KG2000
Installation-Instructions

Refer to our website auspress.com.au for the current technical information and documents.
Installation only by a qualified & licenced plumber to AS/NZS 3500.2 and relevant local requirements.

1. SCOPE

The following instructions apply for the use and installation of pressureless KG2000 solid wall pipe systems made of mineral-reinforced polypropylene (PP-MD) installed in the ground.

They apply for:
- may green (RAL 6017) KG2000 pipes according to DIN EN 14758-1 with ring stiffness SN 10
- KG2000 pipes that are may green (RAL 6017) on the outside and pure white (RAL 9010) on the inside according to DIN EN 14758-1 with ring stiffness SN 16
- KG2000 pipes that are blue (RAL 5015) on the outside and pure white (RAL 9010) on the inside according to DIN EN 14758-1 with ring stiffness SN 16

(The guidelines for the use of flammable building materials in construction and the special installation information for domestic drainage pipe installations must be observed for pipes within buildings.)

2. APPLICATION FIELD

The sewage pipes and fittings made of PP-MD are supplied with a plug-in sleeve and an SBR seal factory inserted. Connections that cannot be pulled apart can be created using the IP-plus welding system by the company Sabug GmbH (www.sabug.de).

The sewage pipes and fittings made of PP-MD can be used as:
- a main line in the ground, below or outside buildings (UD)
- a main line inaccessible in a base plate
- a collector pipe
- a pipe for condensation from furnaces
- a connection duct and connecting pipe in gravity drainage systems installed in the ground to discharge wastewater and rainwater
- a ventilation system, hygienically suitable for fresh air acc. to VDI 6022; radon-proof
- a geothermal heat exchanger system
- a main line in water protection zones II and III

They are also suitable for:
- fuel station wastewater (only with NBR seal)
- canteen wastewater (only with NBR seal)
- slurry, manure, seeping silage juices (only with an IP welding ring)
- high pressure flushing

They can be operated up to approx. 40°C with a heat tracing system.

The recommendations of the DIN 1986-1, DIN 1986-4 and DIN EN 1610 apply for the execution of wastewater pipes.

The KG2000 products are resistant to a constant wastewater temperatures of 90°C. They can also withstand wastewater temperatures of 110°C for short periods.

KG2000 sewer pipes and fittings are suitable for discharging chemically-aggressive wastewater in a range of pH 2 (acidic) to pH 12 (alkaline). They are resistant to household wastewater according to DIN 1986-3. The norm ISO TR 10358 (new for supplement 1 DIN 8078) must be observed for discharging industrial wastewater.

They can be laid in heavy duty areas (SLW 60) with a minimum coverage of 0.5 m in line with the structural analysis guidelines and a maximum cover of 6 m in line with the structural analysis guidelines, and can also be installed at groundwater level.

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3. STRUCUTURAL ANALYSIS PROOF

In case of differences to the structural analysis guidelines, structural analysis proof must be provided. The object questionnaire needs to be completed here (https://www.ostendorf-kunststoffe.com/services/objektfragebogen). In compliance with DIN EN 1610, the vertical deformation of the installed pipes may not exceed 6%.

4. TRANSPORTING AND STORING PIPES AND PIPELINE PARTS

The pipeline parts must be transported with suitable vehicles and loaded and unloaded by qualified persons. The parts of the pipe must be protected against damage. If possible, the pipes should lie flat along their entire length during transportation to prevent sagging and bending. Impacts, especially at temperatures close to zero, should be avoided.
Pipes and fittings can be stored outdoors. The following should be taken into account when storing pipes:

- The pipes must be stored in such a way that correct stacking is ensured and deformations are avoided.
- The rows of pipes can be stored with and without intermediate timber blocks.
- The pipe sleeves should be exposed in the horizontal and vertical direction during storage.
- The stacking height should not exceed 2 m.

Rubber sealing elements may not be stored outdoors for extended periods, unless they are protected adequately.

5. PIPE TRENCH AND PIPE INSTALLATION

5.1 Trench width

The minimum trench width, measured near the base of the pipe, is stated in the following tables according to the trench depth and/or nominal width DN/OD. The respectively larger value is decisive.

