

# Master3Plus acoustic soil and waste pipe systems

SOIL AND WASTE | INSTALLATION GUIDELINES

**PELIFE** 



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# Product information

Master3Plus soil and waste pipes and fittings are tested to EN 1451 and marked with BD (building and drainage) for diameters equal to or larger than 75 mm. The ring stiffness of SN4 pipes is at least 4.0 kN/m<sup>2</sup>. The fittings correspond to the S16 pipe series. Master3Plus is therefore approved for installations inside and outside buildings (below ground) up to the junction to the main sewerage line. Pipes and fittings are supplied with a plug-in socket and an inserted double lip seal ring. When using Master3Plus soil and waste pipe systems, EN 12056 (parts 1-5) and national standards (e.g., for Austria ÖNORM B 2501) are binding regarding planning and dimensioning, as well as the design of drainage systems for buildings and sites. Please get in touch with your local PIPELIFE contact for further information on local standards and regulations.



## Application areas

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### Standard applications

Master3Plus soil and waste pipe systems are mainly utilized as hot-water-resistant drainage pipes for domestic and industrial black-, grey- and rainwater.

#### **Within buildings, Master3Plus can be applied as:**

- Single and group connecting pipes
- Downpipes
- Collecting lines
- Bypass lines
- Ventilation lines
- Internal rainwater pipes with up to 5 meters of backwater height

### Special applications

- Ventilation systems for commercial and residential buildings
- Central vacuuming systems
- Transportation of chemically aggressive wastewater ranging from pH 2 to pH 12

For oil-resistant applications, the EPDM sealing ring must be exchanged for an NBR sealing ring.

### Do not use Master3Plus for

- External applications (e.g., outdoor rainwater downpipes)
- Conveying wastewater containing petrol or benzene
- Environmental temperatures exceeding 100 °C
- Disposal lines in chemical plants
- Indoor rainwater pipes with more than 5 meters of backwater height



## Compatibility

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The dimensions of Master3Plus pipes and fittings **comply with EN 1451-1** and can be combined with other products that comply with this standard.



## Transportation and handling

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### To avoid distorting or damaging the pipes during transportation:

- Loading and unloading must be carried out with care — do not throw or drag the pipes and fittings. Extra care should be taken in conditions below 0 °C
- Ensure the pipes are supported along their entire length
- Joints must be stacked
- Pipes projecting beyond the loading area must be supported to avoid bending
- Protect the pipes from sharp edges (e.g., side walls)



## Storage

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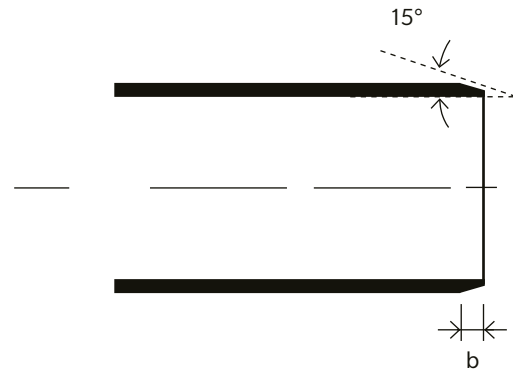
- Pipes should be stored vertically, potentially in storage bags to protect them from dirt and UV radiation
- Stored correctly, Master3Plus soil and waste pipe systems can be kept outdoors for up to 2 years
- If storing the pipes horizontally, do not exceed a stacking height of 2 meters
- Joints must be stacked to avoid bending the pipe rods
- Secure pipe stacks together to prevent rolling
- Fittings and short-length pipes of 150, 250 and 500 mm are packed in cardboard boxes, which must be stored in a dry area

# Installation instructions

## 1.

### Cutting pipes to length

1. Mark the cut surfaces using a saw box or gauge if possible. Cuts must be perpendicular to the pipe axis
2. Use a pipe cutter and chamfering device, angle grinder or a fine-toothed saw (foxtail)
3. Deburr the cut edges inside and out with a sharp knife or deburring tool
4. Chamfer the edges at an angle of approximately 15°. If you are not using a chamfering tool, use a suitable grinder, scraper or file. See the following table for correct bevel lengths:



DN/OD	32	40	50	75	90	110	125	160
b(mm)	4	4	4	4.5	5	6	6.5	9

## 2.

### Standard connections

Master3Plus pipes and fittings are connected by plug-in sockets with factory-fitted sealing rings. To make a standard connection:

1. Remove any dirt or residue from the spigot and socket
2. Thinly coat the spigot with PIPELIFE lubricant and push it into the socket up to the limit.  
Do not use oils or fats as lubricants

Fitting spigots have insertion-depth markings which serve as an orientation guide for the installer. Once the spigot is fully inserted, the socket end should be within the area of the insertion-depth marking. The marking should be hidden or only partly visible.

## 3.

### Expansion compensating connections

Thermal linear expansion must be considered for all straight pipelines of more than 10 meters in length.

Linear expansion does not have to be considered in single and multi-family houses, as well as apartment buildings with pipelines less than 10 m long.

The coefficient of linear expansion is 0.09 mm/(m.K).

To create the correct expansion gaps, mark the pipe with a suitable marker pen on the edge of the socket. Then, pull the pipe out of the socket at several connection points to enable a total expansion  $\Delta L$  for the whole pipe length calculated according to the formula below:

$$\Delta L = L \times \alpha \times \Delta T \text{ [mm]}$$

$\Delta L$  = max. change in length of the pipe [mm]

L = length of the pipe [m]

$\alpha$  = expansion coefficient [mm/(m × K)]

$\Delta T$  = max. temperature change [K]

Alternatively, use long sockets to accommodate the change in length.

The bonding of polypropylene is not possible due to its high solvent resistance.

## 4.

### Installation underground

Single and multiple connecting pipes are usually installed in the floor. The minimum gradient is specified in the associated local norms. For more information on these, get in touch with your local PIPELIFE contact.

Make sure that the pipes are adequately fixed and fastened in such a way that they minimize structure-borne noise (e.g., with insulation material and without a base of residual bricks). Exposed parts of the pipe should be adequately insulated against sound before pouring the screed.

## 5.

### Installation in masonry walls

Recesses and wall slots are only permitted if they do not impair the structural integrity of the building. The wall slots must be arranged so that the pipes can be installed in a stress-free state.

If the pipes are plastered directly (i.e., without using a plaster base), the pipes must be insulated with appropriate materials (e.g., mineral wool, 4-mm PE insulation tube, or similar).

## 6.

### Installation in concrete

If necessary, take pipe expansion into account at the joints (as described in the chapter “Expansion compensating connections” on page 6).

1. To further sound-proof Master3Plus pipes in concrete, completely encase them with a 4-mm PE insulation tube
2. Ensure pipe sections are fastened in place before pouring the screed
3. Close pipe openings with socket plugs
4. Seal socket joint gaps with adhesive tape or by wrapping them with foil

The installation of Master3Plus pipes in solid concrete requires a structural analysis. Do not use vibrating machines; they can deform the pipes due to the weight of the concrete.

## 7.

### Ceiling feedthroughs

Ceiling feedthroughs must be made water- and soundproof. If floating screed or mastic asphalt is applied to floors, exposed pipe sections must be protected with protective sleeves or heat-insulating materials. If another fire compartment is involved, appropriate fire safety measures must be taken (see “Fire safety” subchapter).

## 8.

## Fire safety

### Fire classification

Master3Plus has been classified as a B2 flammable material, according to DIN 4102.

### Fire protection with firestop collars and wraps

Pipe systems and other installations that run through walls and ceilings can compromise fire protection measures. To ensure necessary fire safety precautions are fulfilled, such structures need to, for example, be sealed or encased to provide adequate fire resistance and, therefore, prevent fire and smoke from progressing. The method and scope of these measures are usually defined by national regulations.

In Austria, for example, the specifications for fire protection, as per Guideline 2 of the Institute of Construction (OIB), must be complied with. The "technical guideline for preventive fire protection" (TRVB) sets the requirements for fire resistance and, therefore, the principal implementation possibilities of such measures regarding pipe installations through walls and ceilings.

The installation of soil and waste pipes made from flammable materials in garages, basements and similar spaces is permitted under the following terms:

- The pipe system is made from polyethylene (PE) or polypropylene (PP). Note: PVC cleanouts are permissible but must not exceed the minimum number required
- The pipe system only serves apartments and respective operating units
- The necessary encasing can also be implemented as section insulation as long as the measure has been approved in a report by an accredited authority
- Installations outside basements or garages must be made in service ducts and shafts

**Therefore, and in accordance with this regulation, Master3Plus soil and waste pipe systems may also be used in basements and underground garages.**

The openings for installations in partition walls and/or ceilings that form fire partitions must be closed by suitable measures (e.g., bulkheading or cladding) and in such a way that the fire resistance period of the component is not impaired or the transmission of smoke and fire over the time of the required fire resistance period is effectively contained.

