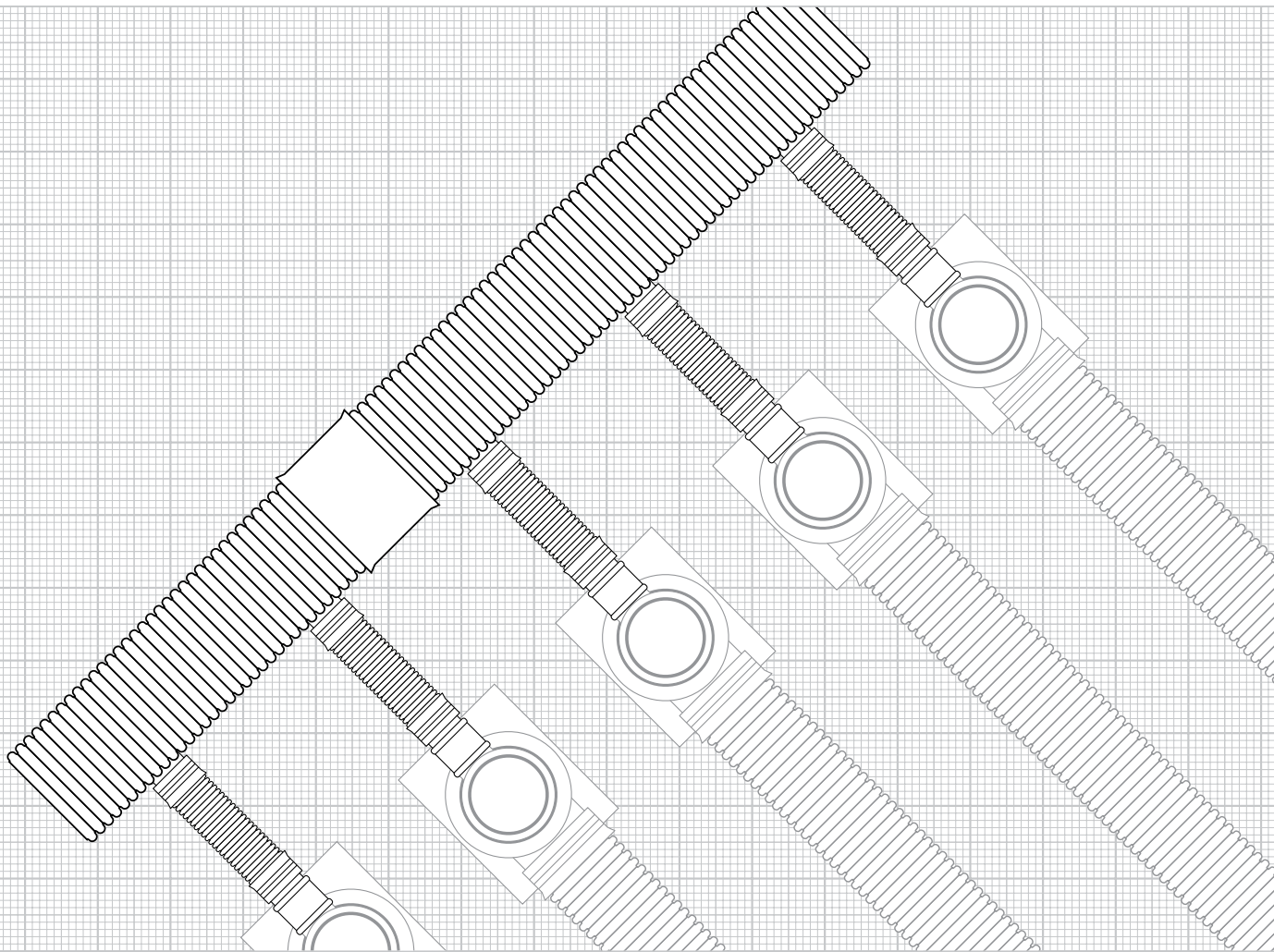


Installation and maintenance manual

Distribution pipe system



For SediPipe® and SediSubstrator® multi-systems

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NB

Please read this installation manual carefully and follow our instructions.

The recommendations are based on DIN EN 1610, DWA-A 139, and DWA-A 127. They apply in addition to the following information.