Minimum trench width according to the installation norm DIN EN 1610 depending on the nominal width DN/OD

Nominal width DN/OD	Minimum trench width (OD_h + x) (m)		
	filled trenches	open trenches ß > 60°	open trenches ß < 60°
≤ 225	OD_h + 0.40	OD_h + 0.40	
> 225 to ≤ 350	OD_h + 0.50	OD_h + 0.50	OD_h + 0.40
> 350 to ≤ 700	OD_h + 0.70	OD_h + 0.70	OD_h + 0.40

With respect to OD_h + x, x/2 corresponds to the minimum clearance between the pipe and the trench wall and/or trench shoring. The OD_h is the outer diameter of the pipe in metres and ß is the slope angle of the unshored trench measured above the horizontal.

Minimum trench width depends on the trench depth

Trench depth (m)	Minimum trench width (m)
≤ 1.00	no minimum trench width specified
> 1.00 to ≤ 1.75	0.80
> 1.75 to ≤ 4.00	0.90
> 4.00	1.00

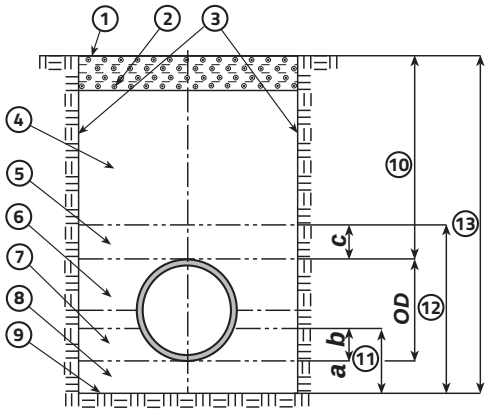
5.2 Trench drainage

The base of the trench must be free of water to ensure correct installation of the pipe and correct compaction in the pipeline zone. This is achieved by means of seepage packing material and French drains or by dewatering.

5.3 Production of the pipeline zone (pipe bedding)

5.3.1 Bedding material

The grain size of the bedding material for the pipeline zone depends on the diameter of the pipe:
22 mm for DN/OD ≤ 200
40 mm for DN/OD > 200 to DN/OD ≤ 600
Granular, loose building materials, such as poorly graded gravel, material with graduated grain (compactable), sand, all-in mixed grain sizes and crushed building materials, are allowed. These may also be recycling building materials.



1) Surface
2) Lower edge of the road structure or rail construction if there is one
3) Trench walls
4) Main filling (3.6)*
5) Cover (3.5)*
6) Side filling (3.12)*
7) Upper bedding layer, b
8) Lower bedding layer, a
9) Trench base
10) Cover height (3.3)*
11) Bedding thickness (3.1)*
12) Thickness of the pipeline zone (3.4)*
13) Trench depth (3.13)*
a) Thickness of the lower bedding layer
b) Thickness of the upper bedding layer
c) Cover thickness
OD_V vertical outer diameter

*The references in the key come from the DIN EN 1610.

5.3.2 Lower bedding layer

The lower bedding layer must be created and compacted depending on the incline. Unless otherwise specified, the thickness of the lower bedding layer a, measured below the base of the pipe, may not be less than 100 mm in normal soil conditions and less than 150 mm on rock or very firm soil. This layer is part of the pipe bearing and should guarantee even distribution of the stress. It must be created carefully so that no weight is focussed on specific points. Suitable recesses (head-holes) must be created near the sleeves, and tamped correctly again after the pipes have been connected.

5.3.3 Upper bedding layer

The thickness of the upper bedding layer depends on the bearing angle and must correspond to the structural analysis calculations. This is also part of the pipe bearings and therefore needs to be compacted carefully. Backfilling of the pipeline at the side below the pipe is very important. When installing and compacting the bedding material, care must be taken to ensure that the position and height of the pipeline are not changed. The pressure distribution on the circumference of the pipe primarily depends on the design of the pipe bearing. The bearing angle is decisive for the deformation proof. According to the structural analysis requirements, this lies between 60° and 180°.

5.3.4 Special types of bedding or support constructions

In the case of unstable ground, such as peat or quicksand, the base of the trench has a low load-bearing capability for the pipeline bedding, and more settling or settling differences can be expected. In this case, special measures are necessary; for instance, it may be necessary to exchange the soil, stabilise the soil or use poles and load-bearing ledgers to support the pipeline. The pipes always need lateral support in this case. Steps must be taken to ensure a bedding layer between the ledgers and the pipes to prevent direct contact.

