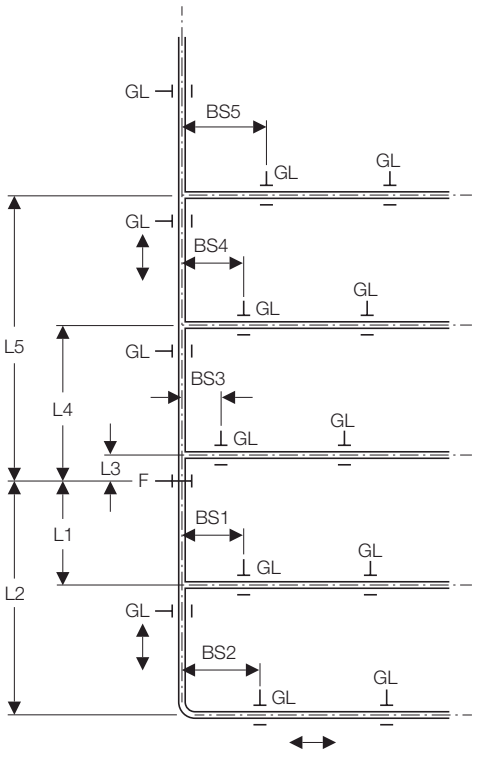


Figure 28: Anchor point in middle floor

BS Deflection leg
F Anchor point
GL Sliding point
L Pipe length

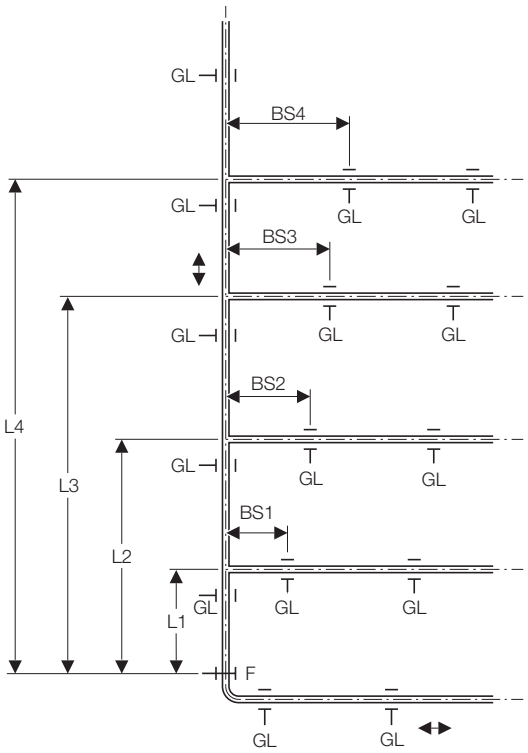


Figure 29: Anchor point in lower floor

BS Deflection leg
F Anchor point
GL Sliding point
L Pipe length

If the pipe is laid in a duct, the change in length can be absorbed by deflection legs as follows:

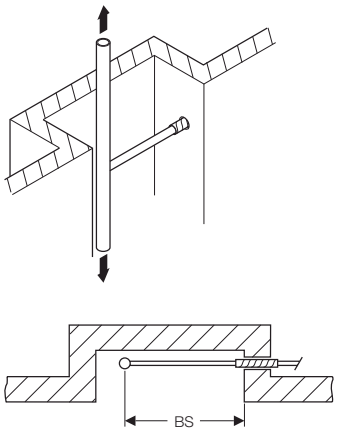


Figure 30: Expansion compensation in duct, without insulation, straight deflection leg

BS Deflection leg

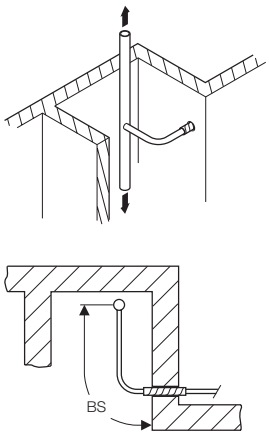


Figure 31: Expansion compensation in duct, without insulation, bent deflection leg

BS Deflection leg

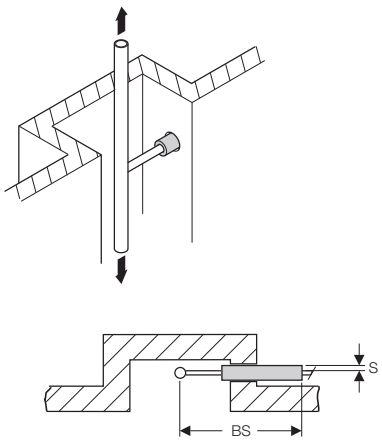


Figure 32: Expansion compensation in duct, with insulation

S Insulation thickness = 1.5 · ΔL
BS Deflection leg

2.7.3 Calculation of the bending leg length

The calculation of the bending leg length comprises of the following steps:

- Calculation of the change in length Δl
- Calculation of the bending leg length L_B

The following section shows several examples of measurement values of bending leg length L_B.

Calculation of the change in length Δl

The expansion of the multilayer pipe changes in accordance with the temperature. The thermal expansion coefficient α is 0.026 mm/(m·K). It applies for all pipe diameters, per length and per Kelvin temperature increase between 0° and 100° C.

The change in length is determined with the following formula:

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

Δl: Change in length
L: Pipe length [m]
ΔT: Temperature differential (operating temperature – ambient temperature at time of installation) [K]
α: Coefficient of thermal expansion mm/[m·K]

Given:

- α = 0.026 mm/(m·K)
- L = 6m
- ΔT = 50 K

Required:

- Change in length Δl of the pipe [mm]

Solution:

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

$$\Delta l = 6m \cdot 0.026 \frac{mm}{(m \cdot K)} \cdot 50\ K$$

Δl = 7.8mm

Table 24: Change in length ΔI for Geberit Mepla multilayer pipe

	Temperature differential ΔT (K)									
Pipe length L (m)	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
1	0.26	0.52	0.78	1.04	1.30	1.56	1.82	2.08	2.34	2.60
2	0.52	1.04	1.56	2.08	2.60	3.12	3.64	4.16	4.68	5.20
3	0.78	1.56	2.34	3.12	3.90	4.68	5.46	6.42	7.02	7.80
4	1.04	2.08	3.12	4.16	5.20	6.24	7.28	8.32	9.36	10.40
5	1.30	2.60	3.90	5.20	6.50	7.80	9.10	10.40	11.70	13.00
6	1.56	3.12	4.68	6.24	7.80	9.36	10.92	12.48	14.40	15.60
7	1.82	3.64	5.46	7.28	9.10	10.92	12.74	14.56	16.38	18.20
8	2.08	4.16	6.24	8.83	10.40	12.48	14.56	16.64	18.72	20.80
9	2.34	4.68	7.02	9.36	11.70	14.04	16.38	18.72	21.06	23.40
10	2.60	5.20	7.80	10.40	13.00	15.60	18.20	20.80	23.40	26.00

Calculation of the deflection leg length LB

The deflection leg length LB to be calculated is defined as follows with expansion compensation by pipe legs and for branch pipes:

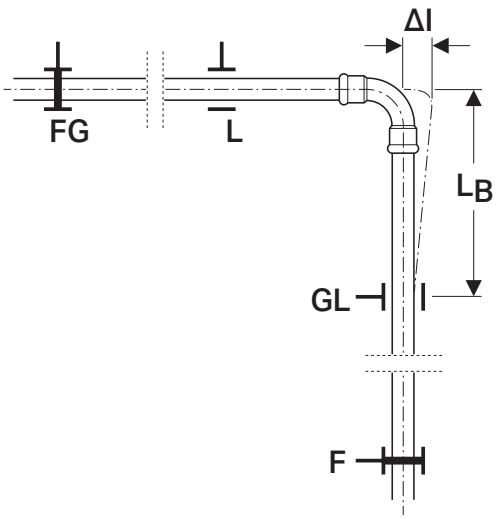


Figure 33: Expansion compensation by pipe leg
F: Anchor point
GL: Sliding point
LB: Deflection leg length

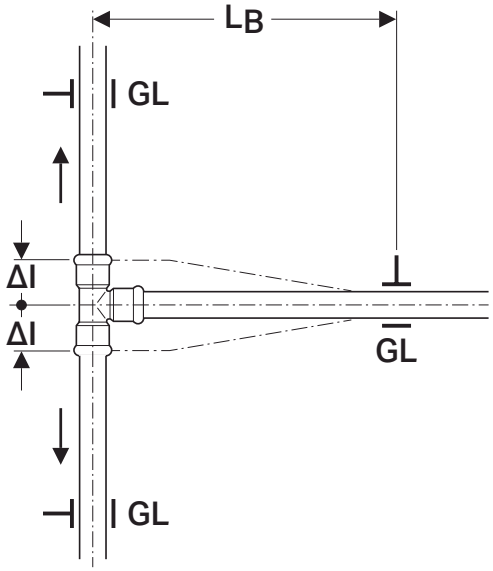


Figure 34: Expansion compensation for branch pipe
F: Anchor point
GL: Sliding point
LB: Deflection leg length

Calculation of the bending leg length

The bending leg length L_B is determined with the following formula:

$$L_B = C \cdot \sqrt{d \cdot \Delta l}$$

- L_B: Length of the bending pipe [m]
- d: Outside pipe diameter [mm]
- Δ: Change in length [m]
- C: Material constant
- L: Pipe length [m]

Given:
- d = 32mm
- L = 6m
- $\Delta T = 50$ K
- $\alpha = 0.026$ mm/(m·K)
- C = 33

Required:
- L_B [mm]

Solution:

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

$\Delta l = 6m \cdot 0.026 \ \frac{mm}{(m \cdot K)} \cdot 50\ K$

$\Delta l = 7.8mm$

$L_B = C \cdot \sqrt{d \cdot \Delta l} \quad [\sqrt{m \cdot m} = mm]$

$L_B = 33 \cdot \sqrt{32 \cdot 7.8}$

$L_B = 521mm$

Calculation of the deflection leg length L_U

The deflection leg length L_U to be calculated is defined as follows:

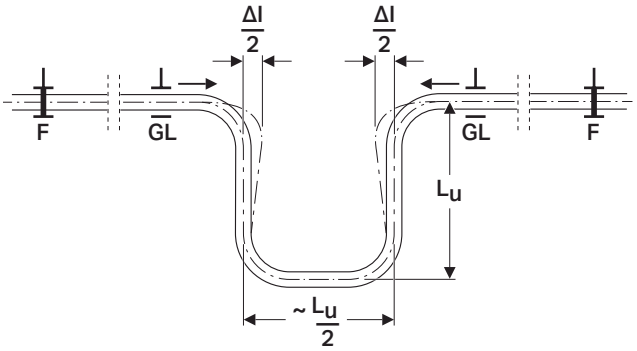


Figure 35: U-bend made of bent pipe
F: Anchor point
GL: Sliding point
L_U: Deflection leg length

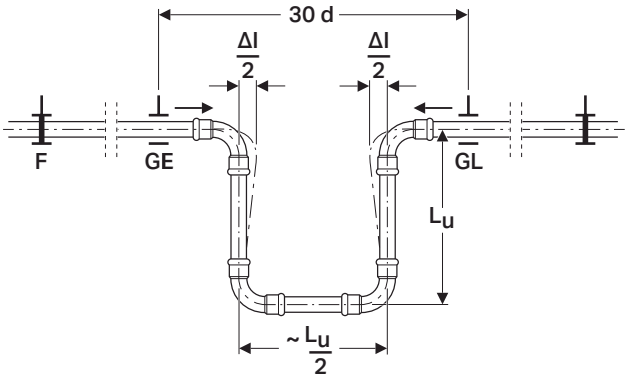


Figure 36: U-bend made with pressfittings
F: Anchor point
GL: Sliding point
L_U: Deflection leg length

The deflection leg length L_U is calculated using the following formula:

$$L_U = \frac{U \cdot \sqrt{d \cdot \Delta l}}{1000}$$

L_U: Deflection leg length [m]
d: Outer pipe diameter [mm]
Δl: Change in length [m]
U: Material constant
L: Pipe length [m]