The relevant safety

provisions of the building

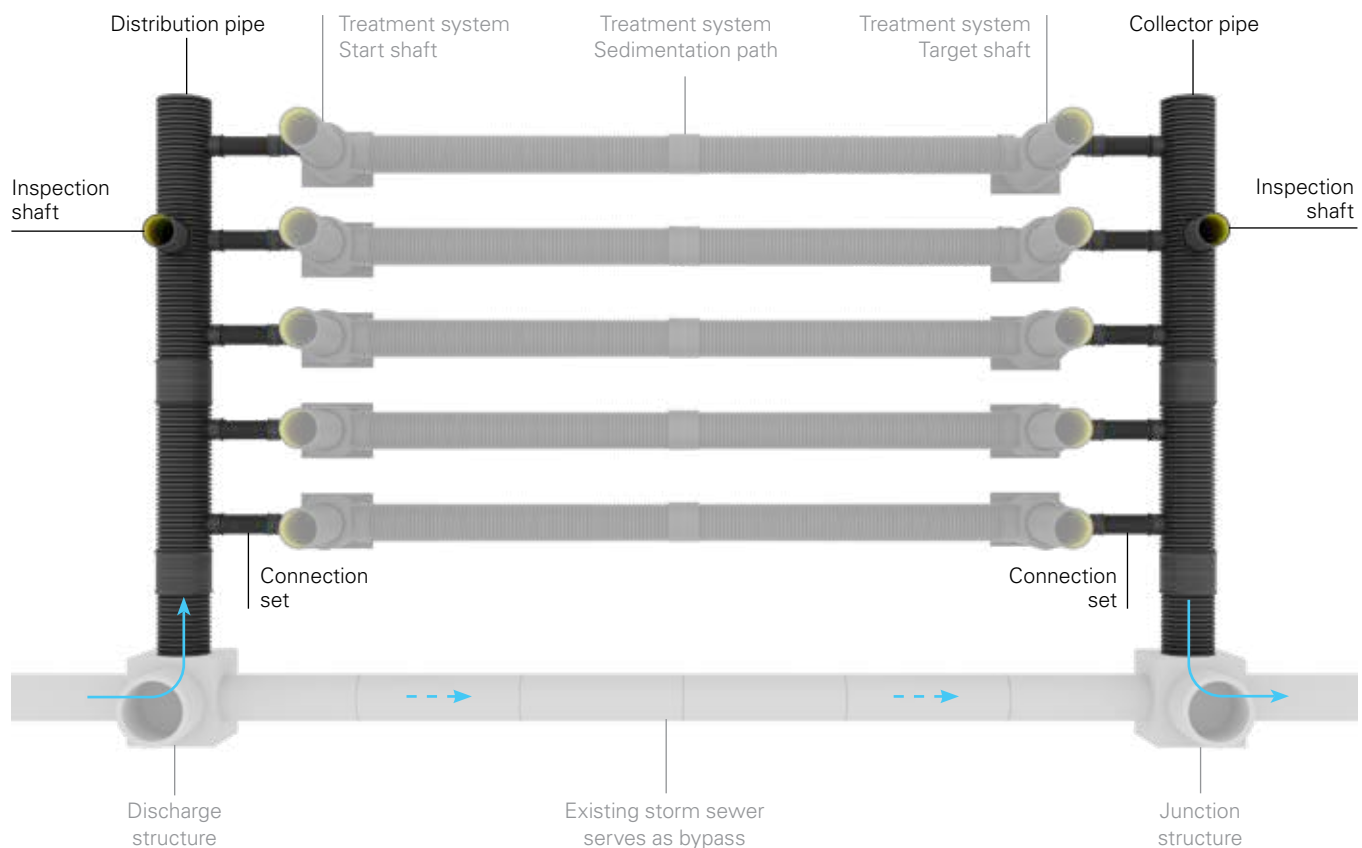
industry apply.

2 System description

- Designed for multiple SediPipe / SediSubstrator treatment systems
- Distribution pipe elements DN 800
- 2 or 3 connections DN 300 for treatment systems
- Inspection shaft D_o 600
- Shaft lining for the connection to concrete shafts

Installation depths

The installation depths of the distribution pipe depend on the installation depths of the connected inlet and/or outlet pipes (e.g., existing storm sewer). The maximum installation depth of the distribution pipe from the top edge of terrain to the pipe invert is 5 m without groundwater depending on the installation parameters (soil temperature $\leq 23^\circ\text{C}$). A project-specific examination is required in cases of groundwater outside the system.