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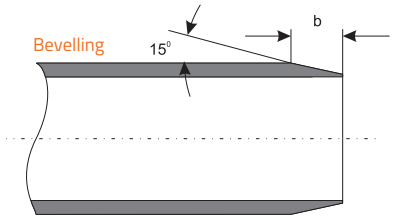
5.3.5 Encasing in concrete

Pipes and fittings made of PP may be covered in concrete directly; however, the following information must be observed:
a) Cover the sleeve gap with tape to ensure that no cement slurry can penetrate and impair the function of the plug-in sleeve.
b) Secure the pipes to prevent buoyancy. The distance between the attachments should be selected so that no impermissible bending can occur (creation of water pockets).
c) Thermally-related changes in length must be taken into account both for installation and in practical use.

6. SHORTENING THE PIPES

A fine-tooth guide saw, a pipe cutter or a suitable cutting disc can be used to shorten the pipes to the required length. Tools used for cutting wood are also suitable, e.g. hand-held circular saws. Observe the safety regulations for the pipe trench!

The cutting line must be marked on the pipe! The pipe must always be cut at right angles to the pipe axis.



Fittings may not be shortened, otherwise there is no guarantee that they will not leak.

If the burr is not removed from the pipe immediately and the pipe is not bevelled, this must be carried out manually before installation. We recommend a finishing tool or a large file for this. Fittings may not be shortened, otherwise there is no guarantee that they will not leak.

DN/OD	110	125	160	200	250	315	400	500
b mm approx.	6	6	7	9	9	12	15	18

7. INSTALLATION OF THE PIPELINE

7.1 General

Work on installing the pipe should start at the lower end of the pipe; pipes are usually installed so that the sleeves point toward the upper end. In case of longer work interruptions, the pipelines must be protected to prevent penetration of materials (sand, dirt etc.). To this end, the ends of the pipe should be closed temporarily. Caps or end plugs should only be removed just before the pipes are connected.

7.2 Production of the plug connection

The pipe connection must be created carefully by experienced specialists. The enclosed sealing rings must be used to guarantee that there are no leaks. The pipe sleeve, the spigot end of the pipe and the seal must be checked for damage and cleaned before the connection process. Damaged pipes or seals may not be used or must be replaced.

If necessary, the insertion depth should be marked with a pen on the spigot end of the pipe to check whether the maximum insertion depth has been reached when the pipes are connected.

A suitable lubricant must be applied to the cleaned spigot end. We recommend the use of oils or grease.

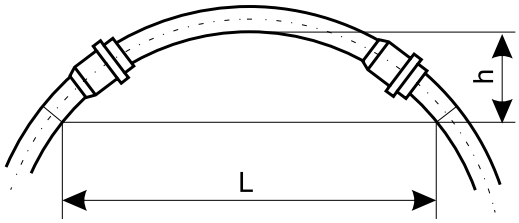
Now, slightly turn the spigot end into the sleeve until it tangibly reaches the stopper or the plug-in marking. The pipes must be connected parallel to the axis, either manually or using levers for pipes in size DN 250 and larger.

If levers are used, a squared timber must be placed crosswise in front of the pipe to ensure better force distribution when pushed together, and to prevent damage to the pipe sections.

In exceptional cases, the flexibility of the plastic pipes DN/OD 110 to 200 allows them to be installed in a curved manner. The values of the following table may not be exceeded here.

Gauge h max. and/or bending radii R in m at a length L of:

DN/OD	110	125	160	200	250	315
8 m	0.24	0.21	0.17	0.13	0.11	0.08
12 m	0.54	0.48	0.38	0.30	0.24	0.19
16 m	0.97	0.85	0.67	0.53	0.42	0.34
R	33	38	47	61	75	95



Alternatively to the information in the table, a 1° deflection of the pipe connection in the KG2000 System is possible thanks to the patented 3-fold seal according to DIN EN 681-1.

8. FILLING

8.1 Side filling

Once the pipe connection and bedding are ready for bearing loads, the lateral filling and main filling work can be started evenly on the left and right of the pipe. This helps in supporting the pipe to keep vertical deformation to a minimum. Also, the pipe should always lie flush on firm ground and the sleeve should have enough support from under so that it lies flush to the pipe in the trench.