Given:
- U=19
- d = 32mm
- Δl = 7.8 mm

Required:
- L_U [m]

Solution:

$$L_U = \frac{U \cdot \sqrt{d \cdot \Delta l}}{1000} \left[\frac{\sqrt{mm \cdot mm}}{\frac{mm}{mm}} \right]$$

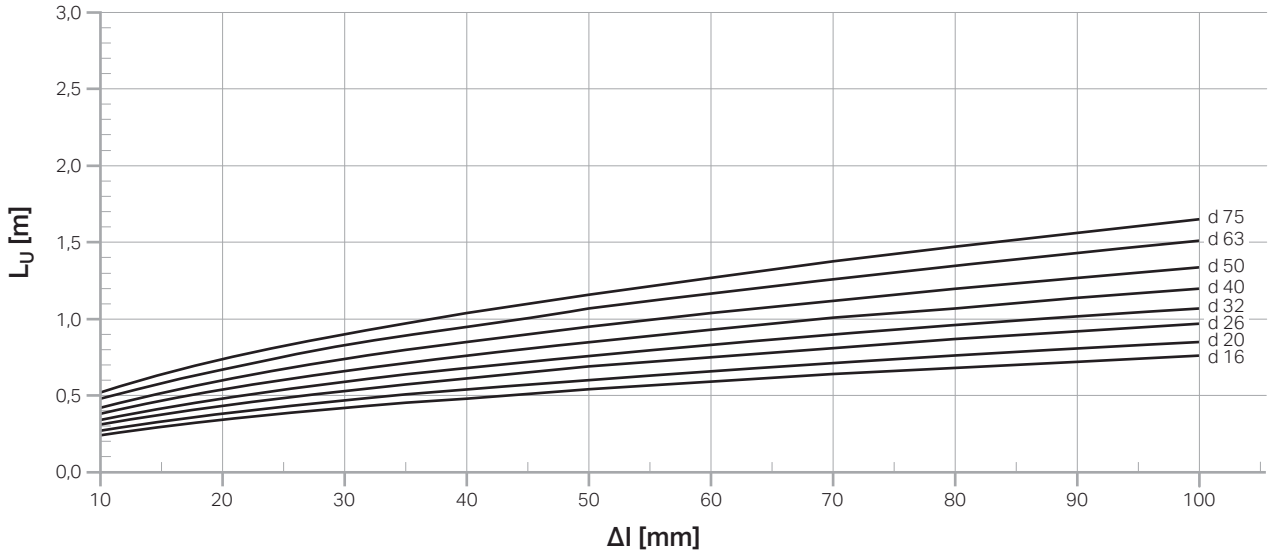


Figure 37: Calculation of the deflection leg length L_U for Geberit Mepla system pipes

2.8 Geberit Mepla dimensioning

The Geberit Mepla fittings are designed with corresponding inlet and outlet zones as well as extended diversion cross-sections for optimised flow. The optimum flow guarantees acceptable pressure losses, although the pipe cross-sections must be reduced near the fittings.

There are various methods for pipe dimensioning described for example in BS EN 806-3 and BS 8558.

Geberit Mepla equivalent pipe lengths, pressure loss coefficients (ζ values), and pressure loss tables are available from the Geberit Technical Support department or can be downloaded from our website www.geberit.co.uk

2.9 Heat emission

In addition to transporting the heat conveying medium (water, steam, etc.), pipes also emit heat due to physical laws. This effect can also be reversed.

Pipes can therefore be used for heat emission (underfloor heating, heated ceilings, heated walls etc.), and also for absorbing heat (chilled water systems, geothermal heat storage etc).

The calculation to determine the heat emissions comprises of the following steps:

- Calculation of the thermal transfer coefficient Kr
- Calculation of the thermal emission QR

General calculation of the thermal transfer coefficient Kr

Assumptions for the general calculation:

- Surface mounted
- Stationary air

$$K_r = \frac{\pi}{\frac{1}{\alpha_i \cdot d_i} + \frac{1}{2 \cdot \lambda_{PE\text{-}Xb}} \cdot \ln\left(\frac{d_1}{d_i}\right) + \frac{1}{2 \cdot \lambda_{A1}} \cdot \ln\left(\frac{d_2}{d_1}\right) + \frac{1}{2 \cdot \lambda_{PE\text{-}HD}} \cdot \ln\left(\frac{d_a}{d_2}\right) + \frac{1}{\alpha_a \cdot d_a}}$$

α_i Heat transfer coefficient, inside [(W/m²·K)]
α_a Heat transfer coefficient, outside [(W/m²·K)]
d_a Outside diameter [mm]
$d_{1.2}$ Diameter of intermediate layers [mm]
d_i Inside diameter [mm]
$\lambda_{PE\text{-}Xb}$ Thermal conductivity, inner pipe [(W/m·K)]
λ_{Al} Thermal conductivity, aluminium pipe [(W/m·K)]
$\lambda_{PE\text{-}HD}$ Thermal conductivity, protective jacket [(W/m·K)]

Value for Geberit Mepla multilayer pipes:

α_i = 200 W/(m²·K)
α_a = 8.1 W/(m²·K)
$\lambda_{PE\text{-}Xb}$ = 0.38 W/(m·K)
λ_{Al} = 204 W/(m·K)
$\lambda_{PE\text{-}HD}$ = 0.38 W/(m·K)

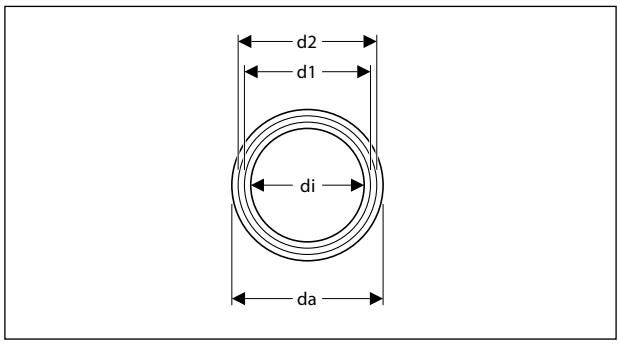


Figure 38: Cross-section of Geberit Mepla multilayer pipe

Table 25: Diameters of Geberit Mepla multilayer pipe

Nominal width DN	Pipe outside diameter da (mm)	Outside diameter of aluminium layer d2 (mm)	Outside diameter of PE-Xb layer d1 (mm)	Pipe inside diameter di (mm)
12	16	14.8	13.8	11.5
15	20	18.7	17.5	15.0
20	26	24.2	22.8	20.0
25	32	30.4	28.8	26.0
32	40	38.2	36.2	33.0
40	50	47.9	45.9	42.0
50	63	60.9	58.9	54.0
65	75	72.9	70.4	65.8

Simplified calculation

Assumptions for the simplified calculation:

- Surface mounted
- Stationary air
- Radiation not taken into account

The thermal transfer coefficient K_r is determined in the simplified calculation with the following formula:

$$K_r = \frac{\pi}{\frac{1}{\alpha_a \cdot d_a}}$$

α_a: Heat transfer coefficient, outside [W(m²·K)]

Values for Geberit Mepla:

α_a = 8.1 W/(m²·K)
λ = 0.43 W/(m²·K)

Calculation of the thermal emission Q_R

The thermal emission is determined with the following formula:

$$Q_R = (T_i \quad T_a) \cdot K_r$$

Q_R : Heat flow for 1m pipe [W/m]
K_r : Heat transfer coefficient [W/m·K)]
T_i : Water temperature in the pipe
T_a : Room temperature

Tabulation calculation of the heat emission

The values of the thermal flow Q_R in the following table are based on the general calculation of the thermal transfer coefficients K_r.

Table 26: Heat emission - Geberit Mepla

Temperature differential ΔT (K)										
	10	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Ø (mm)	**Heat flow QR [W/m]**									
16	3.7	7.4	11.1	14.8	18.5	22.2	25.9	29.6	33.3	37.0
20	4.6	9.2	13.9	18.5	23.1	27.7	32.4	37.0	41.6	46.2
26	6.0	11.9	17.9	23.9	29.8	35.8	41.8	47.7	53.7	59.7
32	7.4	14.8	22.2	29.6	36.9	44.3	51.7	59.1	66.5	73.9
40	9.2	18.4	27.6	36.7	45.9	55.1	64.3	73.5	82.7	91.8
50	11.4	22.8	34.1	45.5	56.9	68.3	79.6	91.0	102.4	113.8
63	14.2	28.4	42.6	56.8	71.0	85.2	99.5	113.7	127.9	142.1
75	17.0	34.0	51.0	68.0	85.0	102.0	119.0	136.0	153.0	170.0

Graphical calculation of the heat emission

The values of the thermal flow Q_R that can be calculated from the following figure are based on the general calculation of the thermal transfer coefficient K_r.

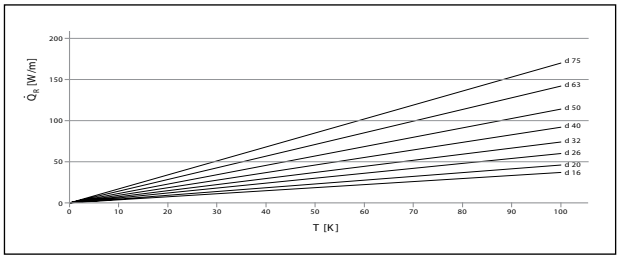


Figure 39: Heat emission – Geberit Mepla System Pipe

Q_R: Heat flow for 1m pipe
ΔT: Temperature differential

3 Geberit tools – Operation and Maintenance

3.1 Geberit Pressing Tools

Always use approved Geberit pressing tools. Please contact Geberit if you are unsure if the tool you are using is compatible with Geberit Mepla.

The instructions for use of each pressing tool must always be observed.

3.1.1 Maintenance of Geberit pressing tools

Always follow the service intervals indicated on the operating instructions of the Geberit Pressing Tool. Check the tool regularly for visible defects and damage that could affect safety, and regularly clean and lubricate it.

The service interval for the tool is indicated by a sticker on the machine. Always service and recalibrate before this date at the latest.

3.2 Geberit Mepla pressing jaw

3.2.1 Basic safety notes

WARNING
Risk of injury from incorrect handling

- Only use the pressing jaw if it is in perfect working order
- Do not tilt the pressing jaw on the pressfitting
- People without technical training are only allowed to use the pressing jaw provided that they have been instructed by a trained specialist
- If the pressing jaw has been used incorrectly, do not continue to use it and have it inspected by an authorised tool service agent

WARNING
Danger of crushing by moving parts

- Keep body parts or other objects clear of the pressing jaw and pressfitting during the operation
- Do not hold the pressing jaw with your hands during the pressing operation

CAUTION
Risk of property damage from incorrect handling

- Replace worn pressing jaw
- Use the transport case for transport and storage, and store the pressing jaw in a dry room
- Have any damage inspected immediately by an authorised tool service agent
- Observe the safety notes for the cleaning and anti-corrosion protection agents used

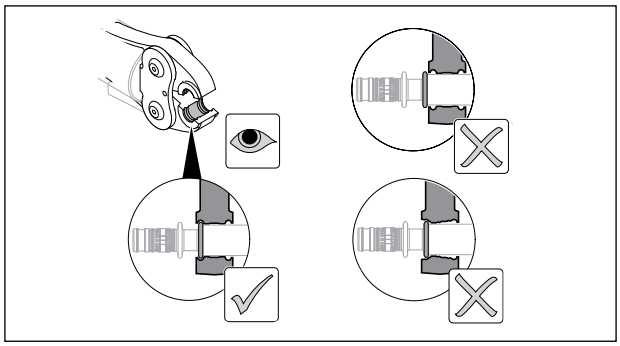
3.2.2 Operating the Geberit Mepla pressing jaw

Placing the pressing jaw on the pressfitting.