NB

The inlet distribution pipe must be installed horizontally with a gradient of 0 %. The cuffs DN 300 for the treatment systems installed at equal distances of 1.65 m are arranged centrically on the distribution pipe, not same level. The backwater thus created in the inlet initially calms down and distributes the inflowing stormwater consistently in the inlet distribution pipe until it is discharged into the treatment systems via the connection sets. The pipes of the connection sets must be installed with a consistent gradient of at least 0.5 % from the inlet distribution pipe. This ensures consistent supply of the treatment system. The distribution pipe/collector pipe is installed with a gradient of 1 %.

4 System components

The distribution pipe system DN 800 consists of a modular number of pipe components with 2 or 3 lateral connections each, main pipes and various accessories. Pipe segments closed on one side are used for the end of the distribution pipe and/or collector pipe. Pipe segments with inspection openings allow inspection and maintenance of the system using extension pipes.



①
Main distribution pipe – short
DN 800



②
Distribution pipe 2-fold
DN 800



Distribution pipe 2-fold
with inspection opening
DN 800



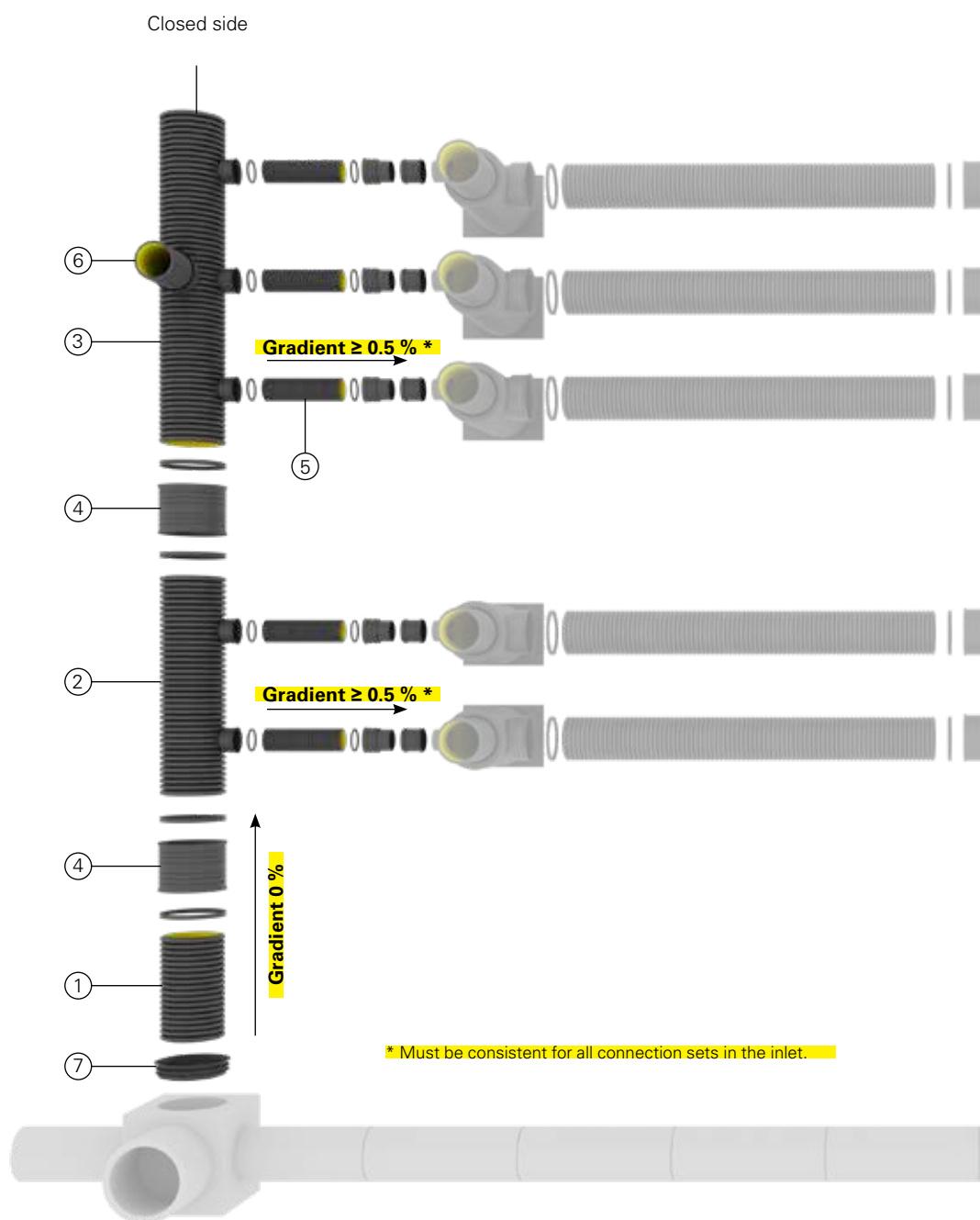
Main distribution pipe – long
DN 800



Distribution pipe 3-fold
DN 800



③
Distribution pipe 3-fold
with inspection opening
DN 800

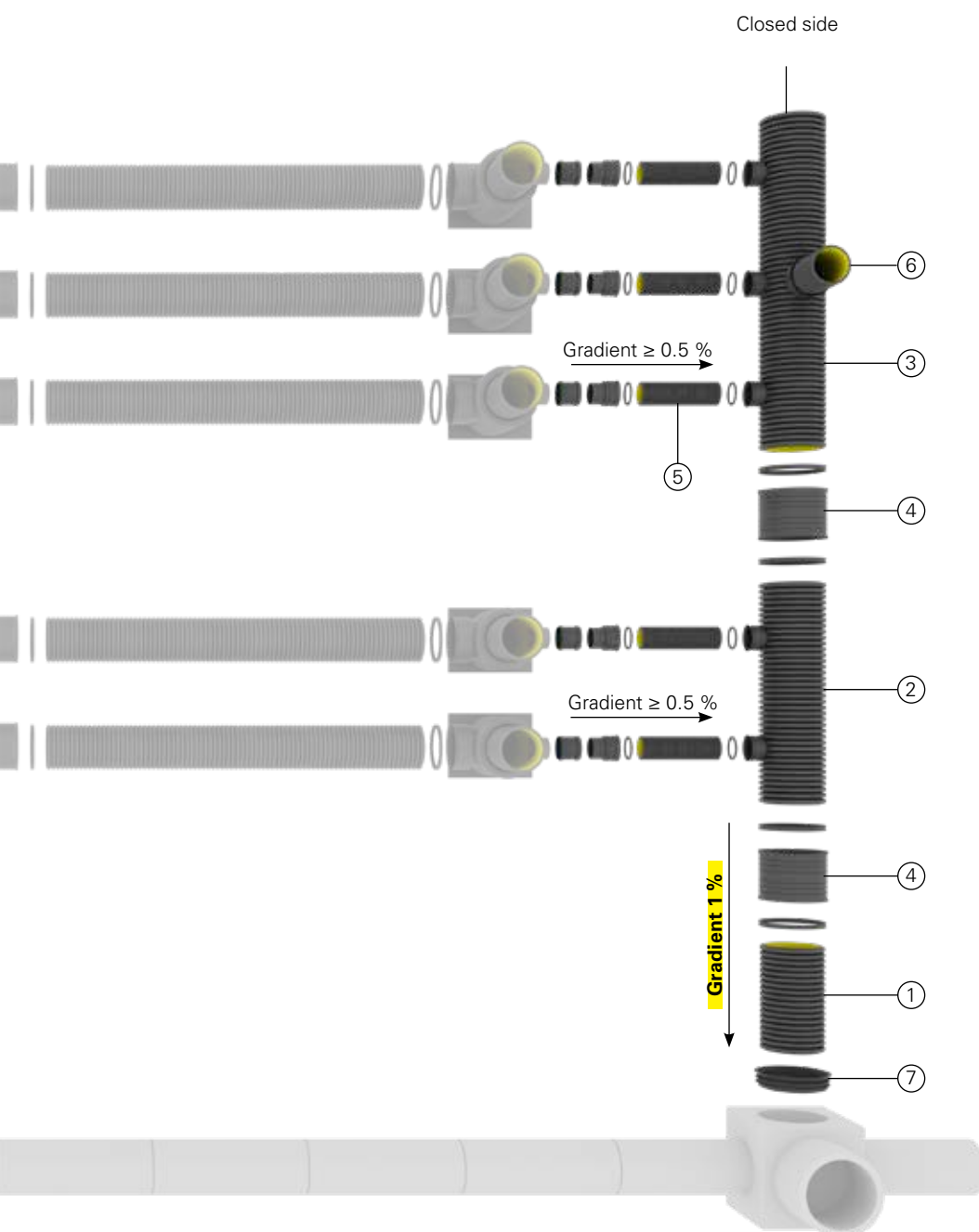


Exemplary representation

4 System components

NB

The axial spacing of the lateral connections arranged in parallel is 1.65 m. This ensures that proper compaction using appropriate compacting equipment can take place between the system components of the treatment system.



④
Coupling
DN 800



⑤
KG connection set
1 m, 3 m, 6 m
DN 300



⑥
Inspection shaft
Extension pipe
D_o 600



⑦
Shaft lining
DN 800

NB

