Geberit Sales Ltd
Geberit House
Academy Drive
Warwick
Warwickshire
CV34 6QZ

T 0800 077 8365
F 0844 800 6604
Eire +44 (0)1926 516 800
Literature 0800 007 5133

→ www.geberit.co.uk

Supply Systems Installation Guide

GEBERIT

Supply Systems Installation Guide

Mapress and Mepla. Valid from 1. April 2012

KNOW HOW INSTALLED

Supply Systems Installation Guide

Contents

Geberit Mapress Installation Guide

Contents

Geberit Mapress Installation Guide

Contents

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 drinking 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*
- Mapress system valves
- Mapress pressing tools
  - ACO 102 [1]
  - ACO 202, ECO 202 [2]
  - EFP 02 [2]
  - ECO 301 [3]
- 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”.

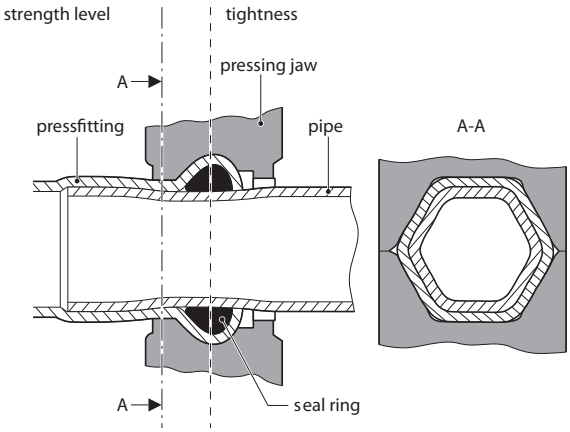


Figure 3: Cross-section of a Mapress press connection with applied pressing jaw Ø 12 - 35mm and hexagonal pressing contour

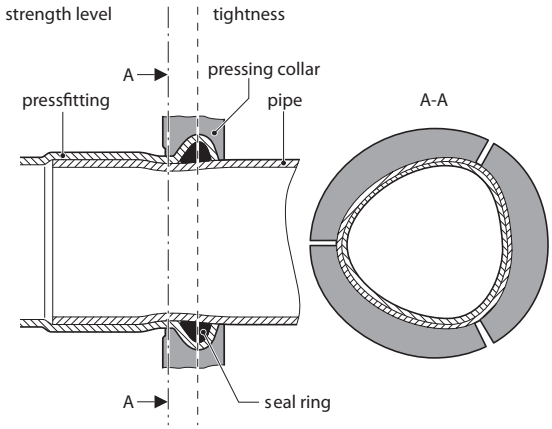


Figure 4: Cross-section of a Mapress press connection with applied pressing collar Ø 42 - 108mm and lemon shaped contour

1.2.3 Approvals

Table 1: Approvals for Geberit Mapress

System	Application	Testing guidelines / Codes of practice	Approval mark
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 0610086 DVGW W 534 SVGW W/TPW 132 TRbF 231 DVGW W 270 FM	DW 8501AT2552 (DVGW) SVGW 8503-1663 OVGW-W 1.088
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	
Geberit Mapress Stainless Steel Gas Ø 15 - 108mm	Natural gases Liquefied gases	BSi (UK) DVGW VP 614 OVGW G1-TR Gas	DG 4550BL0118 (DVGW) OVGW G 2.663
Geberit Mapress Copper Ø 15 - 108mm	Drinking water Heating water Open and closed water circuits Compressed air	WRc (WRAS) cert. no 0610087 DVGW W 540 DVGW W 270	DW 8501AT2552 (DVGW) SVGW 8503-1663 OVGW-W 1.088
Geberit Mapress Copper Gas Ø 15 - 54mm	Natural gases Liquefied gases	BSi (UK) DVGW VP 614	DG 4550BL0161 (DVGW)

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 MapressCuNiFe

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.

Transport and storage

During transportation and storage, Gebrit Mapress system pipes are protected against dirt using factory fitted plugs and packaging material. These must not be removed until they are installed to prevent contamination.

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

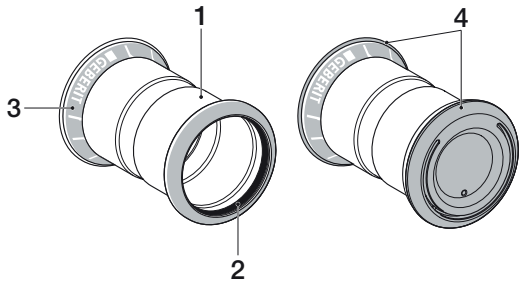


Figure 5: Construction of Geberit Mapress pressfitting

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 light green 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 without pressing socket (e.g. bend with plain ends) as well as all pressfittings made of non-alloy steel 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 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 2: 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 3: 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 4: 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	500-700	N/mm^2
0.2% - Expansion limit $R_{p0.2}$	≥ 220	N/mm^2
Breaking elongation A_5	> 40	%

Table 5: 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 bending tool up to r>3.5·d. Specialist bending equipment will be required above 54mm diameter. 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 6: 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 7: 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 8: 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

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

Table 9: 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/mm²
Breaking elongation A_5	> 40	%

Table 10: 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	0.351	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 1.5	72.1	3.715	4.083
80	88.9 x 1.5	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 bending tool up to r>3.5·d. Specialist bending equipment will be required above 54mm diameter. 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 11: 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

1.3.4 Geberit Mapress Stainless Steel pressfitting

Table 12: 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 13: Product material of Geberit Mapress pressing indicator

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

Table 14: Product material of Geberit Mapress protection plug

Material Designation	Abbreviation	Recycling code
Polyethylene low density	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 15: 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.

Geberit Mapress Stainless Steel Silicone-free pressfitting

Table 16: 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 17: Product material of Geberit Mapress pressing indicator

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

Table 18: Product material of Geberit Mapress protection plug

Material Designation	Abbreviation	Recycling code
Polyethylene low density	PE-LD	

Marking

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 19: 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

Mapress Stainless Steel Silicone-free pressfittings are packed individually and come with a clear protection plug which protects the fitting from dirt and dust.

Mapress Stainless Steel Gas pressfitting

Table 20: Material of 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 21: Product material of Geberit Mapress pressing indicator

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

Table 22: Product material of Geberit Mapress protection plug

Material Designation	Abbreviation	Recycling code
Polyethylene low density	PE-LD	

Marking

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 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 23: Marking on 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

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.

1.3.5 Mapress Carbon Steel system pipe

Mapress Carbon Steel system pipe, externally galvanised

Table 24: Material of Mapress Carbon Steel system pipe, externally galvanised

Material Designation	Abbreviation (BS EN10305)	Material no.	
		EN	AISI
Non-alloy steel	E195 (RSt 34-2)	1.0034	1009

Table 25: Galvanising characteristics of Mapress Carbon Steel system pipe, externally galvanised

Type of galvanisation	Coating version (DIN 50961)	Coating thickness (µm)
Galvanically zinc-plated, blue passivated	FeZn8	8

Table 26: Physical characteristics of 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 27: 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 28: 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 29: Technical data of 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
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.

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 30: 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	No Potable Water

Geberit Mapress Carbon Steel system pipe, plastic coated

Table 31: Material of Geberit Mapress Carbon Steel system pipe, plastic coated

Material Designation	Abbreviation (BS EN 10305)	Material no.	
		EN	AISI
Non-alloy steel	E195 (RSt 34-2)	1.0034	1009

Table 32: 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 primer for plastic.

Table 33: 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 34: 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 35: 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	300	Nm	22 x 1.5

Table 36: 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.

Marking

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 37: Marking of 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)

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 38: Material of 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 39: Galvanising characteristics of Mapress Carbon Steel system pipe, internally and externally galvanised

Type of galvanisation	Coating version (BS EN 10326)	Coating galvanisation thickness (µm)
Hot-dip coating	Z275	20

Table 40: Physical characteristics of 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 41: 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 42: 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
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.

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 43: 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)

1.3.6 Geberit Mapress Carbon Steel pressfitting

Table 44: Material of Geberit Mapress Carbon Steel pressfitting

Material Designation	Abbreviation (BS EN 10305)	Material no.	
		EN	AISI
Non-alloy steel	E195 (RSt 34-2)	1.0034	1009

Table 45: Product material of Geberit Mapress pressing indicator

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

Table 46: Product material of Geberit Mapress protection plug

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

Table 47: Galvanising characteristics of Geberit Mapress Carbon Steel pressfitting

Type of galvanisation	Coating version (BS EN 10326)	Coating 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 48: 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.

1.3.7 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 49: 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 50: Technical data of Copper pipe, defined by BS EN 1057 (thin-walled)

Nominal width DN	Pipe dimension d x s (mm)	Internal diameter di (mm)	Pipe weight m (kg/m)	Water volume V (l/m)	Strength
12	15 x 0.7	13.6	0.280	0.145	R250
20	22 x 0.9	20.2	0.531	0.321	R250
25	28 x 0.9	26.2	0.682	0.539	R250
32	35 x 1.2	32.6	1.134	0.835	R250/R290
40	42 x 1.2	39.6	1.369	1.232	R250/R290
50	54 x 1.2	51.6	1.772	2.091	R250/R290
65	66.7 x 1.2	64.3	2.198	3.247	R290
65	76.1 x 1.5	73.1	3.129	4.197	R290
100	108 x 1.5	105	4.467	8.659	R290

1.3.8 Geberit Mapress Copper pressfitting

Table 51: Material of Geberit Mapress Copper pressfitting

Material Designation	Abbreviation (BS EN 1057)	Material no.	
		EN	UNS
Copper	Cu-DHP	CW024A	C12200
Gunmetal	CuSn5Zn5Pb2-c	CC491K	Not standardised
DR Brass	CuZn36Pb2As	CW602N	C35330
Brass	CuZn40Pb2	CW617N	C38000

Table 52: Product material of Geberit Mapress pressing indicator

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

Table 53: Product material of Geberit Mapress protection plug

Material Designation	Abbreviation	Recycling code
Polyethylene low density	PE-LD	

Marking

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

Table 54: Marking on 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.

Geberit Mapress Copper Gas pressfitting

Table 55: Material of Geberit Mapress Copper Gas pressfitting

Material Designation	Abbreviation (BS EN 1057)	Material no.	
		EN	AISI
Copper	Cu-DHP	CW024A	C12200
Gunmetal	Rg	CC491K	UNS C83600

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 56: 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.

1.3.9 Geberit Mapress system seal rings

Table 57: Technical data and applications of the Geberit Mapress seal rings

	Seal ring CIIR black	Seal ring HNBR yellow	Seal ring FKM blue	Seal ring FEPM light green
Technical abbreviation	CIIR[1]	HNBR	FKM	FEPM
Material	Butyl rubber	Hydrogenated acrylontrile-Butadiene rubber	Fluoropolymer	Tetrafluoroethylene/ propylene rubber
Minimum operating temperature	-30°C	-20°C	-25°C (solar) -20°C (industry)	-10°C
Maximum operating temperature	120°C	70°C	220°C (solar) – see pg 89 for details 180°C (industry)	180°C
Maximum operating pressure	16 bar[2]	5 bar	16 bar[2]	10 bar
Tests	• WRAS • KTW recommendation • VdS Approval for wet systems • VdTUV Approval	• BSi • HTB test for high thermal loads	• VdTUV Approval	
Mapress Pressfitting System	• Mapress Stainless Steel • Mapress Carbon Steel • Mapress Copper[3]	• 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 • Solar systems	• Saturated steam – contact us for details
Other media or applications	Upon request		Upon request	Upon request

1 Leak path in seal if not pressed
2 Higher pressures possible upon consultation with Geberit
3 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 Department:

- 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 58: Antifreeze agents without corrosion protection for Geberit Mapress

Additive	Seal Ring Material			Test Conditions	Manufacturer[1]
	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 (max.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 59: 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
Diagloss CW 4001	X	X	X	3.5	40	Schweitzer Chemie, Freiberg/N.
DEWT-NC	X	X	-	0.4	20	Drew Ameroid, Hamburg
Hydrazine	X	X	-	Concentration for use, see manufacturer's information		Lanxess, Leverkusen
Levoxin 64	X	X	-	100	120	Lanxess, Leverkusen
Hygel H 140	X	X	X	100	20	Hydrogel Chemie, Werl
Kebocor 213	X	-	X	0.5	20	Kebo Chemie, Düsseldorf
Nalco 77382	X	-	-	0.5	20	Nalco Deutschland GmbH
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
Varidos SIS	X	-	X	100	20	Schilling Chemie, Freiberg

a EPDM flat gasket (max. 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 60: 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)	
Engine Coolant ANF	X	X	X	100	20	Eurolub, Eching (Nr. Munich)
Antifreeze	X	-	-	100	60	Aral
Antifrogen N	X	X	X	100	120	Hoechst / Clariant
Antifrogen L	X	X	-	100	120	Hoechst / Clariant
Antifrogen SOL	-	-	X	100	120	Hoechst / Clariant
Frostex 100	X	-	X	66.6	20	TEGEE Chemie, Bremen
Glysantin G 30 (Alu Protect / BASF)	X	X	-	67	120	BASF SE, Ludwigshafen
Pekasol L	X	X	-	50	120	Prokühlsole, Alsdorf
	X	X	X	50	20	
Solan (replaces Pekasol 2000)[c]	X	X	X	90	130	Prokühlsole, Alsdorf
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 (max. 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)

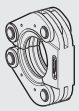
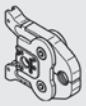
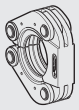
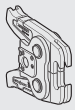
General information

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:

Compatibility class	Pressing devices	Pressing jaws/pressing collars		Adaptors for pressing collars	
1	ACO 102		Ø 12 – 28mm		—
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		—

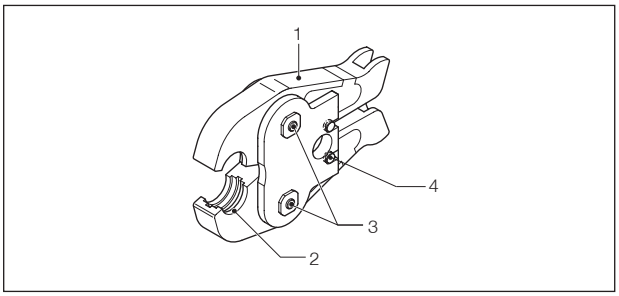
1) For more details see Geberit Supply Systems Tooling Product Guide and Price List
Only use pressing devices which have been approved by Geberit.

Structure of Geberit Mapress pressing jaw

Geberit Mapress pressing jaw up to Ø 35mm

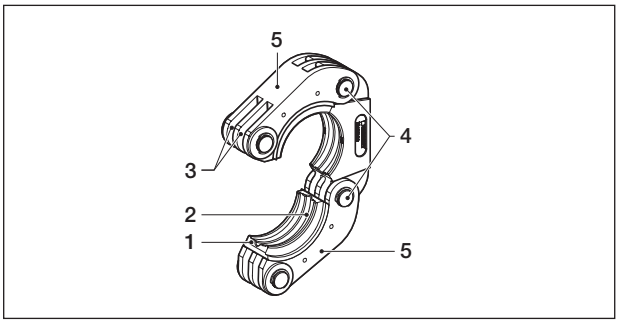
1 Jaw lever
2 Pressing contour
3 Jaw pivot points
4 Electronic contacts (compatibility 3 jaws only)

The appearance can vary depending on the size and design.



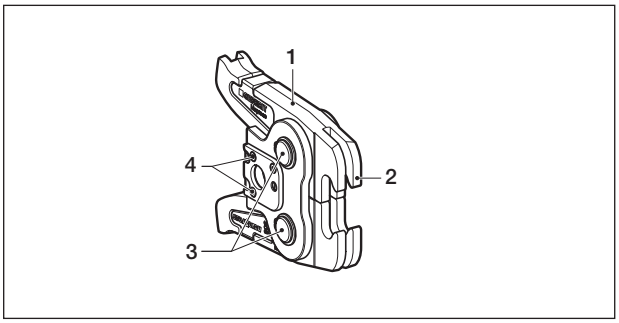
Geberit Mapress pressing collar

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



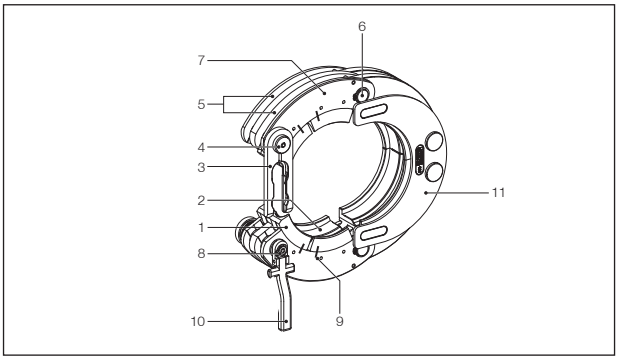
Geberit Mapress adaptor jaw

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



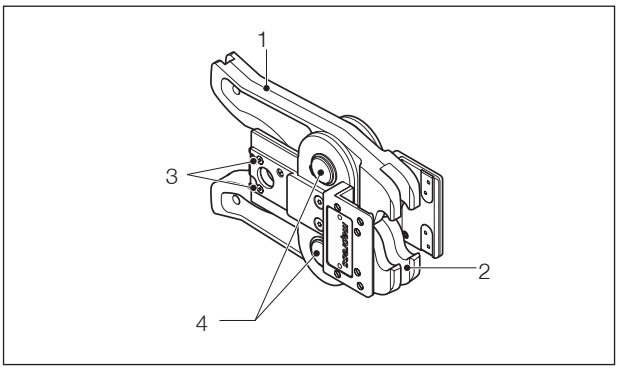
Geberit Mapress pressing collar Ø 76.1 – 108mm

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

1 Jaw lever
2 Claw
3 Contacts
4 Jaw joints



The appearance can vary depending on size and design.

2 Planning

2.1 Corrosion resistance

2.1.1 Corrosion – Geberit Mapress Stainless Steel

Resistance to inner corrosion

Potable water

Corrosion-resistant steels do not react with potable water due to their protective chromium 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 page 95-96)

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, for example, 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

Resistance against external corrosion

Geberit Mapress Stainless Steel is resistant to corrosion due to the atmosphere (ambient air). The probability of corrosion is increased by contact with corrosion-promoting construction materials or by installation in corrosive atmospheres.

Resistance against 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.

Protection against external corrosion

In areas at risk of corrosion, installation of pipes without corrosion protection should be avoided.

If there is the risk of corrosive substances (e.g. plaster, building materials containing chloride, concrete, nitrite or ammonium) acting on the pipes over prolonged periods, surface-mounting or suitable corrosion protection is recommended.

Protection against external corrosion must meet the following requirements:

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

The use of closed-cell insulation materials or hoses has proved to be effective as corrosion protection.

The minimum protection against external corrosion is coating, priming or painting.

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

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

Gas installation

Geberit Mapress Stainless Steel Gas does not need any protection against corrosion due to the material properties of the steel. This also applies to concealed routing and underfloor routing, providing the following situations can be reliably excluded:

- Indirect or direct contact with materials or substances containing chloride or other corrosion promoters
- Indirect or direct contact with electrical current

Sufficient additional corrosion protection is required if these situations cannot be reliably excluded.

Influence of operational conditions and processing

Pitting corrosion after water pressure test

The probability of pitting corrosion is increased if residual water remains in the pipe after the water pressure test. Avoid partial filling of the piping system.

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

Heating of the Geberit Mapress Stainless Steel pipes changes the material structure and increases the probability of intercrystalline corrosion. Geberit Mapress Stainless Steel system pipes should therefore never be bent when warm.

Geberit Mapress Stainless Steel system pipes can be bent on building sites when cold with standard pulling bending tools up to a diameter of Ø 54mm.

Installation in concrete

In special areas of application, e.g. sprinkler systems, pipes of non-rusting 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

Incorrectly used insulation materials can cause corrosion of pipes. Insulation materials for thermal insulation of pipes made of non-rusting steel may contain up to 0.05% water-soluble chloride ions.

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

Insulation materials and hoses of AS quality according to AGI-Q 135 are considerably below this level of maximum 0.05% of water soluble chloride ions and are therefore particularly suitable for stainless steel.

Closed-cell insulating materials ensure effective corrosion protection, as they prevent the concentration of chlorides.

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.

Potable water supply lines made of stainless steel should only be installed on construction sites using pressed joints due to possible damage caused by corrosion resulting from soldering or welding.

2.1.2 Corrosion – Geberit Mapress Carbon Steel

Corrosion of heating and other closed circuit installations

Resistance to internal corrosion

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

The probability of corrosion is increased if oxygen is present in the circuit.

Corrosion-causing oxygen can enter the circuit through compression glands, screw connections or automatic air vent valves if there is negative pressure in the heating system.

There is no risk of corrosive damage from oxygen that enters when filling and supplementing with water since the amount of oxygen is very low.

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.

Resistance to external corrosion

Normally the outer surfaces of a pipe installation in a building do 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, spray or cleaning water).

Geberit Mapress Carbon Steel should never be installed in permanently damp rooms.

- **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 coating 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. Additionally the jointing parts must be protected 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.

Resistance against bimetal corrosion

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

Protection against internal corrosion

The following measures delay the generation of corrosion:

- Adding oxygen binding media to the circulating water
- Setting the pH value of 8.5 - 9.5 necessary for carbon steel
- Only use water additives that have been tested and approved by Geberit
- Observe the manufacturers' instructions for use.

The following must be observed when selecting water additives for corrosion prevention:

Protection against external corrosion

There is no danger of corrosion from oxygen that enters when filling and supplementing with water, as the oxygen is bound into iron oxide compounds as a result of the reaction with the inner steel surface of the system. In addition, the oxygen that is generated from the heated heating circuit water escapes when the heating system is de-aerated.

Geberit Mapress Carbon Steel should not be permanently exposed to moisture. In the case of installations in rooms with excessive exposure to moisture, the pipes should be installed outside of this area.

When installing in-wall or under screed, the Geberit Mapress Carbon Steel pressfittings and stripped sections of the pipe should be coated using an additional suitable corrosion protection.

If the pipes are installed under concrete ceilings, a contact foil should be used between the concrete ceiling and steel pipe (according to DIN 1988, Part 7, Paragraph 5.3) in addition to the corrosion protection.

Protection against outside corrosion is provided by:

- Coatings
- Plastic binders
- Corrosion protection binders

Protection against external corrosion must meet the following requirements:

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

Thermal insulation material or hoses have been proven successful as a minimum protection against outside corrosion.

Thermal insulation materials are not an adequate corrosion protection with chilled water installations.

Felt or similar materials should not be used for corrosion protection, as felt retains absorbed moisture for prolonged periods and therefore promotes corrosion.

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

Corrosion of compressed air installation

Geberit Mapress Carbon Steel is only resistant against corrosion in dehumidified compressed air systems with dry compressed air. Any humidity and air contained in the installation system may lead to corrosion.

If the compressed air contains lubricating oil over 5 mg/m^3, then the blue FKM seal ring must be used.

2.1.3 Corrosion – Geberit Mapress Copper

Resistance to external corrosion

Geberit Mapress Copper is resistant to corrosion from the atmosphere (ambient air).

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.

Resistance to 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 drinking 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 from components made of galvanised steel.

Protection against external corrosion

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.

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

Corrosion, in potable water installations

Resistance to internal corrosion

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 the water.

For reasons of corrosion protection the 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

Corrosion, heating installations

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

2.2 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.

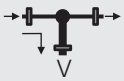
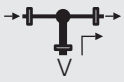
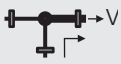
The person installing the electrical system is responsible and accountable for the equipotential bonding.

2.3 Geberit Mapress system pressure loss

2.3.1 Equivalent pipe lengths

- Equivalent pipe length (m)
- V = 2 m/s

Table 51: Equivalent pipe length – Geberit Mapress Ø 12 – 22mm

Designation	Pressfitting	Loss Coefficient	Dimensions d x s (mm) 12 x 1.0	15 x 1.0	18 x 1.0	22 x 1.0
Bend 90°		0.7	0.267	0.370	0.479	0.630
Elbow adaptor 90°		1.5	0.572	0.793	1.026	1.351
Pipe bridge		0.5	0.191	0.264	0.342	0.450
Bend 45°		0.5	0.191	0.264	0.342	0.450
Reducer		0.2	—	0.106	0.137	0.180
Sleeve/Adaptor		0.1	0.038	0.053	0.068	0.090
T-piece (flow separation)		1.3	0.496	0.688	0.889	1.171
T-piece (flow integration)		0.9	0.343	0.476	0.616	0.811
T-piece (through-flow for flow integration)		0.3	0.114	0.159	0.205	0.270

(continued overleaf)

Table 51: Equivalent pipe length – Geberit Mapress Ø 12 - 22mm (continued)

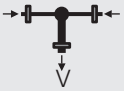
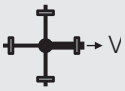
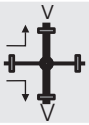
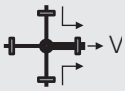
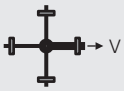
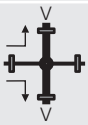
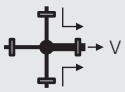
Designation	Pressfitting	Loss Coefficient	Dimensions Ø x s (mm) 12 x 1.0	15 x 1.0	18 x 1.0	22 x 1.0
T-piece (through-flow for flow separation)		0.2	0.076	0.106	0.137	0.180
T-piece (counterflow for flow integration)		3.0	1.145	1.587	2.052	2.702
T-piece (counterflow for flow separation)		1.5	0.572	0.793	1.026	1.351
Cross-piece 30° (through-flow)		0.2	—	—	0.137	0.180
Pipe cross 30° (flow separation)		1.3	—	—	0.889	1.171
Pipe cross 30° (flow integration)		0.9	—	—	0.616	0.811
Pipe cross 90° (through-flow)		0.2	—	0.106	0.137	0.180
Pipe cross 90° (flow separation)		1.7	—	0.899	1.163	1.531
Pipe cross 90° (flow integration)		1.3	—	0.688	0.889	1.171

Table 52: Equivalent pipe length – Geberit Mapress Ø 28 - 54mm

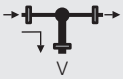
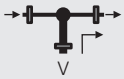
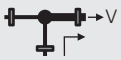
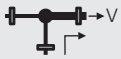
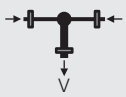
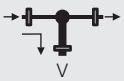
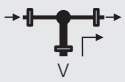
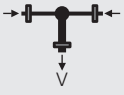
Designation	Pressfitting	Loss Coefficient	Dimensions Ø x s (mm) 28 x 1.5	35 x 1.5	42 x 1.5	54 x 1.5
Bend 90°		0.7	0.829	1.121	1.427	1.975
Elbow adaptor 90°		1.5	1.777	2.403	3.057	4.232
Pipe bridge		0.5	0.592	—	—	—
Bend 45°		0.5	0.592	0.801	1.019	1.411
Reducer		0.2	0.237	0.320	0.408	0.564
Sleeve/Adaptor		0.1	0.118	0.160	0.204	0.282
T-piece (flow separation)		1.3	1.540	2.082	2.649	3.668
T-piece (flow integration)		0.9	1.066	1.442	1.834	2.539
T-piece (through-flow for flow integration)		0.3	0.355	0.481	0.611	0.846
T-piece (through-flow for flow separation)		0.2	0.237	0.320	0.408	0.564
T-piece (counterflow for flow integration)		3.0	3.553	4.805	6.114	8.465
T-piece (counterflow for flow separation)		1.5	1.777	2.403	3.057	4.232

Table 53: Equivalent pipe length – Geberit Mapress Ø 66.7 - 108mm

Designation	Pressfitting	Loss Coefficient	Dimensions Ø x s (mm) 66.7 x 1.2	76.1 x 2.0	88.9 x 2.0	108 x 2.5
Bend 90°		0.7	2.620	3.008	3.660	4.614
Elbow adaptor 90°		1.5	5.615	6.445	7.843	9.886
Pipe bridge		0.5	–	–	–	–
Bend 45°		0.5	1.872	2.148	2.614	3.295
Reducer		0.2	0.749	0.859	1.046	1.318
Sleeve/Adaptor		0.1	0.374	0.430	0.523	0.659
T-piece (flow separation) 8.568			1.3	4.866	5.586	6.797
T-piece (flow integration) 5.932			0.9	3.369	3.867	4.706
T-piece (through-flow for flow integration)		0.3	1.123	1.289	1.569	1.977
T-piece (through-flow for flow separation)		0.2	0.749	0.859	1.046	1.318
T-piece (counterflow for flow integration)		3.0	5.615	6.445	7.843	9.886
T-piece (counterflow for flow separation)		1.5	11.230	12.890	15.686	19.772

2.4 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.

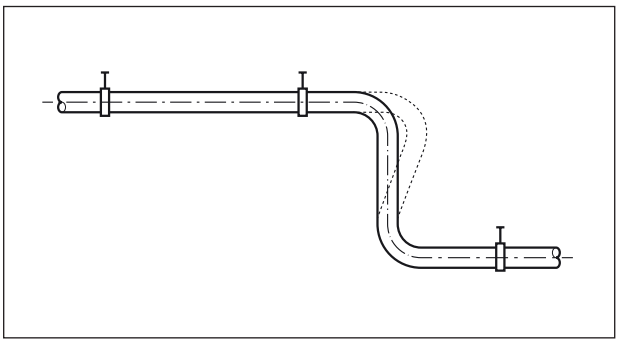


Figure 6: Absorption of change in length through the elasticity of the piping system

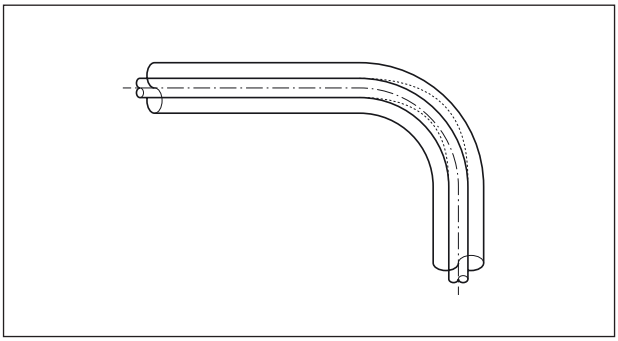


Figure 7: Absorption of a change in length through insulation

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.