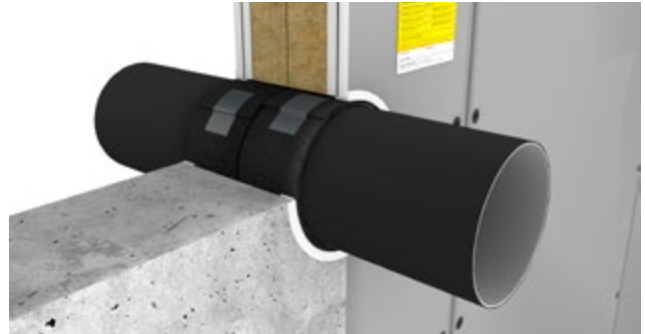
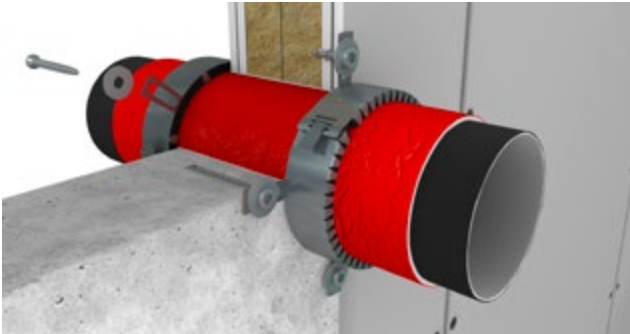
If fire safety measures are required for plastic pipelines, fire protection collars or wraps can be used. A multitude of fire collars and wraps have been approved for use with Master3Plus.

For instance, the following:

- Hensotherm® RM30/RM50 and 7KS
- Promat PROMASTOP FC3/FC6
- Hilti CFS
- Air Fire Tech RORCOL V30/V60

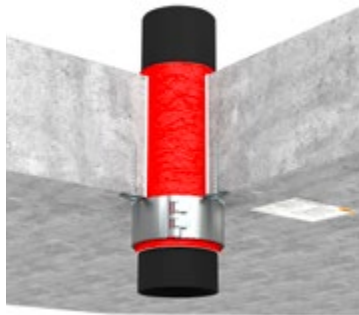


Wall ducts with fire collars or wraps



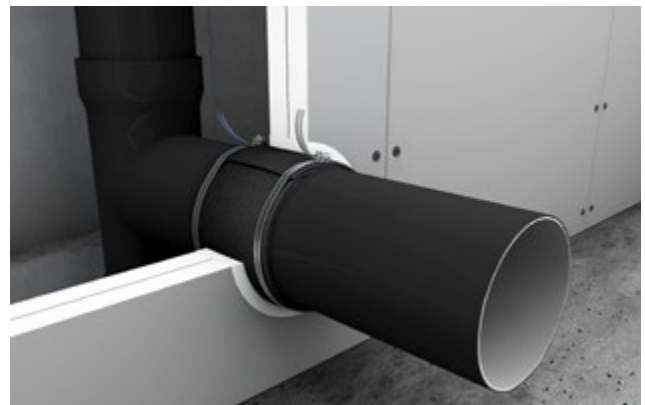
Fire collars or wraps must be installed on both sides of a Master3Plus pipe that leads through a fire compartment wall.

Ceiling ducts with fire collars and wraps



A fire collar or wrap must be applied to a Master3Plus pipe on the ceiling side of a fire compartment.

Shaft ducts with fire wrap 7KS100



An appropriate number of layers (as specified by Hensotherm) of 100 mm Hensotherm 7KS fire wrap must be applied around Master3Plus soil and waste pipes that run through shaft walls, which are planked on one side.

**Please note:** For each method and product used, the design, planning and application of fire collars and wraps must comply with the specifications and guidelines of the respective manufacturer.

9.

## Clamp fastening, positioning and installation

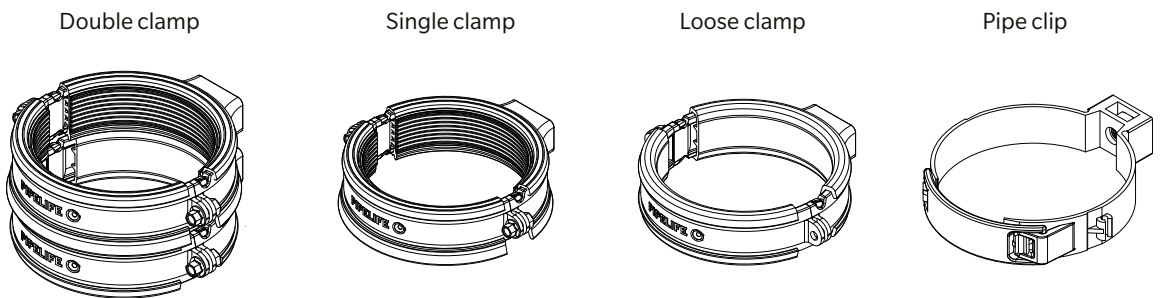
Commercially available clamps that match the pipe’s outer diameter (and surround it completely) may be used on Master3Plus pipes and fittings. Do not use pipe hooks for fastening.

In general, we recommend only using clamps with rubber inserts to fasten downpipes.

When sound absorption is required, we recommend using the PIPELIFE single clamps in diameters 110, 125 and 160 for vertical and horizontal pipes.

For enhanced sound absorption, we recommend using the PIPELIFE double clamp on vertical piping in diameters 110, 125 and 160.

For basic fastening without any sound absorption requirements, the PIPELIFE pipe clip can also be used.



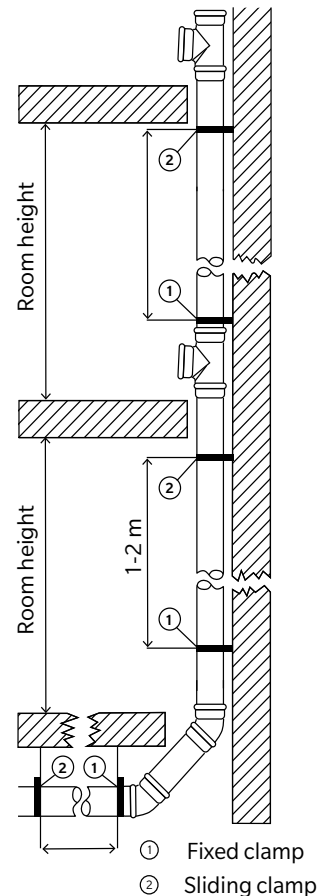
The following maximum installation distances should be followed for all PIPELIFE clamps:

	Ø 125	Ø 125	Ø 160
	1450 mm	1500 mm	1500 mm
	Ø 125	Ø 125	Ø 160
	2000 mm	2000 mm	2000 mm