WARNING
Leaking connection due to incorrect pressing

- Clean any dirt, chips or the like between the pressing jaw and the pressfitting

1. Ensure the diameter of the pressfitting matches the diameter of the pressing jaw
2. Press the jaw levers together the open the pressing jaw
3. Place the pressing jaw on the tool guide rim of the pressfitting



4 Release the jaw lever

CAUTION
Leaking connection due to incorrect pressing

- Ensure that the pressing jaw is completely closed after the pressing operation
- Have any pressing jaws that have not been closed completely, as well as the pressing tool, inspected for damage by an authorised tool service agent. Replace any connections that have not been pressed correctly
- If aluminium is visible in the pressing area after the pressing operation, have the pressing jaw inspected by an authorised tool service agent

5 Press the pressfitting (see operating instructions of the pressing tool for the correct sequence)

6 Open the pressing jaw and remove it from the pressfitting

3.23 Maintenance schedule

A service sticker on the pressing jaw indicates the date when the next calibration is due.

For information about Geberit Mepla tool service agents, please contact your local Geberit sales representative or visit www.geberit.co.uk/toolservice

Interval	Maintenance work
Regularly	• Check the pressing jaw for externally visible defects, damage and signs of wear that could effect safety, and if necessary, take it to an authorised tool service agent • Clean and lubricate the pressing jaw with general purpose spray lubricant • Check that the jaw levers can move easily
Every year (a service sticker indicates the date)	• Have an authorised tool service agent check and re-calibrate the tool

3.3 Geberit Mepla pressing collar and adaptor

3.3.1 Basic safety notes

WARNING:
Risk of injury caused by flying fragments if used incorrectly or if worn or damaged pressing collars and adapter jaws are used

- Only use the pressing collars and adapter jaws if they are in perfect working order
- Examine the pressing collars and adapter jaws regularly before and after each use for defects, particularly for incipient cracks in the pressing contour and the retaining bracket, and also for other damage. If there are incipient cracks, take the entire pressing collar and adapter jaw out of service immediately and do not use it again
- Do not use pressing collars and adapter jaws again after they have been used incorrectly or in a way that does not comply with their intended use. Instead, hand them over to an authorised tool service agent for testing
- Adhere strictly to maintenance regulations and maintenance intervals for the pressing collars, adapter jaws and pressing tools
- Wear suitable protective equipment (protective goggles etc.)
- Only have repair work carried out on the pressing collars and adapter jaws by an authorised repair agent
- Follow the country-specific safety regulations
- Read all safety notes and instructions. Failure to observe the safety notes and instructions can lead to electric shock, fire and/or serious injuries. Store all safety notes and instructions for the future
- Read through and observe the safety notes enclosed with the pressing tool before commissioning the pressing collars and adapter jaws

NOTE

Pressing collars and adapter jaws are wear and tear parts. Frequent pressing will cause the material to become worn; advanced stages of wear will be indicated by incipient cracks. Pressing collars and adapter jaws that display this kind of wear or are damaged in any other way may break, particularly if they are used incorrectly (e.g. pressing a fitting that is too large, tilting, foreign bodies on the fitting) or in a way that does not comply with their intended use.

- Do not continue to use the pressing collars or adapter jaws if they are worn
- Take pressing collars and adapter jaws displaying incipient cracks out of service immediately and do not continue to use them
- Use the transport case for transport and storage, and store the pressing collars and adapter jaws in a dry room
- Observe the safety notes with respect to the cleaning and corrosion-protection agents used

3.3.2 Operating the Geberit Mepla pressing collar and adaptor

The pressing operation with pressing collar and adapter jaw consists of the following steps:

- Inserting the adapter jaw into the pressing tool
- Fitting the pressing collar around the pressfitting
- Hooking the adapter jaw into the pressing collar
- Carrying out the pressing operation

The adapter jaw must fit the pressing collar used:

Pressing collar	Adaptor for pressing collar
Ø 63mm	ZB 203
Ø 75mm	ZB 203

CAUTION
Risk of injury caused by flying fragments if used incorrectly or if worn or damaged adapter jaws are used

- Only use the adapter jaw if it is in perfect working order (see the basic safety notes)
- Make sure that the adapter jaw used fits the pressing collar
- If the adapter jaw has been used incorrectly, or in a way that does not comply with its intended use, do not continue to use it and have it inspected by an authorised repair shop
- Wear suitable protective equipment (protective goggles etc.)

Inserting the adapter jaw into the pressing tool

CAUTION
Leaking connection due to failed pressing sequence

- Clean away any dirt, chips or the like between the pressing collar and the pressfitting
- Make sure the pressing collar is positioned correctly on the tool guide rim
- Make sure the guide lugs on the pressing collar Ø 75mm are not damaged. Have any damaged guide lugs replaced by an authorised tool service agent

Adapter jaws are wearing parts. Frequent pressing will cause the material to become worn; advanced stages of wear will be indicated by incipient cracks. Adapter jaws that display this kind of wear or are damaged in any other way may break, particularly if they are used incorrectly or in a way that does not comply with their intended use.

The procedure for inserting the adapter jaw depends on the type of pressing tool and is described in the operating instructions for the pressing tool.

The PWH 40 pressing tool is not suitable for pressing with the ZB 203 adapter jaw, as the press capacity is insufficient.

Fitting the pressing collar around the pressfitting

CAUTION
Risk of injury caused by flying fragments if used incorrectly or if worn or damaged pressing collars are used

- **Only use the pressing collar if it is in perfect working order (see the basic safety notes)**
- **Ensure the diameter of the pressfitting matches the diameter of the pressing collar**
- **Do not tilt the pressing collar on the pressfitting**
- **Clean away any dirt, chips or the like between the pressing collar and the pressfitting**
- **If the pressing collar has been used incorrectly, or in a way that does not comply with its intended use, do not continue to use it and have it inspected by an authorised tool service agent**
- **Wear suitable protective equipment (protective goggles etc.)**

Pressing collars are wearing parts. Frequent pressing will cause the material to become worn; advanced stages of wear will be indicated by incipient cracks. Pressing collars that display this kind of wear or are damaged in any other way may break, particularly if they are used incorrectly (e.g. pressing a fitting that is too large, tilting, foreign bodies on the fitting) or in a way that does not comply with their intended use.

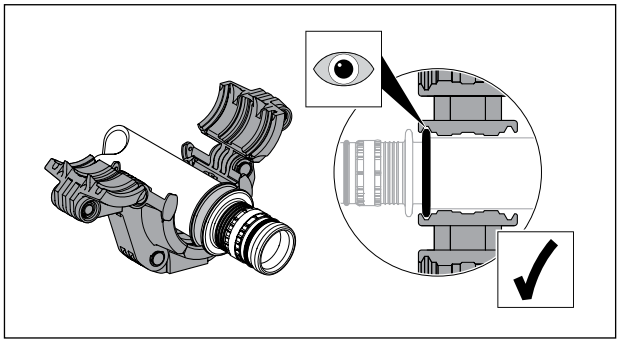
WARNING
Danger of crushing by moving parts

- **Do not place any part of your body or other objects in between the pressing collars**
- **Do not hold the pressing collar with your hands during the pressing sequence**

CAUTION
Leaking connection due to failed pressing sequence

- **Make sure that the pressing collar is completely closed after the pressing sequence**
- **Have any pressing collars that have not been closed completely, as well as the pressing tool, inspected for damage by an authorised repair shop**
- **Replace any connections that have not been pressed correctly and do not attempt corrective pressing**
- **If there are any burrs on the pressfitting after the pressing sequence, have the pressing collar inspected by an authorised tool service agent**

1. Ensure the diameter of the pressfitting matches the diameter of the pressing collar and that the adaptor matches the pressing collar
2. To open the pressing collar, pull the pressing segments apart.
3. Place the pressing collar around the pressfitting and position it on the tool guide rim of the pressfitting



4. Release the pressing segments, and the pressing segments of the pressing collar will close automatically.
5. Turn the pressing collar into the pressing position

Hooking the adapter jaw into the pressing collar

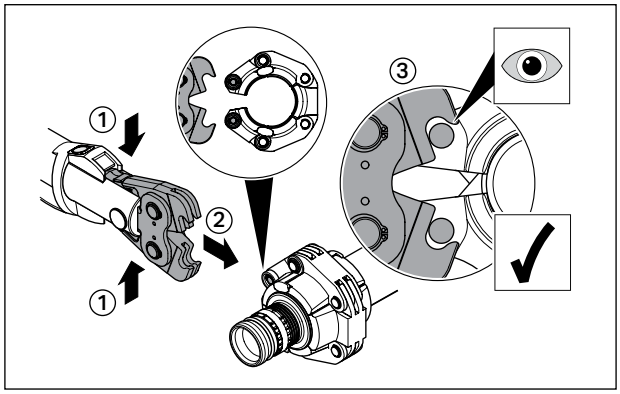
Prerequisites

The pressing collar is fitted around the pressfitting.

CAUTION
Damage to the pressing collar if adapter jaw is used incorrectly

- Make sure that the claws of the adaptor jaw always completely embrace the pins of the pressing collar

1. To open the adaptor jaw, push both jaw levers together
2. Hook the claws of the adaptor jaw into the pins of the pressing collar



3. Release both jaw levers

Carrying out the pressing operation

CAUTION
Danger of crushing by moving parts

- Do not place any part of your body or other objects in between the pressing collars
- Do not hold the pressing collar with your hands during the pressing sequence

CAUTION
Leaking connection due to failed pressing sequence

- Ensure that the pressing collar is completely closed after the pressing sequence
- Have any pressing collars that have not closed completely, as well as the adaptor for pressing collar and the pressing tool inspected for damage by an authorised tool service agent
- Replace any connections that have not been pressed correctly and do not attempt corrective pressing
- If there are any burrs on the pressfitting after the pressing sequence, have the pressing collar inspected by an authorised tool service agent

1. Press the pressfitting (see operating instructions for the pressing tool for the correct sequence)
2. Open the adaptor jaw and remove it from the pressing collar
3. Open and remove the pressing collar

Corrective pressing

If a pressed joint has not been completely pressed, it must be pressed again. Depending on the state of the initial pressing, there may be considerable idle stroke before the pressing tool engages. A corrective pressing is performed as described above for a normal pressing operation.

CAUTION
Leaking connection due to failed pressing sequence

- Fittings that have been pressed with an incorrectly positioned pressing collar may be damaged and must not be pressed again
- Replace any connections that have not been pressed correctly

3.3 Maintenance schedule

NOTE

For safety reasons, it is absolutely essential to observe the following maintenance intervals and perform the maintenance work described. The same applies to the mandatory maintenance regulations for the pressing tools.

A service sticker on the pressing collar and the adapter jaw indicates the time of the next mandatory maintenance. The pressing collar and adapter jaw must always be taken for maintenance together with the pressing tool in its transport case.

Repair work may only be carried out on the pressing collars and adapter jaws by an authorised tool service agent.