In the area of the sockets, recesses are to be made in the lower bedding zone so that the connections may be carried out properly. Also make sure that the sleeves are flush with the pipe in the trench. The recesses must not be larger than is necessary for proper connection. In creating the pipeline zone, the main filling and the removal of the shoring should be done so that the load-bearing capability of the pipeline corresponds to the planning requirements.

Careful recompaction is essential after the gradual removal of the shoring. It is important that once the sand has been filled below the pipe, that the pipe is weighed down.

8.2 Cover

The compacted cover must be min. 15 cm thick above the pipe apex (min. 10 cm above the sleeve connection). Compaction should be carried out manually or with a light compaction device.

8.3 Main filling

Mechanical compaction with suitable compaction equipment directly above the pipeline should only be carried out when there is a minimum cover of 30 cm. Settling is only allowed within the normal technical scope.
High loads on the covered pipeline during the construction phase, e.g. driving with heavy construction equipment or vehicles, should be avoided.

9. STABILISATION OF THE PIPELINE ZONE

The pipeline zone can be designed in line with the drawing (see Page 1). Geotextiles can be used on the ground of the pipeline zone to prevent the earth becoming soft. Additional stabilisation of the pipeline zone can be achieved using plastic grids, wood grids or filter gravel.

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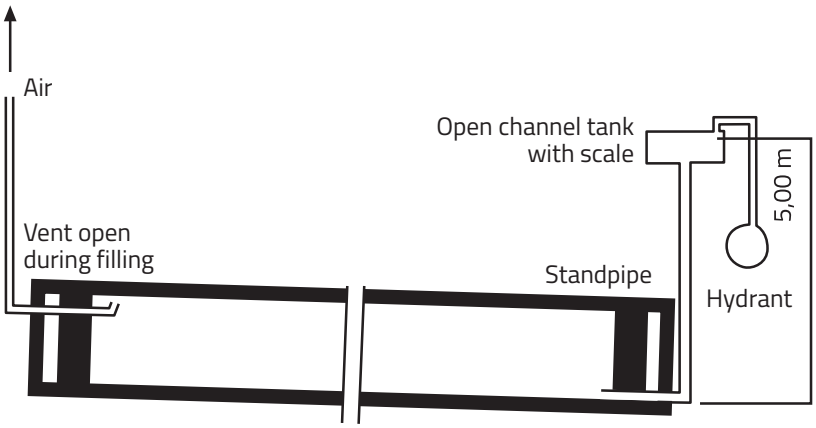
10. CHECKING FOR LEAKS

The pipelines, shafts and inspection openings are tested for leaks either with air (method 'L') or with water (method 'W'). With respect to the method 'L', the number of corrective steps and repeat tests is unlimited in case of leaks. In case of one-off or repeat failure of the test with air, it is allowed to test with water and the result of the water test alone is decisive.

Testing with water

All openings of the tested section of pipeline, including all branches and junctions, must be closed in a watertight and pressure-tight manner, and secured so that they cannot be forced open. We recommend, especially in the outdoor sections, anchoring the number of fittings by positioning poles or using appropriate securing clips to prevent changes to the position. Pipes and test plugs on straight pipelines also require appropriate support to counter horizontal pressure forces. The pipes that have not yet been covered should be secured to prevent changes of position. The pipeline must be filled with water so that it is free of air. Therefore it is filled slowly from the lowest point of the pipe so that the air in the pipe can escape through the adequately dimensioned venting points at the highest point of the pipeline.



An adequate pause (1 hour) should be planned between filling and testing the pipeline to allow any air left in the pipe from the filling process to escape gradually. The test pressure is measured at the deepest point of the test section. Open channel pipes must be tested with 0.5 bar over-pressure. The test pressure, which must be applied before the start of the test, must be maintained for 30 minutes according to DIN EN 1610. If necessary, the water quantity required for the water intake must be constantly refilled and measured.

The test requirement is met, if the volume of the added water is not greater than 0.15 l/m² in 30 min for pipelines.
Remark: m² describes the wetted inner surface.

Testing with air

General information: The alternative air pressure test is a standard method thanks to its many advantages over water pressure tests. Testing with air (method 'L'): Testing times for pipelines (without shafts and inspection openings) after taking the pipe diameters into account are provided as recommendations in the following table:

The method should be determined by the client. For reasons of safety, please handle and test carefully. Ensure that the blocking elements sit tightly!