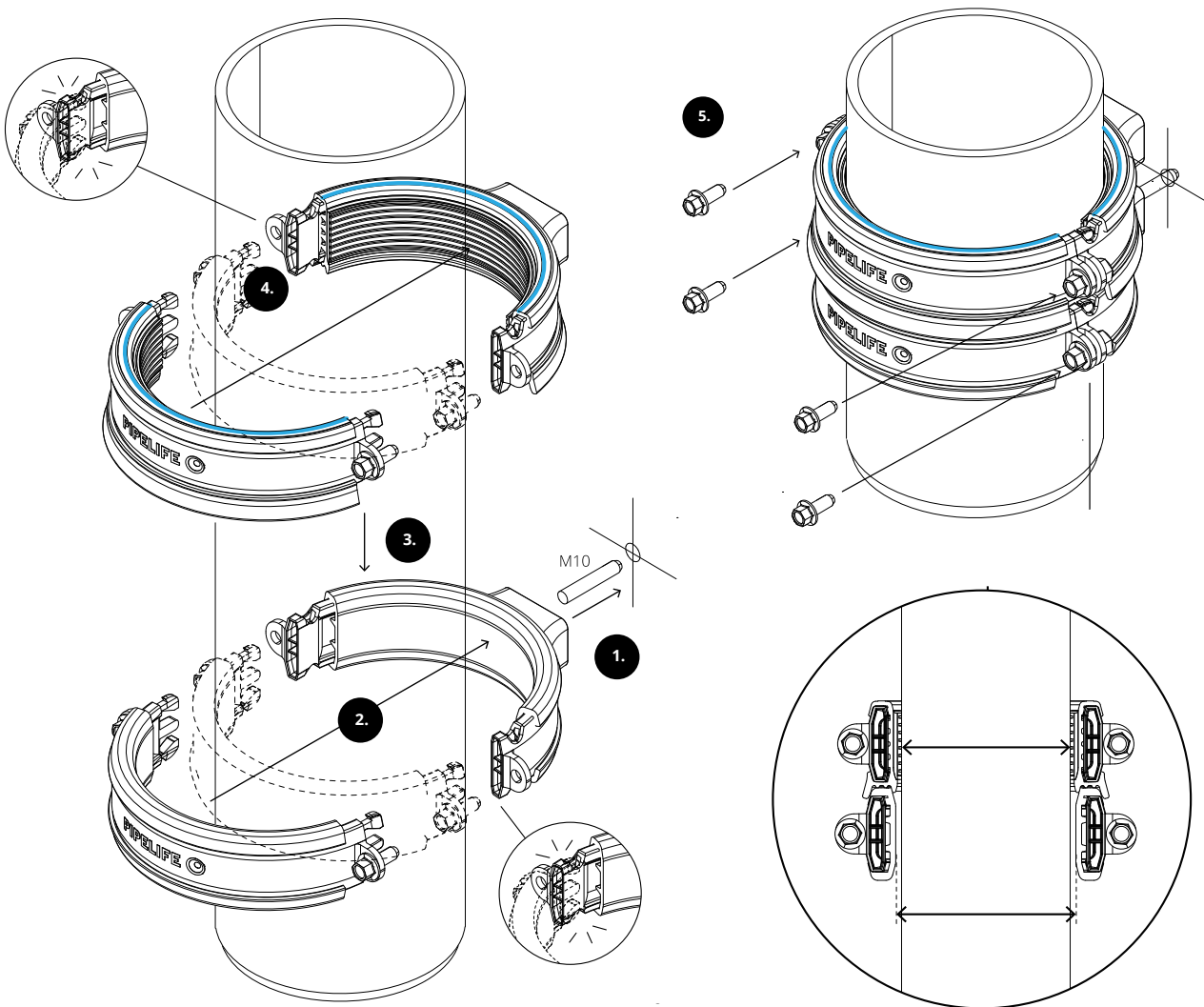
When fastening downpipes, we recommend installing two pipe clamps with rubber inserts on each floor. The pipeline should be fastened directly beneath the socket with a fixed clamp (1), ensuring it cannot slip during further installation.

Installing a loose clamp (2) will stabilize the pipe and enable thermal expansion of the piping system. Ideally, there should not be any contact between the loose clamp’s rubber insert and the pipe to avoid the transmission of structure-borne sound. However, if it must be tightened, it should only be done to the point at which there is only slight contact between the pipe and rubber insert so that the pipe can thermally expand in an axial direction.

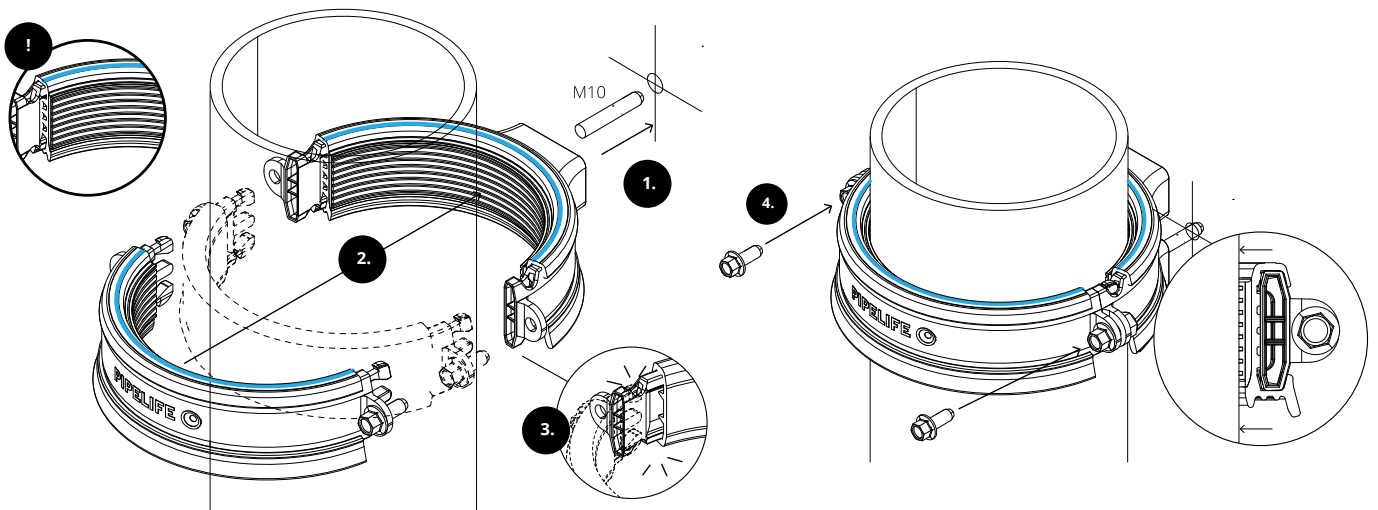
The PIPELIFE loose clamp has been designed to avoid contact with the pipe and, therefore, minimize unnecessary sound bridges. Loose clamps allow longitudinal movement of the pipelines.



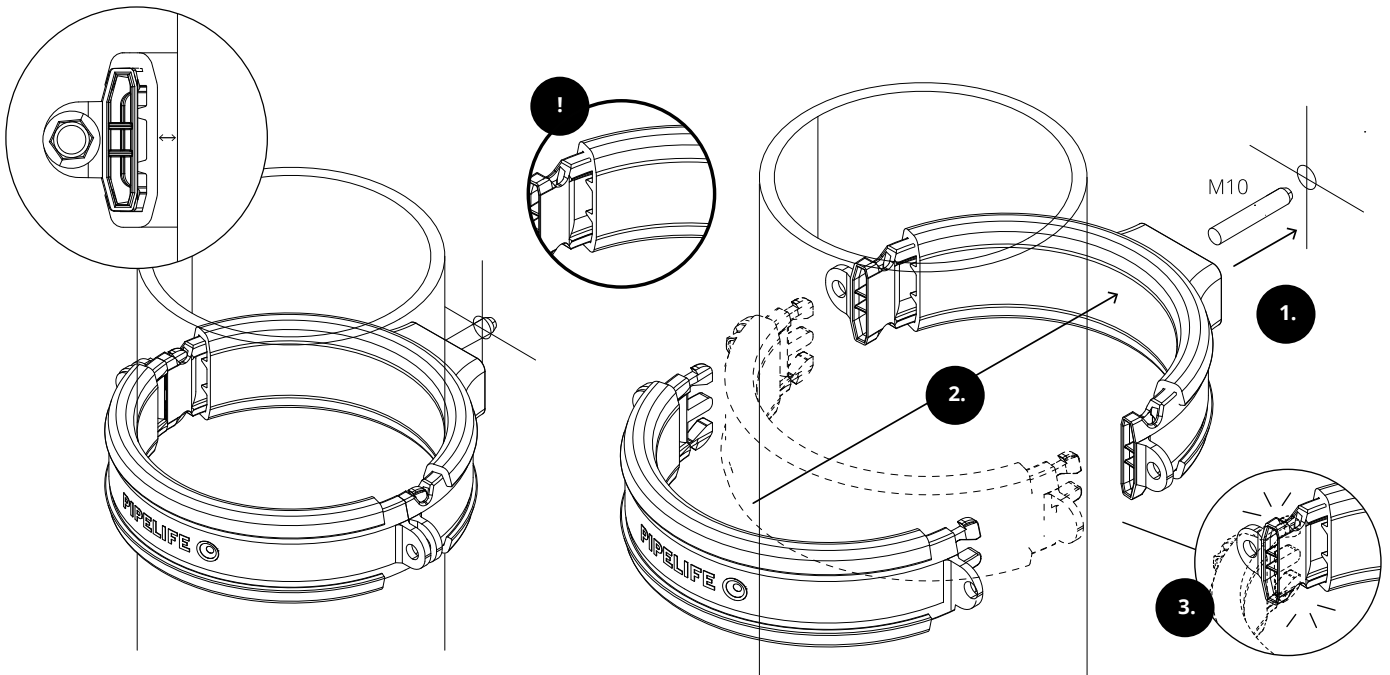
**Double clamp installation**



**Single clamp installation**



## Loose clamp installation



### 10.

## Avoiding structure-borne noise

Take care to avoid structure-borne sound transmission. Even small acoustic bridges, such as mortar residues between the pipe system and the building, can lead to unwanted sound in adjacent rooms.