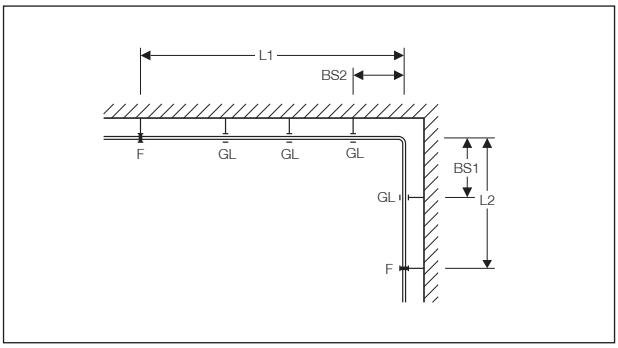


Figure 8: Expansion compensation by pipe leg

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

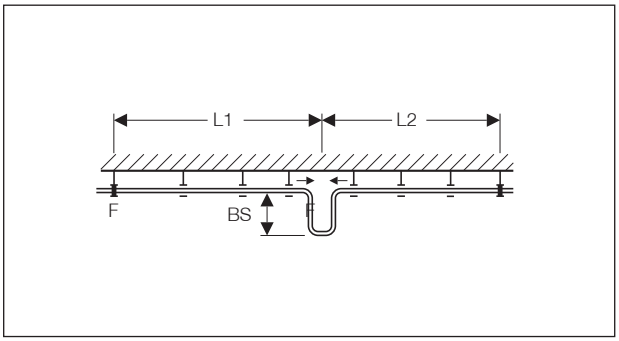


Figure 9: Expansion compensation by U bends

BS Bending leg
F Fixed point
L Pipe length

The following figures show commercially available compensators that can be used for absorbing the pipe expansions:

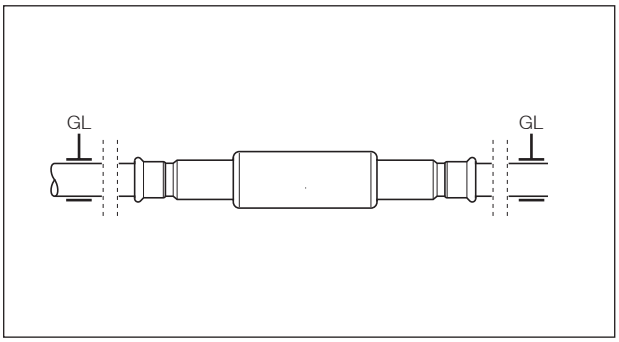


Figure 10: Geberit Mapress axial compensator

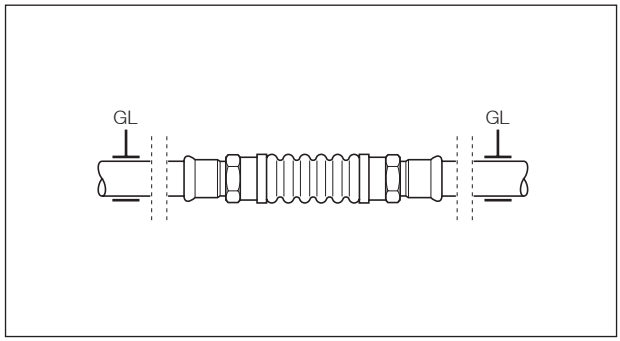


Figure 11: Commercially available axial compensator with female thread and Geberit Mapress adaptor with male thread

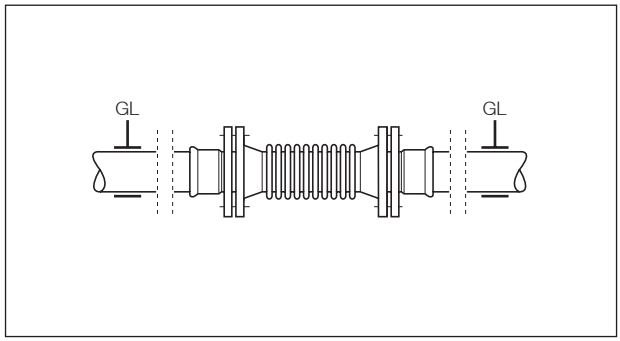


Figure 12: Commercially available axial compensator with flange connection

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.

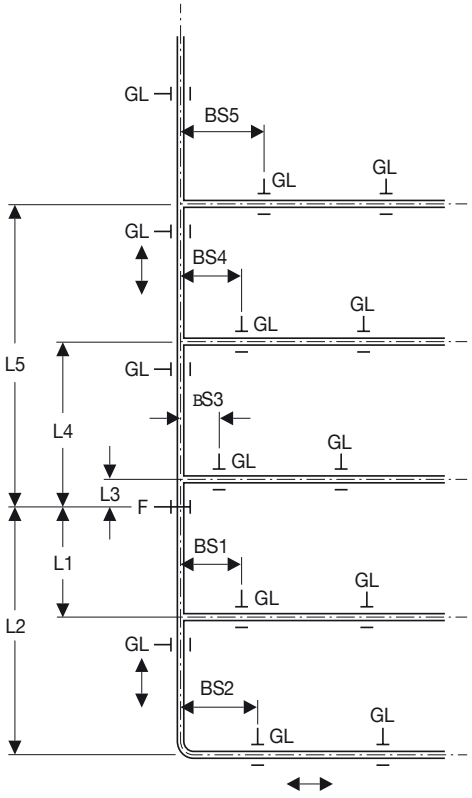


Figure 13: Expansion compensation by bending leg with anchor point in middle floor.

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

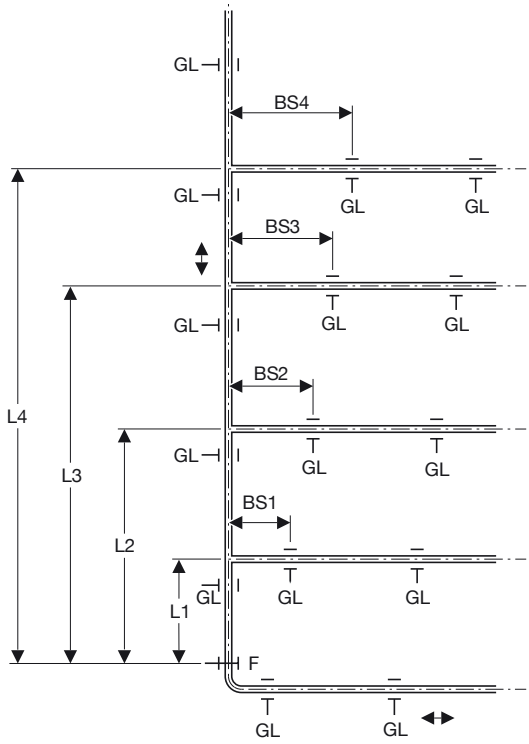


Figure 14: Expansion compensation by bending leg with anchor point in bottom floor.

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

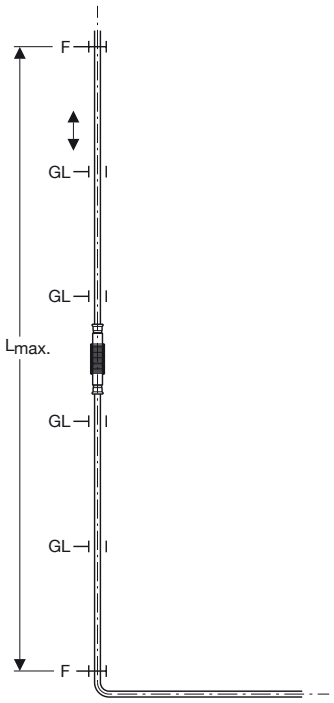


Figure 15: Expansion compensation by axial expansion fitting in riser pipe.

F Anchor point
GL Sliding point
L Pipe length

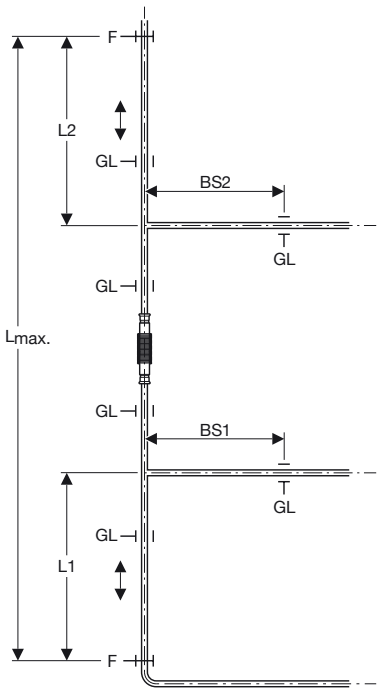


Figure 16: Expansion compensation by axial expansion fitting with anchor point in bottom floor.

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

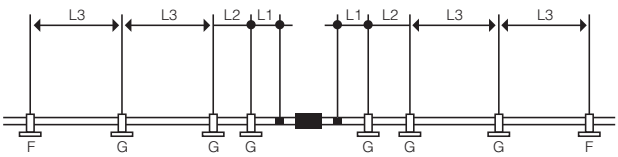


Figure 17: Installation of axial expansion fittings

G Sliding point
F Fixed point

Table 54: 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

2.4.1 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 55: 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 = 5 [m]
- ΔT = 50 [K]

Required:

- Change in length Δl of the pipe (mm)

Solution:

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

$$\Delta l = 5m \cdot 0.0165 \quad \frac{mm}{(m \cdot K)} \cdot 50K$$

$$\Delta l = 4.1mm$$

Table 56: 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:

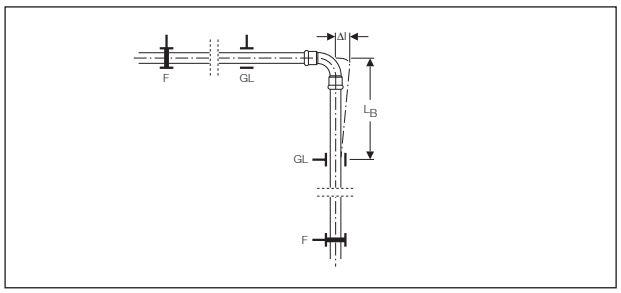


Figure 18: Expansion compensation by pipe leg

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

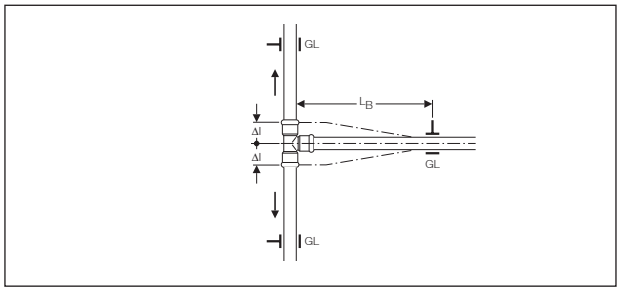


Figure 19: Expansion compensation for branching pipe

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 54 “Material dependant parameters for calculating the bending leg length of Geberit Mapress Stainless Steel” on page 41).
L Pipe length [m]

Given:

- Material: Cr-Ni-Mo steel material no. 1.4401 (BS 316)
- C = 60
- d = 54mm
- Δl = 0.030m

Required:

- L_B (m)

Solution:

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

$L_B = 60 \cdot \sqrt{0.054 \cdot 0.030}$
$L_B = 2.41m$

Calculation of the bending leg length L_U

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

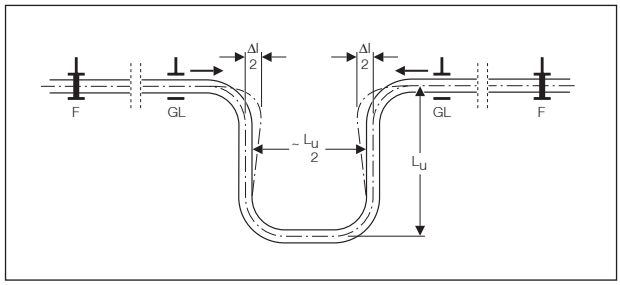


Figure 21: U bend expansion compensation from bent pipe

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

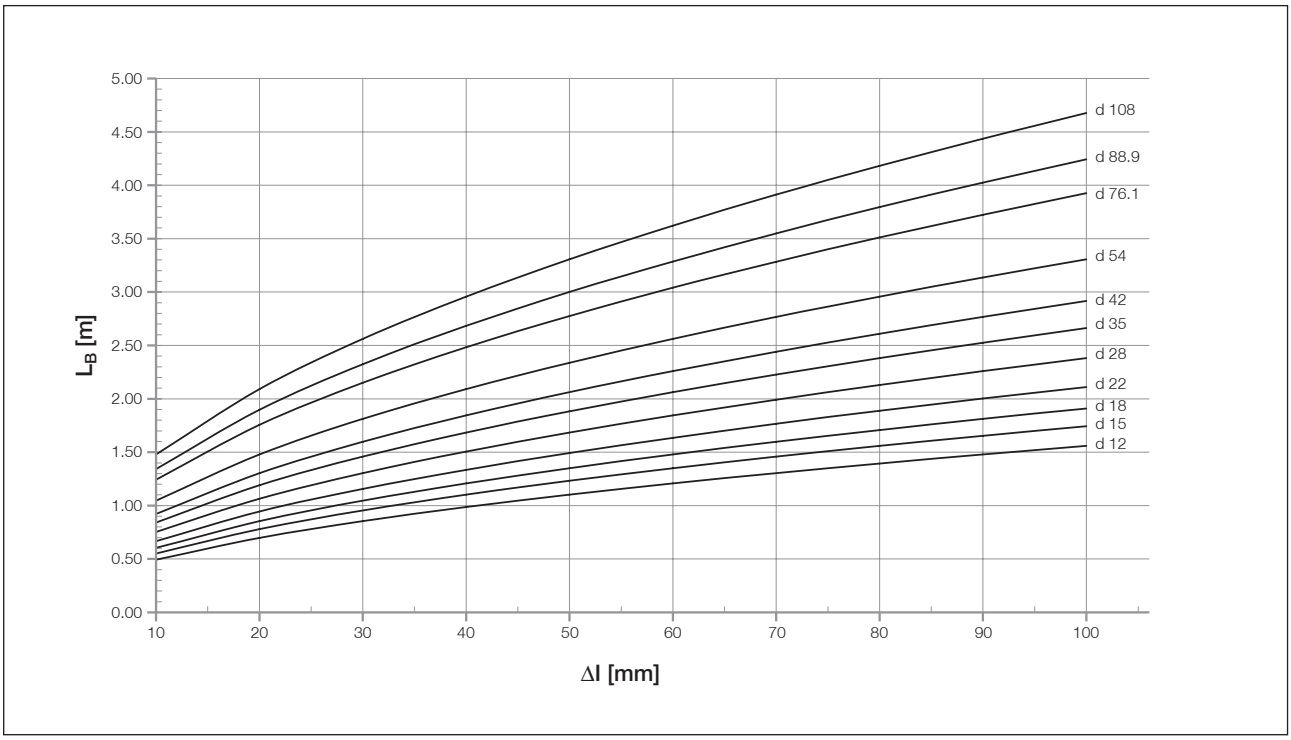


Figure 20: Determination of the bending leg length L_B for Mapress Stainless Steel

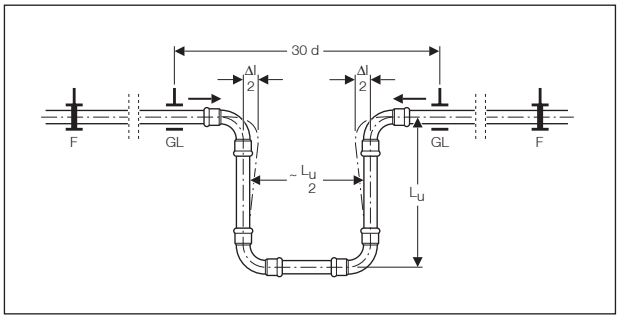


Figure 22: U bend expansion compensation with pressfittings

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 56 “Material dependant parameters for calculating the bending leg length of Geberit Mapress Stainless Steel” on page 41).
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:

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

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

$L_U = 1.37m$

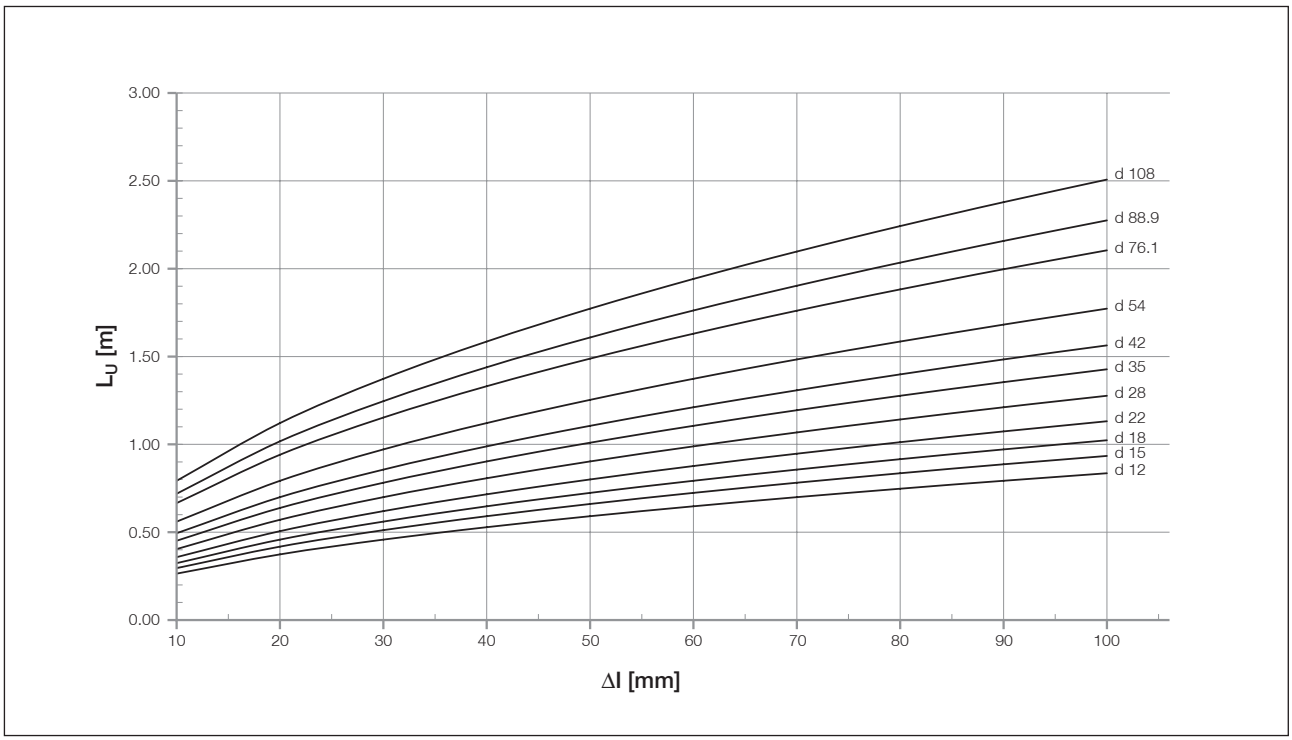


Figure 23: Determination of the bending leg length L_U for Geberit Mapress Stainless Steel

2.4.2 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 57: 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	45	25

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 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:

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

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

Δl = 21mm

Table 58: 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:

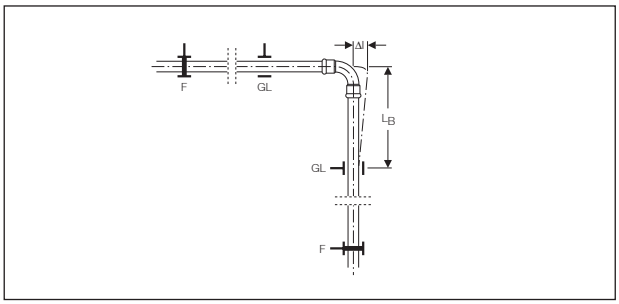


Figure 24: Expansion compensation by pipe leg

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

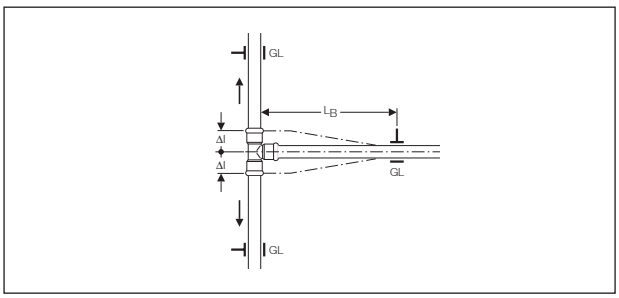


Figure 25: Expansion compensation for branching pipe

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 56 “Material dependent parameters for calculating the bending leg length of Geberit Mapress Carbon Steel” on page 45).
L Pipe length [m]

Given:

- Material: Non-alloy steel material no. 1.0034
- C = 45
- d = 54 [mm]
- Δl = 0.021 [m]

Required:

- L_B [m]

Solution:

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

$L_B = 45 \cdot \sqrt{0.054 \cdot 0.021}$

$L_B = 1.52m$

Calculation of the bending leg length L_U

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

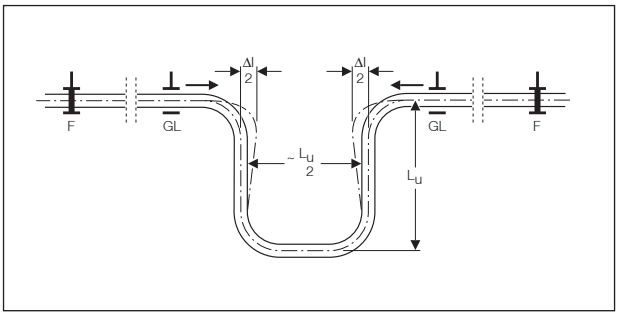


Figure 27: U bend expansion compensation from bent pipe

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

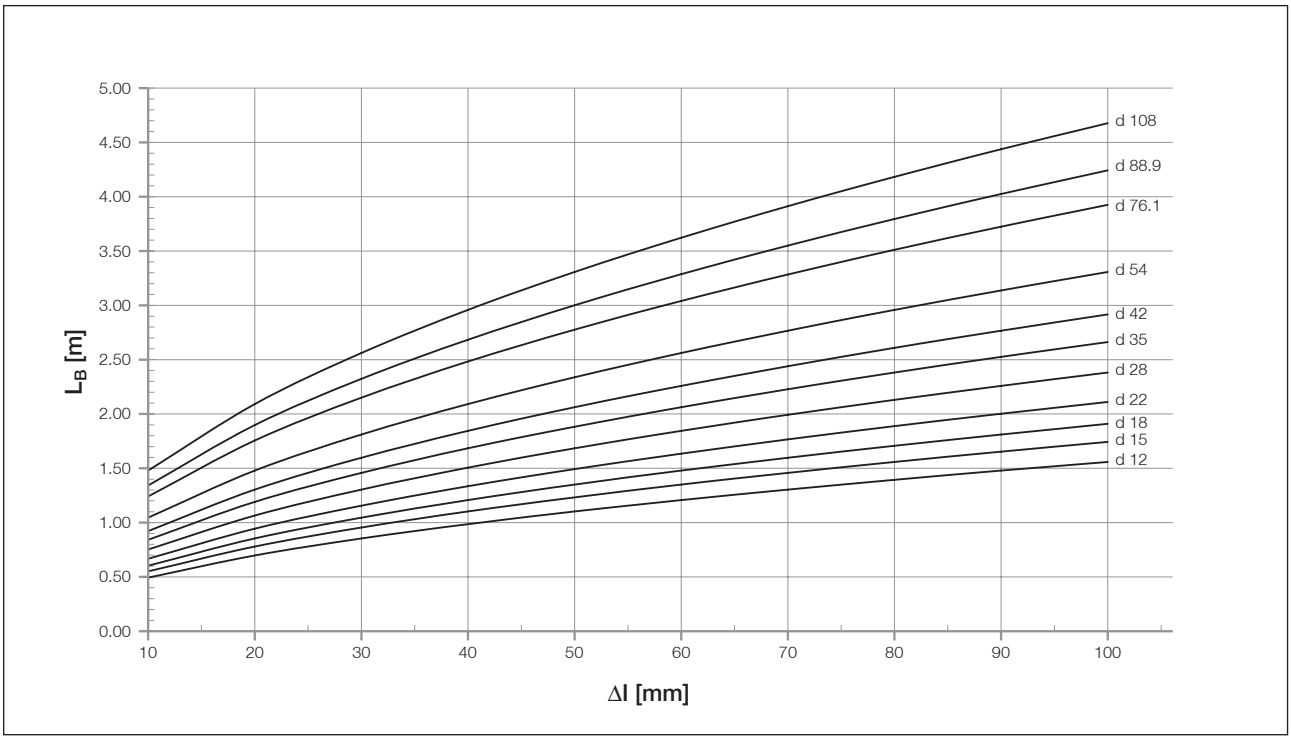


Figure 26: Determination of the bending leg length L_B for Geberit Mapress Carbon Steel.

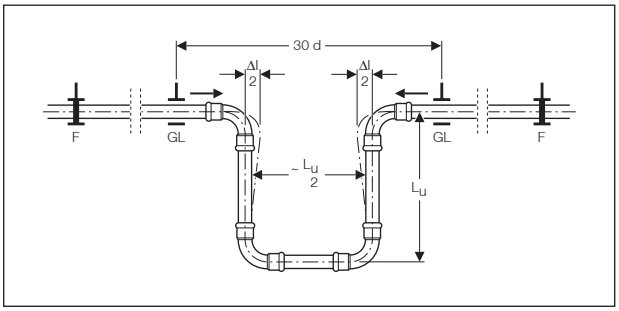


Figure 28: U bend expansion compensation with pressfittings

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 58 “Material dependant parameters for calculating the bending leg length of Geberit Mapress Carbon Steel” on page 45).
L Pipe length (m)

Given:

- Material: Non-alloy steel material no. 1.0034
- U = 25
- d = 54mm
- Δl = 0.021m

Required:

- L_U (m)

Solution:

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

$L_U = 34 \cdot \sqrt{0.054 \cdot 0.021}$

$L_U = 0.84m$

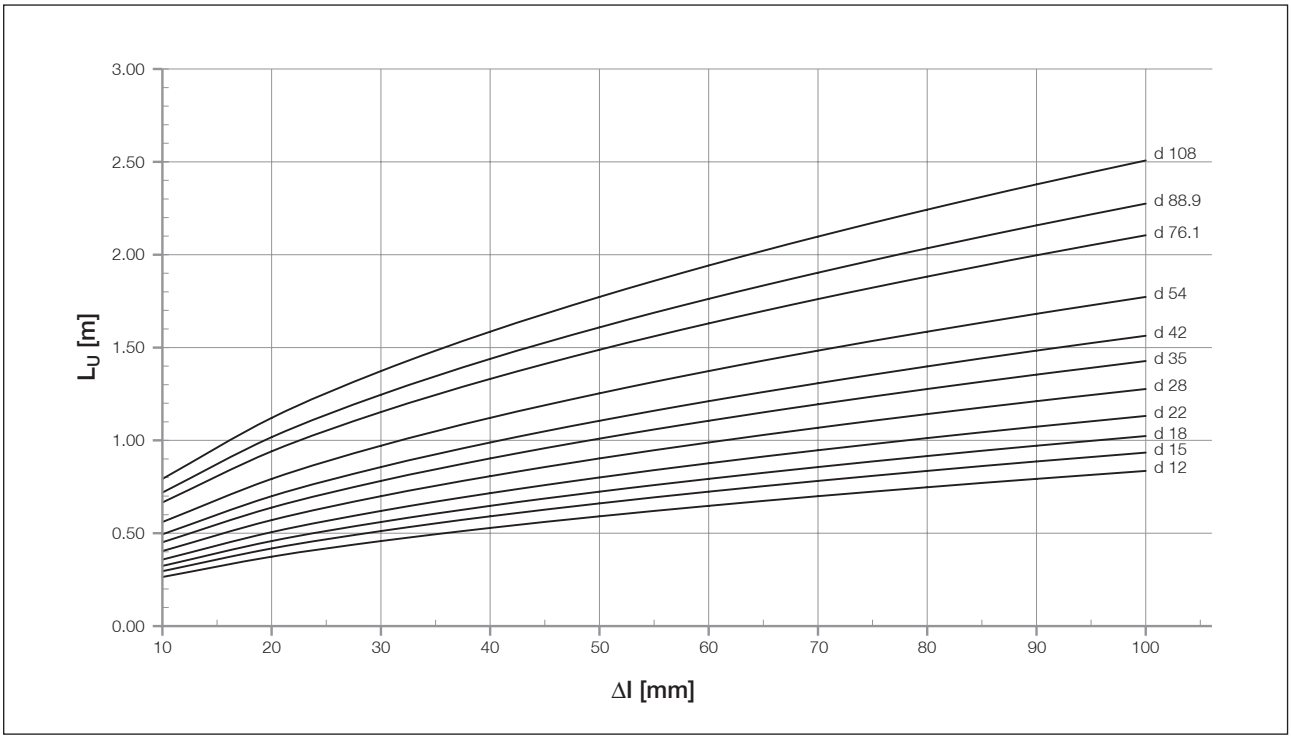


Figure 29: Determination of the bending leg length L_U for Geberit Mapress Carbon Steel

2.4.3 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 59: 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:

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

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

$$\Delta l = 0.29mm$$

Table 60: 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:

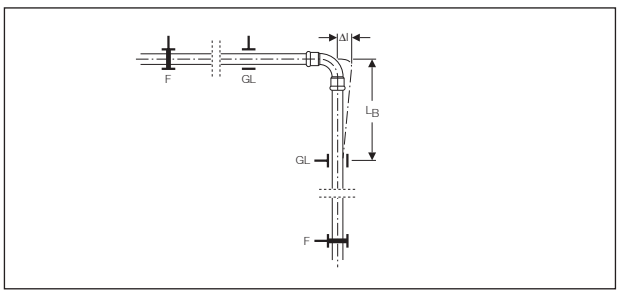


Figure 30: Expansion compensation by pipe leg

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

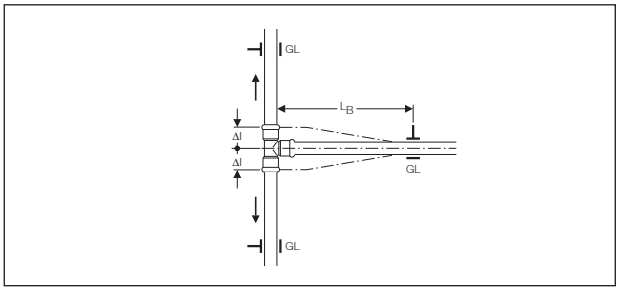


Figure 31: Expansion compensation for branching pipe

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 58 “Material dependent parameters for calculating the bending leg length of copper to BS EN 1057” on page 49).
L Pipe length [m]

Given:

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

Required:

- L_B [m]

Solution:

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

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

$L_B = 2.06m$

Calculation of the bending leg length L_U

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

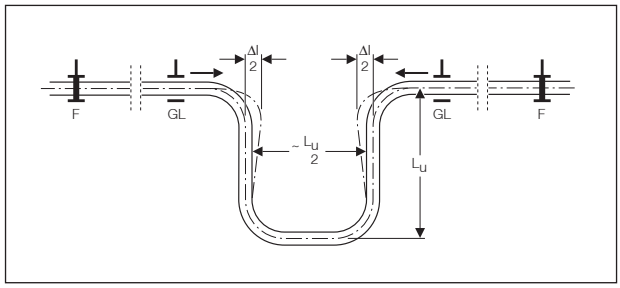


Figure 33: U bend expansion compensation from bent pipe

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

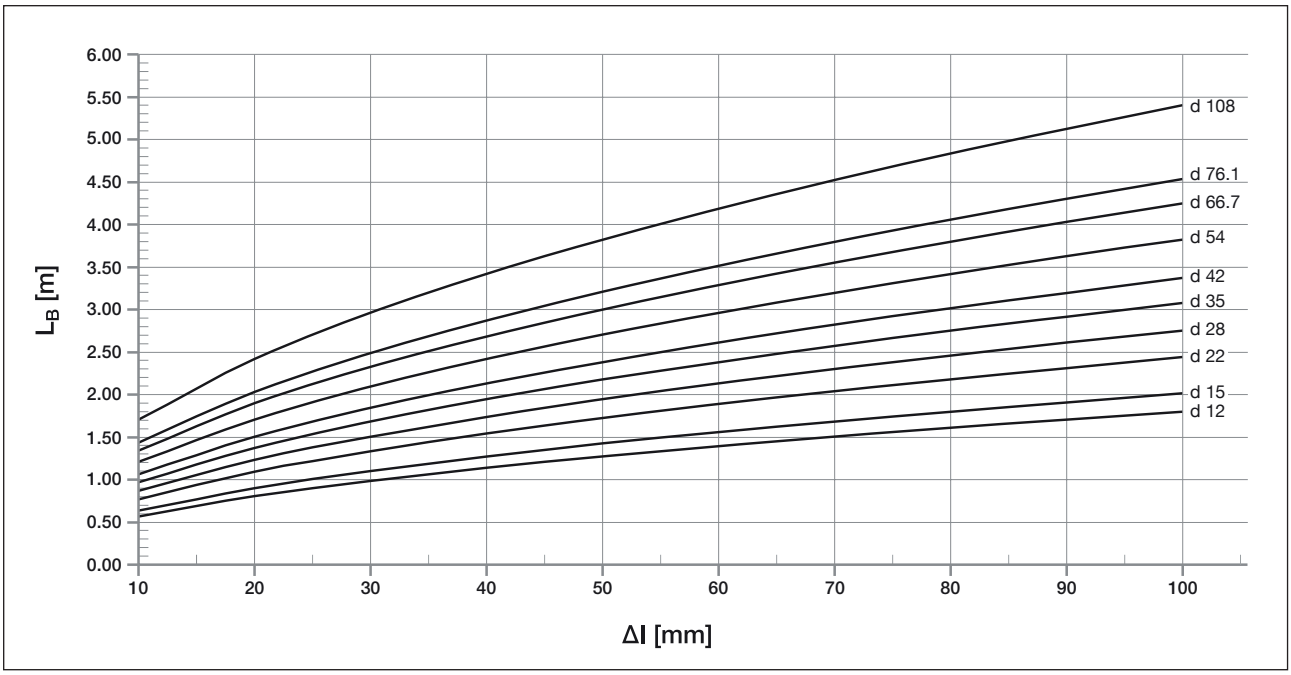


Figure 32: Calculation of the bending leg length L_B for copper pipes in accordance with BS EN 1057