Test methods	Test pressure P_0* (mbar)	Pressure loss Δp (kPa)	DN/OD 110 (test time in min.)	DN/OD 125 (test time in min.)	DN/OD 160 (test time in min.)	DN/OD 200 (test time in min.)	DN/OD 250 (test time in min.)	DN/OD 315 (test time in min.)	DN/OD 400 (test time in min.)	DN/OD 500 (test time in min.)	DN/OD 630 (test time in min.)
LC	100	15	3	3	3	3	4	5	5	7	9
LC**	100	15	7	7	7	7	10	14	14	17	24

* Pressure above atmospheric pressure
** Test times apply for use in drinking water abstraction areas

INSTALLATION INSTRUCTIONS

1. If necessary, our KG2000 pipes can be shortened to the required length on the building site. A saw, standard flex or a professional pipe cutting system can be used for this.

2. Burr or areas of unevenness that are created when the pipes are shortened should be removed with suitable tools. Also, care should be taken to ensure that the interface has a new clean bevel. A flex or file can be used for this.

3. The insertion depth of the spigot end in the sleeve should be clearly marked to allow controls to check that the spigot end has been inserted fully.

4. The spigot end of the pipe and the inside surface of the sleeve must be clean and free of damage.
A suitable lubricant must be applied all around the spigot end.

5. Pipes and fittings in smaller nominal widths can be connected easily by hand. We recommend using a tool for larger nominal widths, for instance a squared timber with a hammer or a rubber hammer.

6. Once a section of piping has been installed, it is vital that sand be filled beneath the pipes. It is important that once the sand has been filled that the pipe is weighed down. This guarantees that the pipe lies flat on the ground and the recess are well filled.

7. The position must be checked carefully once the pipe system has been connected.

Technical changes, misprints and errors are reserved.

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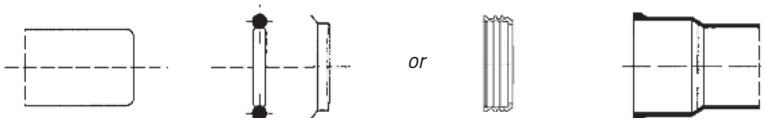
12. CONNECTION WITH PIPES MADE OF OTHER MATERIALS

12.1.1 Connecting cast iron insertion ends to PP sewer pipes and fittings

If cast piping ends with an insertion end, the PP piping is connnected to the cast pipe insertion end with the connection piece KG2000-UG. The PP connector (KG2000-UG) is always delivered without gasket. The GA gasket set or the sleeve must be ordered separately.

Push the sleeve onto the cast iron pipe spigot, then push the PP connector (KG2000-UG) onto the cast iron spigot with the sleeve. The A-ring is a rolling ring and is used to safely guide the spigot of the pipe. The G-ring is used for sealing. First pull the A-ring onto the cast iron spigot, then fit the G-ring onto the rim of the cast iron spigot. Push the PP connector (KG2000-UG) onto the cast iron spigot with the GA rings.

Cast-iron pipe – spigot end

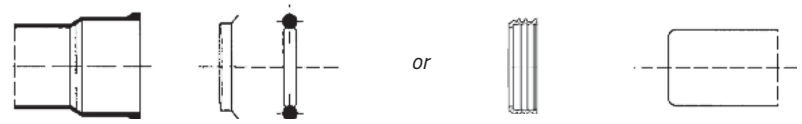


cast-iron pipe – spigot end | GA-set gasket DN/OD 125-200 | GA-gasket DN/OD 110 | PP connection piece KG2000-UG

Connecting cast iron sockets to PP sewer pipes and fittings

If cast piping ends with a socket, the PP piping is connected to the cast iron pipe socket without any connection piece.
Put the sleeve onto the PP spigot. Push the PP spigot together with the sleeve into the cast iron pipe socket. The A-ring is a rolling ring and is used to safely guide the pipe spigot. The G-ring is used for sealing. First pull the A-ring onto the PP spigot, then fit the G-ring onto the rim of the PP spigot. Push the PP spigot together with the GA rings into the cast iron pipe socket.