Pipes fed through walls and ceilings must also be fitted with an insulation cover (e.g., a PE insulation tube 4 mm) to minimize structure-borne sound transmission.

If the pipe is embedded in plaster or masonry, it must be covered in 4-mm PE insulation to separate it from the building structure.

### 11.

## Avoiding condensation

Inside buildings, condensation may form on the surface of rainwater pipes when temperatures fall below the dew point. To avoid this, vulnerable pipes must be provided with suitable water-vapor-diffusion-tight insulation.

Generally, insulation thicknesses of 20–30 mm are sufficient. Insulation thickness calculators and tables can be found on the website of the insulation material manufacturer.

12.

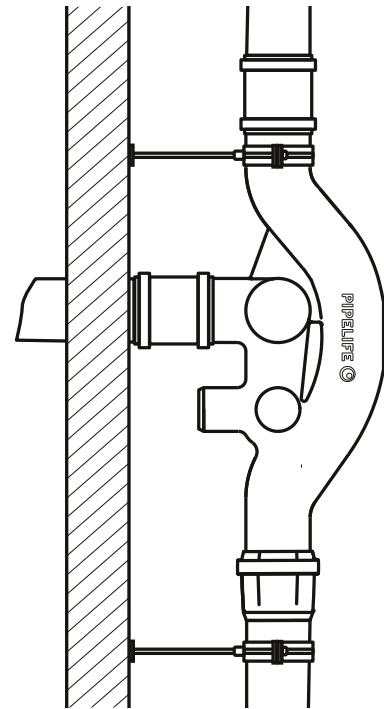
## Ventilation branch installation

A rapid increase in water flow in conventional fall pipes can dry out connected floor lines and empty water traps that prevent discharge odors from escaping. To avoid this, fall pipes are often over-dimensioned or installed with a separate ventilation line. Neither of these options are ideal as they both require extra space. Eventually, this limits the number of horizontal connections that can be made and, accordingly, the overall number of floors in the building. Our flow-optimized Master3Plus ventilation branch prevents this and facilitates the efficient installation of vertical fall pipes in high-rise buildings.

### Fixation of the ventilation branch

The ventilation branch should be fastened with two clamps. Attach the first clamp to the inlet section of the branch and the other below the branch, underneath the socket of the vertical connecting pipe.

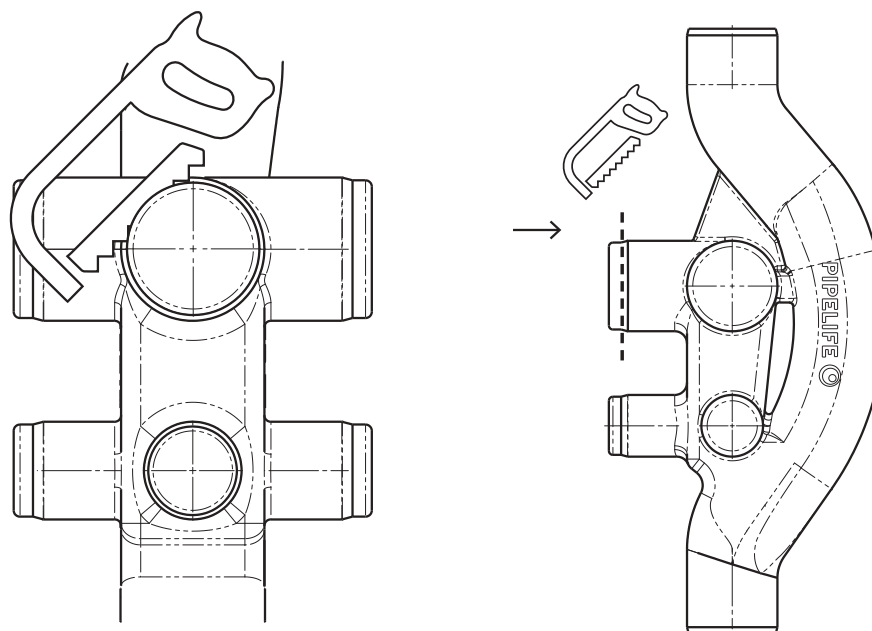
More information about the ventilation branch can be found in the **Master3Plus Design and Specifications** document.



### Connection of horizontal inlet pipes

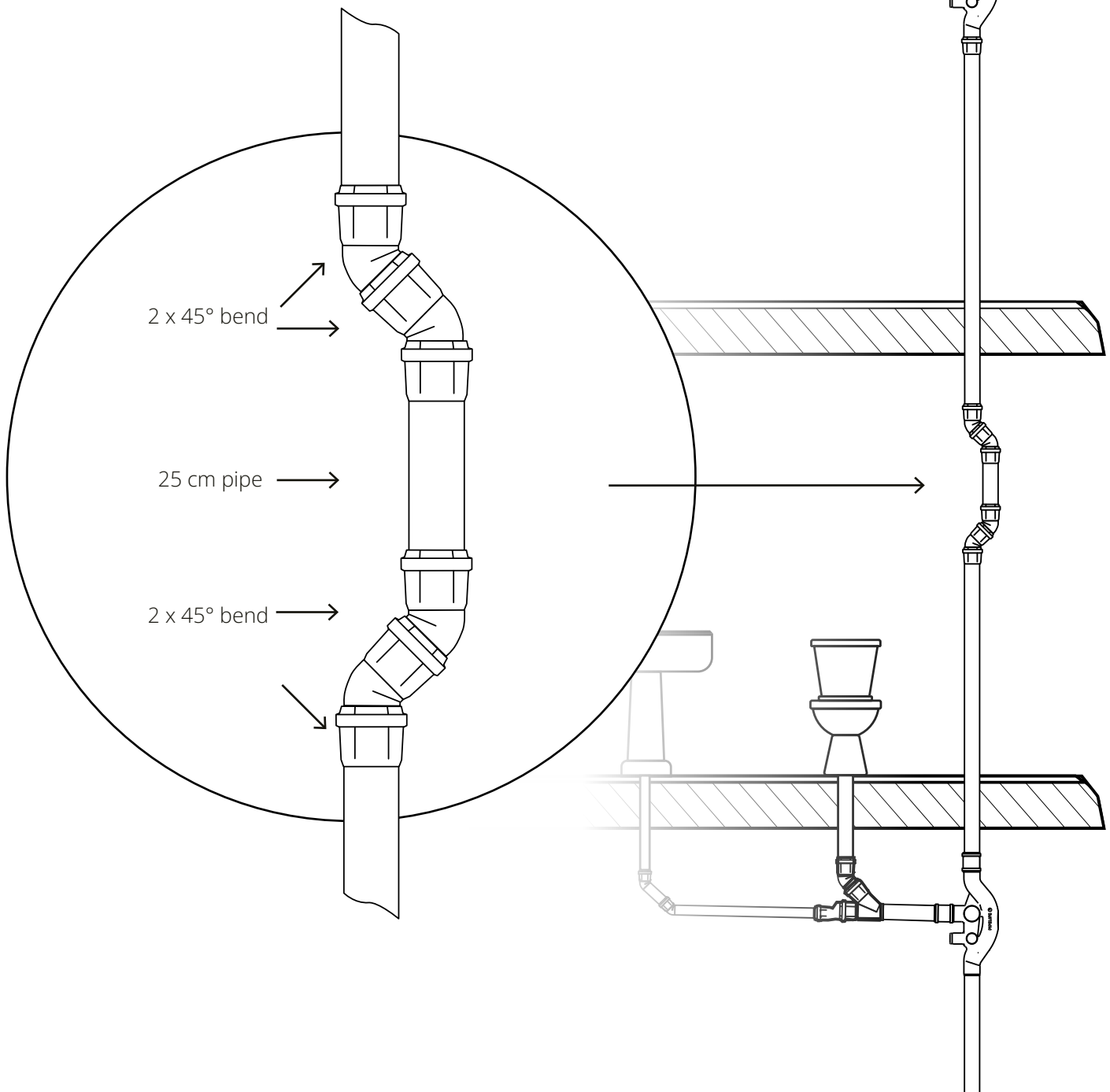
Horizontal connections can be made with Master3Plus double sockets:

- Open the connection spigot by cutting the seal at the chamfered edge of the connection inlet (ensuring the chamfer remains intact). This will enable the double socket to be inserted into place
- Remove any dirt or residue from both the spigot and the socket
- Thinly coat the spigot with PELIFE lubricant. Do not use oils or fats as lubricants
- Fully insert the lubricated spigot into the socket