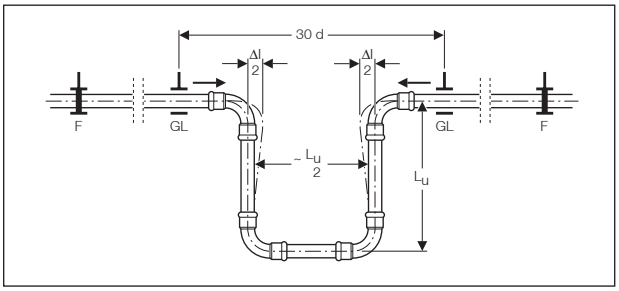


Figure 34: U bend expansion compensation with pressfittings

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 58 “Material dependant parameters for calculating the bending leg length of copper to BS EN 1057” on page 49).
L Pipe length [m]

Given:

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

Required:

- L_U [m]

Solution:

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

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

$$L_U = 1.15m$$

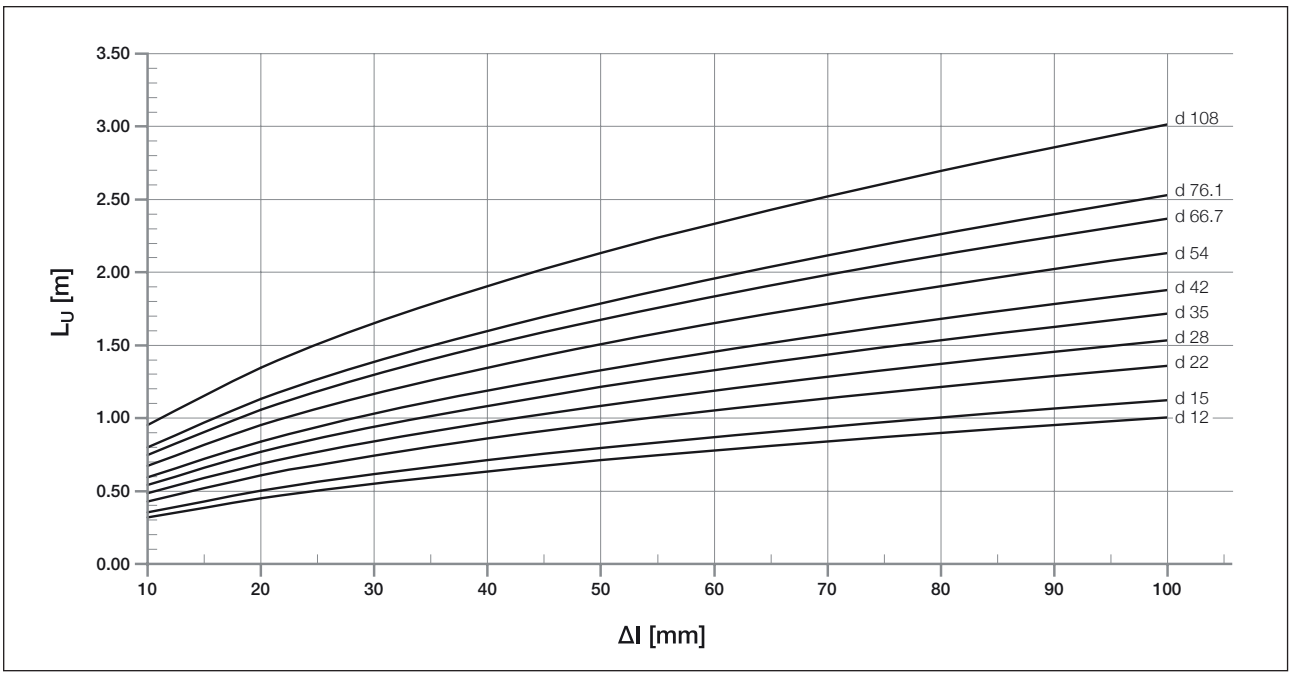


Figure 35: Calculation of the bending leg length L_U for copper pipes in accordance with BS EN 1057

2.5 Heat dissipation

2.5.1 Heat dissipation, general

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, concrete core activation, geothermal heat storage etc.).

2.5.2 Heat dissipation – 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

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 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
- 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 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 61: 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.

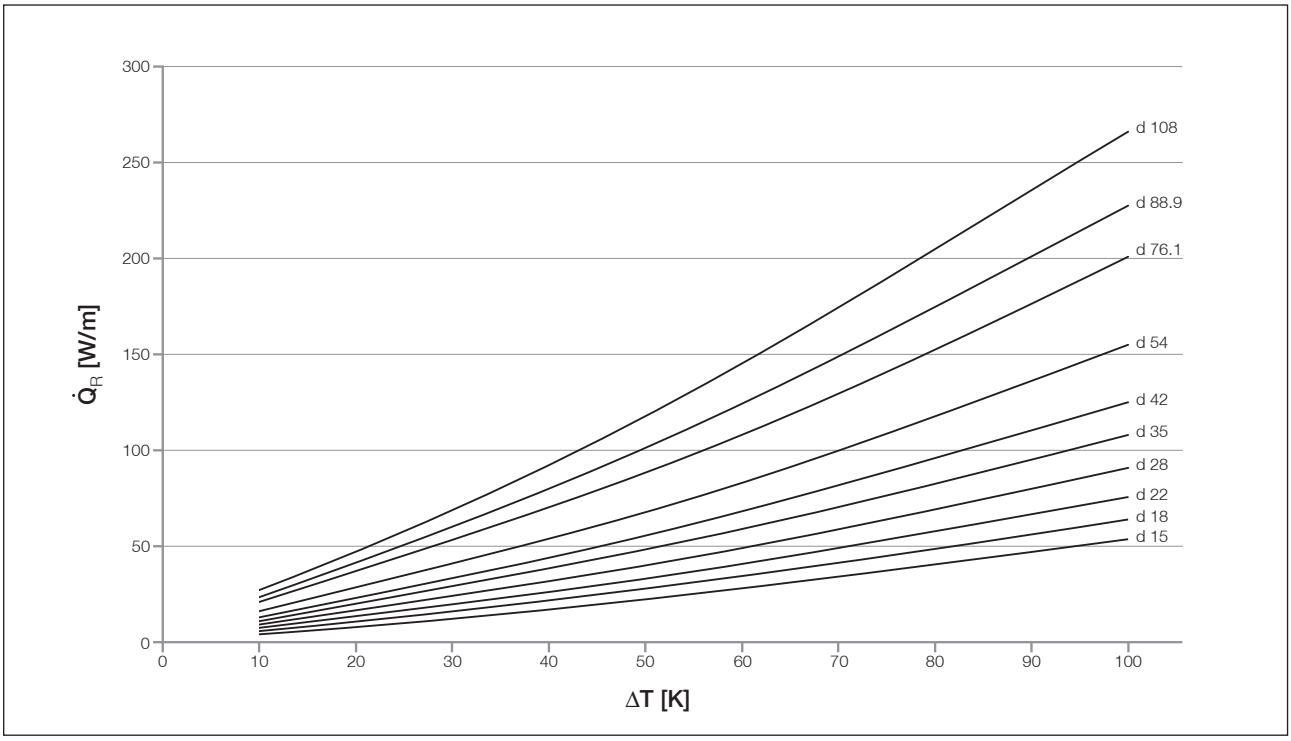


Figure 36: Heat emission – Geberit Mapress Stainless Steel

Q_R Heat flow for 1m pipe

ΔT Temperature differential

2.5.3 Heat dissipation – 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 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 62: 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
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.

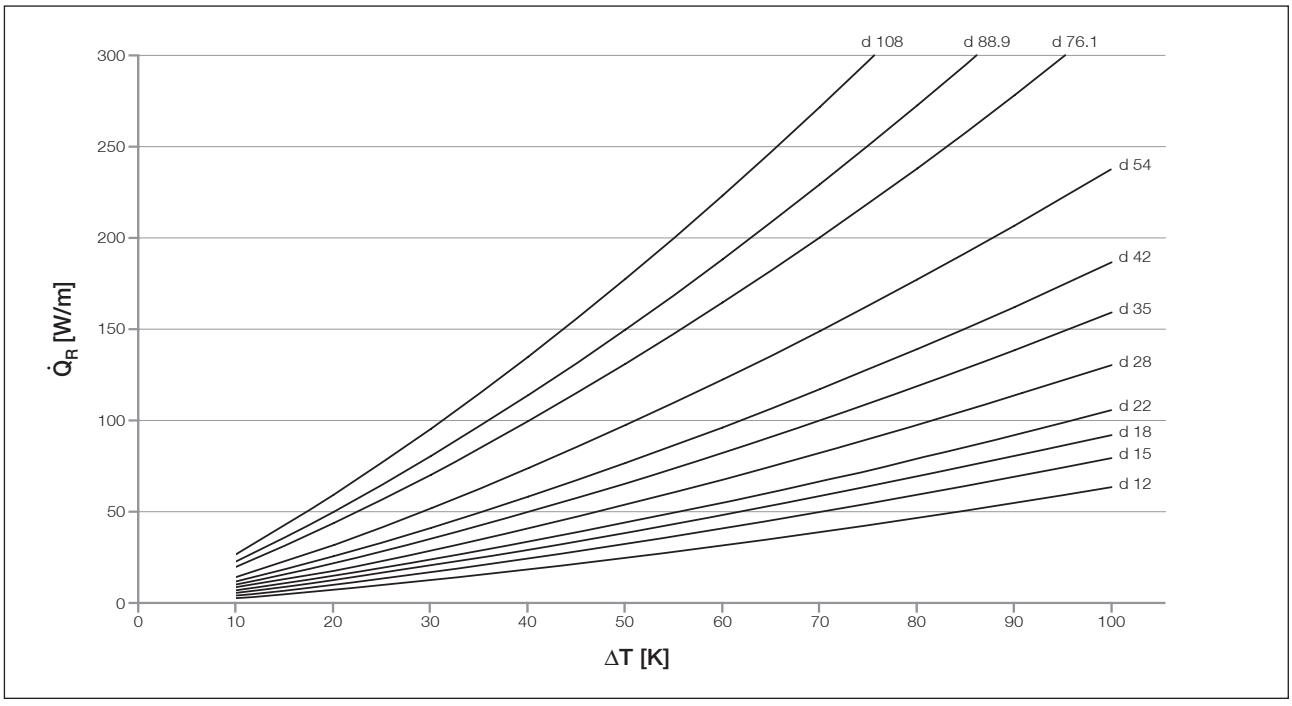


Figure 37: Heat emission – Geberit Mapress Carbon Steel

Q_R Heat flow for 1m pipe

ΔT Temperature differential

2.5.4 Heat dissipation – 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 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 63: Heat emission of Copper pipes according to BS EN 1057

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	3.8	8.5	13.9	19.7	25.9	32.6	39.6	46.9	54.7	62.8
18 x 1.0	4.6	10.3	16.8	23.8	31.3	39.4	47.8	56.8	66.2	76.0
22 x 1.2	5.3	12.1	19.6	27.8	36.6	46.0	55.9	66.3	77.3	88.8
28 x 1.2	6.3	14.3	23.2	33.0	43.4	54.5	66.3	78.7	91.8	105.5
35 x 1.5	7.8	17.6	28.5	40.5	53.3	66.9	81.4	96.7	112.7	129.6
42 x 1.5	9.5	21.3	34.5	49.0	64.5	81.0	98.6	117.1	136.6	157.1
54 x 1.5	10.8	24.3	39.4	55.9	73.6	92.5	112.5	133.7	156.0	179.6
54 x 2.0	13.8	30.9	50.1	71.0	93.6	117.6	143.1	170.1	198.5	228.5
76.1 x 2.0	18.6	41.6	67.4	95.5	125.8	158.2	192.5	228.9	267.4	307.8
88.9 x 2.0	21.3	47.6	77.1	109.3	144.0	181.0	220.4	262.1	306.1	352.5
108 x 2.0	25.3	56.5	91.4	129.5	170.5	214.3	261.0	310.4	362.7	417.8

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.

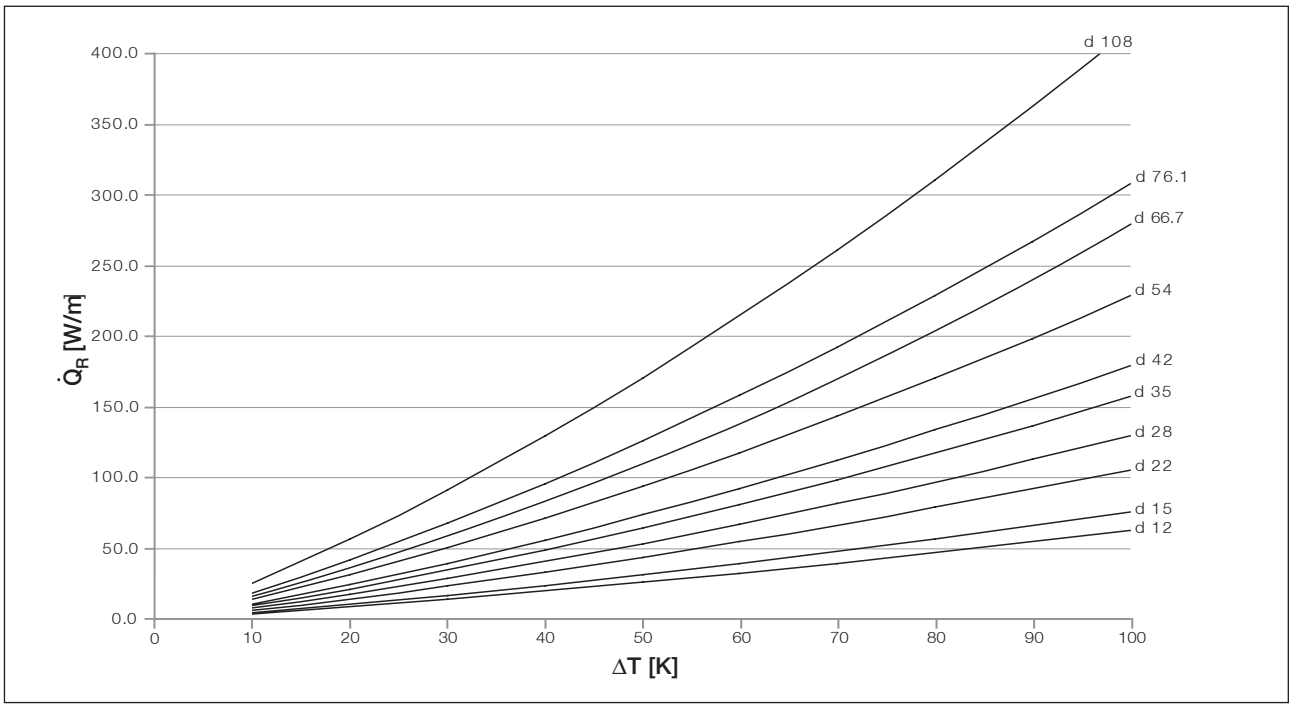


Figure 38: Heat emission of Copper pipes according to BS EN 1057

Q_R Heat flow for 1m pipe

ΔT Temperature differential

3 Geberit tooling 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 Mapress.

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 Mapress 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. 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

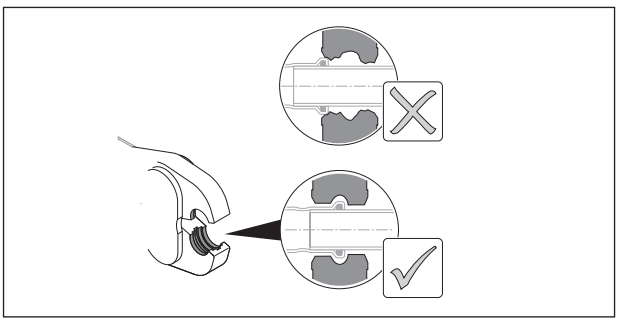
- Replace worn pressing jaw
- Use the transport case for transport and storage, and store the pressing jaw in a dry room
- Have any damage inspected immediately by an authorised specialist workshop
- Observe the safety notes for the cleaning and anti-corrosion protection agents used

3.2.2 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

3.2.3 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

3.3 Geberit Mapress 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 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

3.3.2 Operating the Geberit Mapress pressing collar adaptor

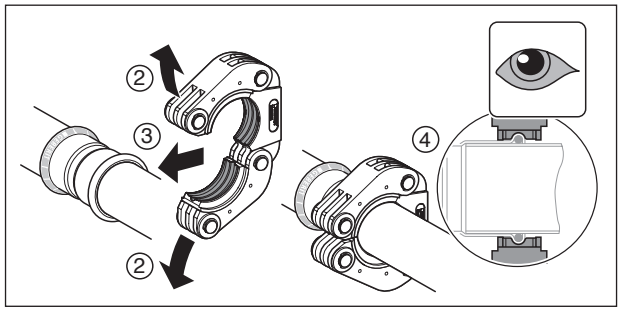
Different adaptors for pressing collars must be used depending on the nominal diameter of the pressfitting.

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 authorized 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 authorized service agent

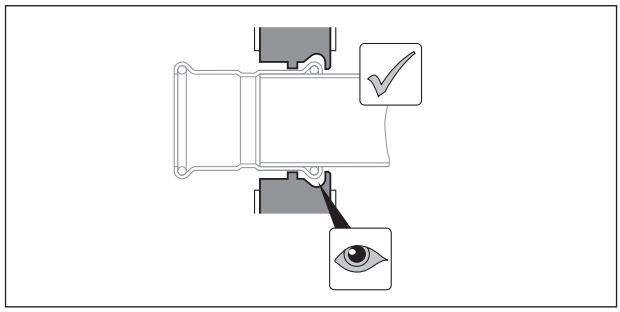


35, 42, 54 and 66.7mm collars

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

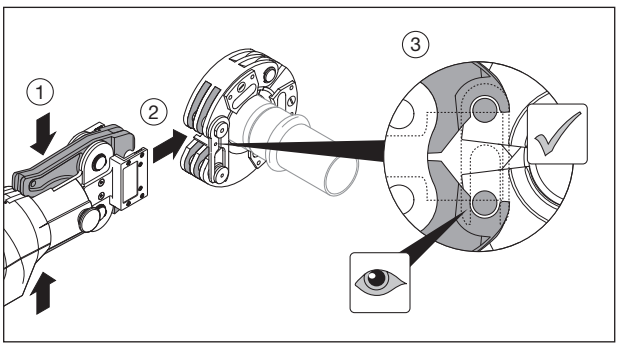
Pressing collar is positioned.

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

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 authorized repair shop

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 authorized 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 authorized repair shop

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

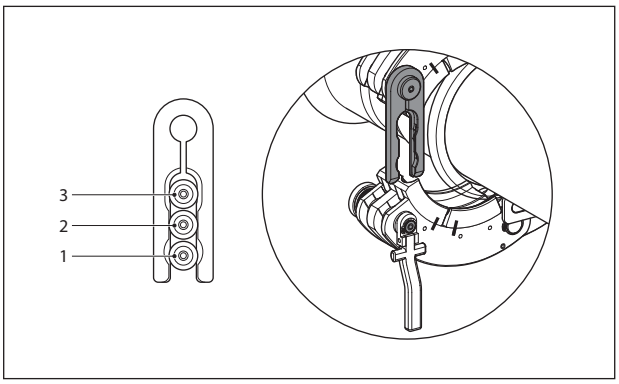
Pressing pressfitting Ø 108mm

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



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

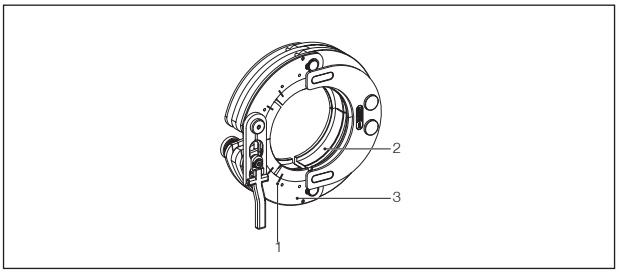
CAUTION
Damage to pipe due to faulty pressing collar that can no longer be released

- 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

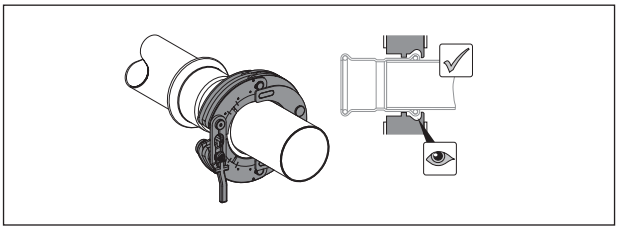
2 To open the pressing collar, depress the locking pin and, at the same time, pull the pressing collar apart at the locking lug

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

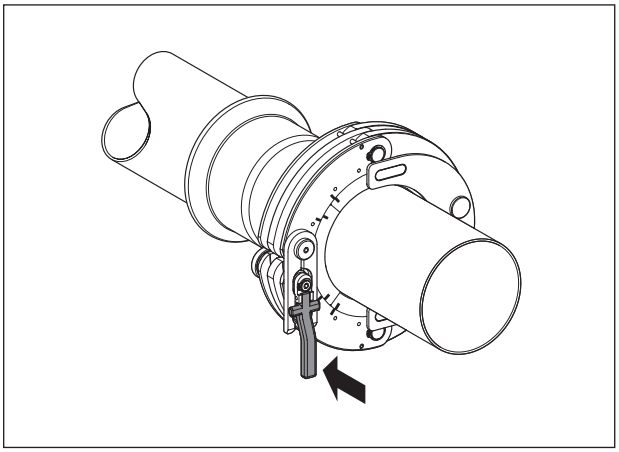
1 Press the pressfitting; see operating instructions for pressing tool

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

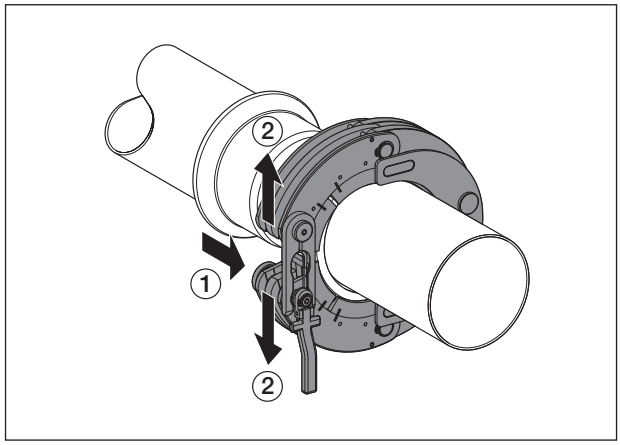
3 Make sure that the locking pin is in position 3

Result: the final pressing completes the pressing sequence.

4 Pull 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

3.3.3 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.

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

4 Installation

4.1.1 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

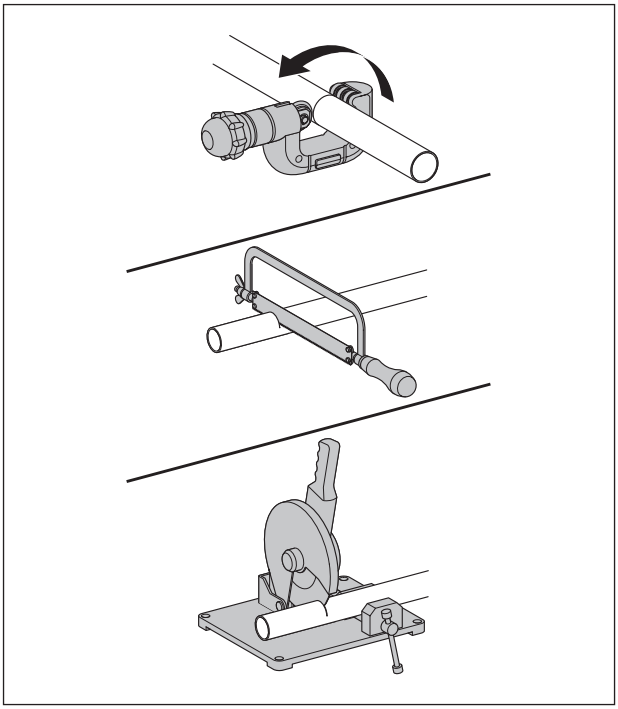
- **Deburr the outside and inside of the pipe ends completely**
- **Remove foreign bodies from the seal ring.**
- **Do not tilt the pipe into the pressfitting.**
- **Push the pressfitting onto the pipe, turning the pipe slightly**
- **Only use lubricants which are free from oil and grease**

4.2 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.

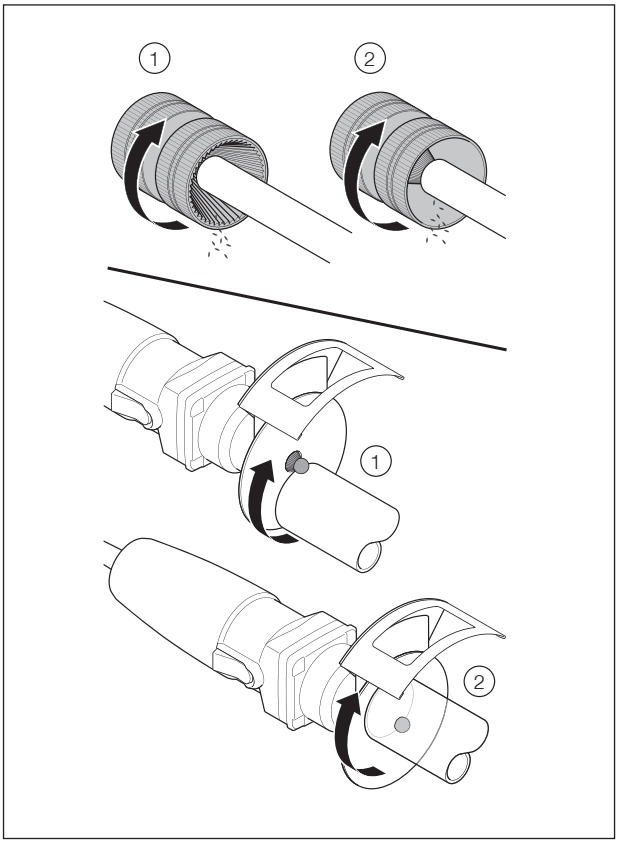
2 Determine the pipe length.

3 Cut the pipe to the correct length.



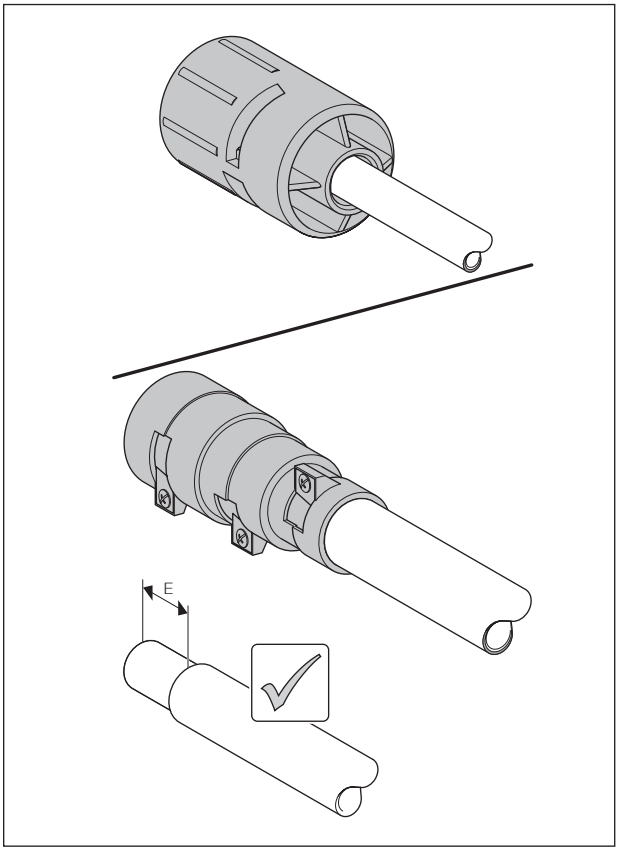
Only shorten the fittings with plain ends up to the maximum permissible shortening dimension k, indicated in the product guide.

4a Deburr the pipe ends, internally and externally.

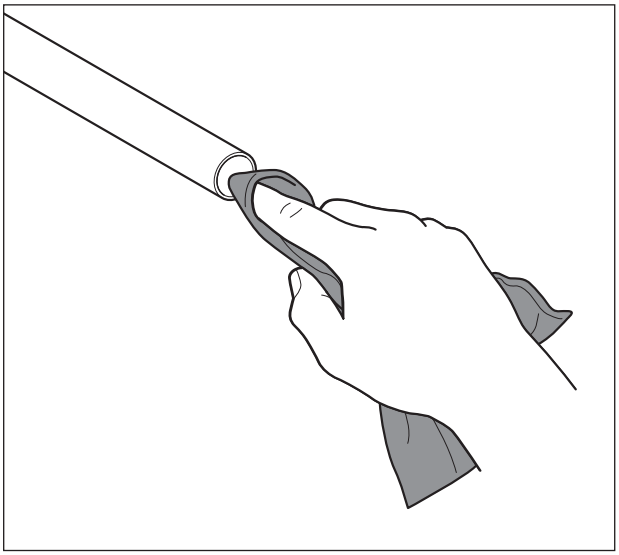


4b The plastic jacket of Geberit Mapress Carbon Steel must be stripped.

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

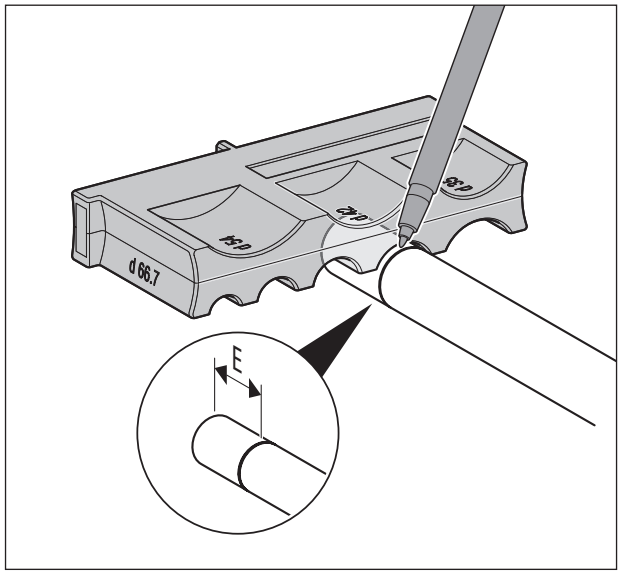


5 Clean chips from the pipe ends.

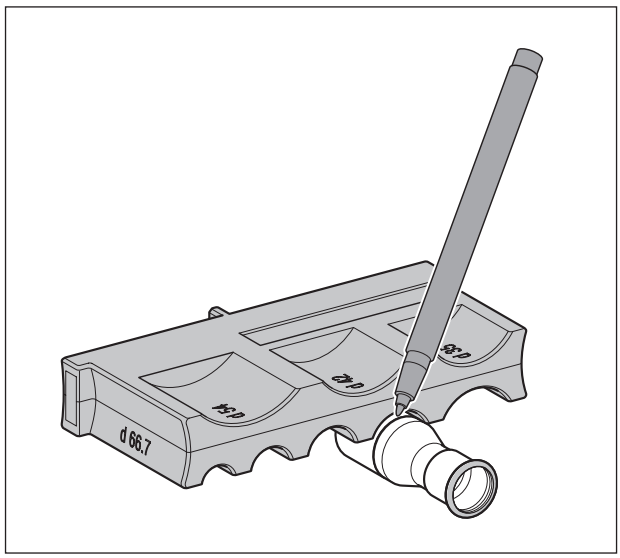


6a Mark the insertion distance.