Generally observe the installation and maintenance manuals of the respective system types when installing FRÄNKISCHE treatment systems.

5 Installation

5.1 Incoming material inspection

Check pipes, pipe components, shafts, shaft components and accessories upon delivery to make sure they are labelled sufficiently and comply with the requirements of the customer. Please observe the manufacturer's specifications. Carefully examine all parts both upon delivery and right before installation to make sure that they are free from damage. Reject damaged components and note this down on the delivery note.

5.2 Transport to the construction site

Generally transport pipes, pipe components, shafts, shaft components and accessories using appropriate vehicles; load and unload under professional supervision. Pipes should be largely supported during transport.

5.3 Unloading the lorry

Using excavator and crane

Generally use hoisting slings (e.g., textile slings or similar). Do not use chains and ropes. Avoid dropping, dumping as well as hitting the pipes and shafts hard against each other. The pipes can be suspended between hoisting slings or round slings for transport.

Using forklifts

Place pallets on forks crossways; ensure largest-possible spacing between the forks.



ATTENTION

Store all components on plain ground using sleepers and secure against shifting. Damaged parts must NOT be installed. Do NOT throw components!

Only install and lift components at temperatures above freezing point.

5.4 Storage at the construction site

Do not dump pipes and shafts with a jerk on hard ground. Store pipes and pallets on even ground that is sufficiently hard to prevent pallets and/or base battens from bogging down. Store shafts on their base on even and solid ground.