For information about Geberit Mepla tool service agents, please contact your local Geberit sales representative or visit www.geberit.co.uk/toolservice

Interval	Maintenance work
Regularly (before use, at the start of the working day)	Pressing collar and adapter jaw: • Examine the pressing collar and adapter jaw for externally visible defects; in particular, damage, incipient cracks and other signs of wear. If defects are present, replace the pressing collar and adapter jaw or have the defects repaired by an authorised repair shop • Spray the entire pressing collar and adapter jaw with BRUNOX® Turbo-Spray® or equivalent Pressing collar: • Remove deposits in the pressing contour • Clean the pressing contour with a cloth soaked in solvent (e.g. methylated spirits) • Spray the pressing contour and joints with BRUNOX® Turbo-Spray® or equivalent Adapter jaw: • Examine whether the jaw levers can move easily. If necessary, spray them with BRUNOX® Turbo-Spray® or equivalent
Annually (or after 3,000 presses)	• Have an authorised tool service agent examine the state of wear of the pressing collar and adapter jaw

4.1 Installation rules

4.1.1 Pipe laying

Follow the installation sequence:

1 Secure system pipes
2 Connect the pipes and fittings
3 Press

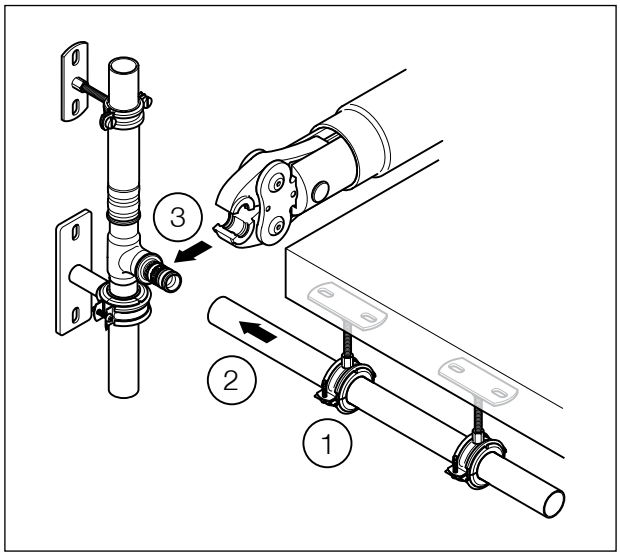


Figure 40: Installation sequence

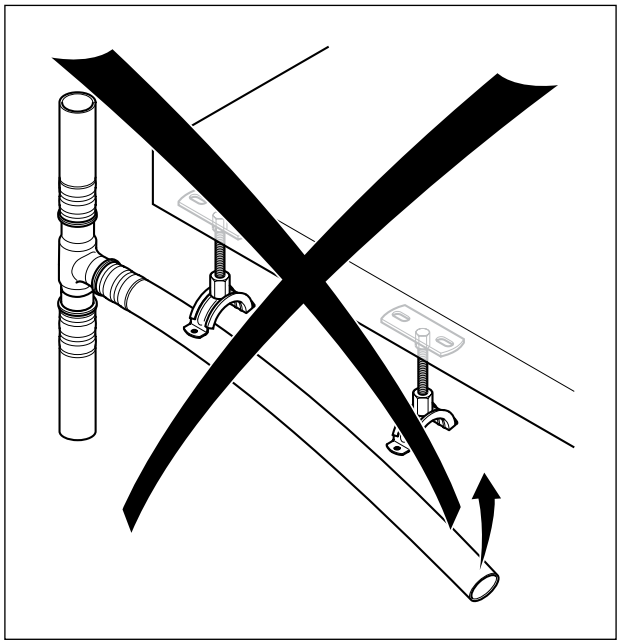


Figure 41: Keep the pressed pipes unstressed

Pressed pipes should be kept unstressed during the installation, e.g. with pipe brackets.

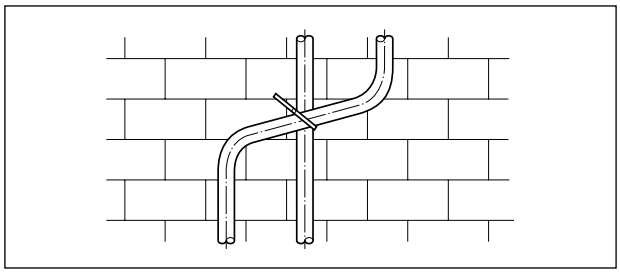
Laying under plaster

All concealed pipes must be thoroughly isolated from the building structure. The following system pipes can be used to this purpose:

- Geberit Mepla system pipes with insulation
- Geberit Mepla system pipes with protective tube

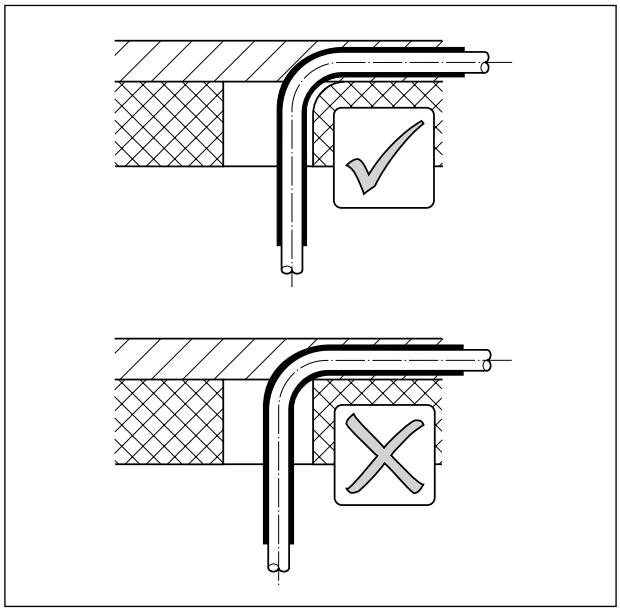
Fastenings which are not sound-absorbing are to be fixed in place over the insulation or protective tube.

In the area of pipe crossovers, the Geberit Mepla system pipes must be fixed in place because otherwise pressure surges may cause noise.



Laying via recesses in the ceiling

Never bend pipes over edges if they are routed through holes in the ceiling. The pipe could otherwise kink.



4.2 Working on pipes

4.2.1 Cutting to length

Cut Geberit Mepla system pipes to length using the Geberit Mepla pliers or a pipe cutter.

Saws and other chip producing tools are not suitable for cutting Geberit Mepla system pipes to length because chips can get trapped around the O-ring and cause leaks.

4.2.2 Bending

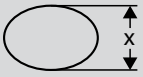
When bending the Geberit Mepla system pipes, observe the following:

- Only Geberit Mepla system pipes of Ø 16 - 50mm can be bent
- The inside of the bend should not be dented or deformed
- The protective jacket must not be damaged

The following dimensions must be complied with:

- Minimum bending radius
- Minimum oval pipe diameter

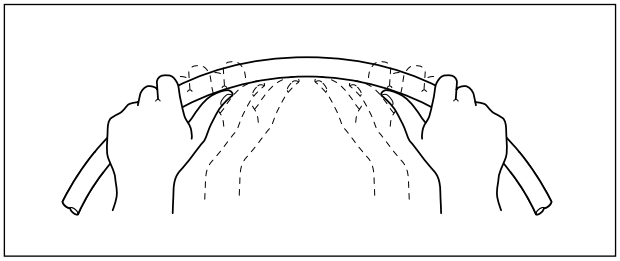
Table 27: Minimum dimensions for bending Geberit Mepla system pipe.

Geberit Mepla diameter Ø (mm)	Ovality smallest diameter Ø min. (mm) 	Minimal bended radius r (mm) 
16	15	58
20	19	70
26	24	93
32	30	116
40	37	160
50	47	200

Geberit Mepla system pipes 63mm and 75mm should not be bent. Use the 90° and 45° elbows for directional changes.

If a previously pressed pipe is to be bent, the connection points must be secured and the adjacent joints supported.

Bending by hand



Geberit Mepla system pipes Ø 16 - 26mm can be bent by hand.

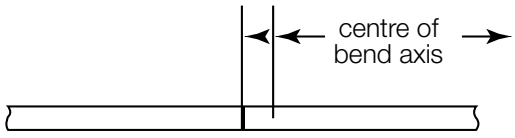
Pipes which are bent by hand should not have any indentations on the surface or be distorted on the inside.

Bending using the Geberit bending tool
Geberit Mepla system pipes 16–32 mm can be hydraulically bent with the Geberit hand-held bending tool.

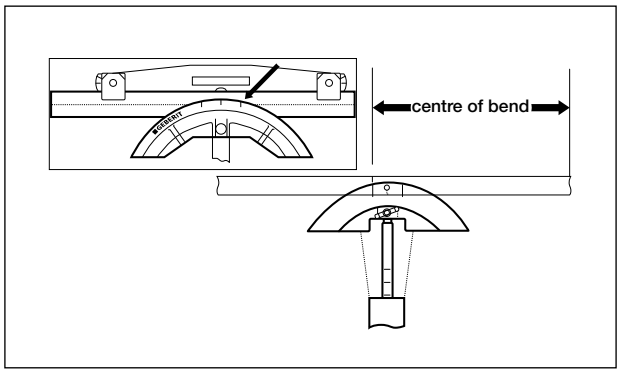
The bending die and the counter supports on the bending cheek must match the outer pipe diameter.

Bending the pre-insulated Geberit Mepla system pipes
If the Geberit hand-held bending tool is used to bend pre-insulated Geberit Mepla system pipes, this causes invisible pipe deformation. Any bending carried out with the hand-held bending tool also poses the danger of damaging the protective jacket and the insulation. We therefore recommend bending the pre-insulated system pipes by hand or removing the insulation in the relevant areas of operation, and bending the system pipes into the required shape without insulation.

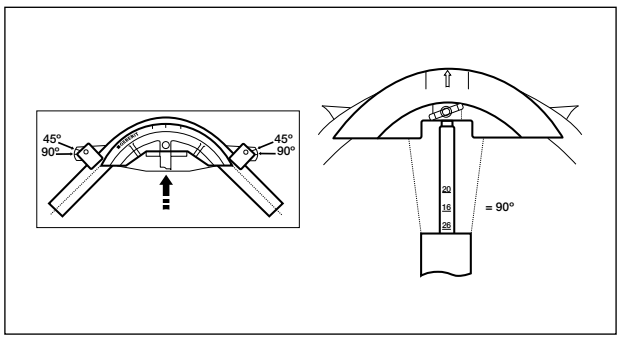
Instructions for using Geberit bending tool



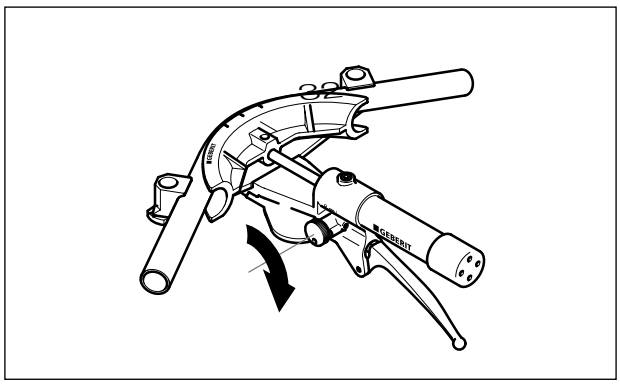
1 Mark the bending axis on the pipe.



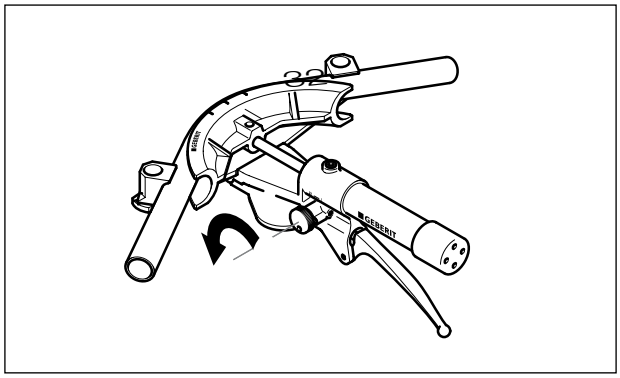
2 Place the pipe in the bending tongs.



3 Bend the pipe by operating the mechanism.



4 For 90° angles keep activating until the corresponding diameter mark appears on the rack.



5 Release the rack using the release handle. The rack moves back in automatically.

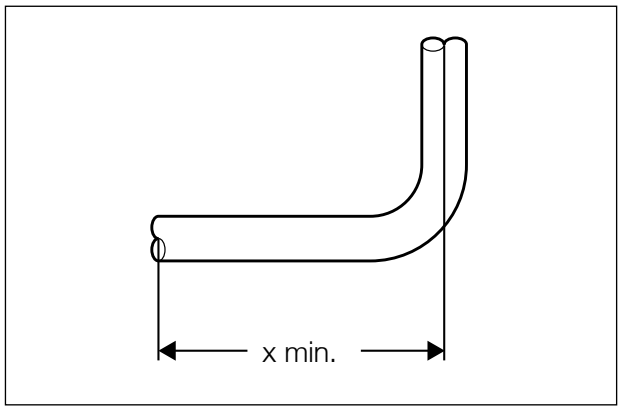


Figure 42: Minimum leg length when bending with the Geberit Mepla bending tool

Table 28: Minimum leg length when bending with the Geberit Mepla bending tool.