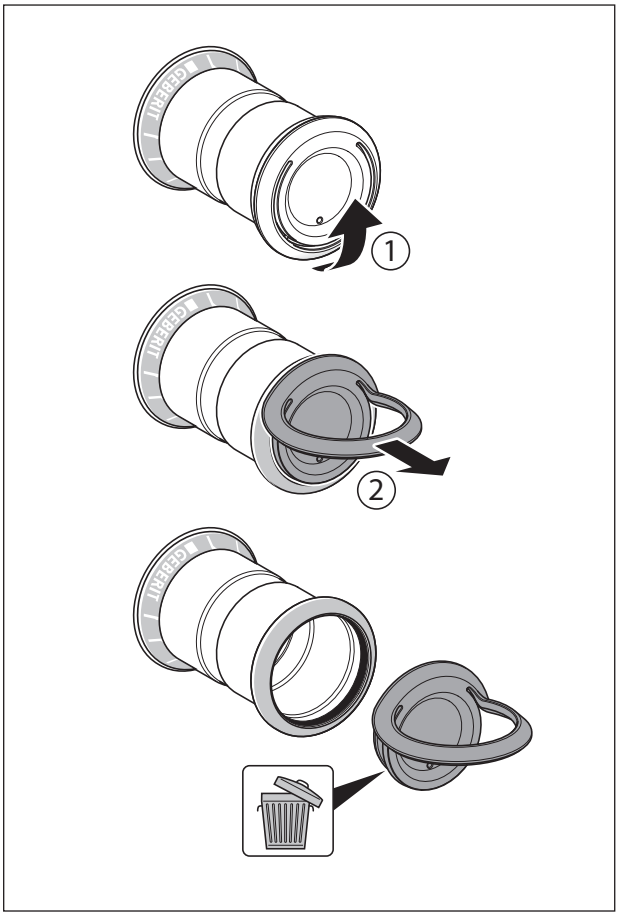
Insufficient mechanical strength if correct insertion depth is not observed.



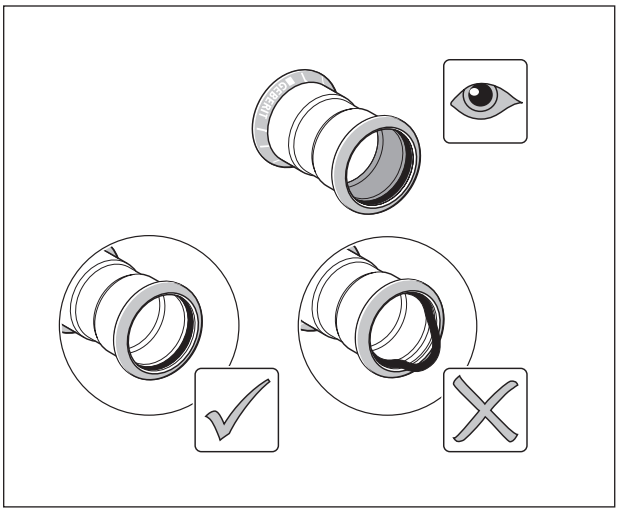
6b On fittings with a plain end, mark the insertion distance on the end.



7 Remove the plug from the fitting.

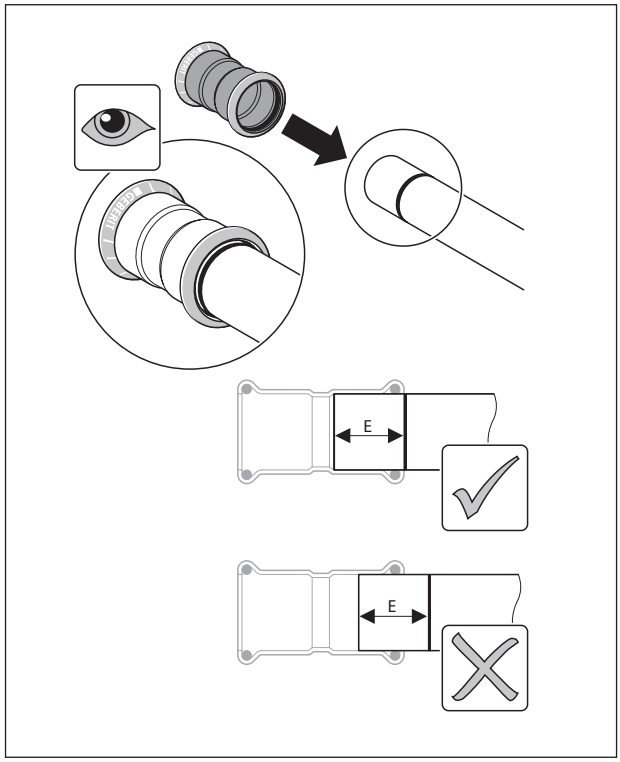


8 Check the seal ring.



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

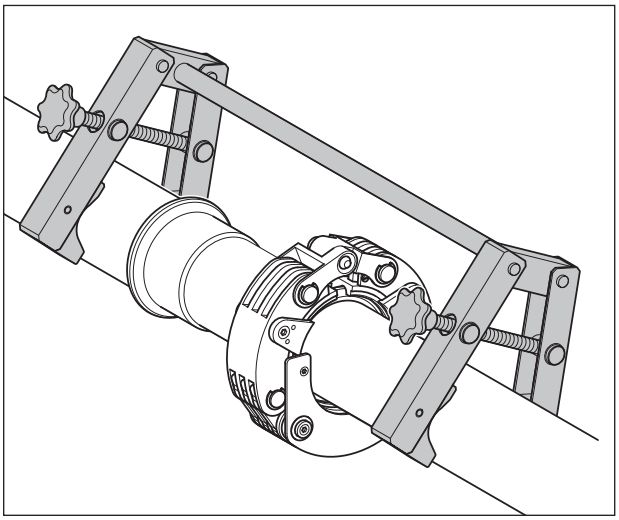
1 Fix the pipe in position.
2 Seal in the threaded connection.
3 Insert the threaded fitting and screw into place, counter holding the threaded fitting.

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

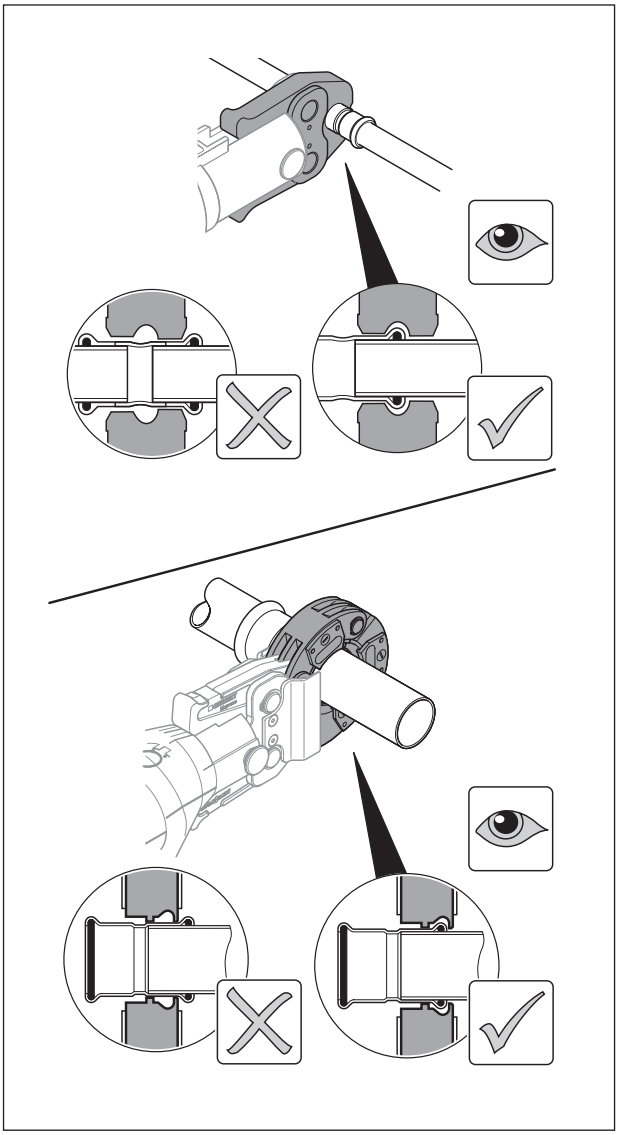
Prerequisites

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

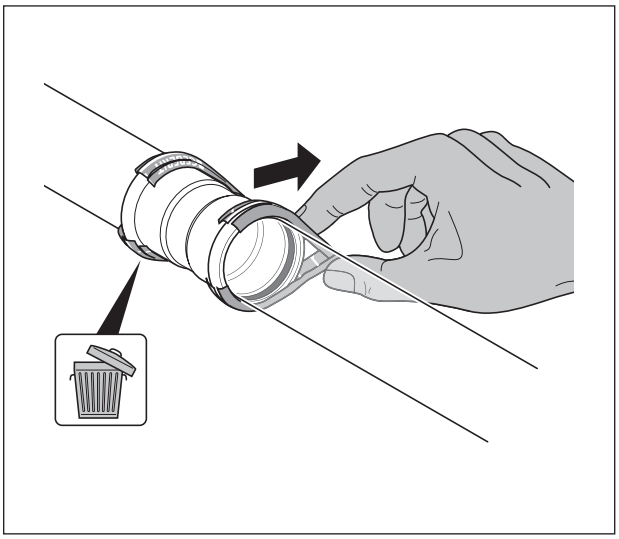
1 Ensure that the diameter of the pressfitting matches the diameter of the pressing jaw or pressing collar: Ø 12 - 35mm use pressing jaw, Ø 42 - 108mm use pressing collar and adaptor.

2 Press the fitting.

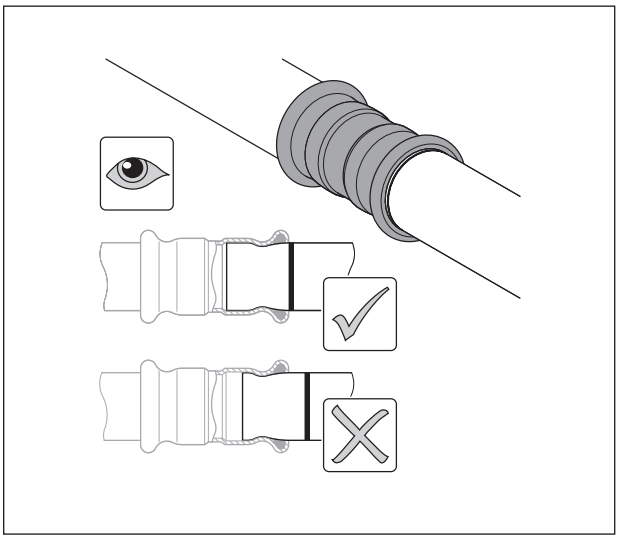
3 Ø 108mm pressfittings must be pressed twice, firstly using the ZB 321 and secondly the ZB 322 adaptor before the collar is removed.



4 Remove pressing indicator from the fitting.



5 Check correct insertion depth has been made.

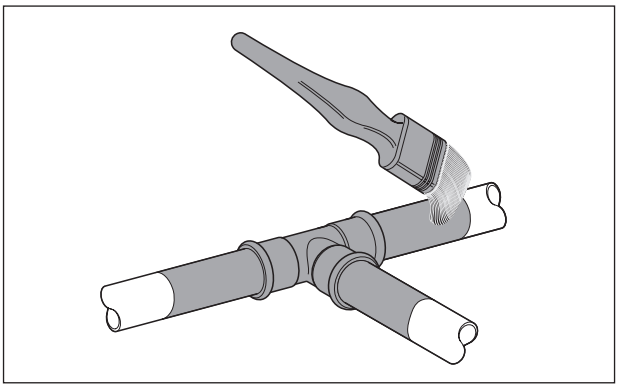


4.3 Geberit Mapress Carbon Steel corrosion protection

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.

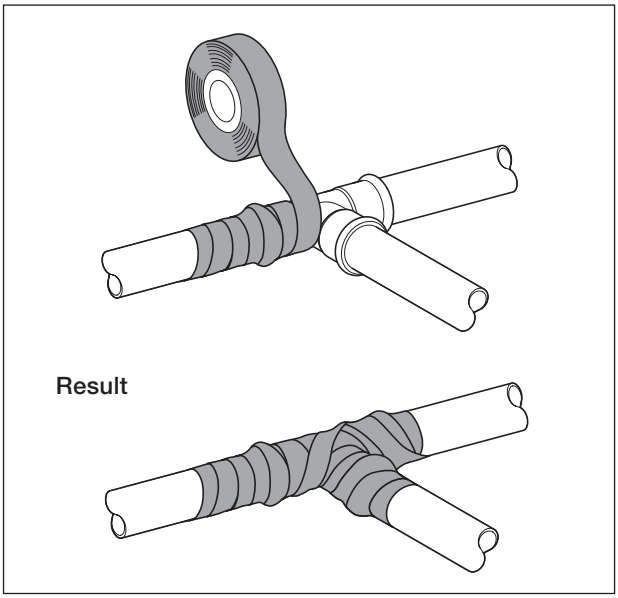
The primer does not have any resistance against corrosion. This is only used as a wash primer for the corrosion protection sleeve.



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.



4.4 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. BS6700, or guides issued by CIBSE and WRAS 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.

4.4.1 Pressure test for potable water installations

Pressure test with air

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, BS6700 or guides issued by CIBSE and WRAS. The below must be understood as a recommendation from Geberit.

For safety reasons, the test pressures are set to a maximum value of 3 bar.

The tightness test must be performed as follows:

- The test pressure is >0.11 bar, but <0.5 bar
- The test section should be limited to 100 litres volume (0.1m³). This is to limit the amount of stored energy
- The test pressure should hold constant for 10 minutes.

The tightness test is followed by a load test:

- This should take place immediately after the leak test
- The test section should be limited to 100 litres volume (0.1m³). This is to limit the amount of stored energy
- The pressure should not be greater than 1.5 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 30 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, BS6700 or guides issued by CIBSE and WRAS. The below must be understood as a recommendation from Geberit.

The installation should be tested with potable water and should hold 1.5 times working pressure for one hour with no visible leakage of water.

The tightness test with water should be performed directly before commissioning for reasons of hygiene and chemical corrosion. If this is not possible, the system must remain completely filled until commissioning. (for additional information please refer to the HVCA Guide to Good Practice TR/6).

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

If water remains in a pipe which contains air after a water pressure test, there is a higher risk of pitting corrosion, especially if the pipe system is not completely closed. This higher risk of corrosion results from evaporation of the remaining water which leads to an increase in the chloride ion content in the remaining liquid phase.

4.4.2 Pressure test for heating installations

The pressure test in installed pipes is generally performed with water (e.g. in accordance with BS6700). The below must be understood as a recommendation from Geberit.

The following must be observed during the pressure test on heating installations:

- The test pressure is 1.5 times the working pressure at all points of the system, but at least 1 bar overpressure
- Immediately after the cold water pressure test, it should be checked that the system remains tight even at the highest temperature. For this purpose, the system must be heated to the calculated highest temperature
- No pressure drop may occur during the test
- The pressure test must be adequately documented.

4.4.3 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.

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.

Tightness and let-by test

The tightness test must be performed as follows:

- The test medium is either air or inert gas (e.g. nitrogen or carbon dioxide)
- The test pressure is 1.5 times the working pressure
- 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
- The tightness test must be adequately documented.

The let-by test must be performed as follows:

- The test medium is either air or inert gas (e.g. nitrogen or carbon dioxide)
- The test pressure is 0.5 times the working pressure
- The test time is 10 mins. after temperature compensation has been completed
- The test pressure must not increase during the test time
- The let-by test must be adequately documented.

Combined load test and tightness test

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

- The test medium is either air or inert gas (e. g. nitrogen or carbon dioxide)
- The test pressure is 3 bar
- The test time is at least 2 hours after completed temperature compensation of 3 hours
- During the test time possible changes in temperature in the test medium must be observed
- A pressure recorder class 1 and a pressure gauge class 0.6 must be used
- The pressure test must be adequately documented.

4.4.4 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/2. The below must be understood as a recommendation from Geberit.

The requirements of the pressure test apply for low and medium pressure pipes.

The pressure test can be performed with air or nitrogen and also with water.

The pressure test with air or nitrogen must be performed as follows:

- The test pressure is 1.1 times the permissible operating overpressure, but at least 1 bar
- The minimum test time is 10 minutes, after temperature compensation has been completed
- The pressure test must be performed together with the corresponding equipment
- The pressure test must be adequately documented.

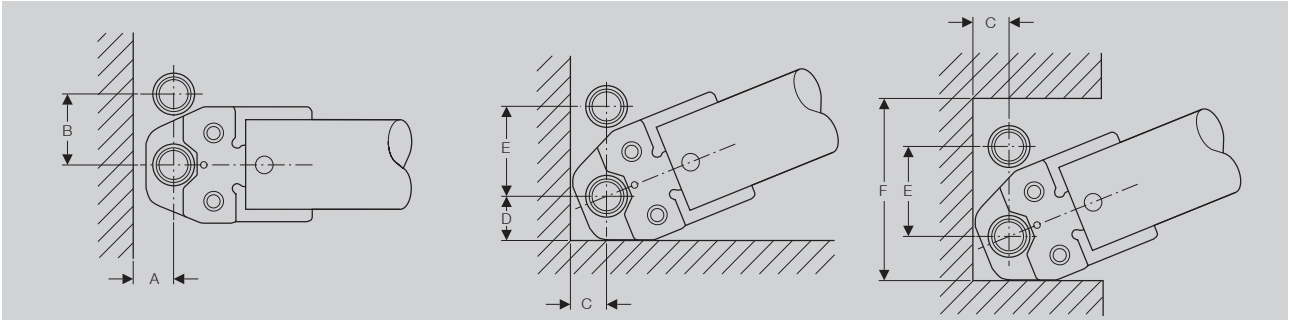
The pressure test with water must be performed as follows:

- The pressure test with water must be performed at 1.3 times the permissible operating overpressure
- If a pressure test is planned for initial or periodical tests, corresponding discharge connections should be provided when the pipe is installed, or the layout should be designed for bottom discharge
- The pressure test must be correspondingly documented.

4.5 Minimum distances and space requirements

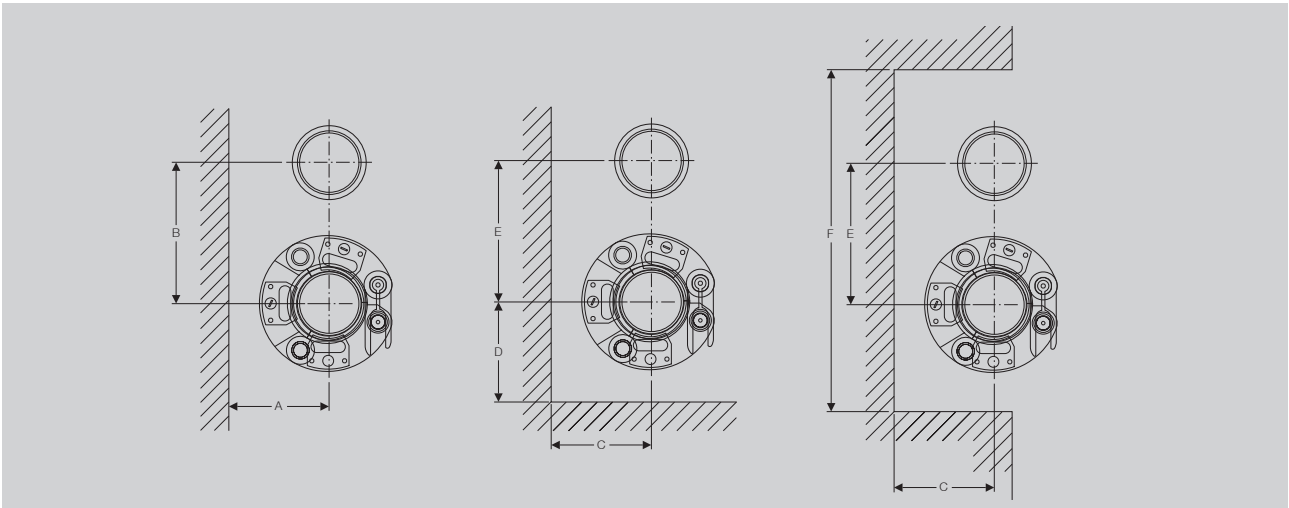
4.5.1 Space requirements when pressing with pressing tools

Table 64: Space requirements when pressing with pressing jaws for mounting on a smooth wall, in corners and in ducts



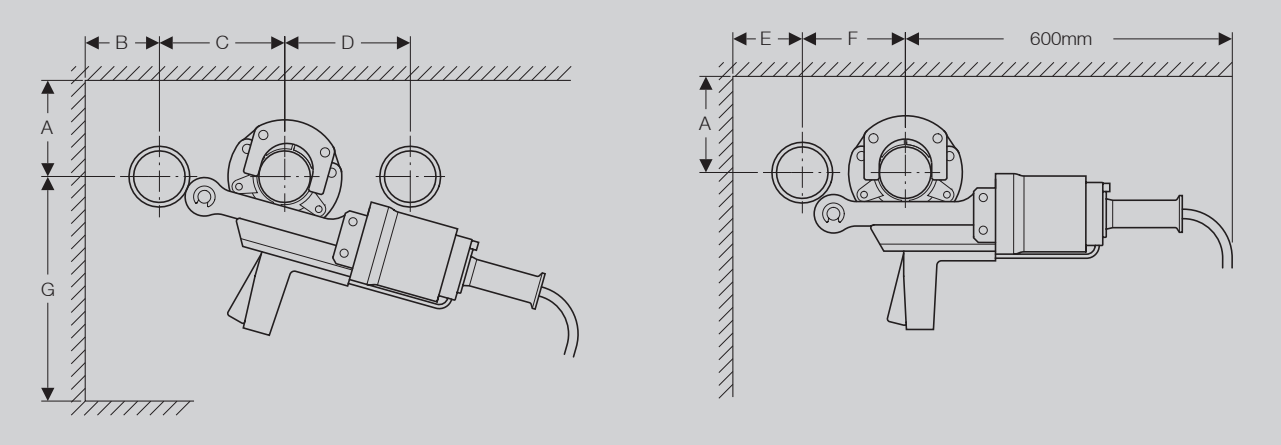
d (mm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)
12-15	20	56	20	28	75	131
18	20	60	25	28	75	131
22	20	65	31	35	80	150
28	25	75	31	35	80	150
35	30	75	31	44	80	170

Table 65: 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 66: 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	300	300
88.9	120	200	220	220	160	180	320
108	130	200	230	230	160	200	340

4.5.2 Minimum distances between two pressed joints

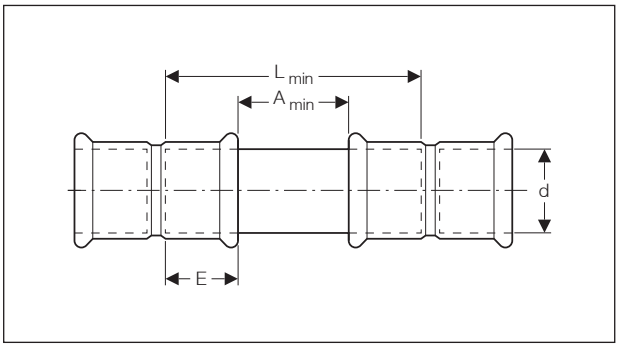


Figure 39: Minimum distance between two pressed joints

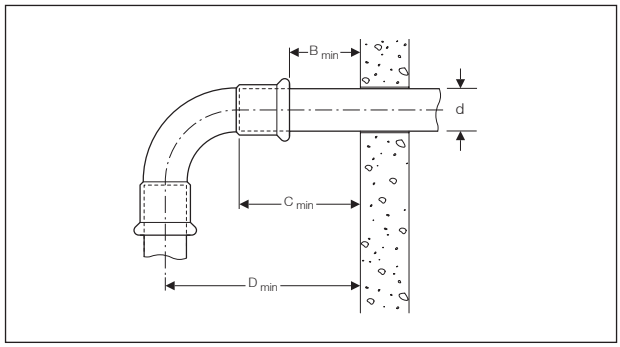


Figure 40: Pipe depths in wall and ceiling outlets

Table 67: 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]	136/126[1]	53
88.9 x 2.0/1.5	20/30[1]	150/140[1]	60
108 x 2.0	20/30[1]	180/170[1]	75

Table 68: 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

4.6 Fixing of pipes

4.6.1 Pipe fixings

When fastening 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

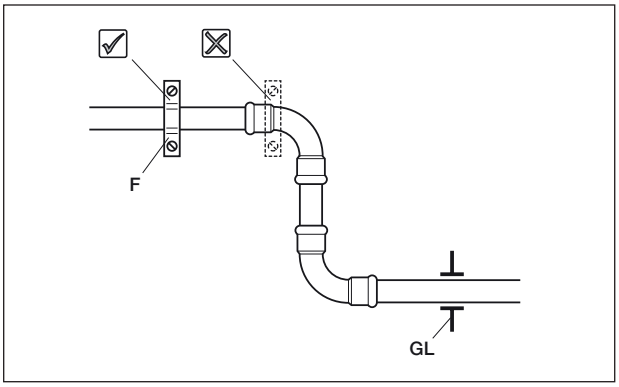


Figure 41: Positioning anchor points: On the pipe, not on the pressfitting

F Anchor point
GL Sliding point

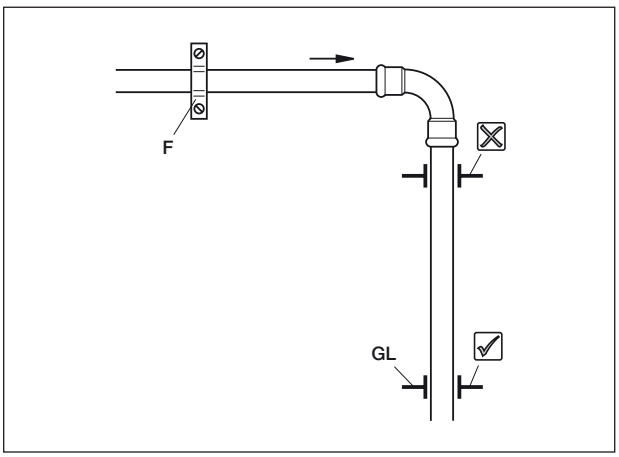


Figure 42: Positioning sliding points: Horizontal pipe should be able to expand freely

F Anchor point
GL Sliding point

4.6.2 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 69: Pipe bracket spacing according to DIN1988, Part 2 (BS EN 10305) for Geberit Mapress Stainless Steel, Carbon Steel and Copper

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 1.5	3.50	3.50
65	76.1 x 2.0	4.25	5.00
80	88.9 x 2.0	4.75	5.00
100	108 x 2.0	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.

4.7 Additional work

The country-specific regulations and guidelines must be observed in the following description for additional work.

4.7.1 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 6700 and WRAS guidelines.

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

4.7.2 Insulation

General

Insulation of Geberit Mapress systems in the UK should be to BS 6700, BS 5422 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%.

Cooling 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.

4.7.3 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 70: 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

4.7.4 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.

5 Applications

5.1 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
Well water	CIIR black	X			X		16	0-100	
Potable water	CIIR black	X			X		16	0-100	
Purified water	CIIR black	X			X		16	0-100	
Factory water	CIIR black	X			X		16	0-100	
Ground water	CIIR black	X			X		16	0-100	
Surface water	CIIR black	X			X		16	0-100	
Treated water	CIIR black	X					16	0-100	Not for pharmaceutical grade waters
Heating water	CIIR black	X		X	X		16	0-120	
Condensate from gas condensing boilers	CIIR black	X					16	Max 120	
Condensate from steam units	CIIR black	X			X		16	Max 120	
Chilled water	CIIR black	X		X	X		16	0-100	Appropriate corrosion protection required for carbon steel
Water-anti-freeze mixture	CIIR black	X		X	X		16	-30-120	For approved anti-freezes
Water-anti-freeze mixture	FKM blue	X		X	X		16	-25-180	For approved anti-freezes
Argon	CIIR black	X		X	X		16	Room temp	

Continued on opposite page…

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
Compressed air	CIIR black	X		X	X		16	Room temp	Residual oil content max. 5 mg/m3. Not for medicinal gases
Compressed air	FKM blue	X		X	X		16	Room temp	Not for medicinal gases
Carbon dioxide	CIIR black	X		X	X		16	Room temp	Not for medicinal gases. Not for dry ice
Nitrogen	CIIR black	X		X	X		16	Room temp	Not for medicinal gases
Vacuum	CIIR black	X (silicone free)		X	X		0.2 absolute	Room temp	Absolute 0.2 corresponds to -0.8 bar in the installation
Methanol	CIIR black	X			X		16	Room temp	
Ethanol	CIIR black	X			X		16	Room temp	
Propanol	CIIR black	X			X		16	Room temp	
Heating Oil EL	FKM blue	X		X	X		5	-20-70	
Engine and Transmission Oil	FKM blue	X		X	X		5	-20-70	
Natural Gas	HNBR yellow		X			X	5	-20-70	
LPG	HNBR yellow		X			X	5	-20-70	Only in the gas phase.
Methane	HNBR yellow		X			X	5	-20-70	Observe all standards regulations and norms.
Ethane	HNBR yellow		X			X	5	-20-70	
Propane	HNBR yellow		X			X	5	-20-70	No underground installation
Butane	HNBR yellow		X			X	5	-20-70	

5.1.1 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

Hygiene characteristics

The high level of potable water quality is not affected by Geberit Mapress Stainless Steel 1.4401 / BS316 S 33 or Geberit Mapress Copper.

Geberit Mapress Stainless Steel 1.4401 / BS316 S 33 does not release any heavy metals to the potable water and cannot cause nickel allergies. The permitted limit value for nickel migration is significantly below < 0 .02mg/l (in accordance with EU Directive 98: Nickel).

The approvals and hygiene tests for the pressed joints also include the gap between the pressfitting and the seal ring CIIR black made of butyl rubber and the EPDM seal rings in copper fittings Ø 66.7 - 108mm.

The seal ring complies with the recommendations for plastics in potable water systems (KTW recommendations) and has passed the test for hygiene according to the national DVGW data sheet W 270.

For extinguishing water pipes, Geberit Mapress Stainless Steel 1.4401/ BS316 S 33 corresponds to the requirements of DIN 1988, Part 6.

Potable water installation

Geberit Mapress Stainless Steel 1.4401 / BS316 S 33 and Geberit Mapress Copper are suitable for all approved potable water after treatment and do not require any additional measures for protection against corrosion.

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.

Electrical trace heaters

Electrical trace heaters can be used if it is ensured that the temperature of the inside wall of the pipe does not exceed 60°C over prolonged periods.

For thermal disinfection short periods of up to one hour per day are permissible at 70°C.

5.1.2 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 Silicone Free (technical gases)

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

- Natural gases
- Liquefied gases

Table 71: Application range of Geberit piping systems for natural gas and liquefied gas

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 17, “Marking of Geberit Mapress Stainless Steel Gas pressfitting”, on page 13 and Table 46, “Marking of Geberit Mapress Copper Gas pressfittings” on page 22.