Pipes and connection elements can be stored outside; the storage period outside must, however, not exceed one year. Prevent excessive heating of pipes during summer and resulting damage from UV exposure due to sustained direct sunlight. We recommend that the pipes be stored in the shade or covered with brightly coloured, light-tight tarpaulin.

5 Installation (contd.)

5.5 Temporary construction site cover

Make sure that no dirt, e.g., backfill material, enters the systems and shafts during the construction period. Do NOT remove the temporary construction site covers before installing extension pipes and/or shaft covers. Additionally protect shaft openings from earth slides until final installation of shaft covers.

ATTENTION

Shafts must NOT be accessed before installing the cover. If necessary, the required load transfer to the native soil must be ensured, e.g., using a wide steel plate.

NB

Generally observe the installation and maintenance manuals of the respective system types when installing FRÄNKISCHE treatment systems.

5.6 Excavating pit and creating embedding

In addition to the regulations of DIN EN 1610, observe the specifications of DIN 18300 "Earthworks" (*Erdarbeiten*) in the latest version regarding excavating the pit and creating the lower embedding for the distribution pipe. If the native soil is not made up of stoneless, compactable material G1 (GE, GW, GI, SE, SW, SI) or G2 (GU, GT, SU, ST), create an embedding according to DIN EN 1610. The embedding shall generally be created with a consistent degree of compaction of $D_{pr} \geq 95\%$ and a load-bearing capacity of $E_{v2} \geq 45 \text{ MN/m}^2$.

The minimum widths according to DIN EN 1610 must be strictly adhered to when creating pipe swales. Please observe any deviating minimum widths in the area of the shafts according to local specifications.

ATTENTION

Create the bearing for the distribution pipes (height and longitudinal incline) considering required gradients and, if necessary, required height differences according to planning provisions.