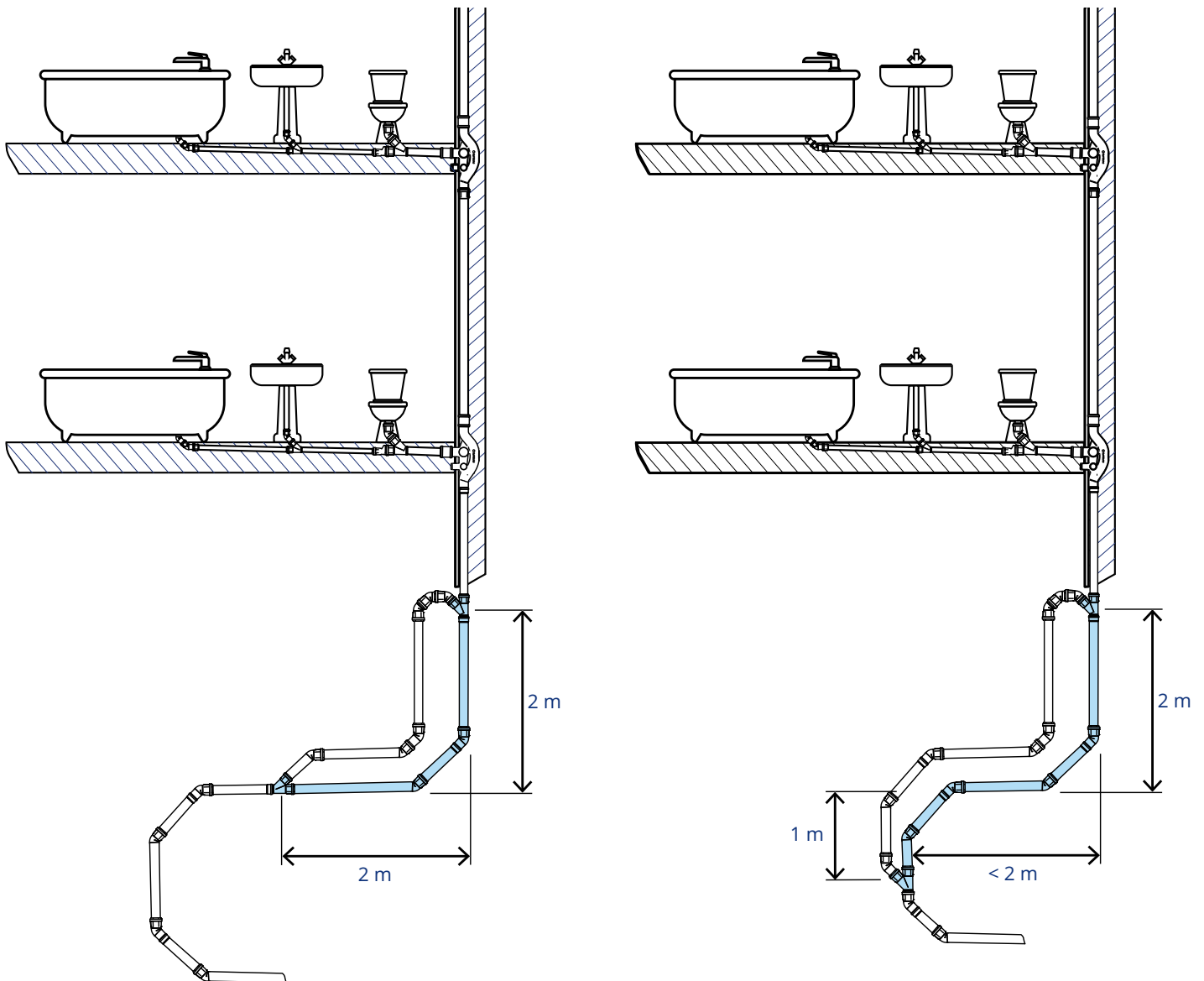
**Installation distances and velocity reduction**

The offset design of the Master3Plus ventilation branch reduces the velocity of the downward flow. This should be consistent throughout the entire vertical installation. The ventilation branch should be installed at every building level — ideally maintaining equal distances between the branches. However, if the distance between two ventilation branches is more than two floors (approx. 6 m), an offset of a similar length to the ventilation branch on the vertical fall pipe (approx. 25 cm) needs to be installed. To ensure a consistent flow, we recommend you only use 45° angle bends.



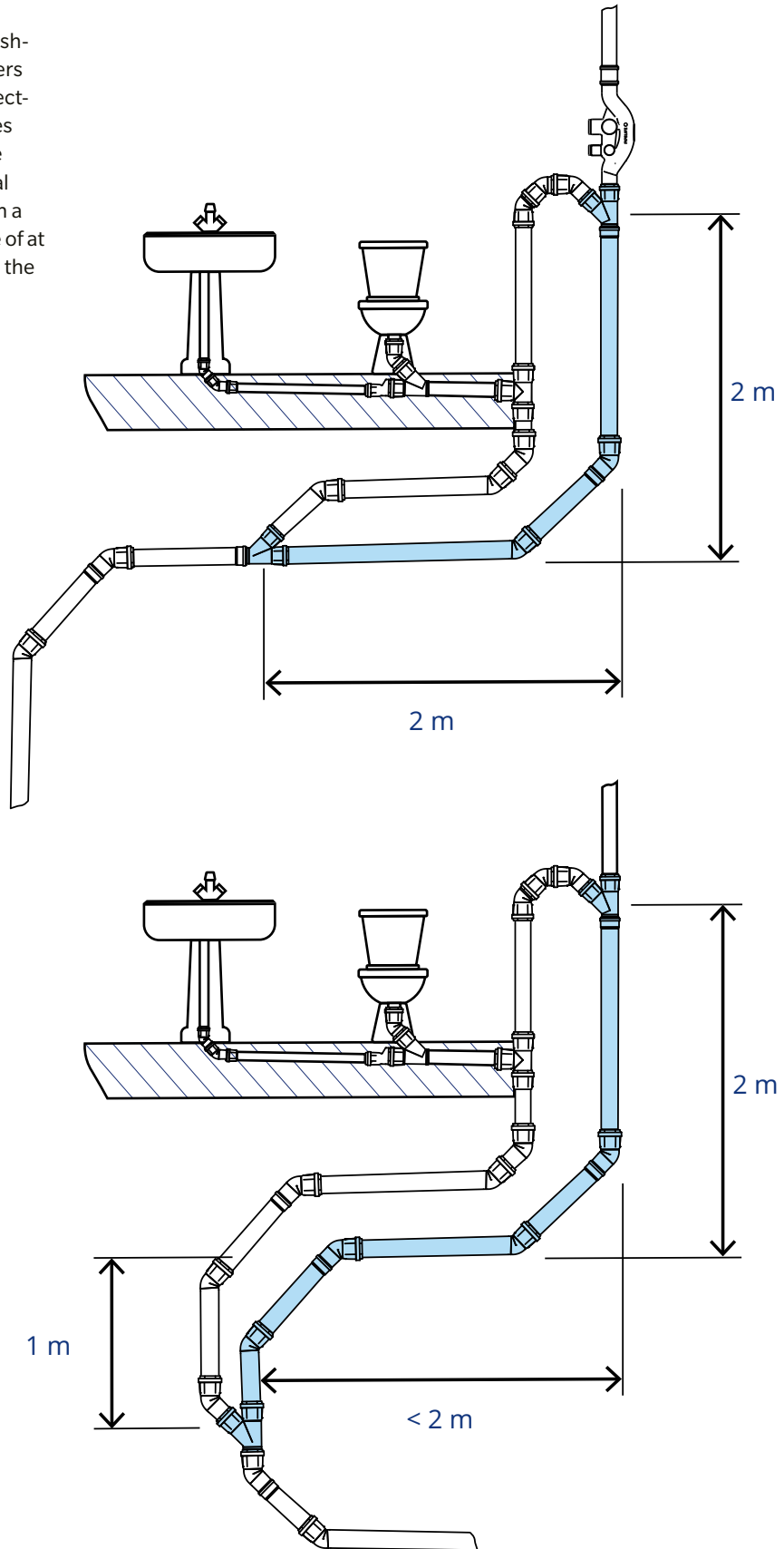
### Pressure relief loop

Fall pipe installations that include a Master3Plus ventilation branch must always be accompanied by a DN/OD 110 pressure relief loop at the bottom of the vertical fall pipe where the transition into the horizontal collection pipe takes place. This ensures that any excess pressure that might occur in this section will be absorbed. If a horizontal installation of at least 2 meters cannot be established, the pressure relief loop must be extended vertically by at least 1 meter and then merged again into the horizontal pipe.