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 as GEBO adaptor with union nut for gas) according to DIN EN or DVGW.

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.

Suitability for use with Gas Service Risers

According to the Institute of Gas Engineers & Managers standard IGEM/UP/2, service risers that exceed 20 meters, above diameters of 50mm must be installed in welded steel medium grade pipework. Where alternatives are to be used, the new material must of at least an equivalent standard.

In particular, this references the end load requirements of the pipework to ensure the integrity of the jointing method used.

Geberit Mapress Stainless Steel Gas and Geberit Mapress Copper Gas pressfittings have been tested by BSi to prEN 1254-7 which included assembly methods, leak testing and fire resistance at 650°C. Also, as part of Advantica's original assessment of the Geberit Mapress Stainless Steel Gas and Geberit Mapress Copper Gas pressfittings the static flexural strength/bending moment was tested.

On this basis, Geberit Mapress Stainless Steel Gas and Geberit Mapress Copper Gas pressfittings meet the same end load requirements of steel threaded, welded and compression systems, and can be used as an alternative jointing technology for service risers.

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

Table 72: 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.

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

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

5.1.3 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 120°C without restriction.

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 120°C. Prevent atmospheric oxygen from entering the heating water.

Geberit Mapress Carbon Steel is not suitable for open water heaters due to the thin wall thickness and the oxygenation capacity that is a feature of the system.

Additives in the heating water must be checked to ensure that they are compatible with the black seal ring CIIR/EDPM.

5.1.4 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.

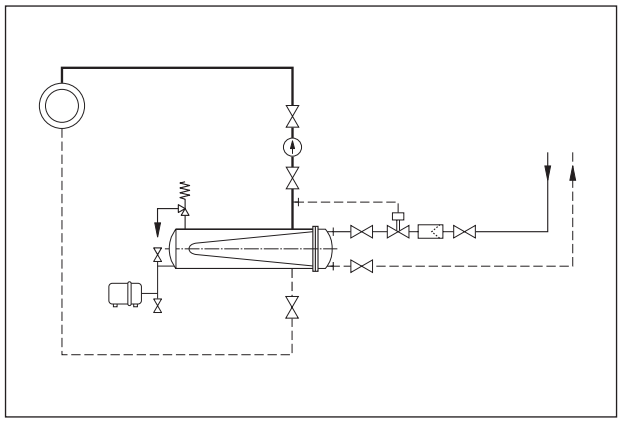


Figure 42: House station with indirect connection of the heating system to the remote heating network.

Geberit Mapress pressfitting systems

The following Geberit Mapress pressfitting systems can be used for the secondary circuit of remote and local heat installations:

- Geberit Mapress Stainless Steel
- Geberit Mapress Carbon Steel

The following operational conditions apply:

Table 73: Operational conditions for Geberit Mapress Stainless Steel and Geberit Mapress Carbon Steel in remote and local heat installations

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

5.1.5 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.

In building technology there are the following main types of heat pumps:

- Air/water heat pump
- Water/water heat pump
- Brine/water heat pump

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 120°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 120°C.

Prevent atmospheric oxygen from entering the heating water.

5.1.6 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. The inlet temperature ranges from +4°C to +6°C, the return temperature from +12°C to +15°C. This range is always determined by the respective application.

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 without restriction under the following operating conditions:

- Geberit Mapress Seal ring CIIR black
  - Water/ antifreeze mixture: -30 - +40°C
  - Cooling water: 0 - 100°C

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

Table 60 on page 26 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 under the following operating conditions:

- Geberit Mapress Seal ring CIIR black
  - Water/ antifreeze mixture: -30 - +40°C
  - Cooling water: 0 - 100°C

The non-alloy steel is not suitable for open cooling water systems due to the thin wall thickness and the high oxygenation capacity, which would cause corrosion.

Table 60 on page 26 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 4.3).

Geberit Mapress Copper

Geberit Mapress Copper can be used for open and closed cooling water systems under the following operating conditions:

- Geberit Mapress Seal ring CIIR/EPDM black
  - Water/ antifreeze mixture: -30-+40°C
  - Cooling water: 0 - 100°C

5.1.7 Solar installation

Principles

Solar heating systems are a special method for obtaining thermal energy by using solar energy.

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

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 60 on page 26 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.

It is advisable not to use pressfittings next to the solar panel as temperatures in the pipework can become highly elevated when the system is not running and could damage the Geberit Mapress seal ring.

5.1.8 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)
- Geberit Mapress Copper

Sprinkler system water pipes are categorised as follows:

- “Wet” extinguishing water pipes: The riser pipe is wet and constantly filled with drinking water
- “Dry” extinguishing water pipes: The riser pipe is dry and if necessary, is filled and operated with non-drinking 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 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.

5.1.9 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

5.2 Special applications

5.2.1 Concrete core activation

Principles

The concrete core activation is used for the air conditioning of rooms. The retention capacity of the exposed surfaces of the building (walls, ceilings and floors) is used for this purpose. These components are fitted with pipe systems where water flows through. The piping system can be used for heating or cooling.

The water circulating in the concrete ceiling prepares the concrete storage tank so that an automatic exchange of energy occurs, depending on the room temperature. Due to the components' scope of storage, the concrete core activation is relatively inert and so an individual, rapid and room-relevant temperature control is not possible. Due to the inertness of the system, we suggest charging the accumulator of the building overnight (with energy for heating or cooling the room depending on the type of application) so that enough energy is provided for heating or cooling the rooms during the main time of use. When designing the concrete core activation, care must be taken to avoid falling below the dew point so as to protect the building and piping system.

Geberit Mapress pressfitting systems

The following Geberit Mapress pressfitting systems can be used for concrete core activation:

- Geberit Mapress Stainless Steel

The following operating conditions must be observed:

- Operating pressure: Max. 16 bar
- Operating temperature: -30°C - +120°C

5.2.2 Condensate drains for condensing 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.

5.2.3 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 74: Tested and approved disinfectants for Geberit Mapress Stainless Steel

Additive [1]	Seal ring material CIIR	Application / Concentration	Manufacturer [2]
BAKTONIUM	X	0.5 – 2% solution	Witty Chemie
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
XEROCID	X	0.5 – 2% solution	MFH Marienfelde GmbH

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

5.3 Industrial applications

As well as building 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.

5.3.1 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.

Care must be taken that a professional connection of the pressed joint is made and that the insertion distance is maintained.

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.

Geberit Mapress is suitable for inert gases (non-explosive and non-toxic) such as nitrogen, argon and carbonic acid.

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 75: 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

5.3.2 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:

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

Table 76: 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.

5.3.3 Saturated steam applications

The following Geberit Mapress pressfitting systems can be used for saturated steam applications with operating temperatures up to max. 180°C and operating pressures up to max. 10 bar:

- Geberit Mapress Stainless Steel

The factory pre-mounted CIIR black seal ring is not suitable for use in saturated steam systems.

The approved seal ring FEPM light green made of tetrafluoroethylene propylene rubber will be supplied separately for this application. This replaces the factory pre-mounted CIIR black seal ring, which must be replaced prior to installation.

The Pressure Equipment Directive must be observed when using Geberit Mapress Stainless Steel together with the seal ring FEPM light green.

Applications up to 10 bar are excluded from PED as the product of pressure and nominal diameter (PN x DN) is less than 1000 (Article 3 item 1.3).

Please consult Geberit before installing Geberit Mapress for saturated steam applications to confirm suitability.

5.3.4 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

6 Disinfection

BS 6700 (2009) requires that potable water pipe systems be disinfected in the following situations:

"**a** in new ins`tallations (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 drinking 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 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 48 must be strictly observed by taking the following measures:

- Trained personnel must take specific measuring and control technology precautionary measures
- Specific conditions of the affected drinking 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 drinking 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 77: Proposed disinfectants for pipelines

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 BS6700 "Design, Installation, Testing and Maintenance of Services Supplying Water for Domestic Use Within Buildings" 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.

Active ingredients, concentrations and temperatures in accordance with Table 77 must be strictly observed by taking the following measures:

- Trained personnel must take specific measuring and control technology precautionary measures
- Specific conditions of the affected drinking 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 a measurement technology
- Measure the concentrations at regular intervals at different points along the supply network

Continuous disinfection should be kept as short as possible.

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 and BS6700 guidelines for more information on disinfection of potable water systems

Table 78: Disinfectants for continuous disinfection of Geberit piping systems in accordance with 11 Drinking Water Directive 2001

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

a Values released by Geberit. During use, the application concentration and temperature must not be exceeded at any point of the piping system.

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, cooling 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.

Leaks if unpressed – visibly safe.

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
- Light weight
- 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
- Geberit MeplaTherm system pipes
  - rough
  - preinsulated
- Protective tubes
- 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 holding 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.

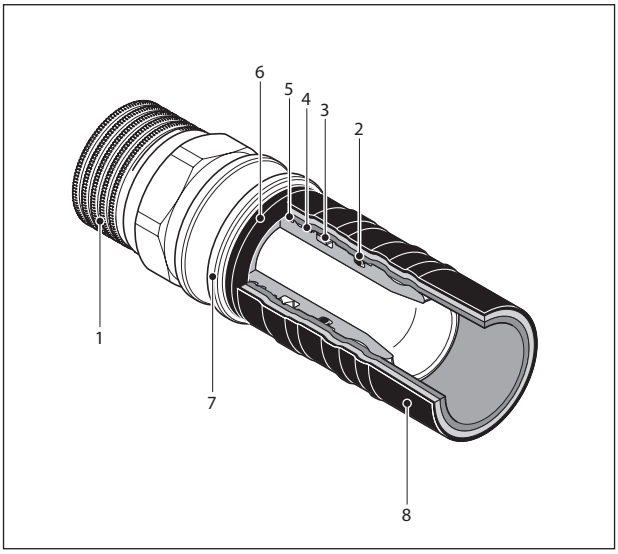
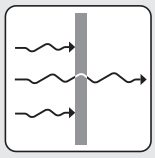
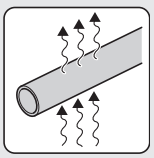
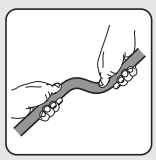
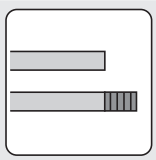
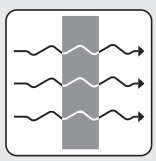


Figure 1: Geberit Mepla pressed joint after pressing

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

System Properties		
	**Corrosion Resistant**	No internal or external corrosion occurs if used correctly. The materials of the pipes and fittings mean that the risk of stress cracking corrosion and deplating effects when in contact with drinking water is virtually nil. Fittings made of brass are not resistant to salt water.
	**Material UV-Stabilised**	Carbon pigments in outer HDPE provide protection from damaging UV light sources. Permanent exposure to the sun should, however, be avoided.
	**Electrical Conductivity**	The system is not electrically conductive as it does not have a continuous conductive path. The system should not be used for equipotential bonding or integrated into the earth system.
	**Fire Protection**	The Geberit Mepla pipe is classed as flame retardant and produces non-toxic smoke. *Fire code 5* *Smoke rating 1*
	**Acoustic Insulation**	Geberit Mepla pipes and fittings do not generate any extra noise when installed correctly. Noise from taps and valves can be isolated with the use of Geberit Mepla decoupling bracketry and additional pipe insulation.
	**Visibly Safe**	Leak paths integrated into Geberit Mepla fittings make un-pressed connections easy to detect on initial fitting. Pipe insertion depth is visible at all times to ensure correct pressing.
	**Hygiene**	The materials used for pipes and fittings are hygienic and suitable for potable water use. The abrasion resistant and smooth PE-Xb inner layer helps prevent the build up of biofilms inside the pipe system.
	**Diffusion Barrier**	The Geberit Mepla pipe is completely resistant to diffusion thanks to its aluminium layer. No gases can pass through the wall of the pipe.
	**Stability**	The aluminium core of the Geberit Mepla pipe ensures that it remains in the required position, yet is easy to bend.
	**Material Expansion**	The low material expansion of Geberit Mepla pipes is five times less than PEX and eight times less than the Polybutylene pipes. Geberit Mepla pipe can be bracketed as per copper pipe.
	**Thermal Conductivity**	Geberit Mepla system pipes are poor heat conductors. The heat loss of Geberit Mepla water pipes is eight hundred times less than that of copper pipes. Geberit Mepla has a thermal conductivity of 0.43 W/mK.

1.2.2 Geberit Mepla system applications

The main applications of Geberit Mepla are:

- Potable water supply pipes for hot and cold water
- Heating
- Cooling / chilled water
- Compressed air

Other media and applications upon request.
Geberit Mepla is not suitable for:

- Medium and high temperature hot water (MTHW / HTHW)
- Saturated steam
- Fire extinguishing water and fire extinguishing pipes
- Sprinklers
- Combustible gases (natural gas, town gas)
- Liquified gases
- Technical and inert gases
- Process pipes
- Chemical applications
- Cooling agents and lubricants
- Engine and gearbox oils
- Heating oil
- Fuel

For these 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			Remark
			Geberit Mepla	Geberit MeplaTherm	PVDF	Gunmetal	Brass	
Potable water	16 10	0 – 20 0 – 70	X X	- -	X X	X X	X X	Service life of 50 years Short term peak temperature of 95ºC for max 150 hours/year
Rainwater and surface water	10	0 – 40	X	X	X	X	X	pH value > 6.0
Salt water[1]	10	0 – 70	X	-	X	X	-	
Water treated by osmosis	10	0 – 70	X	-	X	X[2]	-	
Fully and partially desalinated water	10	0 – 70	X	-	X	X	-	
Water descaled to 0ºfH / 0ºdH	10	0 – 70	X	-	X	X	-	
Disinfectant solution[3]	10	0 – 40	X	-	X	X	X	• Aqueous solution in used concentration • Quaternary ammonium compounds • Guanidinium compounds • Aminoacetic acid
Heating water (closed circuit systems)	10	0 – 85	X	X	X	X	X	Service life of 10 years Short term peak temperature of 95ºC for max. 150 hours / year
Water / antifreeze agent mixture	10	-1 – 40	X	X	X	X	X	Antifreeze agent on glycol basis in used concentration.
Compressed air	10	0 – 40	X	X	X	X	X	Compressed air classes 1 – 3 DIN ISO 8573-1 • Residual oil content max.
Nitrogen	10	0 – 40	X	X	X	X	X	

1 Salt water should not come in contact with the cut surface of the pipe.

2 Gunmetal fittings release metal ions into the water. They are not suitable for ion-free water or only with additional treatment at the point of use.

3 In the event of high hygienic requirements or after contamination, chemical or thermal disinfection at 70°C in accordance with BS 6700, as outlined in HVCA TR/20 “Installation and testing of pipework systems” (part 5) can be performed.

1.2.3 Approvals

In the UK Geberit Mepla is covered by WRAS certificates 0709072, 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:

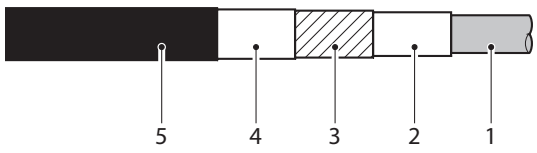
1 Tough, durable HDPE outer shell is non-reactive, flexible and corrosion resistant.

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 Cross linked polyethylene (PE-Xb) resists cracking, ageing and wear. The smooth surface resists limescale and biofilm build up making it ideal for potable water systems.

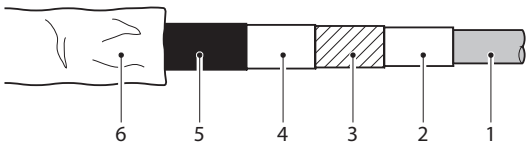
The three layers are bonded together during manufacture to prevent de-lamination during installation and use.

Geberit Mepla system pipe



Item	Description	Product Material
1	Inner pipe	PE-Xb, silane-cross linked
2	Bonding agent	PE, modified
3	Aluminium pipe	Aluminium
4	Bonding agent	PE, modified
5	Protective jacket	PE-HD, black

Geberit Mepla system pipe, preinsulated



Item	Description	Product Material
1	Inner pipe	PE-Xb, silane-cross linked
2	Bonding agent	PE, modified
3	Aluminium pipe	Aluminium
4	Bonding agent	PE, modified
5	Protective jacket	PE-HD
6	Insulation Tear resistant protective foil (outside)	Soft PE foam, closed cell 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: Physical data of Geberit Mepla system pipe with water, 10ºC

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
10 bar	Operating pressure
SKZ A 276, DVGW AS2847 / 2848	Approval marks for Germany
ÖVGW W1.162 TW A	Approval marks for Austria
SVGW	Approval marks for Switzerland
KIWA KOMO CV.Geberit Mepla	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 / 07 – 1147	Approval marks for France
CSTbat 45 - 1147	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 0o C – 70°C	Approval marks for Portugal
VA 1.14 / 12752	Approval marks for Denmark
AENOR N 001 / 471	Approval marks for Spain
UNE 53961 EX, Clases: 1a5 / 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

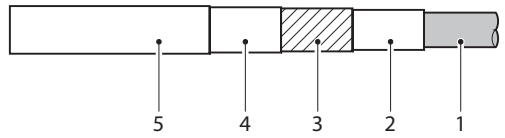
Supplied pipe form:

- Coils of 25 and 50m
- Insulation, red and blue

1.3.2 Geberit MeplaTherm system pipe

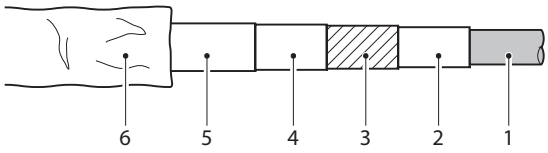
Geberit MeplaTherm system pipe is the same as Geberit Mepla system pipe, except that the inner layer is not supplied with the PE crosslinked. The heat of a heating system means that the layer cross links during use. Geberit MeplaTherm system pipe can be easily distinguished from Geberit Mepla system pipe as it is white where as Geberit Mepla system pipe is black.

Geberit MeplaTherm system pipe



Item	Description	Product Material
1	Inner pipe	PE-Xb
2	Bonding agent	PE, modified
3	Aluminium pipe	Aluminium
4	Bonding agent	PE, modified
5	Protective jacket	PE-HD, white

Geberit MeplaTherm system pipe, round, preinsulated



Item	Description	Product Material
1	Inner pipe	PE-Xb
2	Bonding agent	PE, modified
3	Aluminium pipe	Aluminium
4	Bonding agent	PE, modified
5	Protective jacket	PE-HD, white
6	Insulation Tear resistant protective foil (outside)	Soft PE foam, closed cell PE, grey

Physical characteristics

Table 14: 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 15: 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 16: 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 17: Marking of Geberit MeplaTherm 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
10 bar	Operating pressure
85°C	Operating temperature
SKZ A 276	Approval marks for Germany
KIWA KOMO CV.Geberit Mepla	Approval marks for Netherlands
IIP 137, UNI 10954-1	Approval marks for Italy
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]	Approval marks for France
ATEC 14 / 07-1147	Approval marks for France
CSTbat 45-1147	Approval marks for France

Geberit MeplaTherm system pipe, round, preinsulated

Physical characteristics

Table 18: 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 19: 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 20: 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 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 21: 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 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

1.3.3 Geberit Mepla pressfittings

Geberit Mepla pressfittings are marked on the surface and on the protective cap.

Table 25: Marking of Geberit Mepla pressfitting Ø 16mm

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 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.

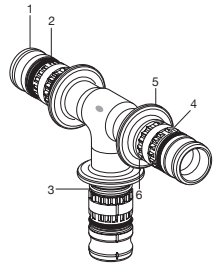


Figure 2: Construction of the PVDF fitting

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

Gunmetal and brass fittings are used for connection to other systems e.g. Geberit Mapress, compression fittings, threaded fittings. Use of gunmetal and brass avoids de-zincification due to the effect of moisture.

The corrosion barrier washer of the metal fittings prevents electrochemical corrosion of the aluminium on the face of the pipe.

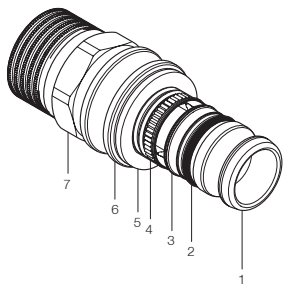


Figure 3: Construction of the fittings in gunmetal/brass

1	Fitting body (Brass CW617K or gunmetal CC499K)
2	O-ring[1]
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

1.3.6 Geberit MeplaFix plug connection

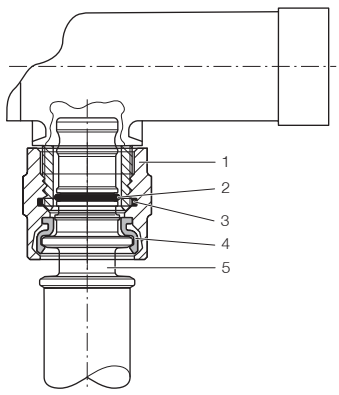


Figure 4: Construction of the Geberit MeplaFix plug connection

1	Geberit MeplaFix adaptor nut
2	O-ring
3	Release lock
4	Snap ring
5	Geberit MeplaFix fitting

1.3.7 Pressing tools

Geberit Mepla pressing tools are provided in the following versions:

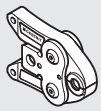
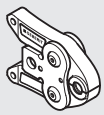
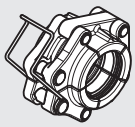
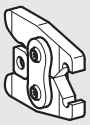
- ACO 102 (12V battery)
- ACO 202 (18V battery)
- ECO 202 (115V / 230V mains)
- EFP 202 (115V / 230V mains)
- MFP 2 (manual)

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 63 – 75mm are pressed using pressing collars with the corresponding 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	 690.456.00.1 690.458.00.1

Only use pressing devices which have been approved by Geberit.

1.3.8 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

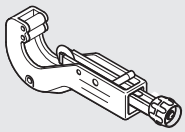
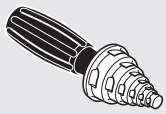
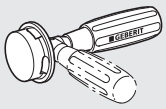
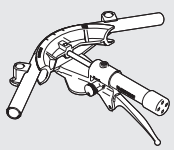
The Geberit Mepla system pipe is cut to length with the following tools:

- Geberit Mepla cutters
- Pipe cutter

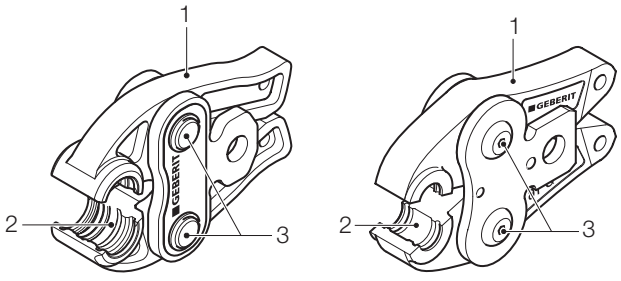
Various cutting tools are available depending on the dimension of the Geberit Mepla system pipe. The use of saws and other tools which could cause chips should be avoided as the O-ring seal could become damaged.

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 calibration tool	Ø 63mm	690.213.00.1	
Pipe deburring tool	Ø 75mm	690.214.00.1	
Pipe bending tool	Ø 16 – 32mm	690.412.00.3	

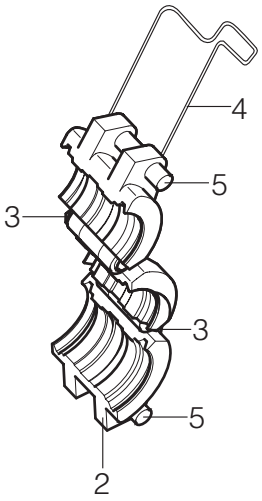
Structure of Geberit Mepla pressing jaws



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.

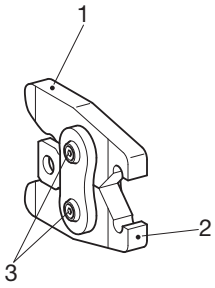
Structure of Geberit Mepla pressing collar



1 Pressing contour
2 Catch
3 Joints
4 Locking clip
5 Pin

The appearance can vary depending on the size and design.

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.

2 Planning

2.1 Corrosion Resistance

The Geberit Mepla system pipe is protected against corrosion by an outer HD PE 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 areas:

- Corrosive environment (gases, vapours and liquids), e.g.
  - Animal facilities
  - Dairies
  - Cheese dairies
  - Storage rooms for chlorine, ammonia etc.
  - Swimming pools

- Permanently damp environments, e.g.
  - Cellar floors in ground water areas or hillsides
  - Rooms endangered by flooding from external water sources or permanent water exposure
  - Surface area of the floor (e.g. large kitchens, washing plants, tiled shower tubs, areas with high pressure cleaning).
  - In waterproof concrete troughs

Rubber collars, sealing tape or other suitable materials can be used for corrosion protection.

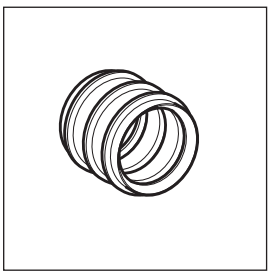


Figure 2: Rubber collar Ø 16 - 26mm, article no. 601.811.00.1, 602.811.00.1, 603.811.00.1.

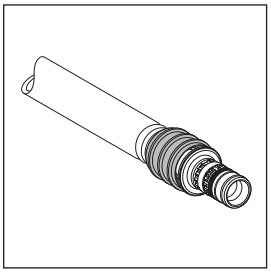


Figure 3: Rubber collar on pipe, is mounted on pipe before pressing

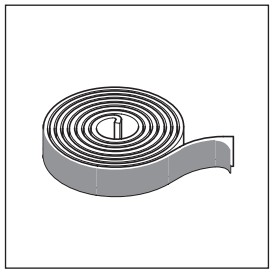


Figure 4: Sealing tape, article no. 601.810.00.1

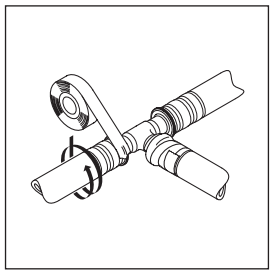


Figure 5: Corrosion protection with sealing tape

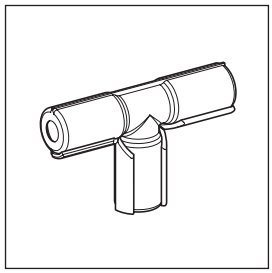


Figure 6: Corrosion protection with termination for t-piece 601.837.00.1, before and after applying the tape

Measures to protect against corrosion are not required if the pipes are equipped with a continuous anti-condensation or thermal insulation and protected from permanent moisture eg in screeds.

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.

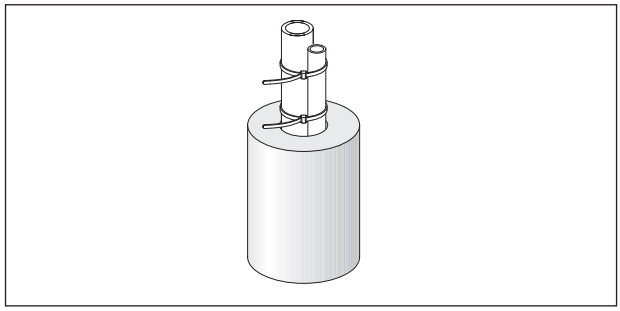


Figure 7: Circulation type pipe attached to pipe

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 heater bands with a maximum temperature of 70°C may be used.

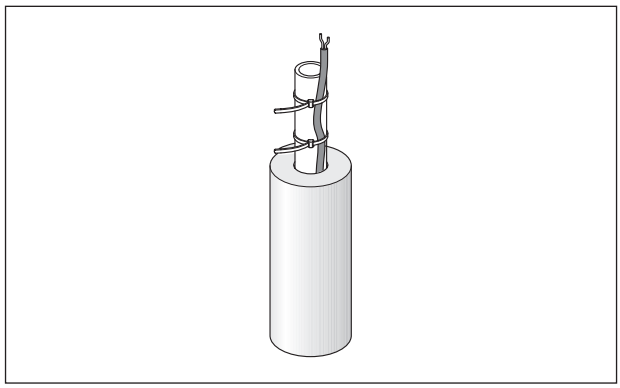


Figure 8: Trace heater band

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 26: 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 (cold) must be protected against heating loss 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.

Table 27: Reference values for minimum insulation thickness for the insulation of drinking water supply pipes 10°C

Assembly situation	Insulation layer thickness at λ = 0.040 W/(m·K) [mm]
Pipe surface-mounted in unheated room (e.g. cellar)	4
Pipe surface-mounted in heated room	9
Pipe in duct, without pipes carrying hot water	4
Pipe in duct, next to pipe carrying hot water	13
Pipe in masonry slits, riser pipe	4
Pipe in wall duct, next to pipes carrying hot water	13
Pipe on concrete ceiling	4

For other thermal conductivity values the insulation layers must be calculated accordingly on the basis of a diameter of Ø 20mm.

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.

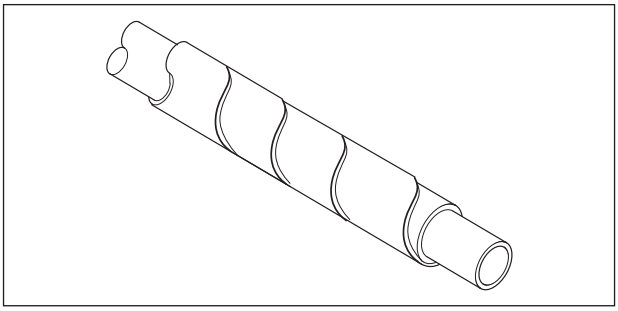


Figure 9: Tape

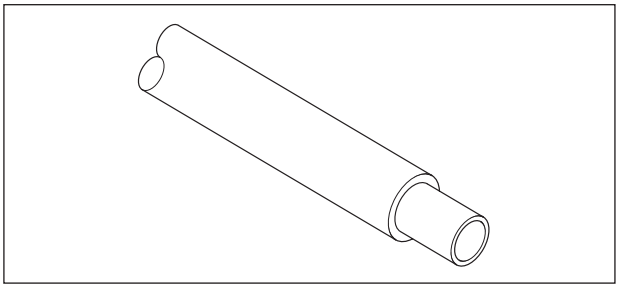


Figure 10: Insulating hose

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.

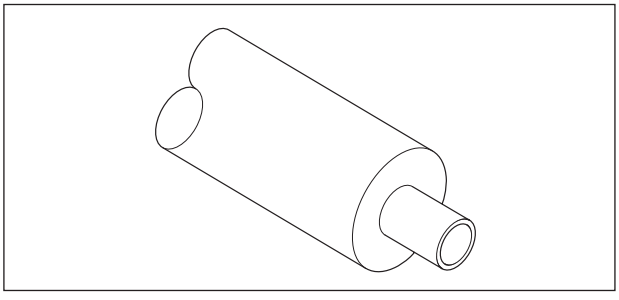


Figure 11: Half-shells with jacketing

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.