Ø (mm)	x min (mm)
16	120
20	130
26	180
32	240

Minimum axis displacement dimension

(When using the Geberit Mepla bending tool)

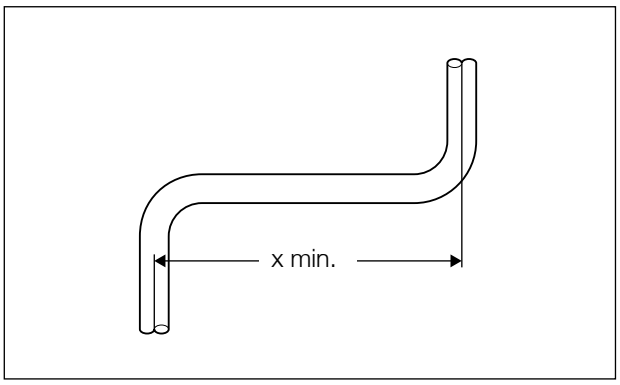


Table 29: Minimum leg length when bending with the Geberit Mepla bending tool.

Ø (mm)	x min (mm)
16	150
20	170
26	230
32	310

4.3 Fastening

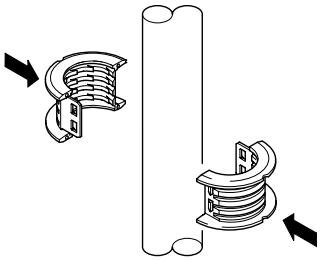
There are two ways to fasten pipes while controlling the thermal expansion:

- sliding points
- anchor points

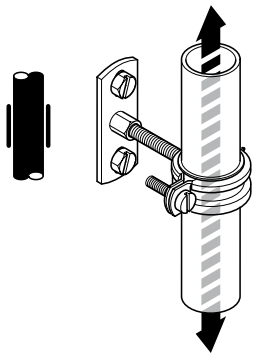
The level of expansion compensation and the arrangement of the sliding points and anchor points must be calculated.

Install the sliding point

1 Mount the pipe bracket lining shell around the pipe.



2 Fit the pipe bracket onto the pipe bracket lining shell.

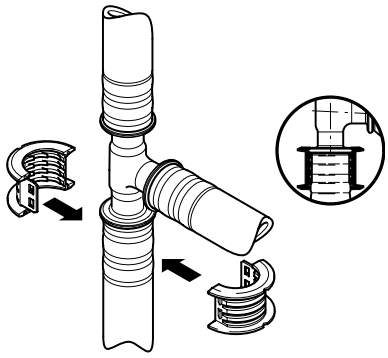


In the case of branches, the anchor point position depends on the load direction:

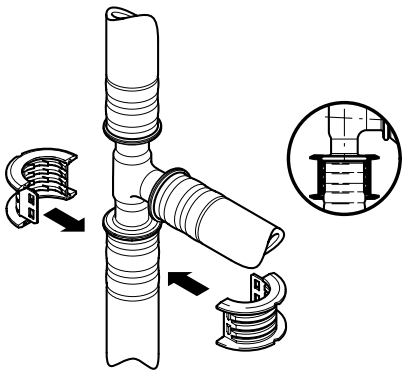
- if the load is from below, the anchor point must be installed underneath the branch
- if the load is from above, the anchor point must be installed above the branch

Install the fixed point

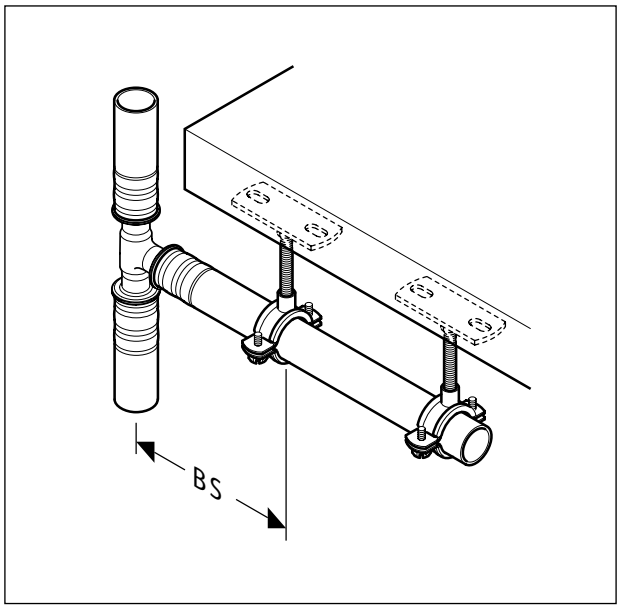
1 Mount the pipe bracket lining shell on the tool guide rim on the fitting.



2 Fit the pipe bracket onto the pipe bracket lining shell.



4.3.1 Fastening without controlling thermal expansion



Control of the lengthwise expansion caused by thermal effects is not necessary with the following pipes:

- Cold water pipes Ø 16 - 75 mm
- Hot water and circulation pipes Ø 16 - 26 mm
- Hot water and circulation pipes Ø 32 - 75 mm, straight pipe runs of up to 12 m

The insulation must be capable of accommodating the necessary change in length. To this purpose the insulation thickness must be at least 1.5 times the change in length.

To fasten the pipes, use pipe brackets with acoustic insulation inserts. Fasten the pipe brackets according to installation specifications, depending on the distance from the wall and ceiling.

4.3.2 Fastening with control of thermal expansion

With hot water and circulation pipes Ø 32 - 75 mm with a straight pipe run exceeding 12 m, control of the change in length caused by thermal expansion must be taken into account.

Anchor points and sliding points are used for this purpose. Expansion compensation and the arrangement of the sliding points and fixed points must be calculated.

For sliding points and anchor points, in addition to the pipe brackets with acoustic insulation inserts also use pipe bracket lining shells. For sliding points, pipe bracket lining shells guarantee a regular slide with a defined force.

The bending leg length BS must be surface-mounted so that the bending leg can fulfil its function.

4.4 Pipe bracket spacing

The fastening distance between the individual pipe brackets on surface-mounted Geberit Mepla system pipes is 1 – 2.5m, depending on the diameter. No additional support brackets are required when pipes are laid clear of the ceiling.

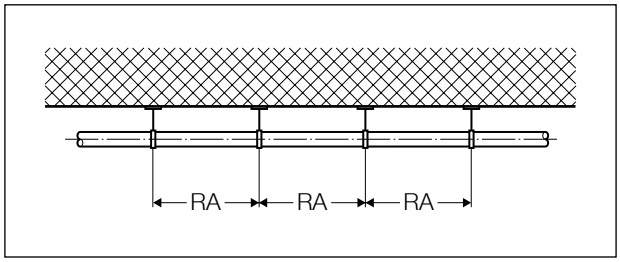


Figure 43: Geberit Mepla pipe bracket spacing

Fastening distances between the pipe clips: 80 cm
Fastening distance for fittings and bends: 30 cm

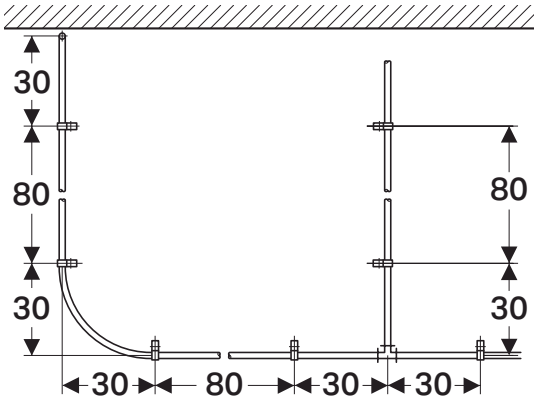


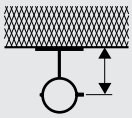
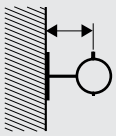
Figure 44: Fastening distances for pipelines laid from the floor

Table 30: Geberit Mepla pipe bracket spacing

Ø (mm)	Pipe bracket spacing RA (m)
16	1.00
20	1.00
25	1.50
32	2.00
40	2.00
50	2.00
63	2.50
75	2.50

The pipe brackets are fastened depending on the distance from the wall and ceiling according to Table 48.

Table 31: Thickness of the threaded drop rods

Bracket type	Distance (mm)	Diameter (mm)							
		16	20	25	32	40	50	63	75
Pipe bracket on ceiling 	<100	M8	M8	M8	M8	M8	M10	M10	½”
	110 – 200	M8	M8	M8	M10	M10	M10	M10	½”
	210 – 300	M8	M8	M10	M10	½”	½”	½”	½”
	310 – 400	M10	M10	M10	M10	½”	½”	½”	½”
	410 – 600	M10	M10	M10	½”	½”	½”	½”	½”
Pipe bracket on wall 	<100	M8	M8	M8	M8	M10	M10	M10	½”
	110 – 200	M10	M10	M10	M10	M10	M10	M10	½”
	210 – 300	M10	M10	½”	½”	½”	½”	½”	½”
	310 - 600	½”	½”	½”	½”	½”	½”	½”	½”

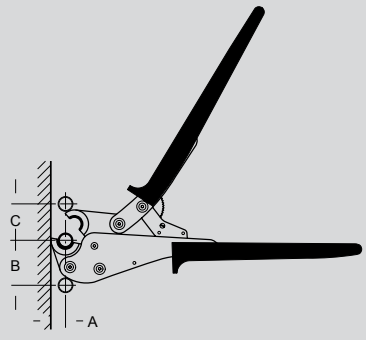
The pipe brackets are fastened as anchor points up to a ceiling and wall spacing of 25 cm as ½”.

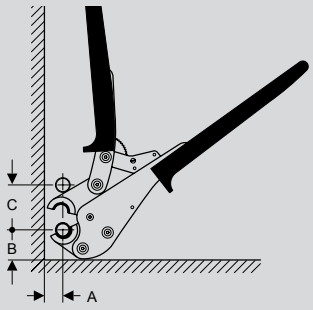
4.5 Space Requirements

4.5.1 Space requirements during pressing with hand operated pressing tool

The Geberit Mepla system pipes must be installed ensuring that there is sufficient space for pressing.

Table 32: Space requirements when pressing with hand-operated pressing tool – mounting on smooth wall and in corners.