### No-connection zones

To avoid water from sanitary pipes flushing into fall pipes, wash basins, showers and toilets must not be directly connected to the main fall pipe. These facilities need to be connected to the pressure relief loop via the vertical or horizontal section. They must be connected with a simple branch at a minimum distance of at least 10 times the pipe diameter from the base of the fall pipe.





13.

### Installation of the bottom bend

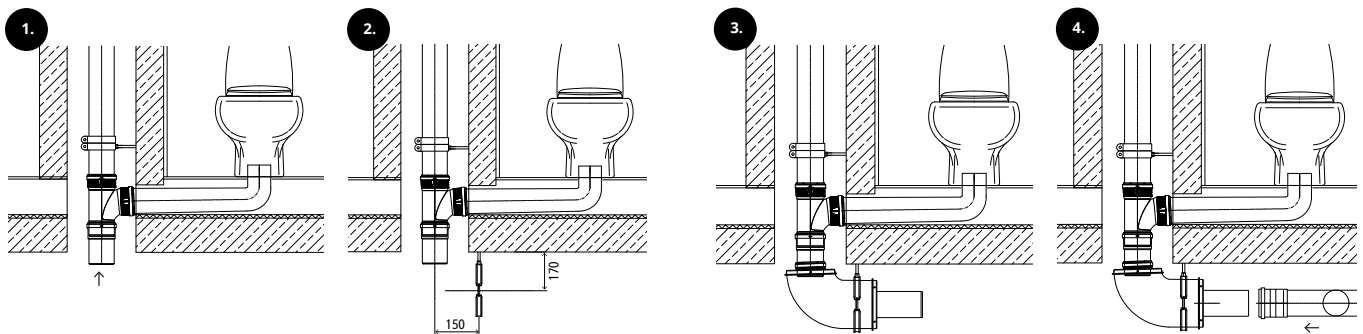
Directional changes in the flow of wastewater, such as the transition from the vertical fall line to the horizontal discharge line, are responsible for a significant proportion of the noise generated by a soil and waste system. The vibrations emanating from transition areas travel up the fall line, resulting in noise disturbance throughout the building.

To limit these vibrations, we have developed the Master3Plus acoustic bottom bend to absorb excessive pipe tremors.

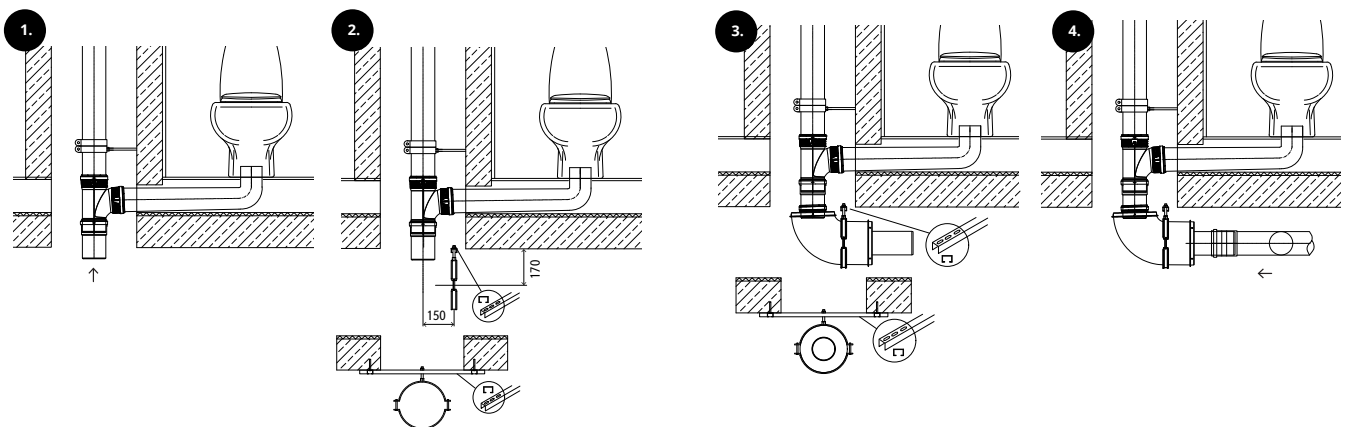


The final installation of the bottom bend depends on the building design, but in general, there are two possibilities:

1. If the shaft is up to 300 x 300 mm, the bottom bend can be fastened directly onto the concrete ceiling



2. If the shaft is larger than 300 x 300 mm, fasten the bottom bend to a metal profile (included), which itself is fixed to the adjacent ceiling.



## 14.

## Replacing fittings

### Using two push-on sockets (figure 1):

1. Cut out a sufficiently long pipe section (length of the fitting + double the outer pipe diameter)
2. Deburr and chamfer the pipe ends before pushing the socket over the entire length of the pipe end
3. Insert the fittings and fit the intermediate piece into the remaining space between the pipes
4. Slide the second push-on socket onto the intermediate piece
5. Insert the intermediate piece and close both gaps by shifting the push-on sockets

### Using long sockets (figure 2):

1. Cut a pipe section according to the length of the fitting plus a single insertion depth
2. Insert the long socket up to the base of the socket and insert the fitting with a push-on socket
3. Push the spigot of the long socket into the fitting socket

Figure 1

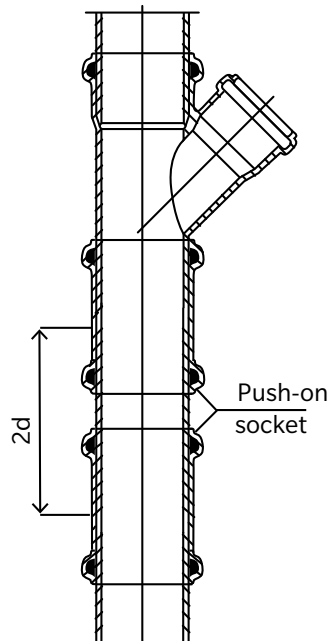
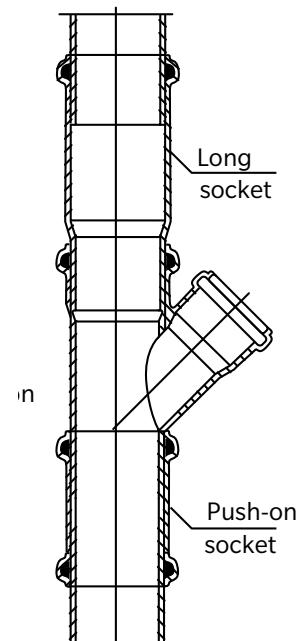


Figure 2



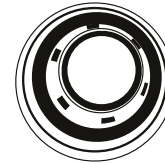
15.

## Installing push-on sockets

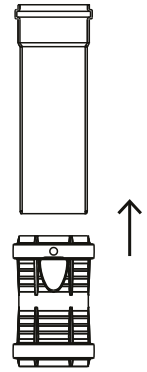
The Master3Plus double socket can be used in two ways:

### Double socket

Stop edges in the double socket limit the insertion depth, allowing insertion from both ends.



Double socket with stop edges



Attach the socket to the pipe end

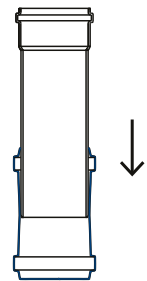
### Push-on socket

The double socket can also be used as a push-on socket for repair purposes. We recommend the following steps:

1. Remove both sealing rings from the double socket
2. Place the socket on the cut (not chamfered) end of a pipe
3. Take the pipe on the socket side and strike the double socket perpendicular to the pipe axis on a flat surface. This will break the stop edges off, and the socket can be pushed over the pipe
4. Reinstall the sealing rings before installing the push-on socket.



Push-on socket without stop edges



Strike on a flat surface

**Please note:** Eye protection should be worn at all times to minimize the risk of injury caused by fragments that break off during the process.

16.

## Transition to cast iron or fiber cement tip ends

The connection of Master3Plus joints to cast iron and fiber cement tips is made by using the specific transition pieces from our portfolio.

**The sealing area for spigots of cast iron and fiber cement pipes:**

DN/OD 50 of 58–67 mm

DN/OD 75 of 78–86 mm

DN/OD 110 of 110–116 mm

DN/OD 125 of 135–142 mm

DN/OD 160 of 160–172 mm

17.

## Transition to cast iron or fiber cement sockets

The connection of the Master3Plus spigot end to a cast iron or fiber cement socket is made using the specific transition pieces from our portfolio.