5.7 Connection to the existing storm sewer

The installation of the distribution pipe/collector pipe usually starts with the connection to the existing stormwater pipe and/or the discharge structure/junction structure to be created locally.

Lateral connection to concrete shafts

Only FRÄNKISCHE shaft lining must be used for the connection of distribution pipes to concrete shafts.

1. Clean the insertion area of the shaft lining before installation.
2. Apply a sufficient amount of lubricant to the complete insertion area of the shaft lining.
3. Insert the profile sealing ring continuously and without overexpanding individual spots into the **first** complete corrugation trough. (When cutting pipes, make sure that cuts are in the middle of the corrugation trough and that there is no damage to the corrugation edge.)
4. Apply a sufficient amount of lubricant to the entire profile sealing ring.
5. Insert the pipe into the shaft lining up to the limit stop.

Tip

We recommend connecting the storm sewer via a shaft which may not be arranged same level to the distribution pipe. The shaft can thus be used as an additional sand trap and maintenance shaft.



5 Installation (contd.)

5.8 Installing the distribution pipes

1. Connection of the first distribution pipe to the concrete shaft (see Section 5.7)
2. Mount the profile sealing rings onto the **second** corrugation trough on each side while still outside the excavation pit. The pipe must be clean.
3. Move the pipe to the installation position using lifting equipment. Observe the respective gradient. **Please observe the details on the side!**
4. Keep the pipe, the sealing ring and the coupling clean. Apply a sufficient amount of lubricant to the sealing ring and coupling. Make sure that the sealing area is free of dirt. Deepen the embedding in the area of the couplings as required. In order to prevent the profile sealing ring from resting on the bearing, the pipe end to be installed can rest on square timber.
5. Use a long lever to install the pipe. Place a board or square timber under the unattached pipe end to prevent damage to the pipe. Pipes must be installed horizontally. Mark the insertion depth on the pipe beforehand.
6. Use the pipe segment with the closed end as the distribution pipe end.
7. When completing the lower embedding by means of tamping, make sure that the bottom side of the pipes rests completely on the compacted foundation.
8. Secure the pipes to prevent shifting during installation.
9. The treatment systems are installed after installing the first distribution pipe run. To do so, please see the respective installation and maintenance manual. The spacing of the cuffs is always 1.65 m centrally. The treatment systems are installed one after another in parallel.
10. Afterwards, install the second pipe run of the distribution structure (inlet or outlet) according to the above instructions. Observe the respective gradient.
11. Finally, install the connection sets between the distribution pipe/collector pipe and the treatment systems. Observe the respective gradient.
Please observe the details on the side!



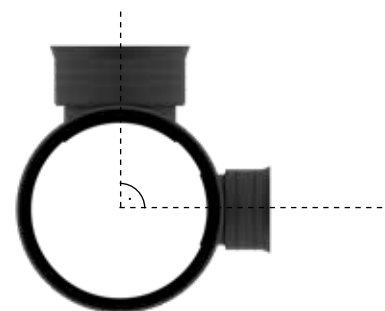
ATTENTION

You must observe the following gradient situations:

- **Distribution pipe (inlet): 0 %**
- **Connection sets (inlet):
≥0.5 % consistently for all sets**
- **Connection set (outlet):
≥0.5 %**
- **Collector pipe (outlet): 1 %**

ATTENTION

The cuffs of the distribution pipes/collector pipes must always be aligned towards the treatment systems. Align the cuffs exactly horizontally.



NB

Generally observe the installation and maintenance manuals of the respective system types when installing FRÄNKISCHE treatment systems.

5 Installation (contd.)

5.9 Upper embedding and lateral backfilling

The specifications of the latest version of DIN EN 1610 must be adhered to when creating the upper embedding and lateral backfilling. If country-specific regulations or deviating specifications conflict with these, these must be agreed upon with FRÄNKISCHE, if necessary. Create the backfilling with stoneless, compactable material G1 (GE, GW, GI, SE, SW, SI) or G2 (GU, GT, SU, ST) according to DIN EN 1610 and create a consistent degree of compaction of $D_{pr} \geq 95\%$ and a load-bearing capacity of $E_{v2} \geq 45 \text{ MN/m}^2$. Make sure that shafts and pipes do not shift during backfilling of the excavation pit.

ATTENTION

Do NOT remove the temporary construction site covers before finishing main backfilling!