Ø (mm)	A (cm)	B (cm)	C (cm)	Ø (mm)	A (cm)	B (cm)	C (cm)
16	1.5	3.8	4.2	16	1.9	3.0	5.0
20	1.6	4.2	4.4	20	2.06	3.1	5.5
26	1.9	4.7	5.3	26	2.3	3.3	6.2

4.5.2 Minimum dimensions for fitting combinations

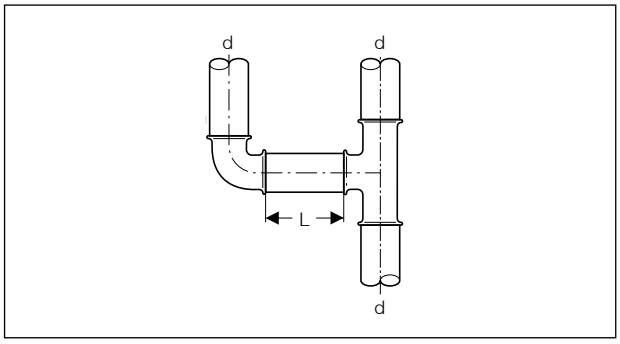


Figure 45: Minimum pipe length between two fittings with press connection

Table 33: Minimum pipe length between two fittings with press connection

Ø (mm) (mm)	16	20	26	32	40	50	63	75
L (mm)	55	60	69	79	91	103	150	190

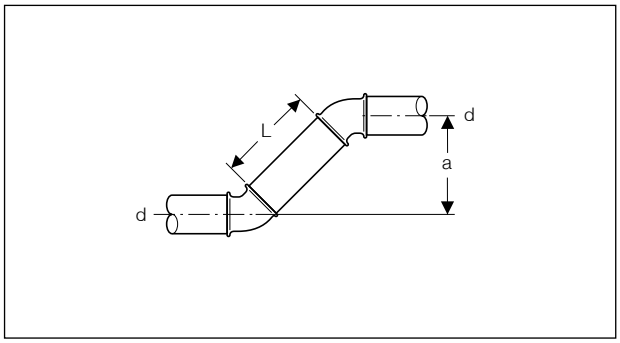


Figure 46: Minimum pipe length and distance between two 45° elbows

Table 34: Minimum pipe length and distance between two 45° elbows

Ø (mm)	26		32		40		50		63		75	
	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)
PVDF	71	69	81	79	95	91	108	103	146	150	175	190

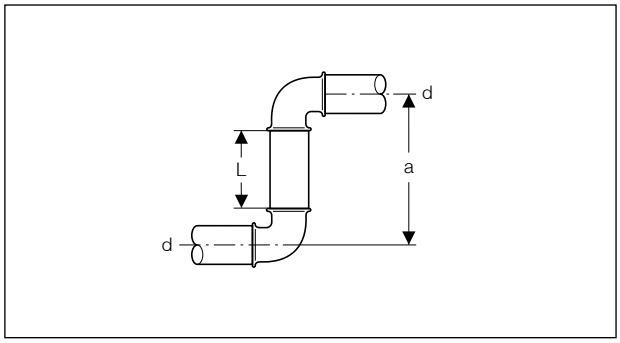


Figure 47: Minimum pipe length and distance between two 90° elbows

Table 35: Minimum pipe length and distance between two 90° elbows

Ø (mm)	16		20		26		32		40		50		63		75	
	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)
PVDF	91	55	98	60	115	69	133	79	157	91	181	103	256	150	309	190

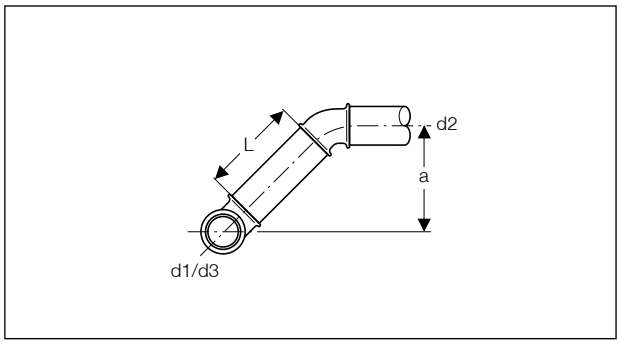


Figure 48: Minimum pipe length and distance between T-piece and 45° elbow

d1/d3: Through-flow
d2: Branch fitting

Table 36: Minimum pipe length and distance between T-piece and 45° elbow

d1/d3 (mm)	d2 (mm)	26		32		40		50		63		75	
		a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)
20	PVDF	76	69										
26	PVDF	75	69	85	79								
32	PVDF	78	69	87	79	101	91						
40	PVDF	81	69	93	79	105	91						
50	PVDF	88	69	77	79	109	91	120	103				
63	PVDF	95	69	105	79	116	91	127	103	163	150		
75	PVDF	99	69	107	79	119	91	132	103	168	150	197	190

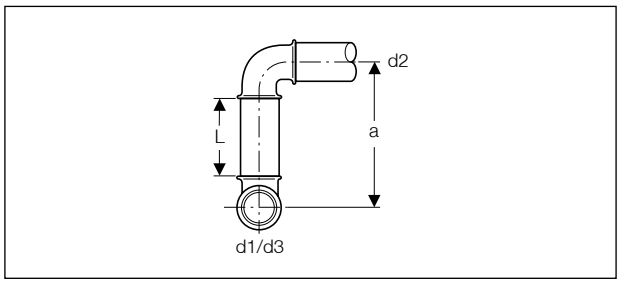


Figure 49: Minimum pipe length and distance between T-piece and 90° elbow

d1/d3: Through-flow
d2: Branch fitting

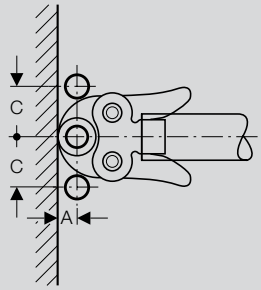
Table 37: Minimum pipe length and distance between T-piece and 90° elbow

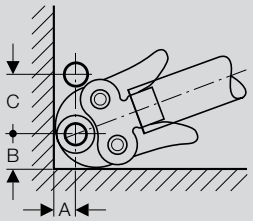
d1/d3 (mm)	d2 (mm)	16		20		26		32		40		50		63		75	
		a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)	a (mm)	L (mm)
16	Rg/Ms	102	60	109	65												
20	Rg/Ms	104	60														
26	Rg/Ms	107	60														
32	Rg/Ms	111	60														
16	PVDF	95	55	101	60												
20	PVDF	95	55	101	60	114	69										
26	PVDF	99	55	107	60	114	69	129	79								
32	PVDF	102	55	110	60	118	69	132	79	157	91						
40	PVDF			114	60	122	69	140	79	162	91						
50	PVDF					132	69	146	79	168	91	186	103				
63	PVDF					141	69	157	79	178	91	197	103	255	150		
75	PVDF					144	69	160	79	182	91	203	103	263	150	309	190

4.5.3 Space requirements during pressing with pressing jaw

The Geberit Mepla system pipes must be installed in such a way so that there is sufficient space for pressing.

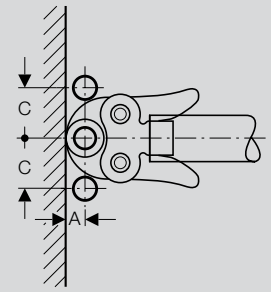
Table 38: Space requirements when pressing with a mechanical pressing tool with pressing jaw compatibility [1] – mounting on a smooth wall and in corners

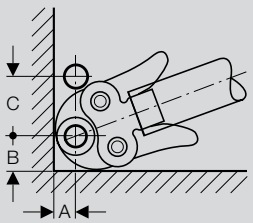




Ø (mm)	A (cm)	C (cm)	Ø (mm)	A (cm)	B (cm)	C (cm)
16	1.5	3.5	16	1.8	2.8	5.5
20	1.7	4.2	20	2.0	3.3	5.5
26	2.0	4.8	26	2.2	3.5	6.0
32	2.5	5.5	32	2.6	3.8	6.6
40	2.9	6.8	40	3.0	4.6	7.4

Table 39: Space requirements when pressing with a mechanical pressing tool with pressing jaw compatibility [2] – mounting on a smooth wall and in corners



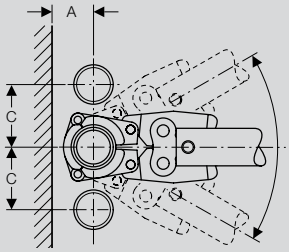


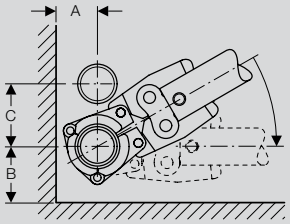
Ø (mm)	A (cm)	C (cm)	Ø (mm)	A (cm)	B (cm)	C (cm)
16	1.6	4.2	16	1.9	3.1	5.8
20	1.8	4.6	20	2.0	3.4	5.7
26	2.1	5.3	26	2.3	3.7	6.2
32	2.7	6.2	32	2.7	4.5	6.7
40	3.1	7.2	40	3.1	5.1	7.7
50	4.0	9.5	50	4.0	6.0	9.5

4.5.4 Space requirements during pressing with pressing collar

The Geberit Mepla system pipes must be installed in such a way so that there is sufficient space for pressing.

Table 40: Space requirements when pressing with a mechanical pressing tool with pressing collar – mounting on a smooth wall or in corners





Ø (mm)	A (cm)	C (cm)	Ø (mm)	A (cm)	B (cm)	C (cm)
63	8.0	11.0	63	8.0	9.0	11.0
75	9.5	15.0	75	9.5	10.0	15.0

4.6 Making a Geberit Mepla press connection

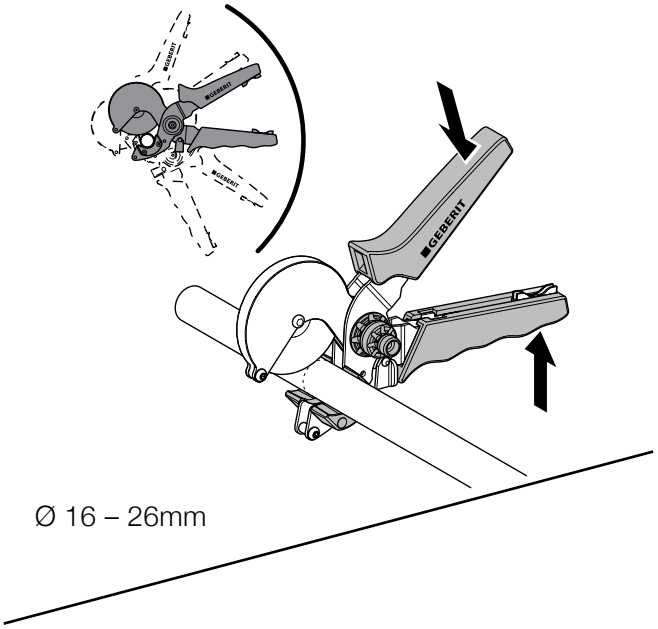
A Geberit Mepla pipe system is assembled in the following steps:

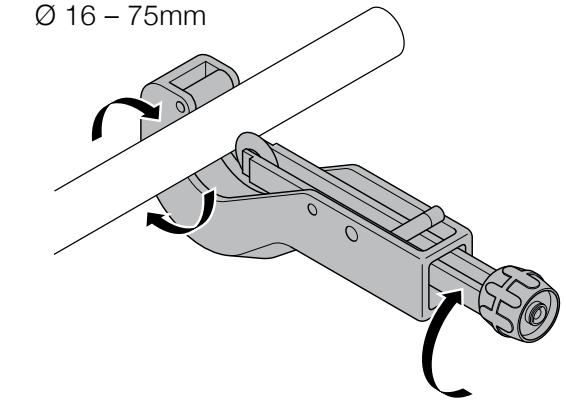
- Prepare the system pipe
- Press the fittings

The use of saws and other tools which cause shavings should be avoided when cutting the Geberit Mepla system pipes, as any shavings around the O-ring can become trapped and can cause leaks.

1 Determine the pipe length.

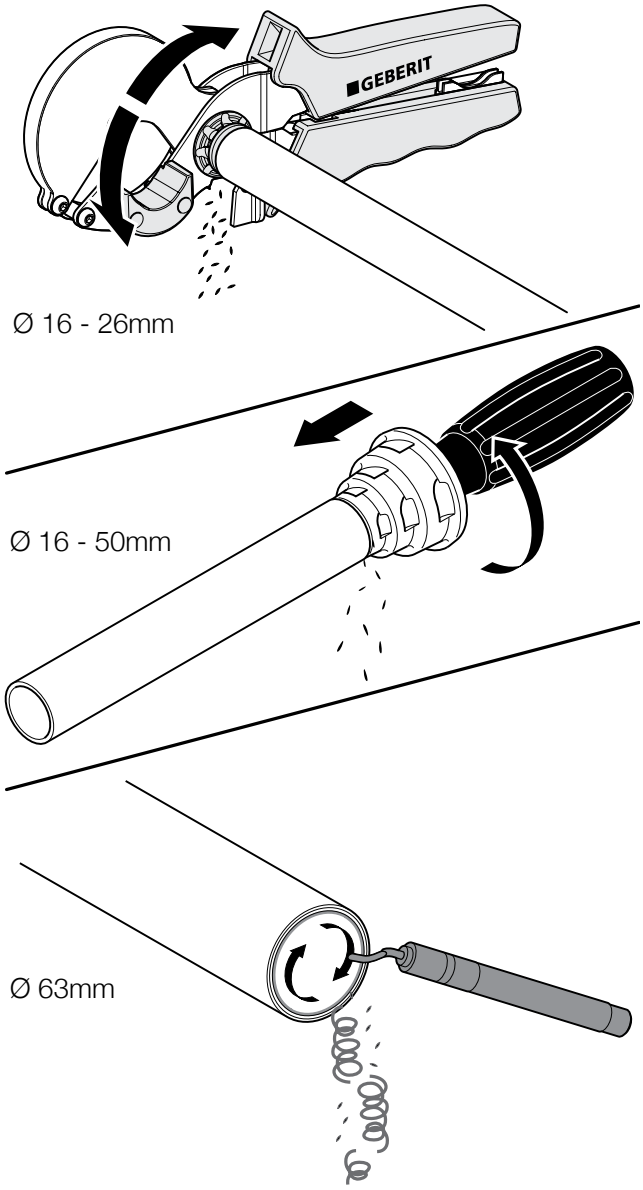
2 Cut the Geberit Mepla system pipe at a right angle.