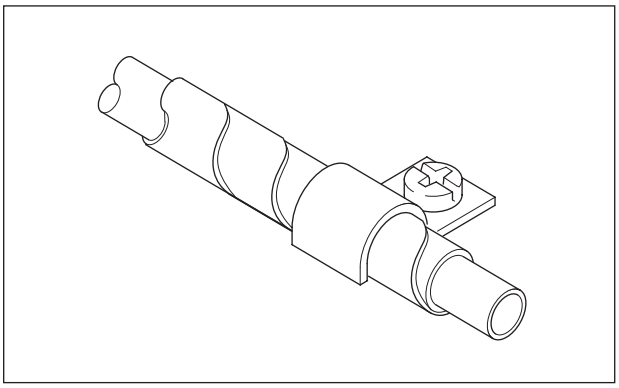


Figure 12: Pipe clip on tape

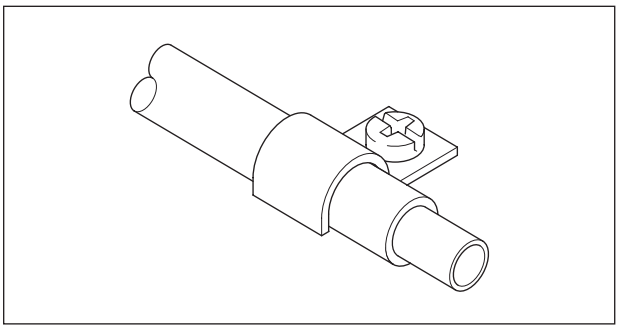


Figure 13: Pipe clip on insulated pipe

2.4.4 Pipe bracket with solid-borne noise insulation

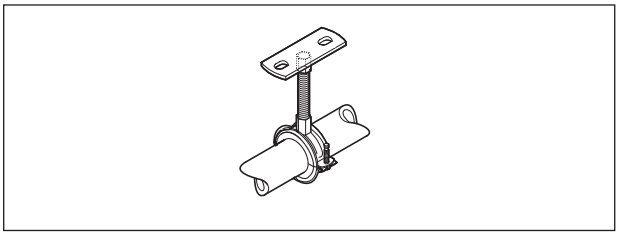


Figure 14: Pipe bracket without lining shell

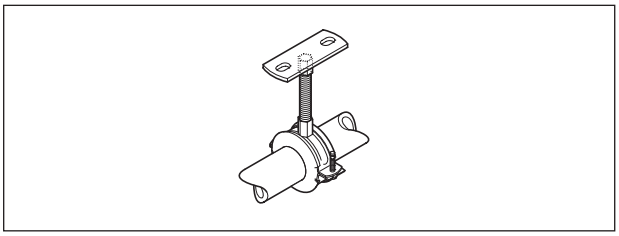


Figure 15: Pipe bracket with lining shell

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.

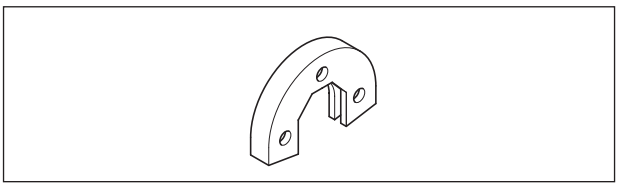


Figure 16: Acoustic insulation insert

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.

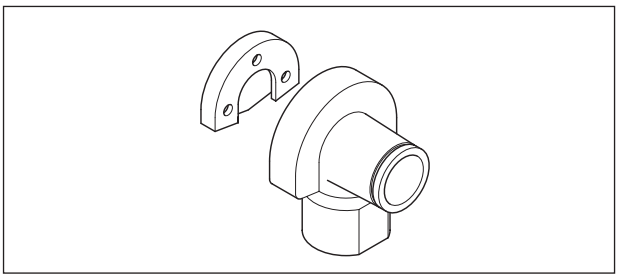


Figure 17: Acoustic insulation insert

2.5 Fire Protection

2.5.1 Fire protection of Geberit Mepla heating and supply pipes Ø 16 - 75mm

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:

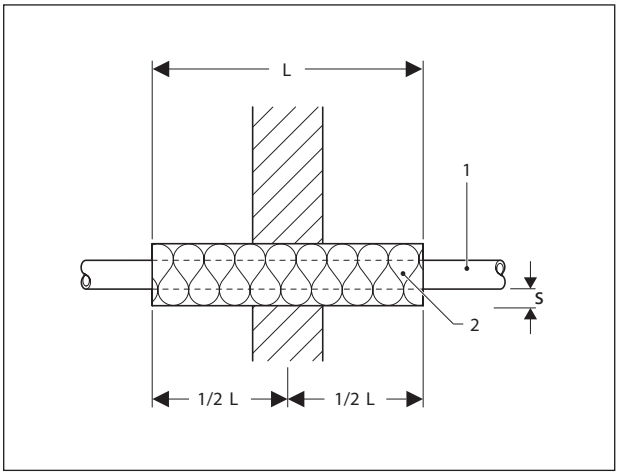


Figure 18: Fire protection, Geberit Mepla Ø 16 - 75mm: Wall penetration, solid wall

L Total length: ≥ 500mm
S Insulation thickness according to Table 28
1 Geberit Mepla system pipe
2 Pipe shell Rockwool RS 800 or equivalent

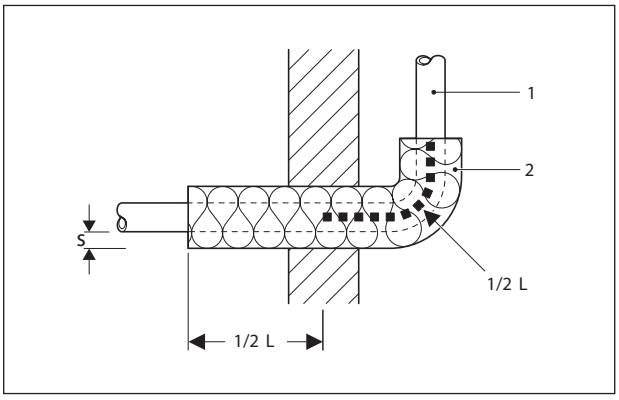


Figure 19: Fire protection Geberit Mepla Ø 16 - 75mm: Wall penetration, solid wall, bend

L Total length: ≥ 500mm
S Insulation thickness according to Table 28
1 Geberit Mepla system pipe
2 Pipe shell Rockwool RS 800 or equivalent

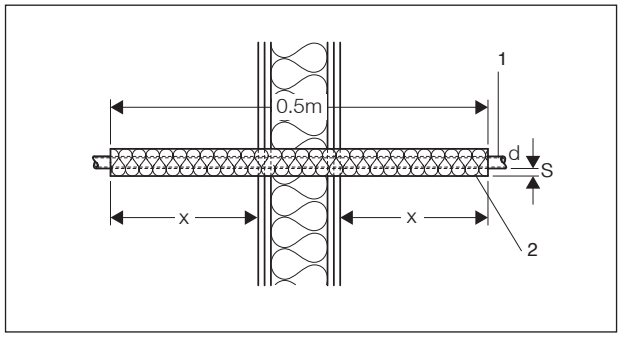


Figure 20: Fire protection Geberit Mepla Ø 16 - 63mm: Wall penetration for drywall installations

L Total length: ≥ 500mm
S Insulation thickness according to Table 28
1 Geberit Mepla system pipe
2 Pipe shell Rockwool RS 800 or equivalent

The penetration of Geberit Mepla Ø 75mm through drywall construction is not permitted.

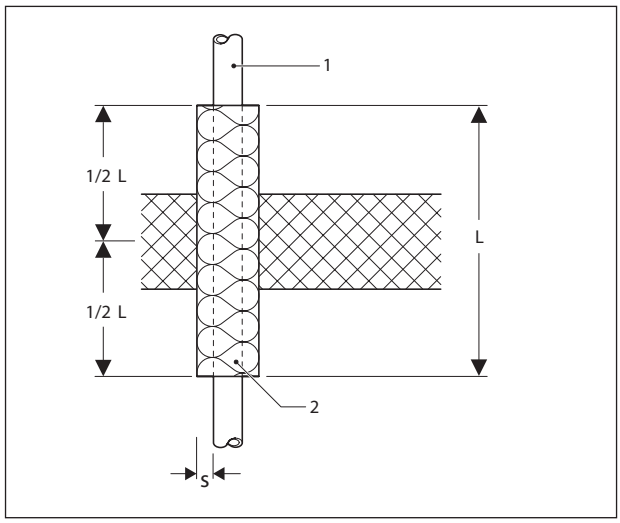


Figure 21: Fire protection, Geberit Mepla Ø 16 - 75mm: Ceiling penetration

L Total length: ≥ 500mm
S Insulation thickness according to Table 28
1 Geberit Mepla system pipe
2 Pipe shell Rockwool RS 800 or equivalent

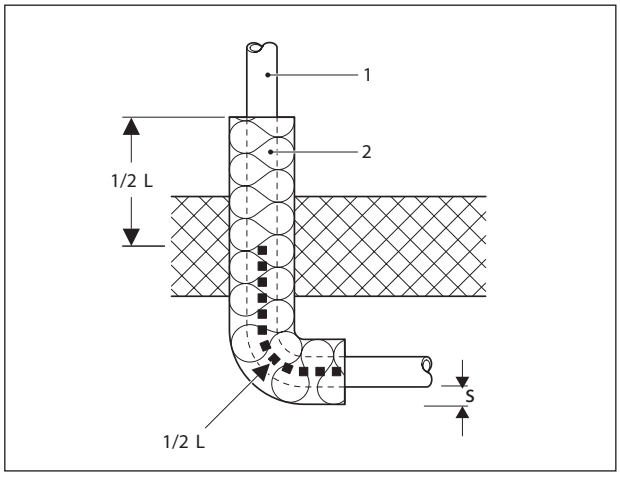


Figure 22: Fire protection Geberit Mepla Ø 16 - 75mm: Ceiling penetration, bend

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 28: Arrangement of the fire protection shell

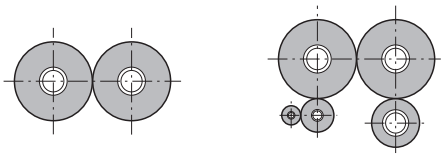
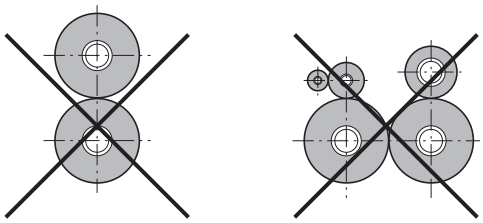
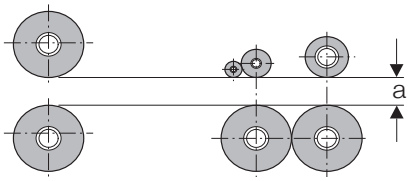
Applications	Geberit Mepla system pipe Ø (mm)								Shell thickness s (mm)
	16	20	26	32	40	50	63	75[1]	
Cold water	✓	✓	✓	✓	✓	✓	✓		20
	–	–	–	–	–	–	–	✓	30
Hot water, heating	✓	✓	✓	–	–	–	–	–	20
	–	–	–	✓	✓	–	–	–	30
	–	–	–	–	–	✓	–	–	40
	–	–	–	–	–	–	✓	–	50
	–	–	–	–	–	–	–	✓	70

[1] The penetration of Geberit Mepla Ø 75mm through drywall constructions is not permitted

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 29: 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 Material for pipe jacketing

Concentrically wound rock wool with net-reinforced aluminium foil and self-adhesive overlapping is used for pipe jacketing.

This material has the following properties:

- Concentrically wound rock wool with net-reinforced aluminium foil and self-adhesive overlapping
- 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
- Supplied by Rockwool, type RS 800

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 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.

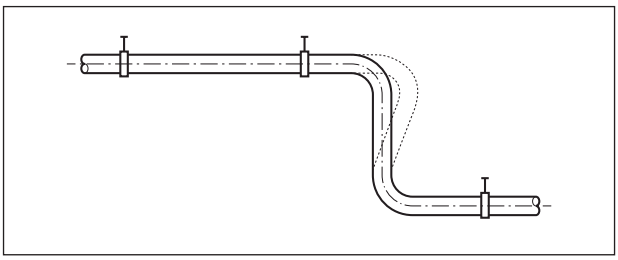


Figure 23: Absorption of a change in length by means of the elasticity of the piping system

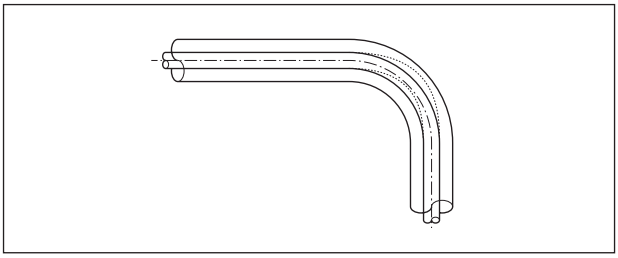


Figure 24: Absorption of a change in length by means of the insulation

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.

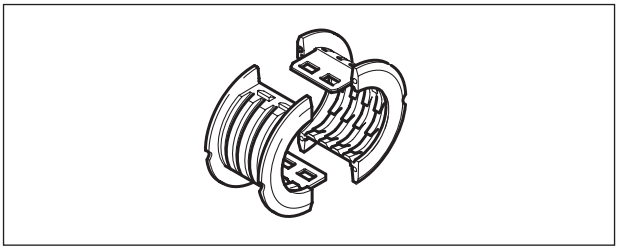


Figure 25: Pipe bracket lining shell, art. no. 603.702.00.1

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:

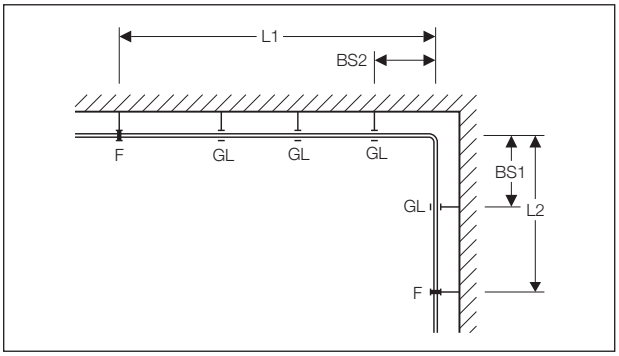


Figure 26: Expansion compensation by change in direction of the pipe

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.

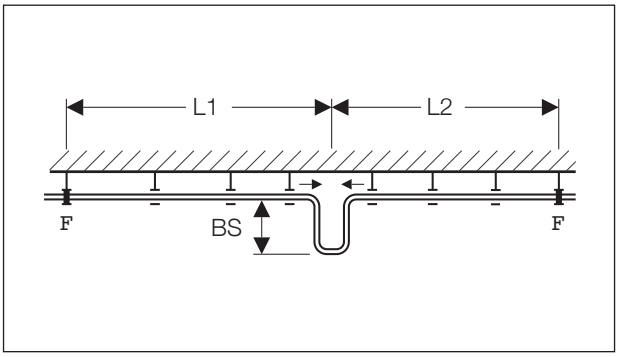


Figure 27: Expansion compensation by U-bend

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.

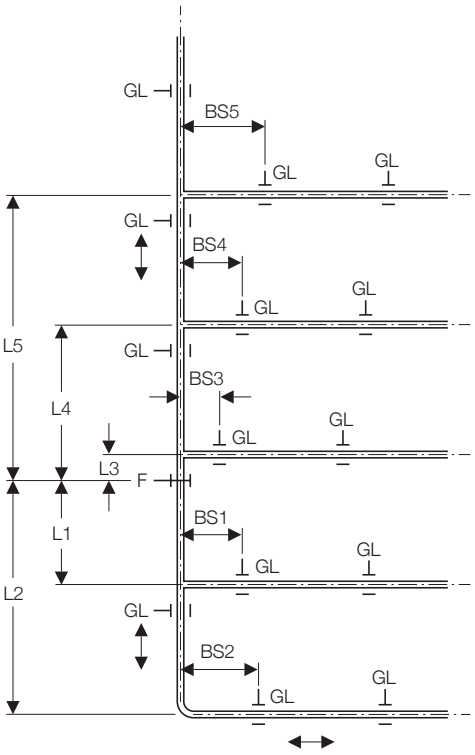


Figure 28: Anchor point in middle floor

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

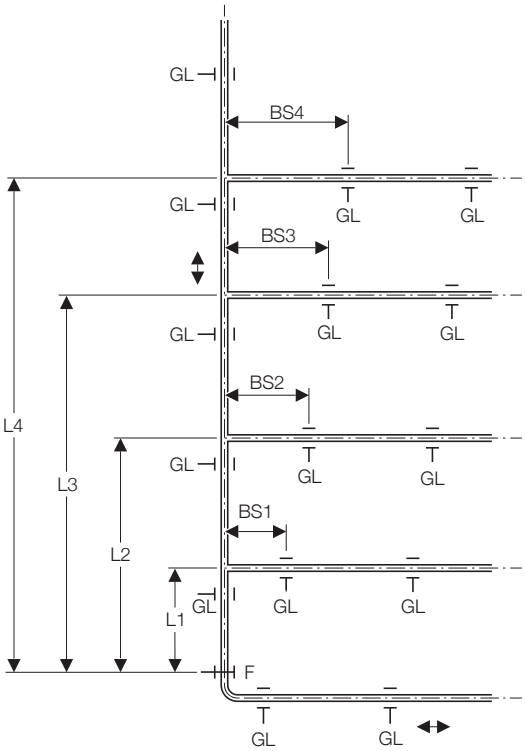


Figure 29: Anchor point in lower floor

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:

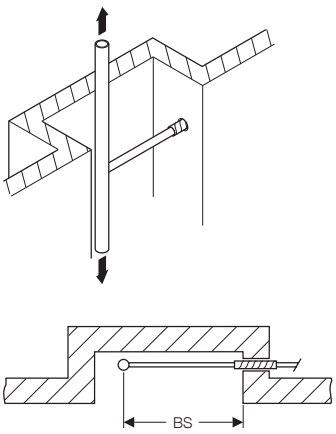


Figure 30: Expansion compensation in duct, without insulation, straight deflection leg

BS Deflection leg

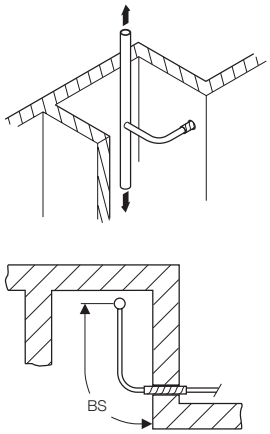


Figure 31: Expansion compensation in duct, without insulation, bent deflection leg

BS Deflection leg

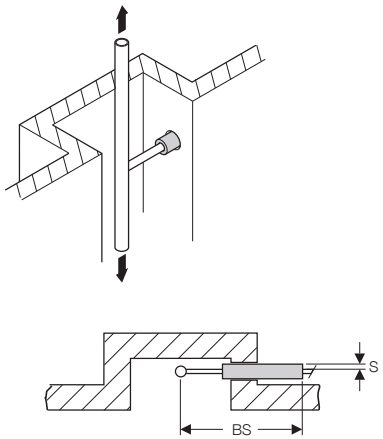


Figure 32: Expansion compensation in duct, with insulation

S Insulation thickness = 1.5 · ΔL

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 30: 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 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
- ΔT = 50 K
- α = 0.026 mm/(m·K)
- C = 33

Required:
- L_B [mm]

Solution:

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

$$\Delta l = 6m \cdot 0.026 \ \frac{mm}{(m \cdot K)} \cdot 50\ K$$

$$\Delta l = 7.8mm$$

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

$$L_B = 33 \cdot \sqrt{32 \cdot 7.8}$$

$$L_B = 521mm$$

2.8 Minimum dimensions for fitting combinations

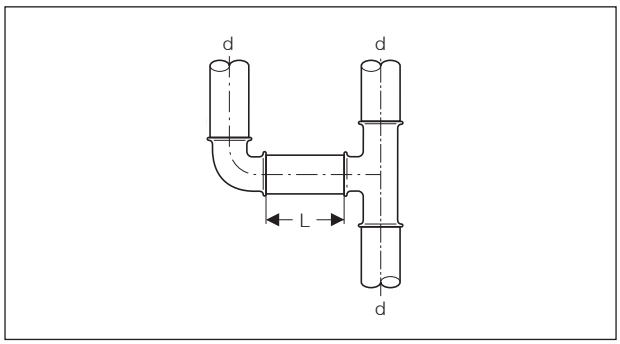


Figure 33: Minimum pipe length between two fittings with press connection

Table 32: 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

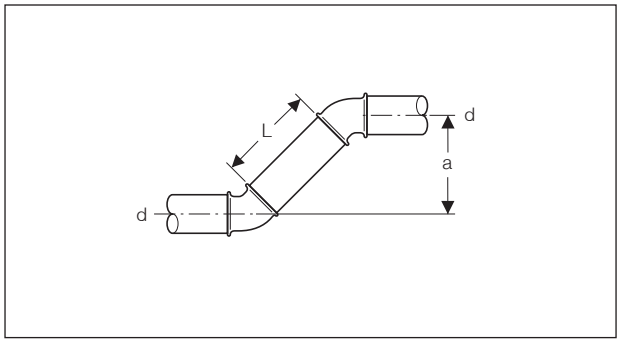


Figure 34: Minimum pipe length and distance between two 45° elbows

Table 33: 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

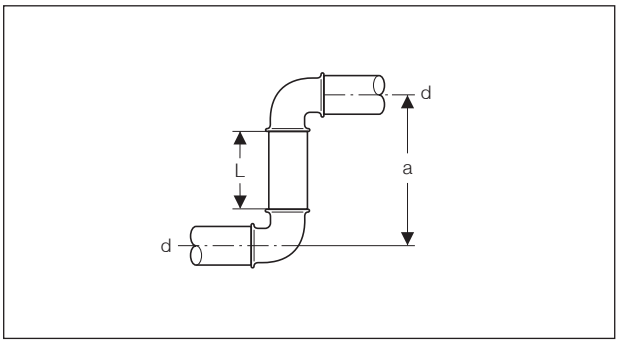


Figure 35: Minimum pipe length and distance between two 90° elbows

Table 34: 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

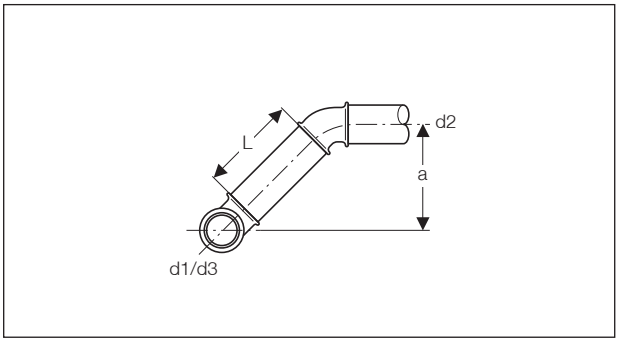


Figure 36: Minimum pipe length and distance between T-piece and 45° elbow

d1/d3: Through-flow
d2: Branch fitting

Table 35: 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

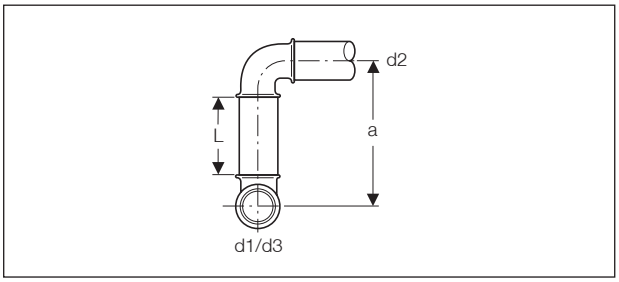


Figure 37: Minimum pipe length and distance between T-piece and 90° elbow

d1/d3: Through-flow
d2: Branch fitting

Table 36: 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

2.9 Pressure loss

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.

2.9.1 Pressure loss coefficients

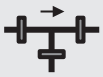
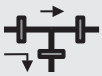
The values were determined based on SVGW specifications (SN EN 1267).

Table 37: Pressure loss coefficient Geberit Mepla system pipe, bent

		Pressure loss coefficient Ø (mm)							
Designation	**Pressfitting**	**16**	**20**	**26**	**32**	**40**	**50**	**63**	**75**
Bent pipe		0.17	0.14	0.70	0.08	0.21	0.13	—*	—*

* The pipes Ø 63 – 75mm should not be bent. Use 90° and 45° elbows for directional changes.

Table 38: Pressure loss coefficient: fittings

		Pressure loss coefficient Ø (mm)							
Designation	**Pressfitting**	**16**	**20**	**26**	**32**	**40**	**50**	**63**	**75**
Elbow 90°C		15.90	9.90	7.10	4.70	4.30	4.00	4.70	5.30
T-piece Through-flow		5.60	2.60	1.40	1.00	0.90	0.60	0.90	1.10
T-piece Branch fitting		15.30	9.00	7.00	4.90	4.40	4.00	4.10	5.40
T-piece Distributor		39.00	29.10	21.40	14.90	13.50	12.60	14.80	17.00
Coupling, reducer		4.10	2.30	1.30	0.80	0.60	0.50	0.70	0.90
Reducer		—	2.80	2.20	1.30	0.80	0.60	0.40	0.60
Elbow tap connector 90°		8.00	4.60	4.30	—	—	—	—	—
Distributor ¾ outlet		5.90	2.70	—	—	—	—	—	—
Flanged stub		—	—	—	—	—	—	—	0.10

2.9.2 Equivalent pipe lengths

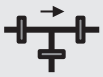
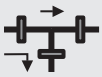
The values were determined based on SVGW specifications (SN EN 1267).

Table 39: Equivalent pipe length Geberit Mepla system pipe, bent

		Equivalent pipe length (m) Ø (mm)							
Designation		**16**	**20**	**26**	**32**	**40**	**50**	**63**	**75**
Bent pipe		0.10	0.10	0.10	0.20	0.30	0.30	—*	—*

* The pipes Ø 63 – 75mm should not be bent. Use 90° and 45° elbows for directional changes.

Table 40: Equivalent pipe length: fittings

		Equivalent pipe length (m) Ø (mm)							
Designation	**Pressfitting**	**16**	**20**	**26**	**32**	**40**	**50**	**63**	**75**
Elbow 90°C		7.10	6.20	6.40	5.90	7.20	9.00	14.4	20.4
T-piece Through-flow		2.50	1.60	1.30	1.30	1.60	1.30	2.80	4.30
T-piece Branch fitting		6.70	5.50	6.20	6.10	7.30	8.90	12.60	21.10
T-piece Distributor		17.30	18.80	18.90	18.30	22.30	28.50	45.80	67.10
Coupling		1.80	1.40	1.20	0.90	1.00	1.20	2.00	3.50
Reducer		—	1.20	1.40	1.20	1.00	0.90	1.00	1.90
Elbow tap connector 90°		3.80	2.80	3.80	—	—	—	—	—
Distributor ¾ outlet		2.60	1.70	—	—	—	—	—	—
Flanged stub		—	—	—	—	—	—	—	0.10

2.9.3 Pressure loss T-piece crossings

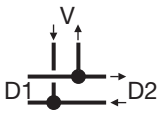


Table 41: Actual pressure loss (mbar)

Dimension			Flow velocities (system)		
D1/V/D2	Position		< 0.3 m/s	> 0.3 < 0.5 m/s	> 0.5 < 0.8 m/s
16/16/16	Outlet	16	22	52	118
	Through-flow	16	15	40	97
20/16/16	Outlet	16	12	27	65
	Through-flow	16	11	25	60
20/16/20	Outlet	16	11	25	62
	Through-flow	20	10	23	52
20/16/20	Outlet	16	10	22	50
	Through-flow	20	4	8	19
26/16/26	Outlet	16	10	21	50
	Through-flow	26	5	12	27

2.9.4 Pressure loss tables

Pressure loss tables are available from Geberit on request. Please contact the Technical Support department.

2.9.5 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, concrete core activation, 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)

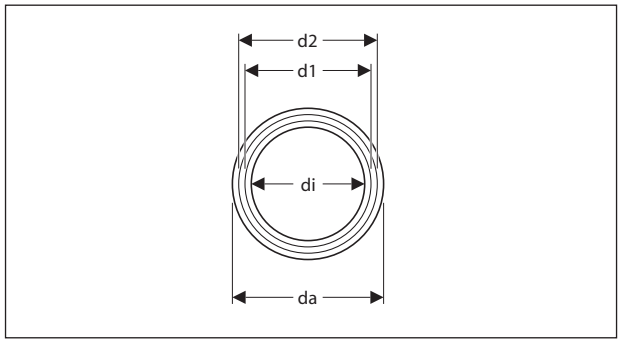


Figure 38: Cross-section of Geberit Mepla multilayer pipe

Table 42: 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 43: 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.

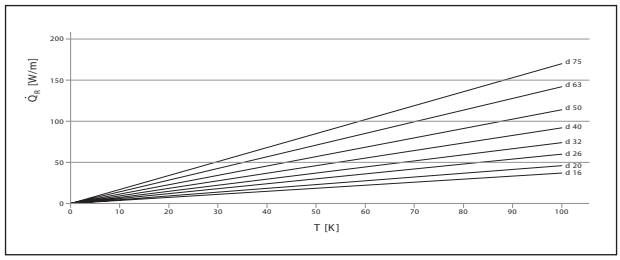


Figure 39: Heat emission – Geberit Mepla System Pipe

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 specialist workshop
- Observe the safety notes for the cleaning and anti-corrosion protection agents used

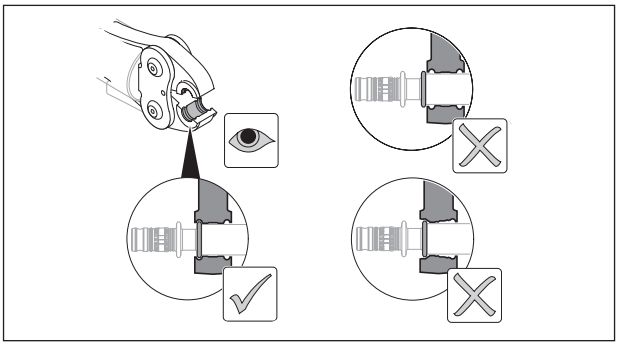
3.2.2 Operating the Geberit Mepla pressing jaw

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

3.2.3 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 agencts, please contact your local Geberit sales representative or visit www.geberit.co.uk

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

3.2 Geberit Mepla pressing collar and adaptor

3.2.1 Basic safety notes

WARNING
Risk of injury from incorrect handling

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

CAUTION
Danger of crushing by moving parts

- Do not hold any parts of your body or other objects in between the pressing collar, adapter for pressing collar and pressfitting
- Do not hold the adapter for pressing collar or pressing collar with your hands during the pressing sequence

CAUTION
Risk of material damage caused by incorrect handling

- Replace worn pressing collar and adapter for pressing collar
- Use the transport case for transport and storage; store the pressing collar and adapter for pressing collar in a dry room
- Have any damage inspected immediately by an authorised repair agent
- Observe the safety notes with respect to the cleaning

3.3.2 Operating the Geberit Mepla pressing collar and adaptor

Press with pressing collar and adaptor for pressing collar involves the following steps.

- Fit the pressing collar around the pressfitting
- Hook the adaptor for pressing collar into the pressing collar
- Press the connection

The adaptor for pressing collar must match the pressing collar used.

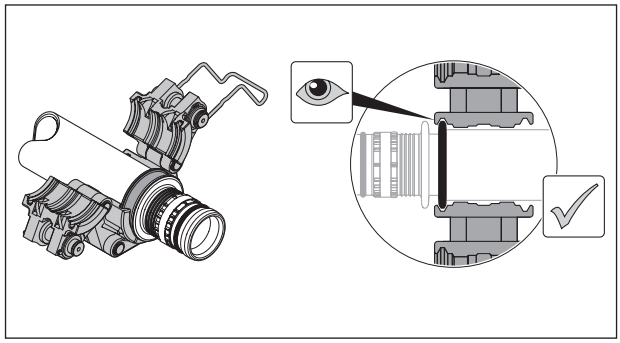
Pressing collar	Adaptor for pressing collar
Ø 63mm	Ø 63mm
Ø 75mm	Ø 75mm

Fit the press collar around the pressfitting.