5.10 Installing the extension pipe (inspection shaft)

Now place the extension pipe $D_o 600$ on the inspection opening of the distribution pipe/collector pipe. Keep the pipe, the sealing ring and the coupling clean. Mount the sealing rings onto the second corrugation trough. Then apply a sufficient amount of lubricant to the sealing ring and coupling. Make sure that the sealing area is free of dirt.

5.11 Tests before backfilling and impermeability test

Prior to completion of the excavation pit backfilling, check the system for proper installation and leak-tightness.

The following tests must be performed in particular:

-  Exact adjustment of the distribution pipes
-  Check for damage, foreign objects or coarse contamination
-  Total insertion depth at the couplings

Tip

We recommend approval of the system by site management before backfilling.

5.12 Completing cover and creating main backfilling

Backfilling work is finished after installing the extension pipes. The materials for main backfilling must be filled and compacted according to design specifications. Make sure that the pipes do not shift during backfilling of the excavation pit. Accessing is only permitted after main backfilling has been completed.

ATTENTION

Do NOT remove the temporary construction site covers or protective covers of the extension pipes before finishing main backfilling!

5 Installation (contd.)

5.13 Cutting the extension pipe

Cut the extension pipe such that it reaches the support ring (observe the dimensions). Cut the pipe to length in the middle of the corrugation trough and align upright to the pipe axis using a fine-toothed saw or other appropriate tools. Remove edges and irregularities on the cutting surfaces with a grater, file or another suitable tool.

5.14 Placing shaft covers (inspection shaft)

The inspection shaft has been designed for commercially available 625 mm standard covers according to DIN EN 124 (to be supplied on site, not included in the scope of delivery).

A commercially available concrete support ring according to DIN 4034 serves as bearing for the covers.

This transfers the possible traffic loads into the ground. There must be no direct load transfer between the support ring and the shaft. The bearing area must be flat and without stationary loads, and it must achieve an E_{v2} module of at least 100 MN/m².

Create the bearing from compacted bearing layer material (E_{v2} module larger than or equal to 100 MN/m²) or in-situ concrete C 16/20 with similar load-bearing properties. Avoid interlocking of the bearing with the corrugations of the extension pipe. Provide and use a casing aid on site! Vertical loads may only be transferred to the load-bearing underground. The support ring must be placed centrally without affecting the bearing.

Cut the extension pipe such that it reaches the support ring. The gap between the pipe and the support ring should be sealed using a DOM sealing ring. Mount the sealing ring onto the last corrugation of the extension pipe. Place a sediment trap D_o 600 on the extension pipe.

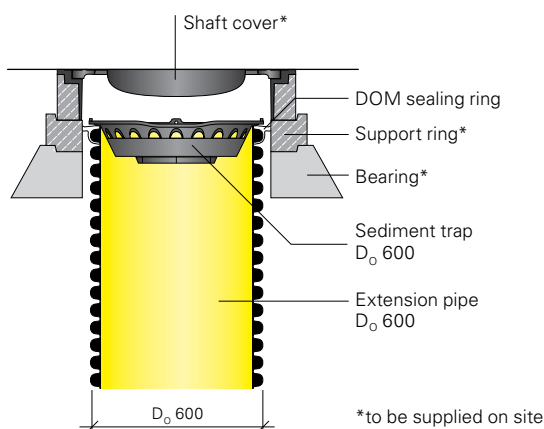


Shaft cover inspection shaft

NB

Shaft covers and equalisation rings are not included in the scope of delivery of FRÄNKISCHE and must be supplied on site.

Shaft cover CW 610 (to be supplied on site)



DOM sealing ring

6 Commissioning

ATTENTION

Observe Section 9 Safety instructions.

1 Making system ready for operation

- Clean system of coarse dirt.
- Remove auxiliary constructions.
- Close shaft covers.



2 Instruction

1. The following people should be present during handover:

- Persons authorised by the principal to perform the acceptance
- Planner/engineering office
- Construction contractor

We also recommend participation of operating staff.



2. Instruction

- Explanation of the system function
- Explanation of maintenance
- Information regarding cleaning and disposal



3 Documentation/handover

- Handover of the installation manual



7 Self-inspection, maintenance, and examination

To ensure functionality of the entire stormwater treatment system including distribution structure, its condition must be ensured through recurring self-inspections and maintenance.