Cast-iron pipe – socket

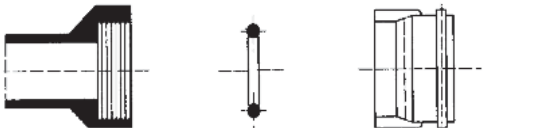


cast-iron socket | GA-set gasket DN/OD 125 – 200 | GA-gasket DN/OD 110 | PP spigot end KG2000 spigot

12.1.2 Connecting PP sewer pipes and fttings to clay pipes with socket

If clay piping ends with a socket, the PP piping is connected to the clay pipe socket with the connection piece KG2000-USM. The connection is sealed with the clay pipe roll ring, which is mounted onto the connection piece and inserted into the clay pipe socket.

Stoneware pipe – socket for roller ring

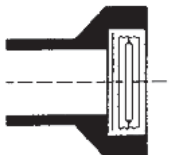


stoneware pipe socket | roller ring | PP connection piece for roller ring KG2000-USM

12.1.3 Connecting PP sewer pipes and fittings to clay pipes with an L sliding socket

If clay piping ends with an L sliding socket, the PP piping is connected to the clay pipe socket (KG2000-KGUSM) with a connecting piece. The connecting piece is pushed into the sliding socket and no additional sealing is required.

stoneware pipe – socket L



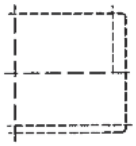
stoneware pipe socket L

PP connection piece
KG2000-USM

12.1.4 Connection of vitrified clay pipe spigots of the standard load series to PP sewer pipes and fittings

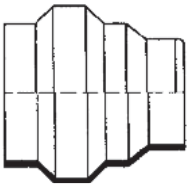
If clay piping ends with an insertion end, the PP piping is connected to the clay pipe insertion end (KG2000-US) with a connecting piece. Sealing takes place with a KG2000-US sleeve.

stoneware pipe – spigot end



stoneware pipe
spigot end
(standard load series)

profile gasket

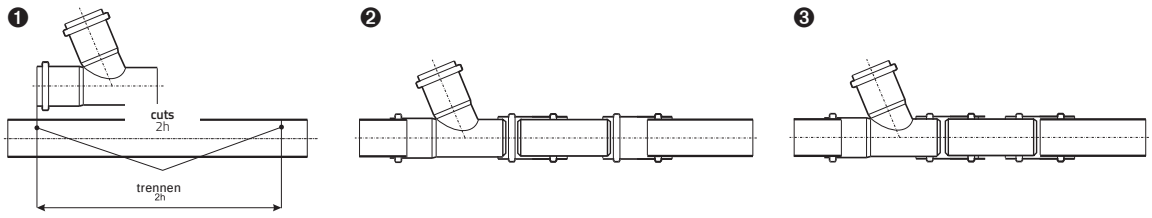


PP connection piece
KG2000-US

13. SUBSE QUENT CONNECTION TO PP SEWER PIPES

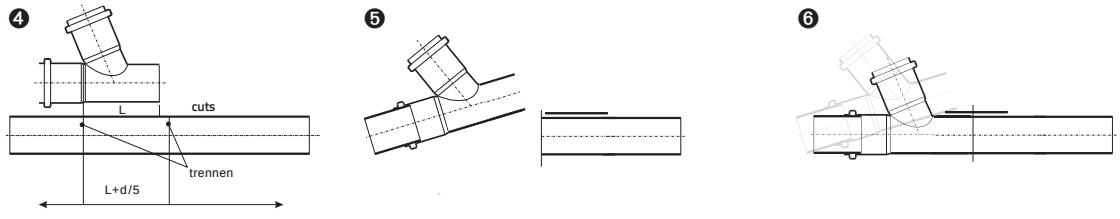
13.1 Installing a branch (procedure I)

In order to install a branch, a sufficiently long piece of pipe (length of the fittings + 2 d) is removed ❶, the pipe-ends are trimmed, cut at an angle and the branch is inserted. Sleeve sockets, with which the piping is once again closed, are pushed over both the other half of the pipe and over the adjusting piece to be inserted ❷ + ❸.



13.2 Inserting a branch (procedure II)

A piece of pipe equivalent to the total length of the branch plus a length approximately equivalent to d/5 is cut out of the piping at hand by means of cross section cuts ❹.



Both pipe ends are trimmed and slanted. A sleeve socket is then pushed over one end and the other pipe end is cautiously levered out, the branch is pushed on ❺ and the end of the pipe with the branch is brought back into the original position. The connection is made by means of pushing back the sleeve socket on the cut between the pipe and the fittings spigot end ❻.

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05/2022