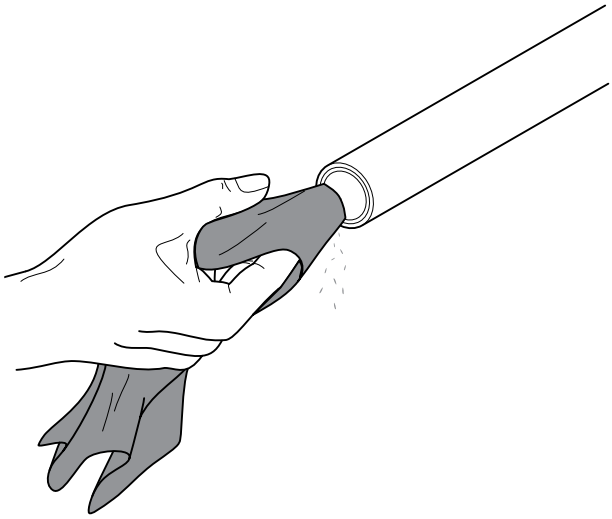


Prepare the pipe and fitting for the pressing operation.

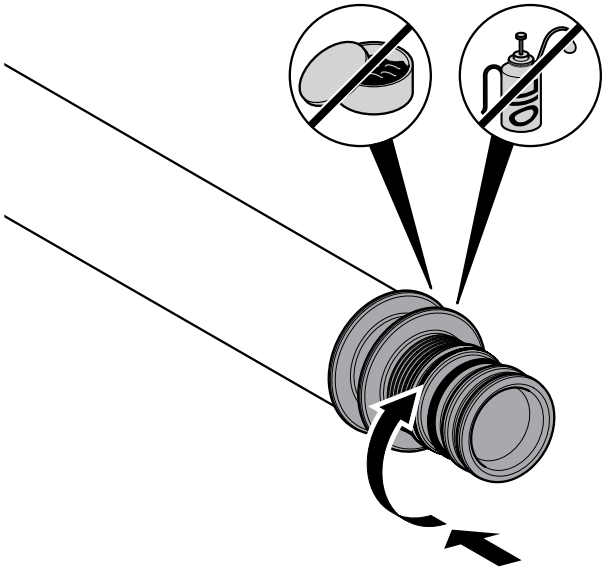
3 Calibrate and deburr the ends of the pipe.



4 Remove chips from the system pipe.



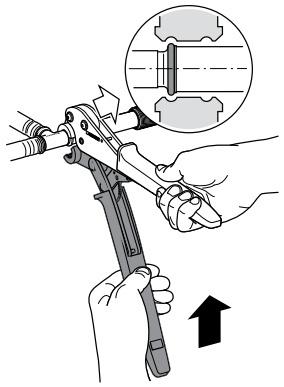
5 Connect the pipe and the fitting. Push fitting completely into pipe.



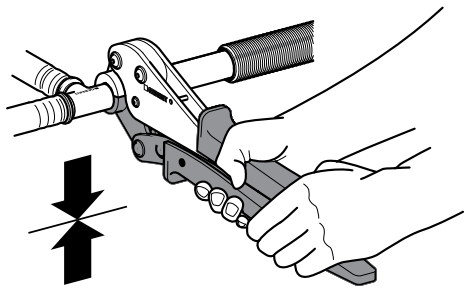
4.6.1 Pressing a Geberit Mepla press connection with hand operated tool

Ø 16 - 20mm

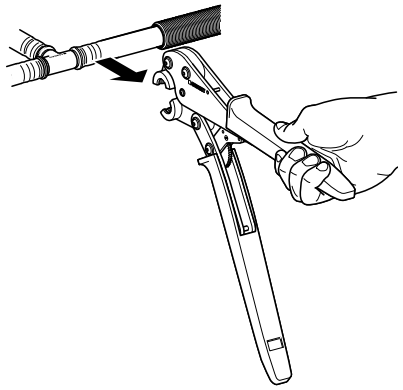
1 Place Geberit Mepla pressing pliers onto guidance groove of fitting.



2 Pressing made by fully closing the pliers.



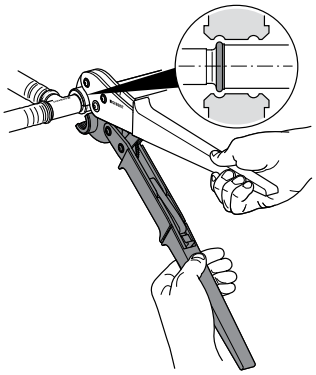
3 The pressing tool reopens automatically after completed pressing.



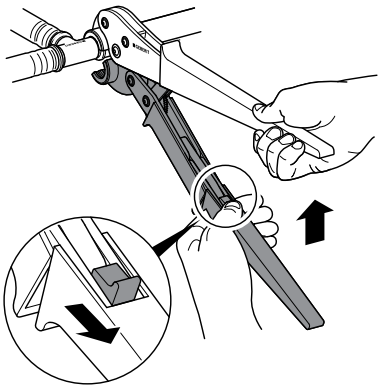
If fittings are turned or pipes are excessively deflected after pressing, the procedure must be repeated.

Ø 26mm

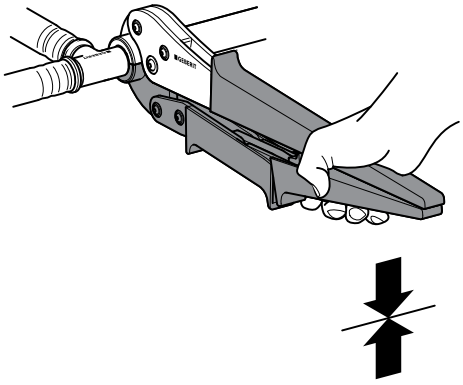
1 Position the hand-operated pressing tool with its groove on the bulge of the fitting.



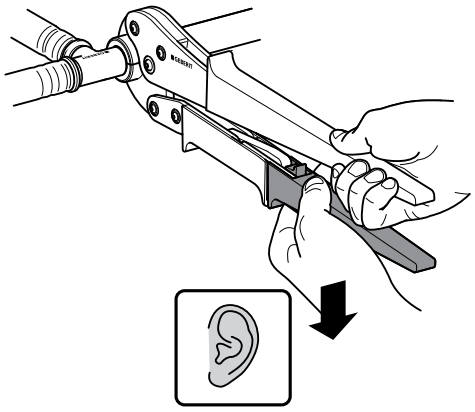
2 Put the legs of the pliers into the offset position by pulling on the slide.



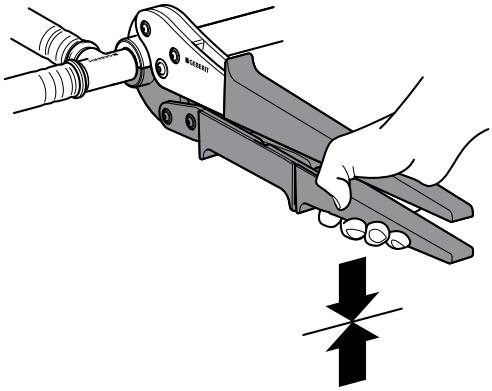
3 Press the legs of the pliers completely together.



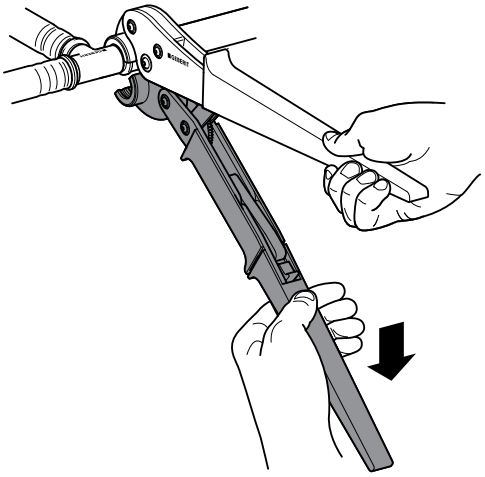
4 Put the offset lever back to the initial position.



5 Complete the pressing operation by closing the legs of the pliers.



6 Pliers open automatically after the pressing has been completed.



For information on required space for pressing procedure, please see section 4.5.1

If fittings are turned or pipes are excessively deflected after pressing, the procedure must be repeated.

4.6.2 Pressing a Geberit Mepla press connection using a mechanical tool

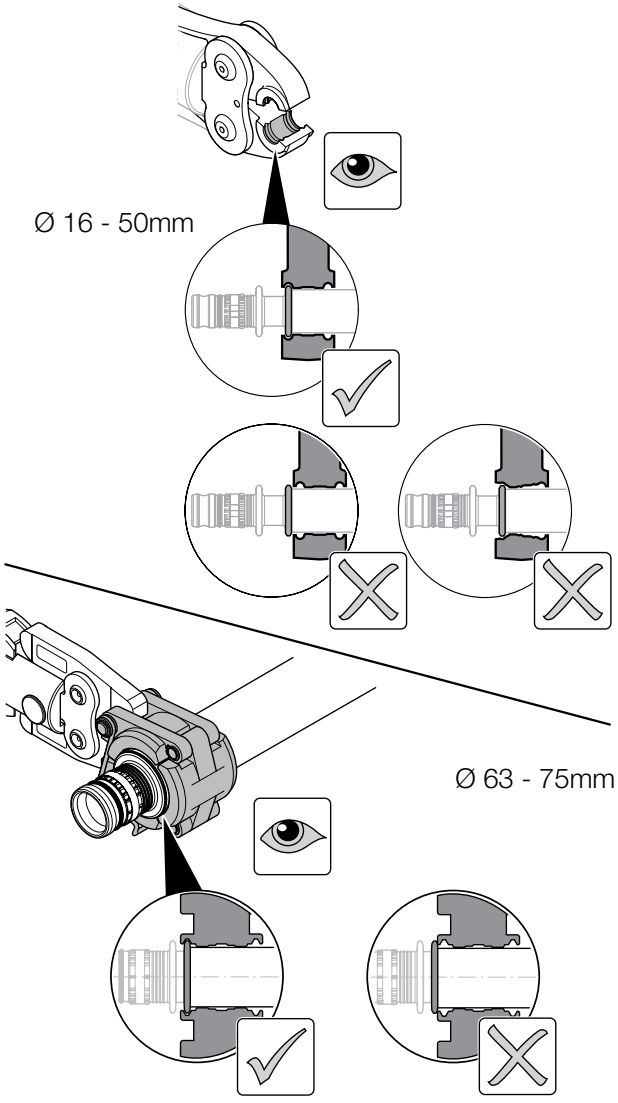
Prerequisites

- The system pipe and fittings are assembled and aligned
- No stress on pipes and fittings

Ensure that the diameter of the pressfitting matches that of the pressing jaw or pressing collar: Ø 16 – 50mm use Geberit Mepla pressing jaws, Ø 63 – 75mm use Geberit Mepla pressing collar and adapter jaw.