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

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, release the locking clip and pull the pressing collar apart
3. Place the pressing collar around the pressfitting and position it on the tool guide rim of the pressfitting



4. Close the locking clip and pull it over the catch
5. Turn the pressing collar into the pressing position

Hook the adaptor for pressing collar into the pressing collar

Prerequisites

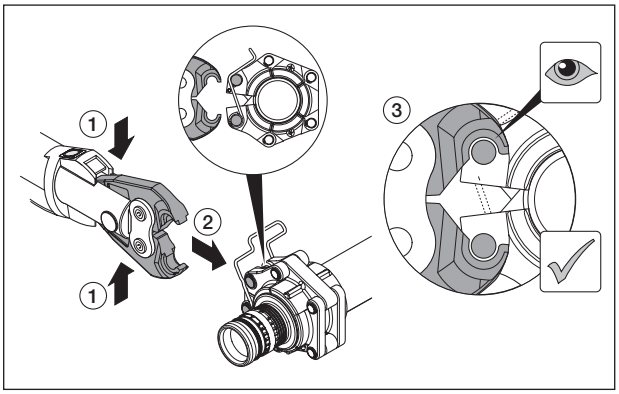
The pressing collar has been placed around the pressfitting.

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

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

2 Hook the claws of the adaptor for pressing collar into the pins of the pressing collar



3 Release both jaw levers

Pressing the connection

WARNING
Risk of injury caused by the pressing collar falling when released

- Hold the pressing collar when releasing

1 Press the pressfitting (see operating instructions for the pressing tool for the correct sequence)

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

3 Open and remove the pressing collar

CAUTION
Leaking connection due to failed pressing sequence

- Ensure that the pressing collar is completely closed after the pressing sequence
- Have any pressing collar 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
- Perform corrective pressing for failed pressed connections using a replacement tool
- If any aluminium is visible in the pressing area after the pressing operation, have the pressing collar along with the adaptor for pressing collar inspected by an authorised tool service agent. Replace any connections that have not been pressed correctly

Perform corrective pressing

If a pressed joint has not been completely pressed, it must be pressed again through corrective pressing. Depending on the state of the initial pressing, there may be considerable idle travel 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

3.3.3 Maintenance schedule

A service sticker on the pressing collar and on the adaptor for pressing collar indicates the date when the next calibration is due. The pressing collar along with the adaptor for pressing collar and the Geberit pressing tool must always be sent in for maintenance together in the transport case.

For information about Geberit Mepla tool service agencts, please contact your local Geberit sales representative or visit www.geberit.co.uk

Interval	Maintenance work
Regularly (before use, at the start of the working day)	• Check the pressing collar and adaptor for pressing collar 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
Every year (a service sticker indicates the date)	• Have an authorised tool service agent check and re-calibrate the tool

4 Installation

4.1 Installation rules

Follow the installation sequence:

1 Secure system pipes
2 Connect the pipes and fittings
3 Press

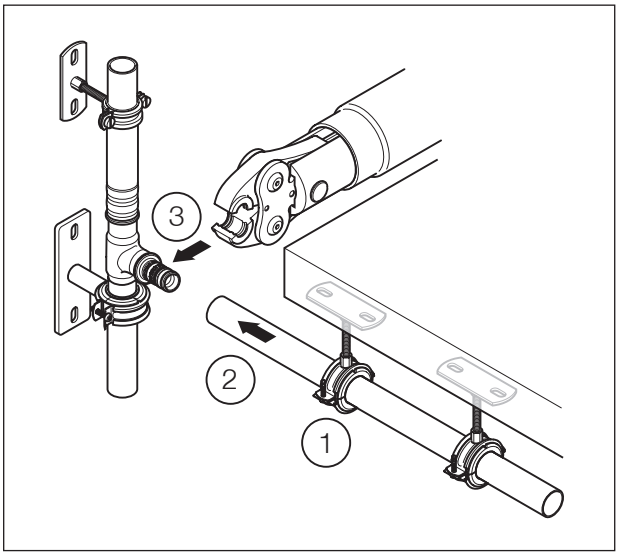


Figure 44: Installation sequence

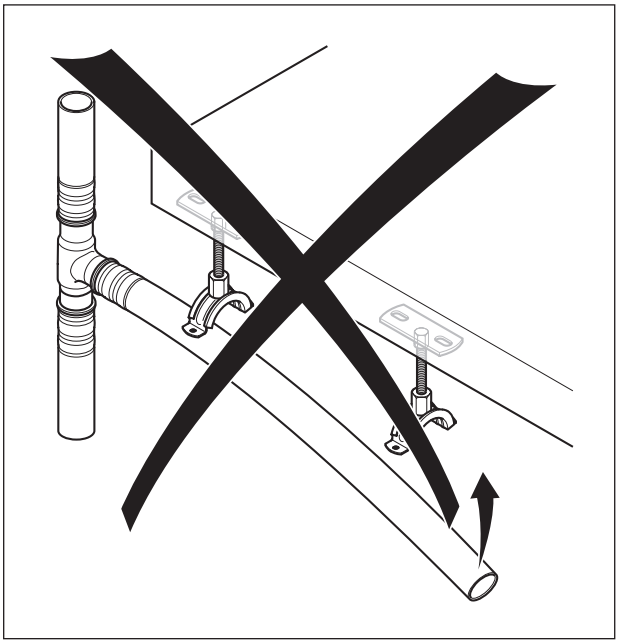


Figure 45: Keep the pressed pipes unstressed

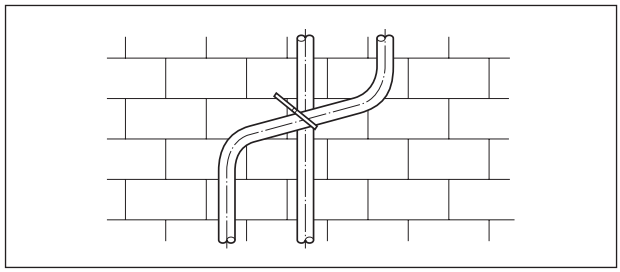
Pressed pipes should be kept unstressed during subsequent installation, e.g. with pipe brackets.

4.1.1 Laying Geberit Mepla system pipe in coils

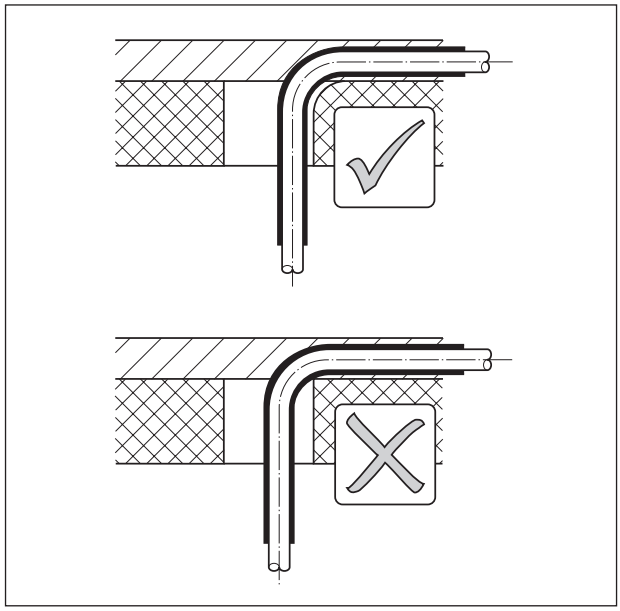
All concealed pipes must be thoroughly isolated from the building structure. The following system pipes can be used to this purpose:

- Geberit Mepla system pipes with insulation
- Geberit Mepla system pipes with protective tube

Always mount fastenings without acoustic insulation above the dividing layer. Geberit Mepla system pipes which are laid in sub-flooring, concealed or surface-mounted and form pipe crossovers must be secured in place.



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, pay attention to 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 should not be damaged

The following dimensions must be complied with:

- Minimum bending radius
- Minimum pipe diameter Geberit Mepla system pipes Ø 16 - 32mm can be hydraulically bent with the bending tool.

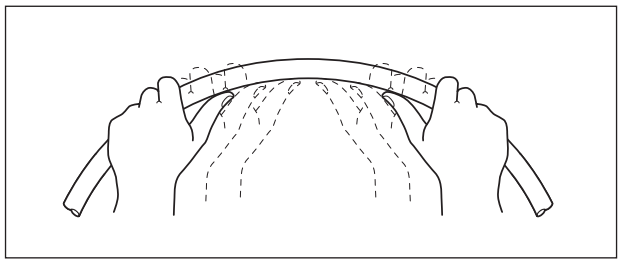
Table 44: Minimum requirements for bending Geberit Mepla system pipe.

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.

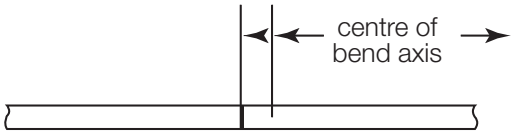
Pipes which are bent by hand should not have any indentations on the surface or be distorted on the inside.

Bending using the Geberit bending tool

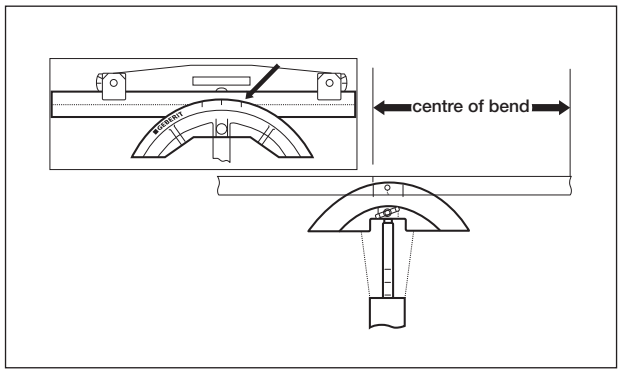
The bending tool can be used for bending Geberit Mepla pipes of Ø 16 - 32mm in a straightforward manner. The bending dies have a marking for the bending axis which takes account of the length of the bend during bending.

With the appropriate tool it is easy to bend Geberit Mepla pipes Ø 40mm and Ø 50mm without kinking or de-lamination.

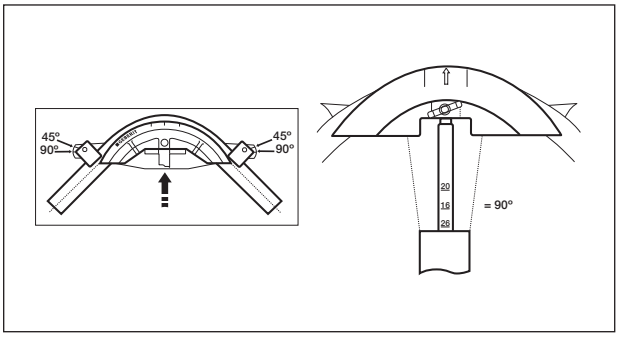
If the bending tool is used to bend preinsulated Geberit Mepla system pipes, this causes pipe deformation. Geberit therefore recommends bending preinsulated Geberit Mepla system pipes by hand.



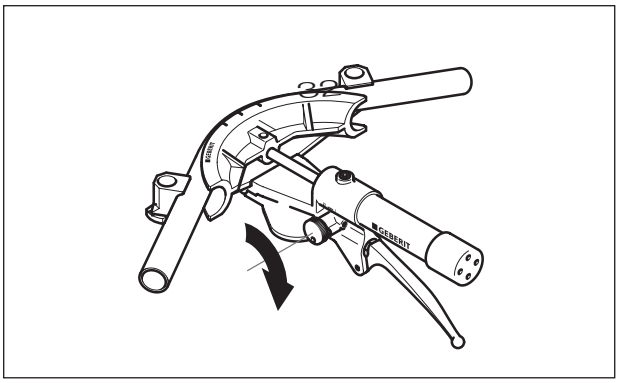
1 Mark the bending axis on the pipe.



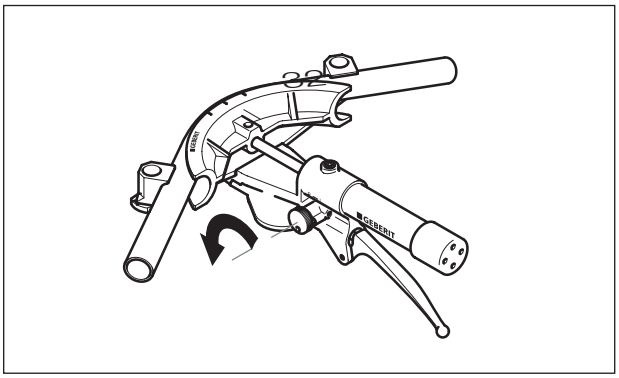
2 Place the pipe in the bending tongs.



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.

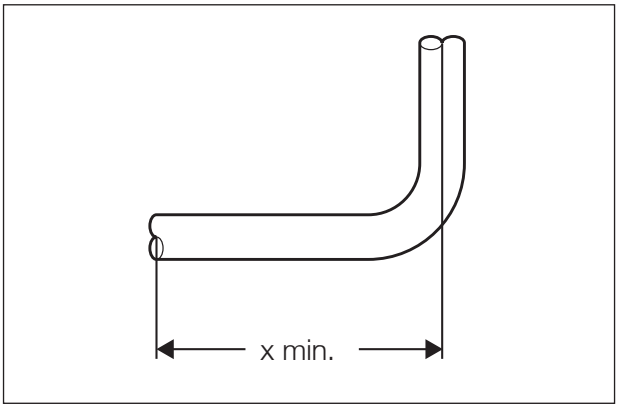


Figure 40: Minimum leg length when bending with the Geberit Mepla bending tool

Table 45: 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)

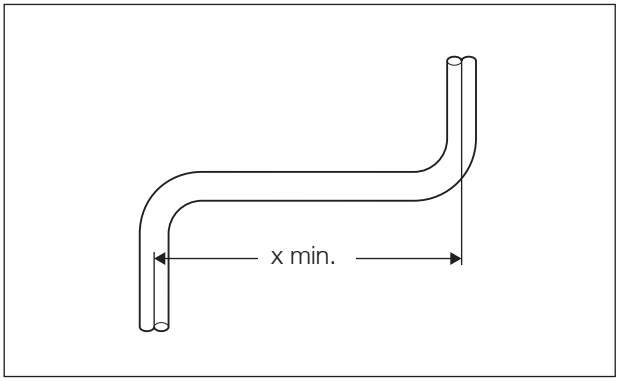


Table 46: Minimum leg length when bending with the Geberit Mepla bending tool.

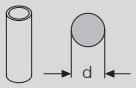
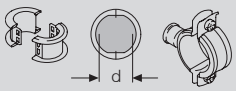
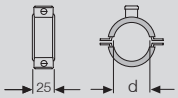
Ø (mm)	x min (mm)
16	150
20	170
26	230
32	310

4.3 Fastening

Non rigidly jointed pipework

The shell halves are fitted onto the horizontal or vertical pipe. A commercially available pipe bracket is then mounted to cover the shell and prevent it from coming apart. The supporting surface of the insert shell guarantees that the pipe slides smoothly.

Geberit Mepla system pipe diameters, suitable insert shells and guide brackets

		
32	32	40
40	40	50
50	50	63
63	63	75

Anchor brackets

The main purpose of the anchor bracket is to control thermal movements and to guide length variation into the desired direction.

When mounting the Geberit pipe bracket insert onto a fitting, the deep groove on the inside of the insert shell locks the fitting firmly. The bracket surrounds the shells and prevents them from coming apart. The location of the anchor point is determined by the position of the Geberit Mepla fitting.

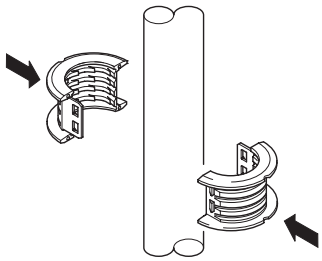
Pipe bracket insert shell, complete, PP black, for anchor points and guide brackets.

d	d1	D	H	h1	Art no.
26	32	34	32	25	603.702.00.1
32	40	49	32	25	604.702.00.1
40	50	57	33	25	605.702.00.1
50	63	76	34	25	606.702.00.1
63	75	91	48	30	607.702.00.1

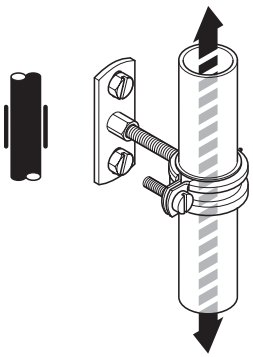
d = Geberit Mepla pipe (outside) diameter (mm)
d1 = Bracket diameter (mm)
h1 = Bracket width (mm)

Install the sliding point

1 Snap the pipe bracket lining shell around the pipe.

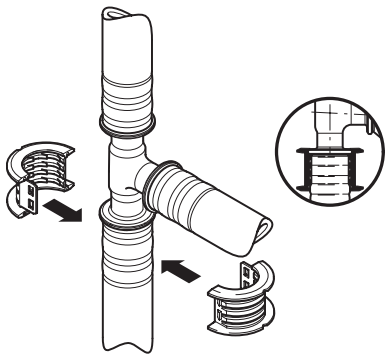


2 Fit the pipe bracket over the pipe bracket lining shell.

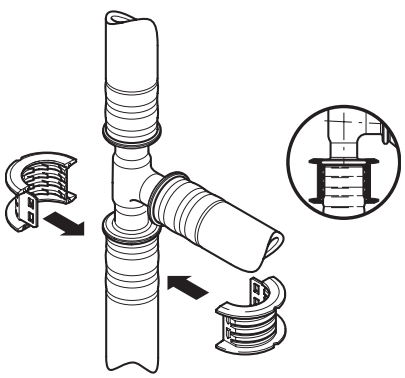


Install the fixed point

1 Snap the pipe bracket lining shell on the tool guide rim on the fitting.



2 Fit the pipe bracket over 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.

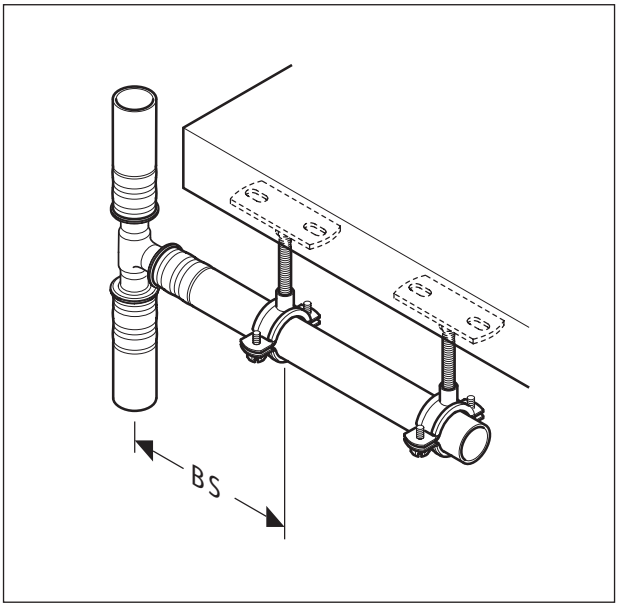
4.3.2 Fastening with control of thermal expansion

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.

Fixed 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 fixed 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.



4.3.3 Flange connections

When making flange connections the following must be observed:

- Only use flanges with sufficient thermal and mechanical stability.
- When fitting the seal between the flange joints, make sure the dimensions of the seal match the external and internal diameter of the flanged stub or flange bushing.
- Before the preliminary tightening of the bolts, make sure the faces of the sealing surfaces are aligned parallel to one another and are located close to the seal. Avoid tension across the joint as a result of tightening the flange joint.
- The length of the bolts must be selected so that the bolts do not protrude more than 2 to 3 threads beyond the nut. Use washers both under the bolt head and under the nut.
- Apply molybdenum sulphide or a similar compound to the threads in order to facilitate tightening of the connecting bolts and to make it easier to undo them later.

The bolt tightening torque of the flat gasket is 40 Nm up to a maximum pressure of 10 bar.

The tightening torque is a reference value. In practice, the values could vary (stiff bolts, pipe axes not totally aligned, hardness of the gasket, etc.)

4.4 Installation Dimensions

4.4.1 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.

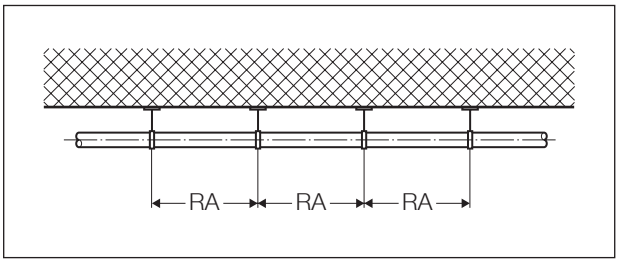


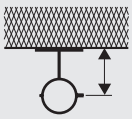
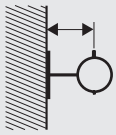
Figure 41: Geberit Mepla pipe bracket spacing

Table 47: 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 48: Thread pitch of the pipe bracket fastening

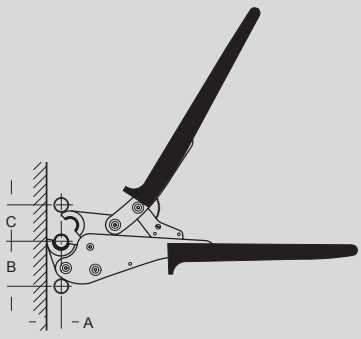
Bracket type	Distance (mm)	Diameter (mm)							
		16	20	25	32	40	50	63	75
Pipe bracket on ceiling 	<100	M8	M8	M8	M8	M8	M10	M10	½”
	110 – 200	M8	M8	M8	M10	M10	M10	M10	½”
	210 – 300	M8	M8	M10	M10	½”	½”	½”	½”
	310 – 400	M10	M10	M10	M10	½”	½”	½”	½”
	410 – 600	M10	M10	M10	½”	½”	½”	½”	½”
Pipe bracket on wall 	<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”

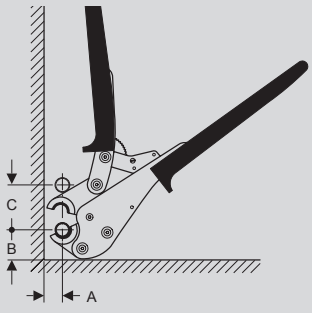
4.5 Space Requirements

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 49: Space requirements when pressing with hand-operated pressing tool – mounting on smooth wall and in corners.



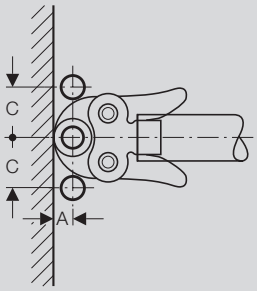


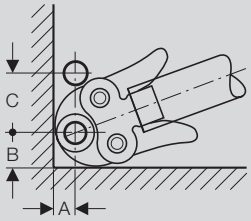
Ø (mm)	A (cm)	B (cm)	C (cm)	Ø (mm)	A (cm)	B (cm)	C (cm)
16	1.5	3.8	4.2	16	1.9	3.0	5.0
20	1.6	4.2	4.4	20	2.06	3.1	5.5
26	1.9	4.7	5.3	26	2.3	3.3	6.2

4.5.2 Space requirements during pressing with pressing jaw

The Geberit Mepla system pipes must be installed in the building so that there is sufficient space for pressing.

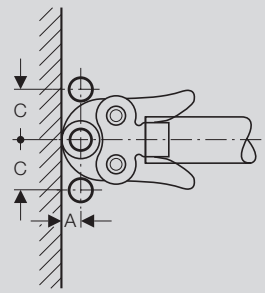
Table 50: Space requirements when pressing with a mechanical pressing tool with pressing jaw compatibility [1] – mounting on a smooth wall and in corners

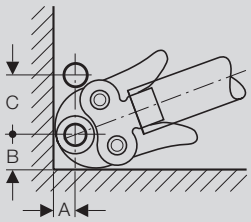




Ø (mm)	A (cm)	C (cm)	Ø (mm)	A (cm)	B (cm)	C (cm)
16	1.5	3.5	16	1.8	2.8	5.5
20	1.7	4.2	20	2.0	3.3	5.5
26	2.0	4.8	26	2.2	3.5	6.0
32	2.5	5.5	32	2.6	3.8	6.6
40	2.9	6.8	40	3.0	4.6	7.4

Table 51: Space requirements when pressing with a mechanical pressing tool with pressing jaw compatibility [2] – mounting on a smooth wall and in corners



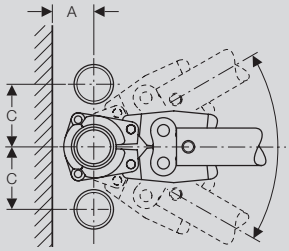


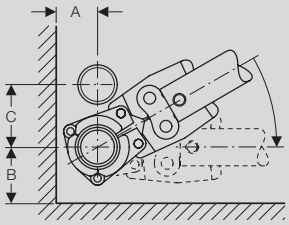
Ø (mm)	A (cm)	C (cm)	Ø (mm)	A (cm)	B (cm)	C (cm)
16	1.6	4.2	16	1.9	3.1	5.8
20	1.8	4.6	20	2.0	3.4	5.7
26	2.1	5.3	26	2.3	3.7	6.2
32	2.7	6.2	32	2.7	4.5	6.7
40	3.1	7.2	40	3.1	5.1	7.7
50	4.0	9.5	50	4.0	6.0	9.5

4.5.3 Space requirements during pressing with pressing collar

The Geberit Mepla system pipes must be installed in the building so that there is sufficient space for pressing.

Table 52: 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 Assembly of the Geberit Mepla pipe system

A Geberit Mepla pipe system is assembled in the following steps:

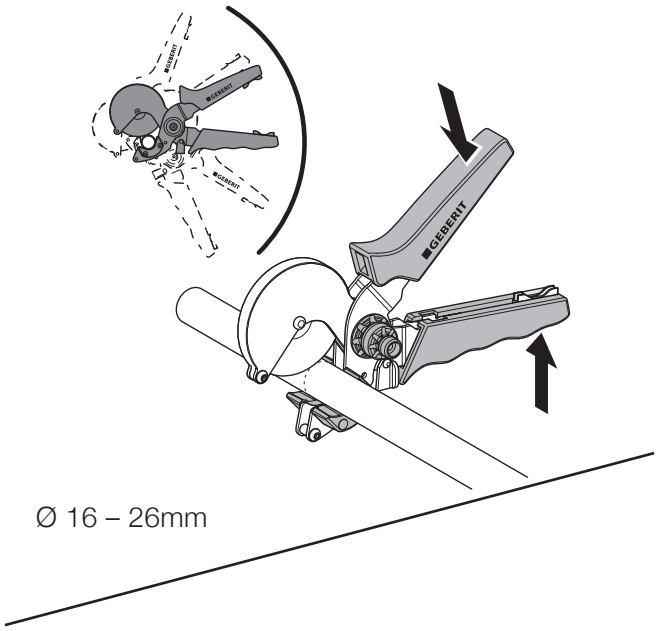
- Prepare the system pipe
- Press the fittings

1 Determine the pipe length.

CAUTION
Damage to pipe ends due to incorrect cutting tool

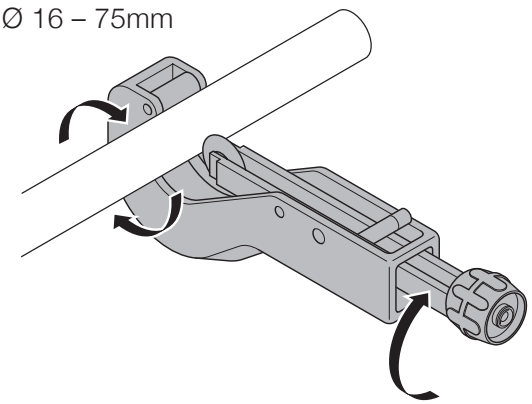
- Ensure correct blades for Geberit Mepla are used
- Do not use saws or cutters that could produce chips as they can get caught in the o-ring and cause leaks

2 Cut the Geberit Mepla system pipe at a right angle.



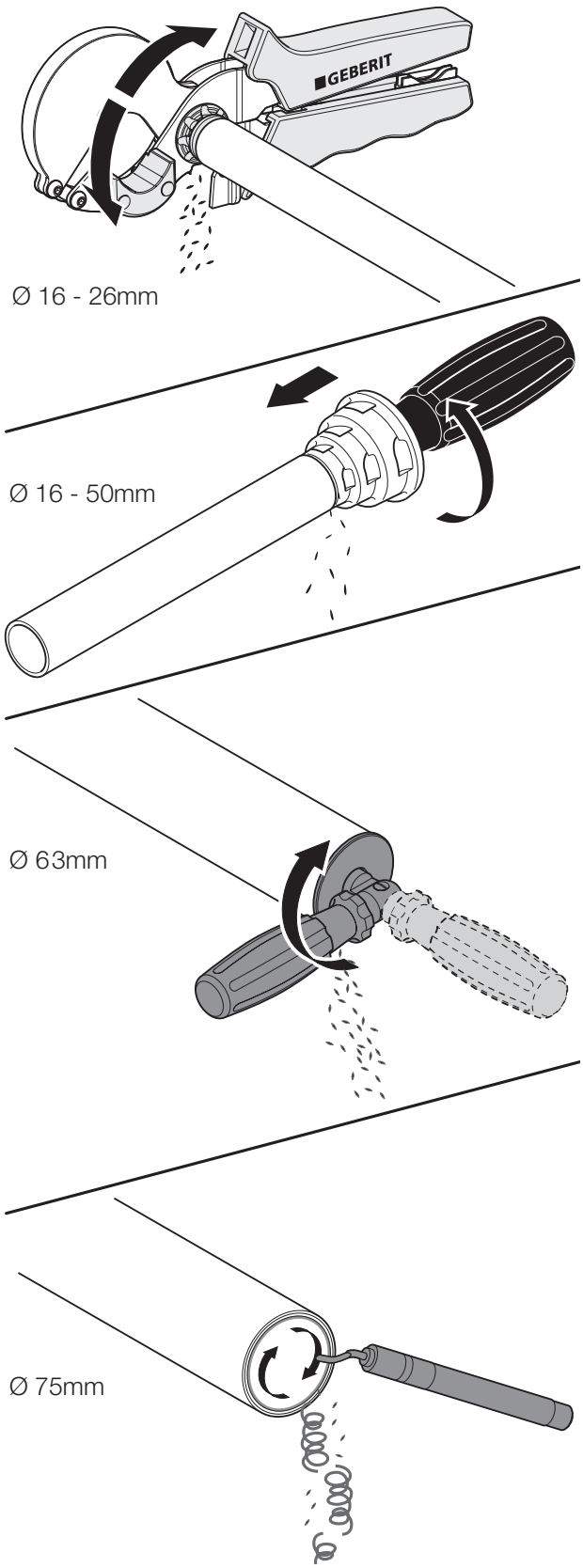
Ø 16 – 26mm

Ø 16 – 75mm

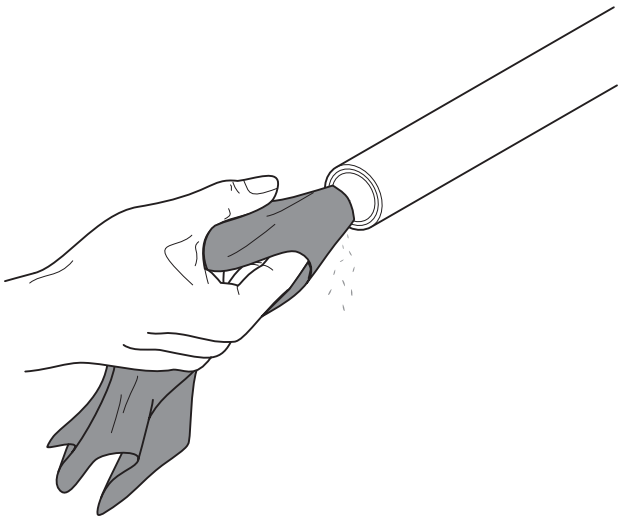


Prepare the pipe and fitting for the pressing operation.