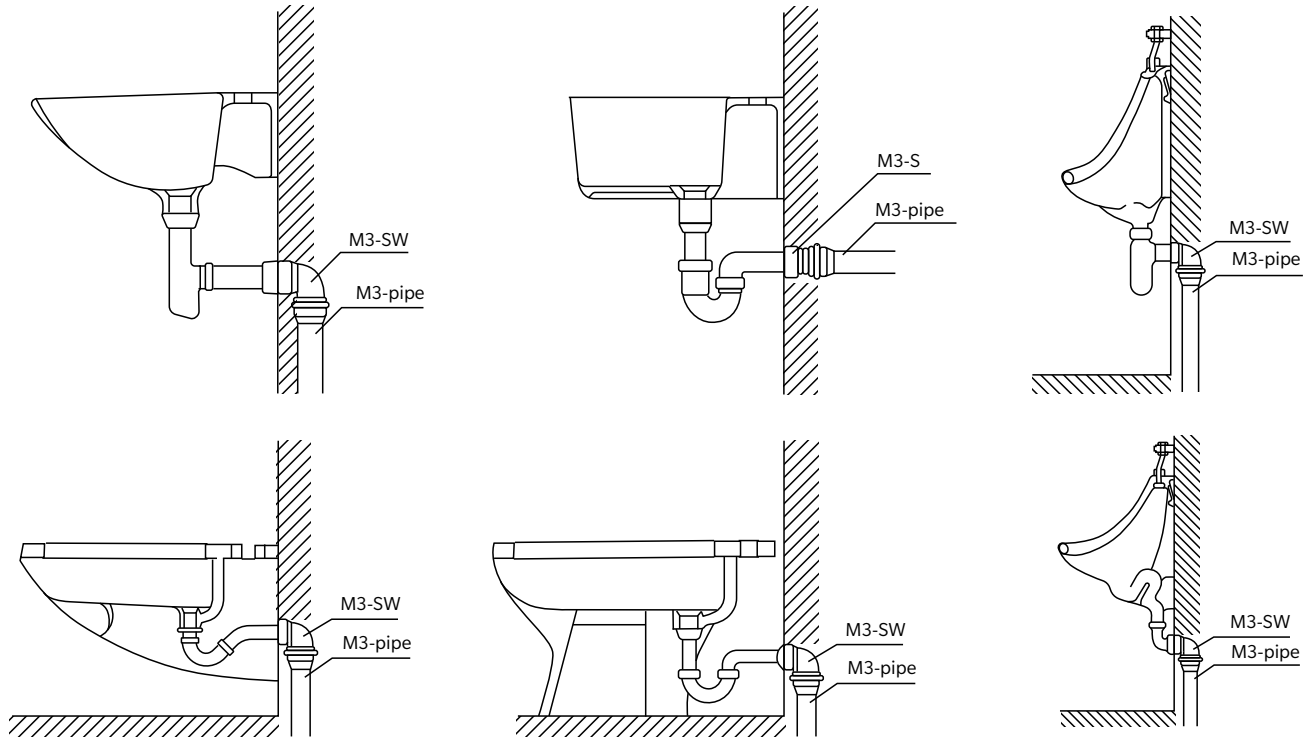
## 18.

## Connecting siphons

Siphons and metal pipes can be connected to Master3Plus pipes with a straight siphon connection or siphon bracket. The PIPELIFE combination nipple should be used for this as it enables siphon-pipe connections from 28 to 47 mm in diameter.

**Examples:** Connection of washbasins, sinks, bidets, urinals, laboratory sinks, etc.

**Note:** Before installation, coat the inside of the rubber nipple and metal pipe or siphon with lubricant to facilitate insertion.



## 19.

## System installation instructions

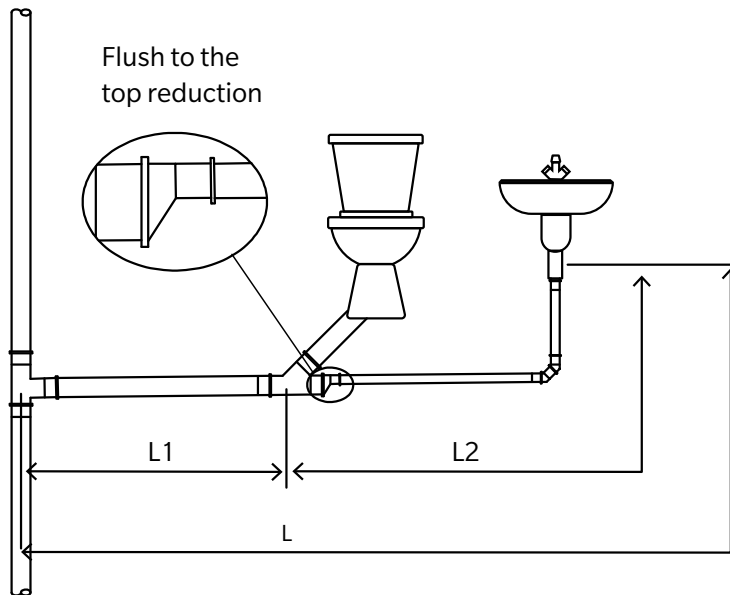
For both planning and installation, follow your respective local norms. The following instructions refer to the Austrian ÖNORM B 2501 issue: 2015-04-01 "Drainage systems for buildings and sites" and EN 12056 parts 1-5 issue: 2000-12-01 "Gravity drainage systems inside buildings".

They are intended to provide an overview of important regulations but not an exhaustive breakdown. The illustrations have been taken from the Austrian standard and have been simplified for easy understanding.

For **semi-detached and terraced houses**, separate downpipes, collecting pipes and underground pipes must be arranged within the building for each object. Merging the underground pipes outside the building is permitted.

**Individual and group connecting pipes** must be installed with a minimum gradient of 1%.

**Individual or group connecting pipes** longer than 4 m (figure 1) or with more than 3 bends must be ventilated separately. The air duct must be connected at the point in the pipe where the diameter of the pipe corresponds to at least the diameter of the air duct.



**Figure 1:**

L1 = Length of group connecting pipe

L2 = Length of single connecting pipe

L = Sum of the pipe lengths

Install **eccentric reducers in horizontal connecting and collecting lines** as close as possible to the vertex, but never flush with the base (see figure 1). In underground pipes, they may be installed flush with the base.

Each drain must have a **secured water inlet** to supplement the seal water. If this water supply cannot be ensured, the drain must have a mechanical gas-tight cover in addition to the odor trap.

The **minimum nominal diameter** of collecting pipes and underground pipes for wastewater, rainwater and mixed water is DN/OD 110.

The **minimum gradient** of collecting pipes and underground pipes for wastewater, rainwater and mixed water at a filling degree of 70% is 1% up to DN/OD 200.

**Changes in the direction** of collecting pipes and underground pipes may only be carried out with single bends of up to 45°. This limitation does not apply if the individual bend has a radius of at least 500 mm.

**Branches with angles of 45° or less** may be installed in collecting pipes and underground pipes. Double branches are not permitted.

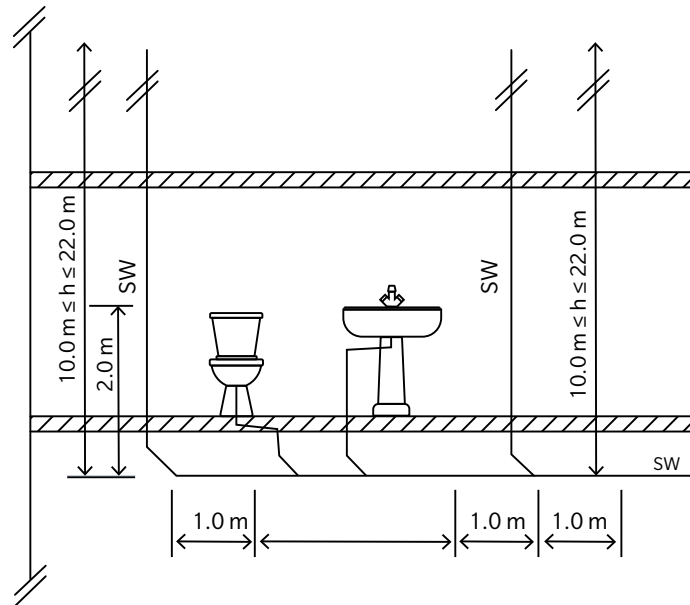
**Junctions** in collecting pipes and underground pipes may only be made at a maximum angle of 45° in the direction of flow. The lateral connecting branch must be turned at least 15° to a maximum of 45°. However, for wastewater containing minimal solids (e.g., kitchen, bath, rainwater), the junction of the downpipe may be made with a branch twisted up to the perpendicular angle.