CAUTION
Leaking connection due to poor alignment of pipes and fittings

▶ Ensure pipes are aligned before pressing

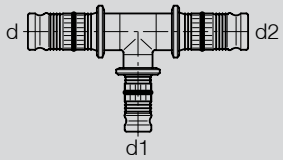


4.7 Additional connection and repairs

4.7.1 Additional connection

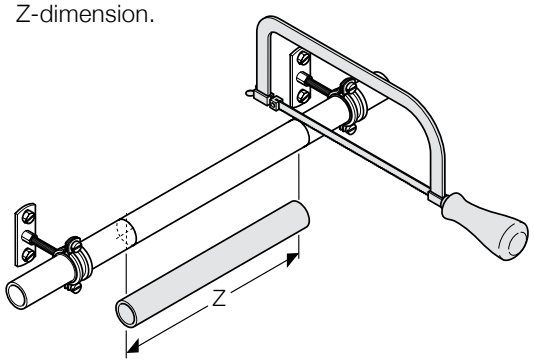
Insert T-piece: additional connections are easy to insert into existing pipework by using repair couplers Ø 16 - 50mm (60x.575.00.5) and T-pieces (6xx.3xx.00.5).

Table 41: Dimensions of pipe sections when inserting T-piece into existing pipework



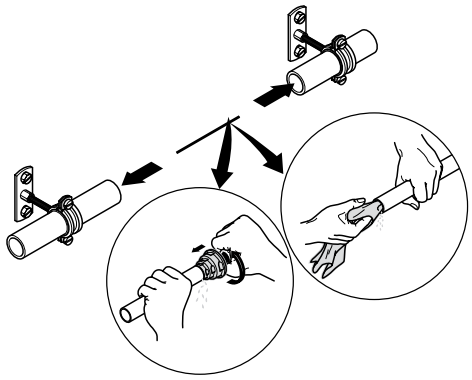
d/d2	d1	L (mm)	Z (mm)
16	16	110	224
16	20	110	224
20	16	120	240
20	20	120	240
26	16	140	258
26	20	140	268
26	26	140	268
32	16	135	265
32	20	135	265
32	26	135	270
32	32	135	275
40	20	165	305
40	26	165	315
40	32	165	320
40	40	165	330
50	32	190	355
50	40	190	365
50	50	190	375

1 Remove pipe section, observing correct Z-dimension.

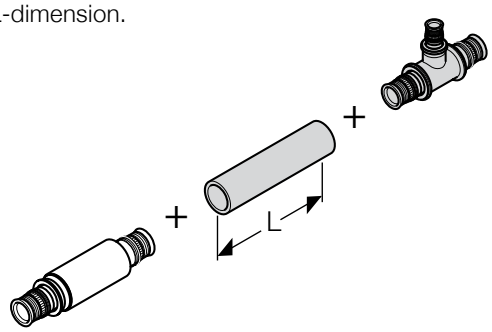


Z = see table to the left.

2 Prepare ends of cut pipe.

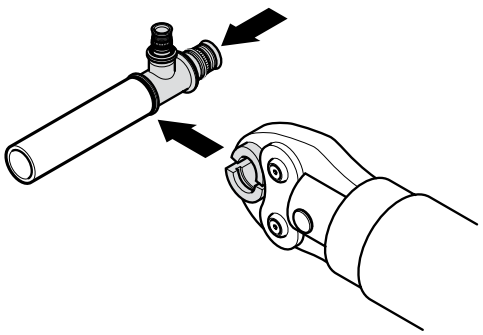


3 Cut spacer pipe to length, observing correct L-dimension.

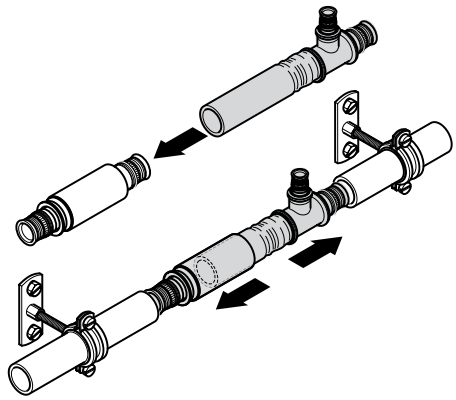


L = see table to the left.

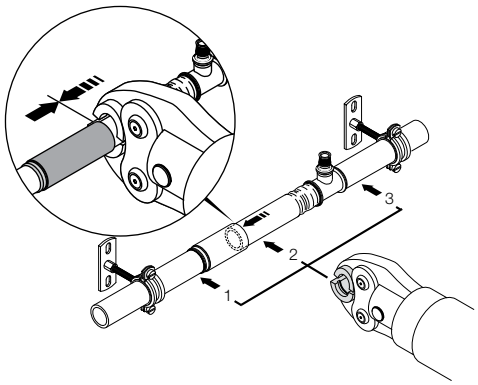
4 Insert T-piece into spacer pipe and press connection.



5 Assemble repair coupling and spacer pipe and extend into existing pipework.



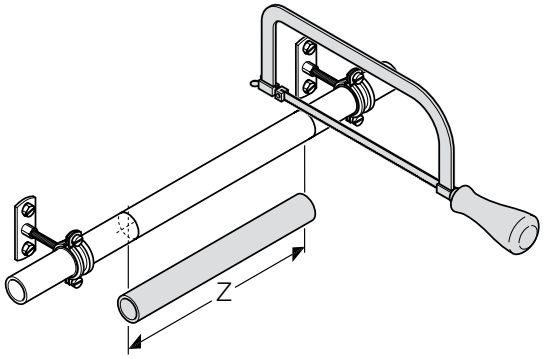
6 Press the sleeve of the repair coupling to finish the connection.



4.7.2 Pipe repair

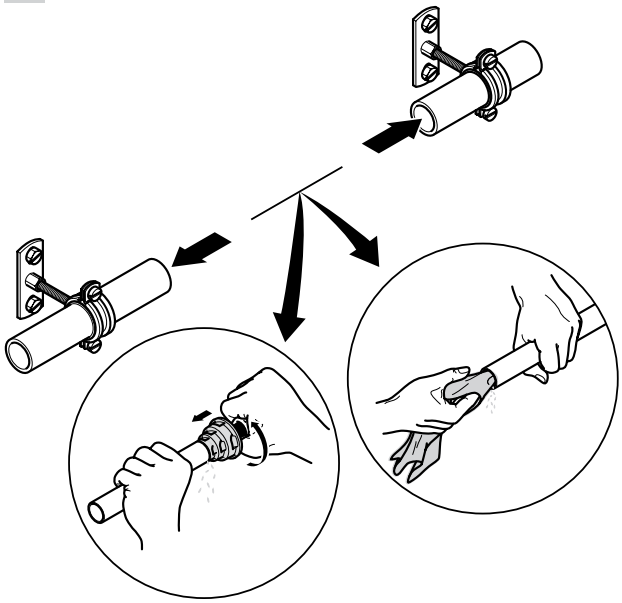
Repair pipework: sections of pipework are easy to insert into existing pipework by using repair couplers Ø 16 - 50mm (60x.575.00.1) and couplings (62x.505.00.1).

1 Remove pipe section, observing correct Z-dimension.

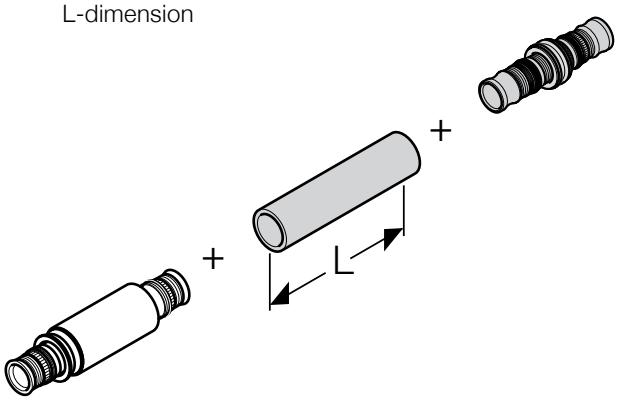


Ø 16 Z = 195
Ø 20 Z = 210
Ø 26 Z = 235
Ø 32 Z = 235
Ø 40 Z = 275
Ø 50 Z = 315

2 Prepare ends of cut pipe.

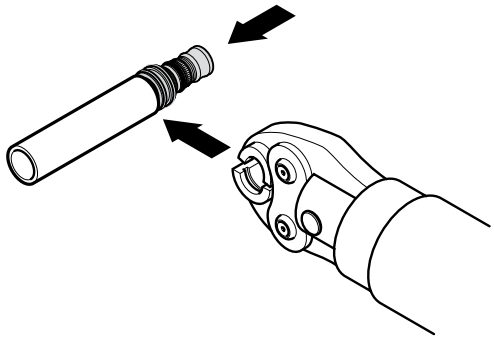


3 Cut spacer pipe to length, observing correct L-dimension

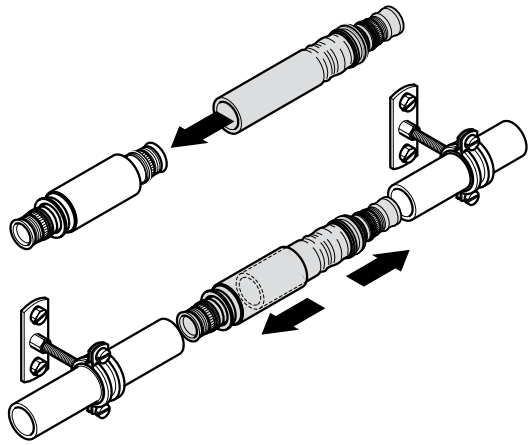


Ø 16 L = 110
Ø 20 L = 120
Ø 26 L = 140
Ø 32 L = 135
Ø 40 L = 165
Ø 50 L = 190

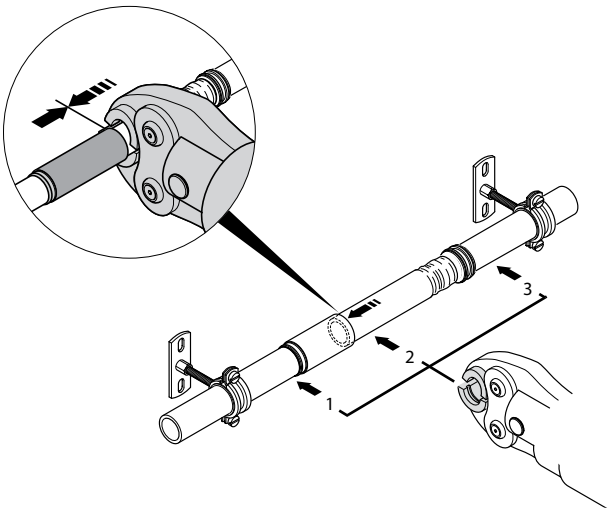
4 Insert coupling into spacer pipe and press connection.



5 Assemble repair coupling and spacer pipe and extend into existing pipework.



6 Press the sleeve of the repair coupling to finish the connection.



4.8 Pressure testing

Please see the section on pressure testing under Geberit Mapress on page 83 of this guide.

5 Maintenance

Disinfection

Please see the section on disinfection under Geberit Mapress on page 91.

Descaling

Limescale deposits that lead to malfunctions (such as reduced water flow) in the Geberit Mepla system pipes can be removed using a suitable limescale remover. This requires the following conditions to be fulfilled:

- Only use a sulfamic or citric-acid-based limescale remover
- The limescale remover must contain a corrosion-protection agent and be approved by the manufacturer for use with non-ferrous heavy metals
- Under no circumstances should the limescale remover come into contact with the aluminium on the front-end connection points of the system pipes
- Do not exceed the concentration for use and application time specified by the manufacturer of the limescale remover
- Use the limescale remover at room temperature
- Rinse the pipeline thoroughly after descaling. There must be no acid left on the draw-off point (check the pH value)
- The limescale deposits must not be removed mechanically, as this runs the risk of damaging the surfaces of the system pipe

Pipe lining

Geberit Mepla is not suitable for pipe lining by means of sandblasting and a subsequent coating of epoxy resin. The system pipes cannot withstand the pressure involved in the sandblasting process. Furthermore, the surface of the system pipes is not designed for an epoxy resin coating.

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