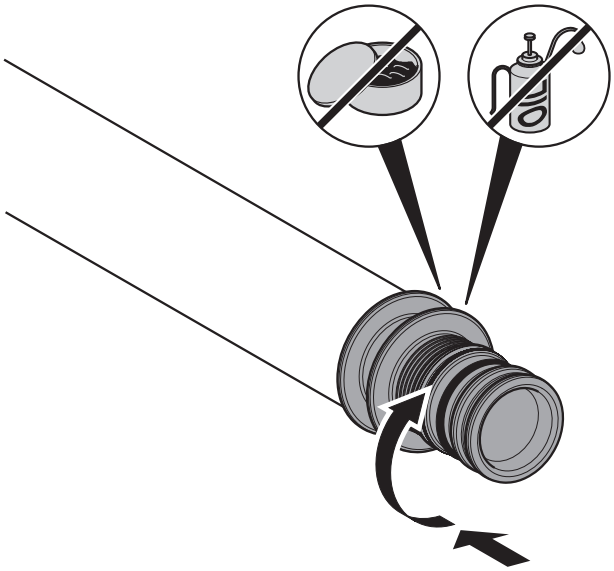
3 Calibrate and deburr the ends of the pipe.



4 Remove chips from the system pipe.



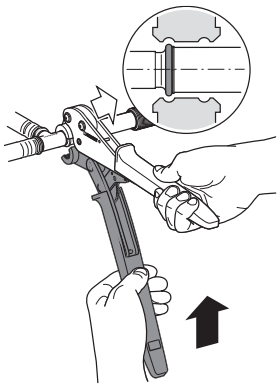
5 Connect the pipe and the fitting. Push fitting completely into pipe.



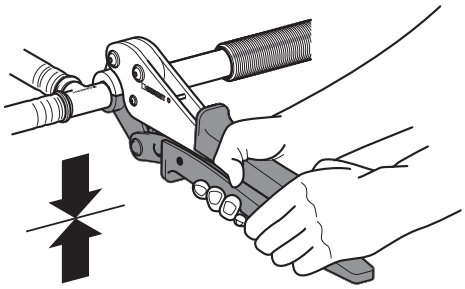
4.6.1 Pressing a Geberit Mepla press connection with hand operated tool

Ø 16 - 20mm

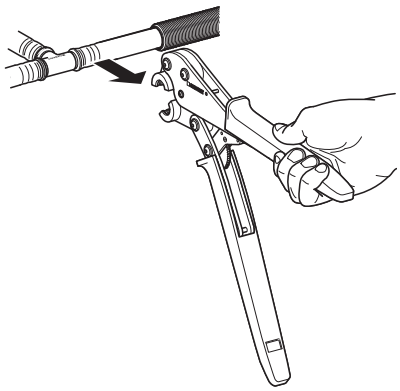
1 Place Geberit Mepla pressing pliers onto guidance groove of fitting.



2 Pressing made by fully closing the pliers.



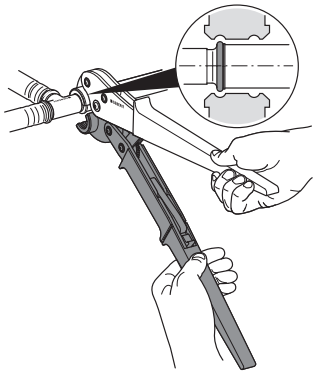
3 The pressing tool reopens automatically after completed pressing.



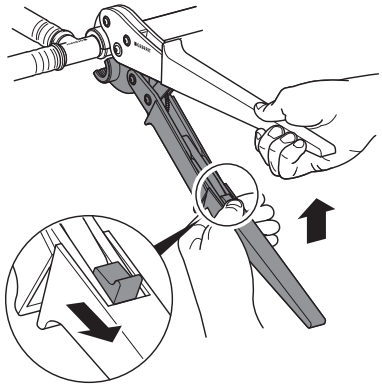
If fittings are turned or pipes are excessively deflected after pressing, the procedure must be repeated.

Ø 26mm

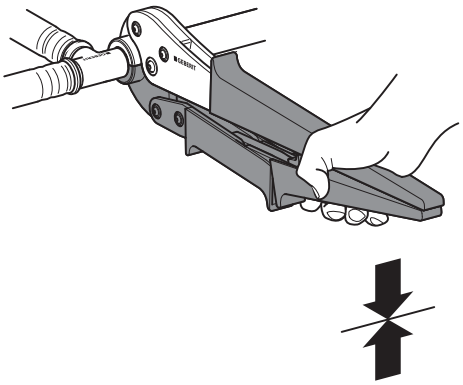
1 Position the hand-operated pressing tool with its groove on the bulge of the fitting.



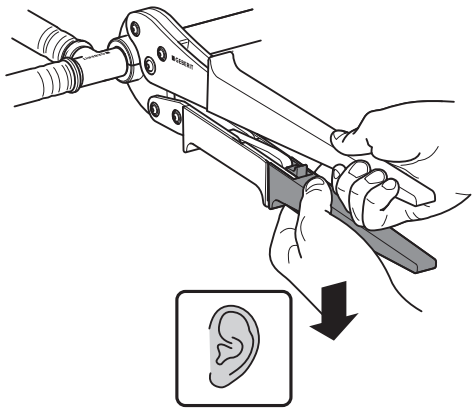
2 Put the legs of the pliers into the offset position by pulling on the slide.



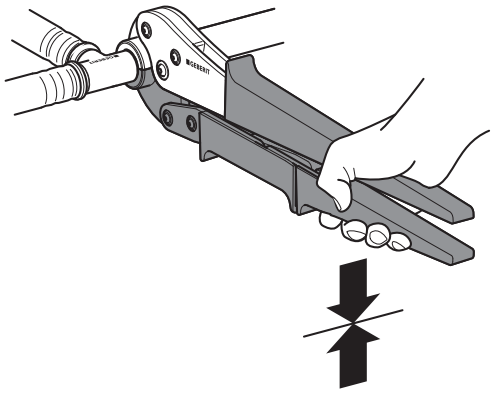
3 Press the legs of the pliers completely together.



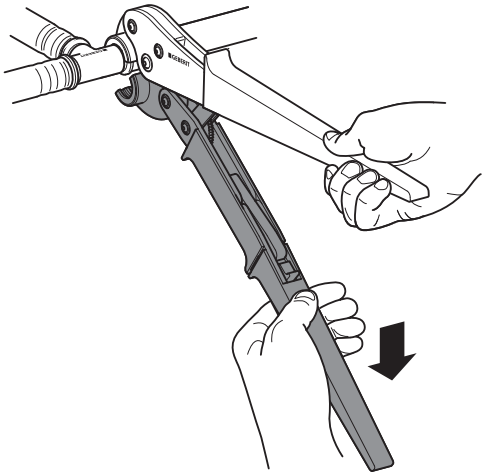
4 Put the offset lever back to the initial position.



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

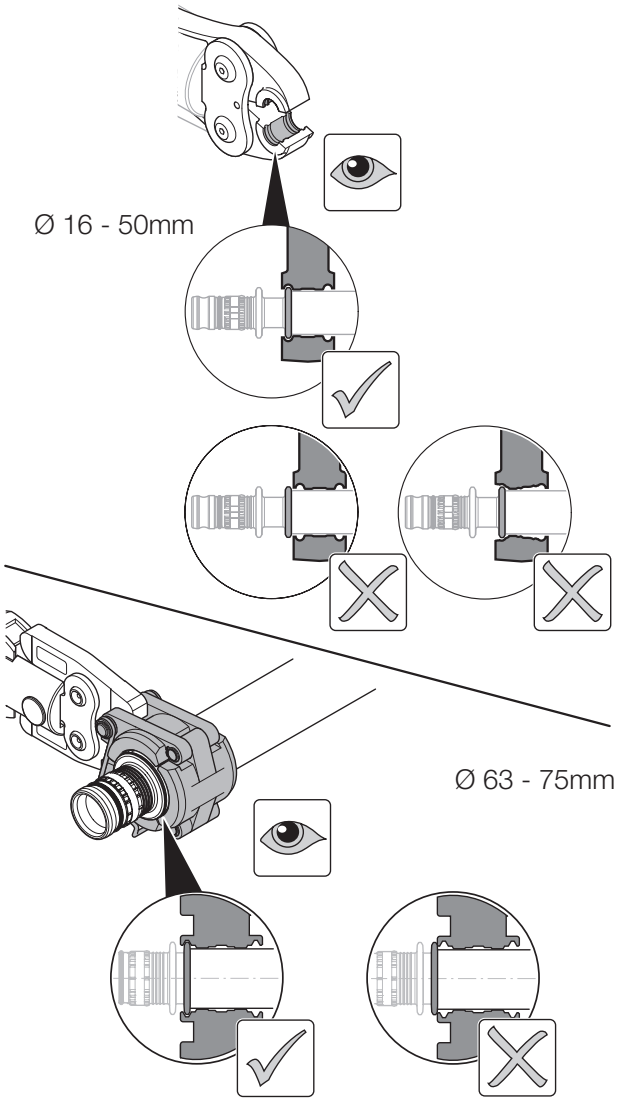
Prerequisites

- 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 suitable adaptor.

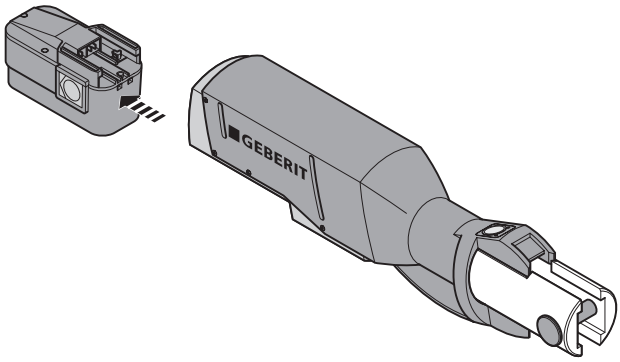
CAUTION
Leaking connection due to poor alignment of pipes and fittings

▸ Ensure pipes are aligned before pressing

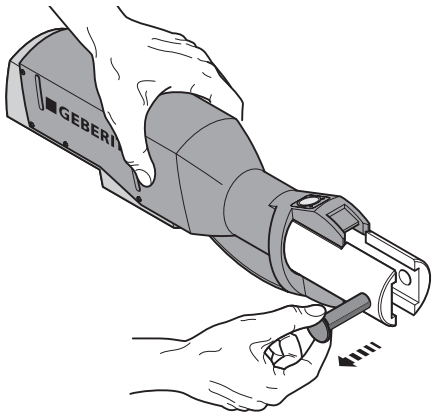


Preparation of Geberit Mepla pressing tool

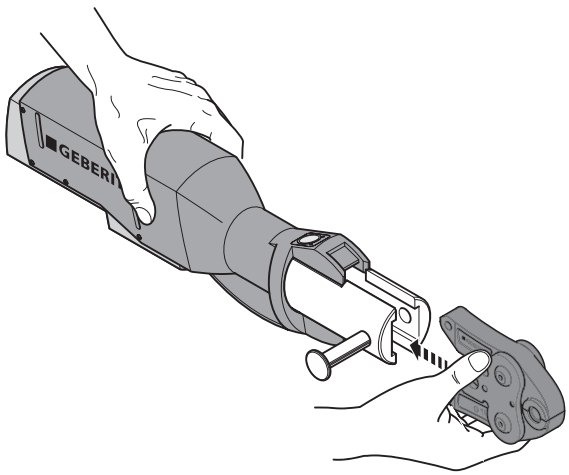
1 Pressing tool not connected.



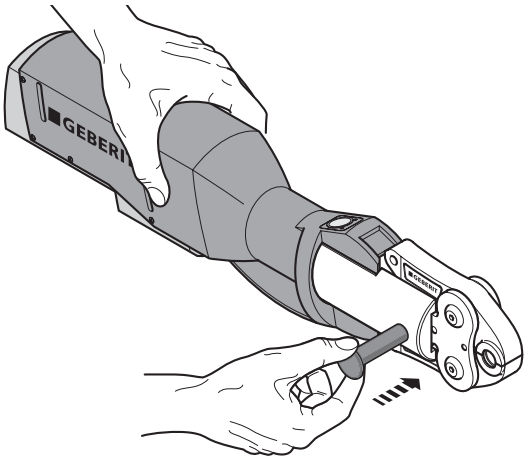
2 Lift up locking pin.



3 Insert jaws Ø 16 – 50mm.



4 Insert locking pin – will then be ready for pressing.



*To change pressing jaws, carry out steps 3 and 4 in reverse order.

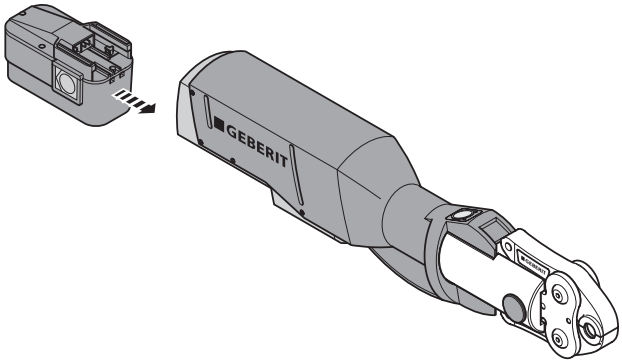
For information on the required space for pressing procedure, please see section 4.5.2.

When working at very low temperatures, the following steps might be necessary for correct function:

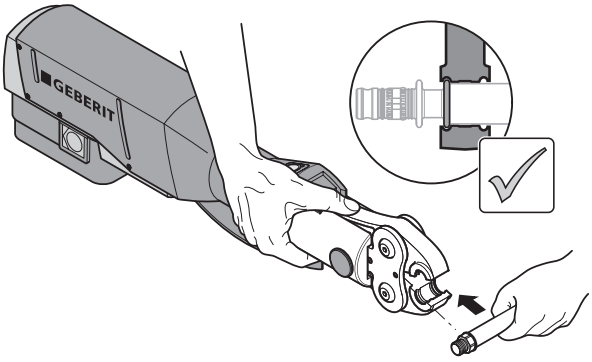
- Connect power
- Press release button
- Switch on power and let the tool warm up for approximately 4 seconds
- Repeat steps if necessary

Pressing jointing using a mechanical tool (Ø 16 – 50mm)

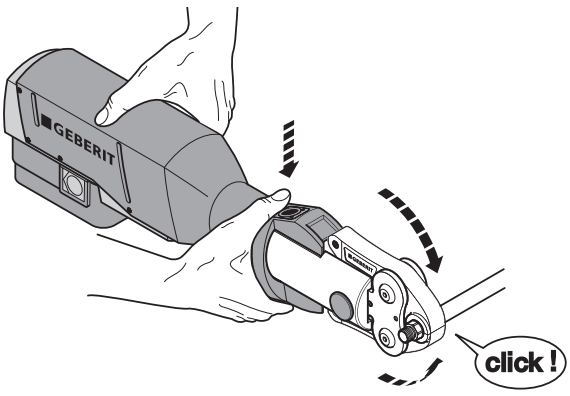
1 Connect power.



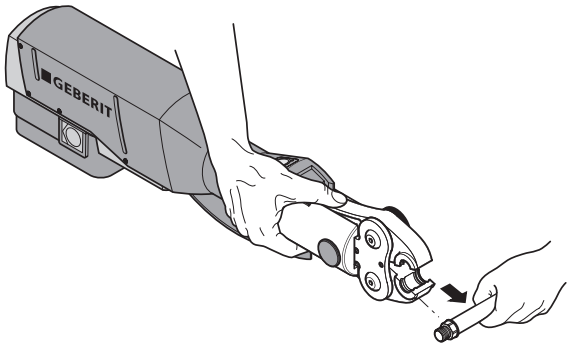
2 Place pressing tool with corresponding jaw onto guidance groove of the fitting.



3 Switch power on and do not interrupt until jaw is released automatically.



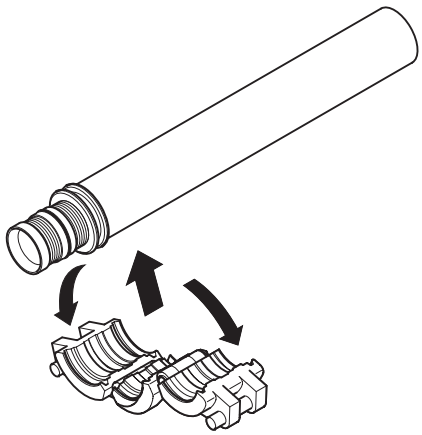
4 Open jaw by hand and remove tool from fitting.



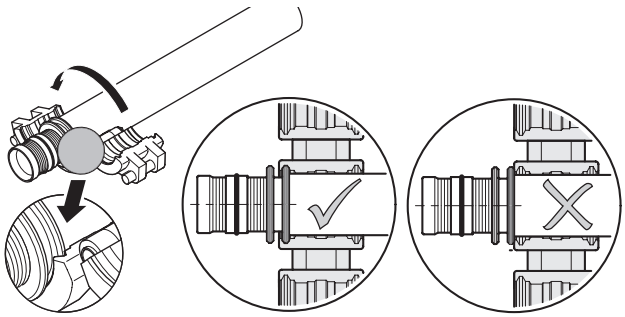
If the fittings are turned or the pipes are excessively deflected after pressing, the procedure must be repeated.

Press jointing using a mechanical tool (Ø 63mm)

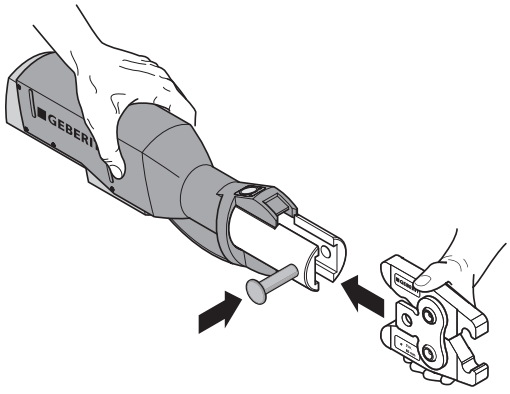
1 Open pressing collar Ø 63mm.



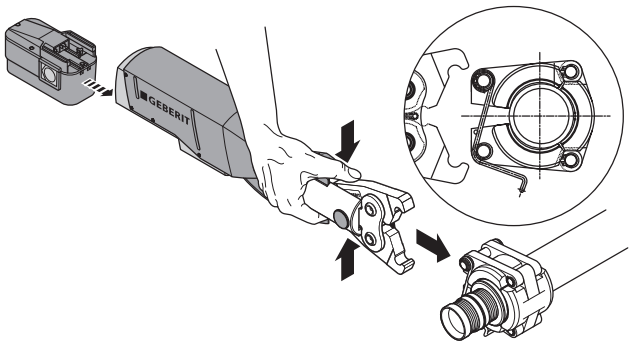
2 Place pressing collar onto guidance groove of fitting and close the pressing collar Ø 63mm.



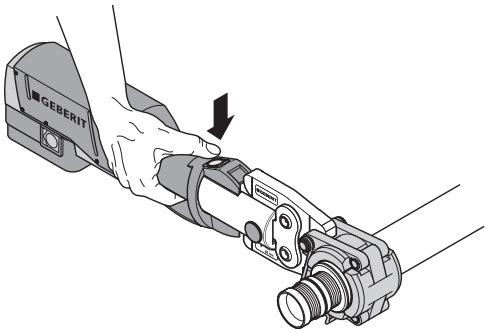
3 Insert adaptor for pressing collar Ø 63mm and insert locking pin all the way – tool will then be ready for pressing.



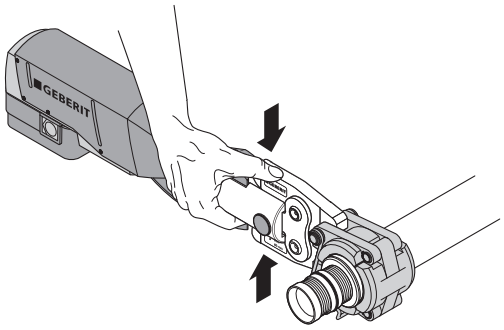
4 Connect power and connect adaptor to pressing collar.



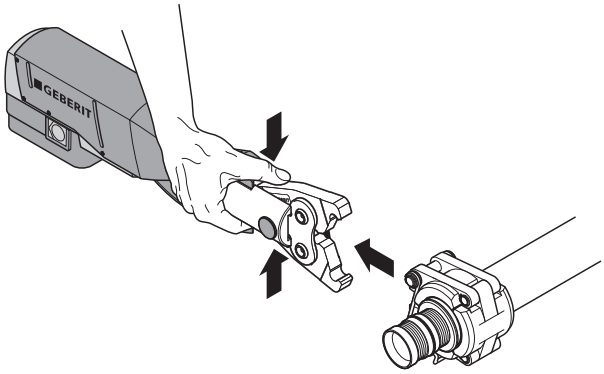
5 Switch power on and do not interrupt until adaptor for pressing collar Ø 63mm is released automatically.



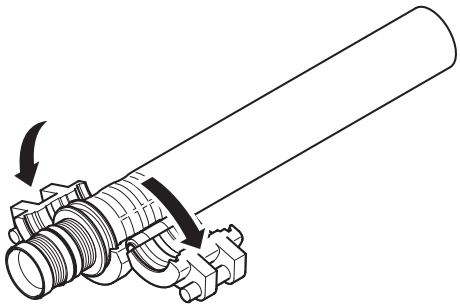
6 Open adaptor for pressing collar Ø 63mm by hand.



7 Remove pressing tool.



8 Open pressing collar by hand and remove tool.



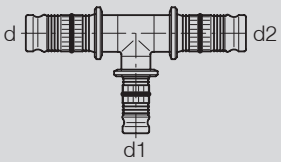
For detailed information regarding the maintenance and use of Geberit pressing tools, please see the operating instructions of the pressing tool for more information.

4.7 Additional connection and repairs

4.7.1 Additional connection

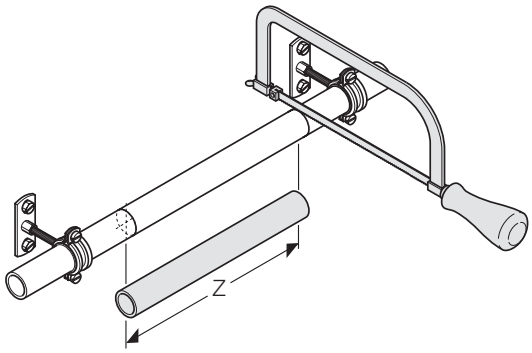
Insert T-piece: additional connections are easy to insert into existing pipework by using repair couplers Ø 16 - 50mm (60x.575.00.1) and T-pieces (6xx.3xx.00.1).

Table 53: Dimensions of pipe sections when inserting T-piece into existing pipework



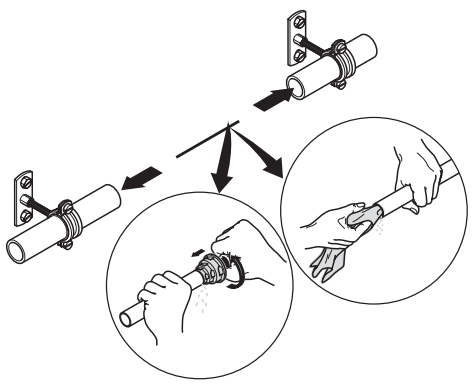
d/d2	d1	L (mm)	Z (mm)	d/d2	d1	L (mm)	Z (mm)
16	16	110	224	32	26	13.5	27.0
16	20	110	224	32	32	13.5	27.5
20	16	120	240	40	20	16.5	30.5
20	20	120	240	40	26	16.5	31.5
26	16	140	258	40	32	16.5	32.0
26	20	140	268	40	40	16.5	33.0
26	26	140	268	50	32	19.0	35.5
32	16	135	265	50	40	19.0	36.5
32	20	135	265	50	50	19.0	37.5

1 Remove pipe section, observing correct Z-dimension.

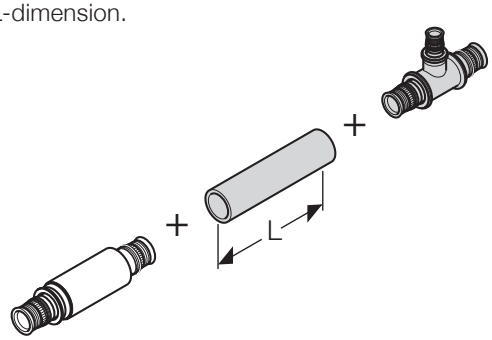


Z = see table above.

2 Prepare ends of cut pipe.

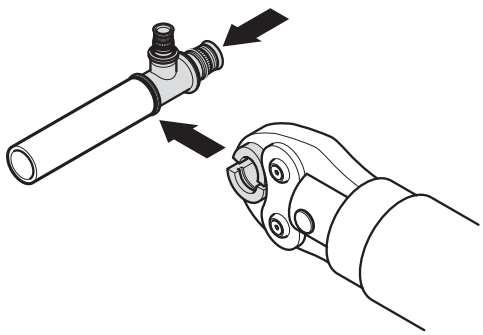


3 Cut spacer pipe to length, observing correct L-dimension.

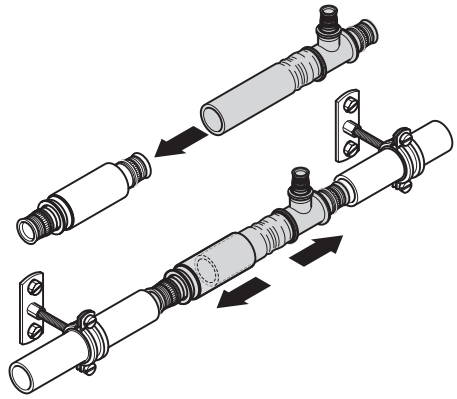


L = see table above.

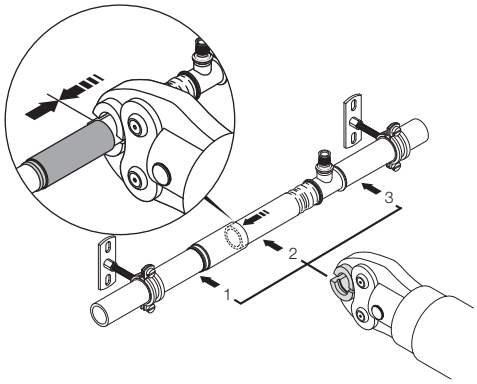
4 Insert T-piece into spacer pipe and press connection.



5 Assemble repair coupling and spacer pipe and extend into existing pipework.



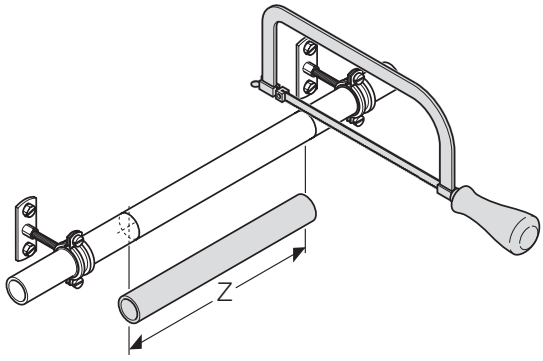
6 Press the sleeve of the repair coupling to finish the connection.



4.7.2 Pipe repair

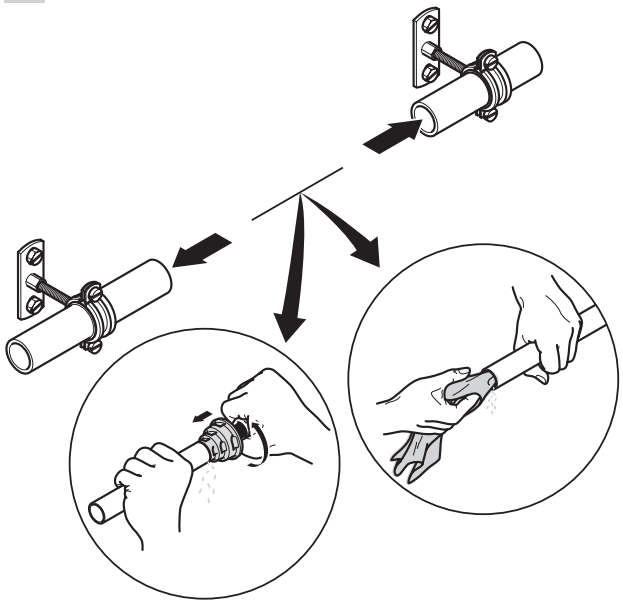
Repair pipework: sections of pipework are easy to insert into existing pipework by using repair couplers Ø 16 - 50mm (60x.575.00.1) and couplings (62x.505.00.1).

1 Remove pipe section, observing correct Z-dimension.

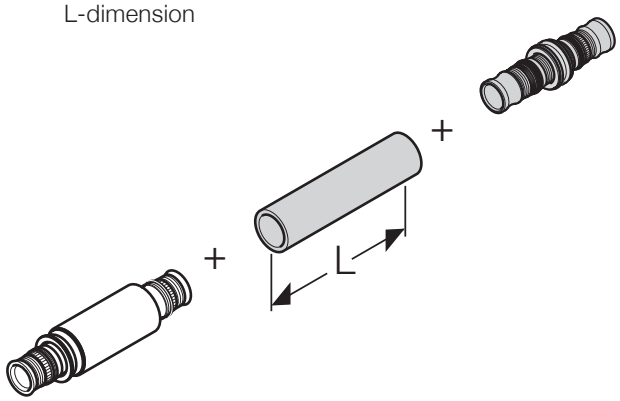


Ø 16Z = 195
Ø 20Z = 210
Ø 26Z = 235
Ø 32Z = 235
Ø 40Z = 275
Ø 50Z = 315

2 Prepare ends of cut pipe.

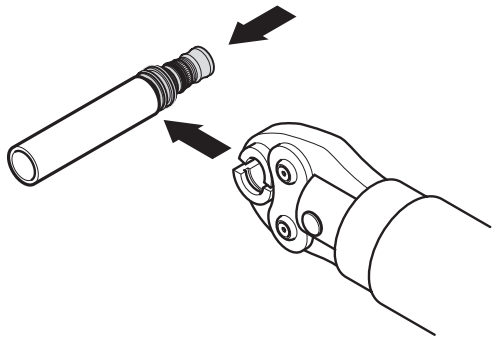


3 Cut spacer pipe to length, observing correct L-dimension

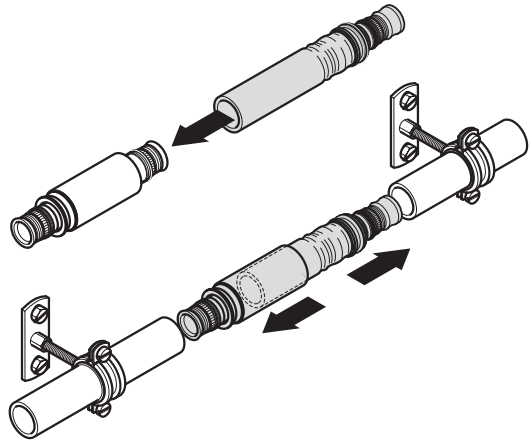


Ø 16L = 110
Ø 20L = 120
Ø 26L = 140
Ø 32L = 135
Ø 40L = 165
Ø 50L = 190

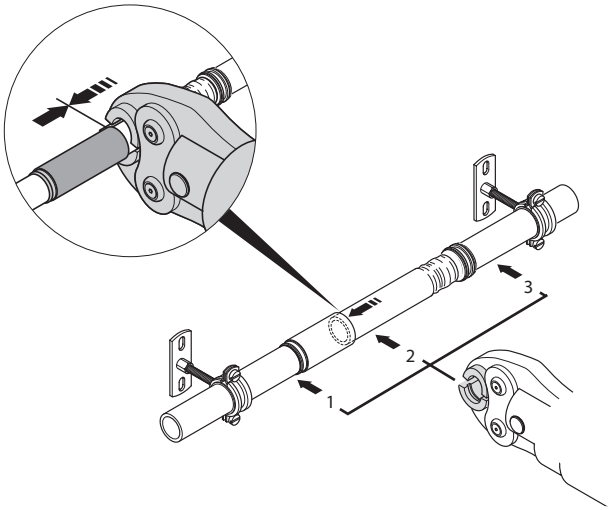
4 Insert coupling into spacer pipe and press connection.



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 73 of this guide.

5 Disinfection

Please see the section on disinfection under Mapress on page 96.