**Below a drop height of 10 meters**, the junction of the downpipe into a horizontal pipe must be designed with at least 2 bends (e.g., 2 x 45°).

**At drop heights from 10 to 22 m**, the downpipe (figure 2) must be kept clear of all connections up to a height of 2 m, measured from the channel bottom of the downpipe warping or the collecting pipe or underground pipe. At the junction with a collecting pipe or underground pipe (figure 2), a range of 1 m, measured from the deflector bend or junction of the downpipe, must be kept free from connections. The junction of the downpipe into a collector or underground pipe must be designed with two 45° bends and an intermediate piece with a length of 250 mm (figure 3).

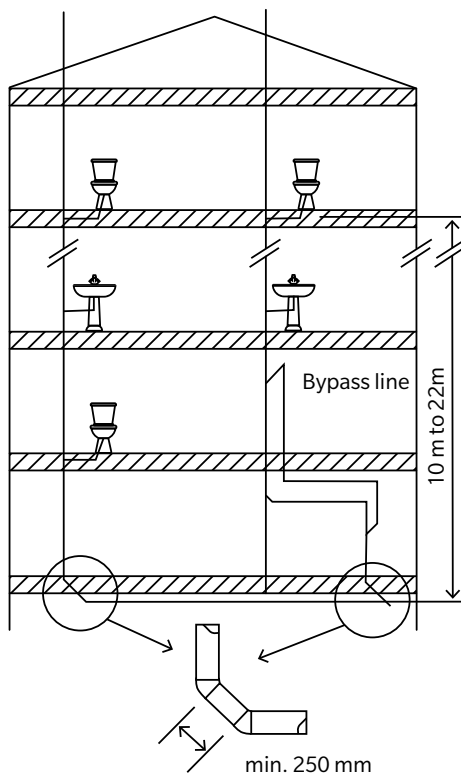
In the case of downpipes with a **drop height of more than 22 meters**, bypass pipes must be installed for downpipe diverters and at the junction into collecting pipes and underground pipes. According to figure 4, this bypass line may only be connected to the collecting pipe and underground pipe 1.5 m after the contact bend. The downpipe must be deflected with two bends at 45° and an intermediate piece with a length of 250 mm.

When connecting single or group connecting lines to downpipes, branches with angles of 87° to 88.5° must be used.



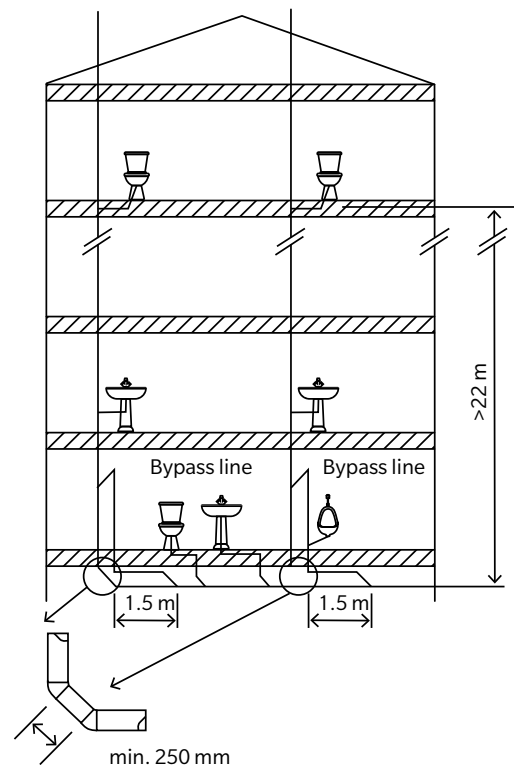
**Downpipe height 10 to 22 m**

**Figure 2:** Connection-free zone at the junction into the collector or underground pipe, taken from ÖNORM B 2501: 2015-04-01.



**Downpipe height 10 to 22 m**

**Figure 3:** Junction of downpipes (10 m to 22m drop height) into a collecting pipe, taken from ÖNORM B 2501: 2015-04-01 (figure 14).



**Downpipe height more than 22 m**

**Figure 4:** Junction of downpipes (more than 22m drop height) into a collecting pipe, taken from ÖNORM B 2501: 2015-04-01 (figure 15).

**Junction of adjacent drainage objects at the same height as the drainpipe:**

For similar drainage objects, arrange a double branch at 180° as shown in figure 5. In WC systems (figure 6) or various drainage objects (e.g., WC and wash basin; figure 7), arrange a double branch with a maximum internal angle of 135°.

**Junction of adjacent drainage objects at a different height to the drainpipe:**

The larger connection line must be connected to the downpipe below the smaller connection line as shown in figure 8. If this is not possible, the distance in relation to the base heights must be at least 250 mm, as shown in figure 9.

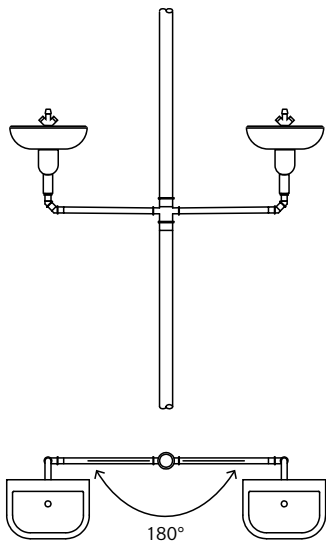


Figure 5

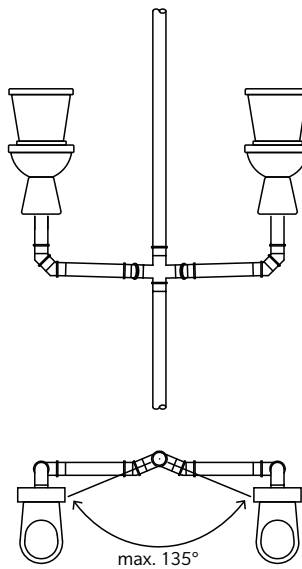


Figure 6

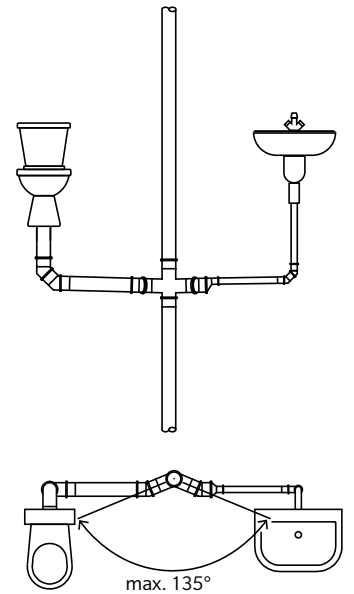


Figure 7

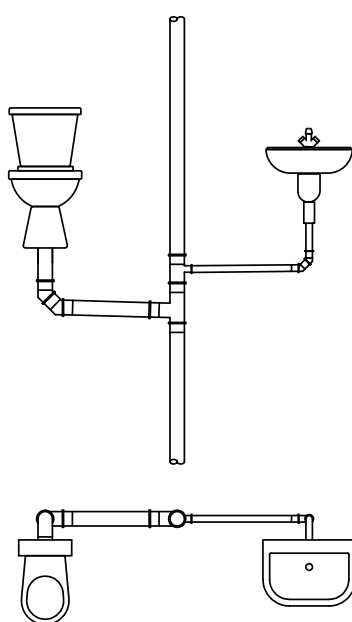


Figure 8

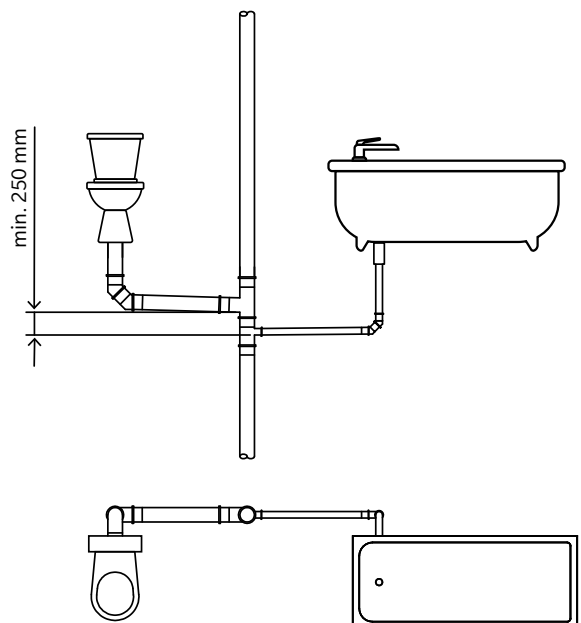


Figure 9



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