Generally observe the separate installation and maintenance manuals of the respective system types for SediPipe / SediSubstrator systems.

In the course of their inspection, maintenance, and tests, the distribution structure must be inspected as well to ensure proper operation of the entire system.

The operational capability of the distribution structure must be verified by the operator under dry weather conditions at least every three months. To do so, open the covers of the connection structures/connection shafts and inspection shafts, and visually inspect from the top (simple visual inspection).

Check the following:

- Structural condition of the system
- Height of the permanent water level in the distribution pipe (inlet)
- Mud level in the distribution pipe (inlet)

ATTENTION

If a relevant deviation from normal conditions occurs which may impair the operational capability of the system, maintenance must be carried out in order to immediately eliminate the detected deficiencies.

8 Emptying, cleaning, and disposal

Emptying and cleaning

Use a high-pressure cleaning/vacuum vehicle to empty the distribution pipes and remove the contained water and mud fractions. For this purpose, initially vacuum the complete contents through the shaft (inspection shaft or connected concrete shaft).

Initially, the cleaning nozzle is guided from the connection shaft up to the end of the distribution pipe during high-pressure cleaning. Cleaning and flushing then takes place during retracting.

The efficiency of the vehicle and the cleaning and nozzle parameters must be selected depending on the pipe section, pipe material and degree of pollution to be expected. Use deflection pulleys to avoid damage to the system.

NB

Flushing of the inlet distribution pipe and removal of the flushing water must be effected quickly due to the 0 % gradient installation. This ensures that the washed matter does not flow back.

ATTENTION

In the event of an oil spill, the system must be immediately maintained by a specialist and the washed matter must be disposed of appropriately! Otherwise, subsequent rain may lead to a discharge of light liquids!

Disposal

Materials removed from the entire system (distribution structure and treatment systems) such as mud and flushing water used to clean the system may contain hydrocarbons and heavy metals. Therefore, they must be disposed of in compliance with the applicable legal provisions.

Waste fractions occurring after spills with light liquids must be disposed of professionally as "oil/water separator contents" in compliance with the current waste catalogue. The statutory disposal and acceptance certificates must be included in the operating log together with the entries as evidence of proper disposal.

ATTENTION

Applicable waste disposal regulations must be observed when disposing of the matter extracted from the system.

9 Safety instructions

ATTENTION

Staff responsible for installation, assembly, operation, maintenance and repair must have appropriate qualifications required for this kind of work. The builder is responsible for organising in detail authority, responsibility and supervision of staff.

The operational safety of the system components supplied is only guaranteed in case of proper installation and correct use. Technical threshold values must not be exceeded.

Observe the accident prevention regulations and relevant standards and directives for installation, fitting, operation, maintenance and repair!

These are inter alia (in extracts):

- Accident prevention regulations
 - Construction work BGV C22 (*Bauarbeiten BGV C22*)
 - Technical wastewater systems GUV-V C5 (*Abwassertechnische Anlagen GUV-V C5*)
- Safety regulations for working in enclosed spaces of technical wastewater systems GUV-R 126 (*Sicherheitsregeln für Arbeiten in umschlossenen Räumen von abwassertechnischen Anlagen GUV-R 126*)
- Handling biological working materials in technical wastewater systems GUV-R 145 (*Umgang mit biologischen Arbeitsstoffen in abwassertechnischen Anlagen GUV-R 145*)
- Directives for working in tanks and narrow spaces BGR 117 (*Richtlinien für Arbeiten in Behältern und engen Räumen BGR 117*)
- Standards
 - Excavations and trenches - Slopes, planking and strutting, breadths of working spaces DIN 4124 (*Baugruben und Gräben-Böschungen, Verbau, Arbeitsraumbreiten*)
 - Construction and testing of drains and sewers DIN EN 1610 (*Verlegung und Prüfung von Abwasserleitungen und -kanälen*)
- Tool for safety and health protection in technical wastewater systems

WARNING

- Hazards from gases and vapours such as risk of suffocation, risk of poisoning and risk of explosion
- Risk of falling
- Risk of drowning
- Germ pollution and wastewater with sewage
- High physical and psychological stress during work in deep, narrow and dark spaces
- And others

DANGER

Non-compliance with the operating manual may result in considerable property damage, injury or death.

CAUTION

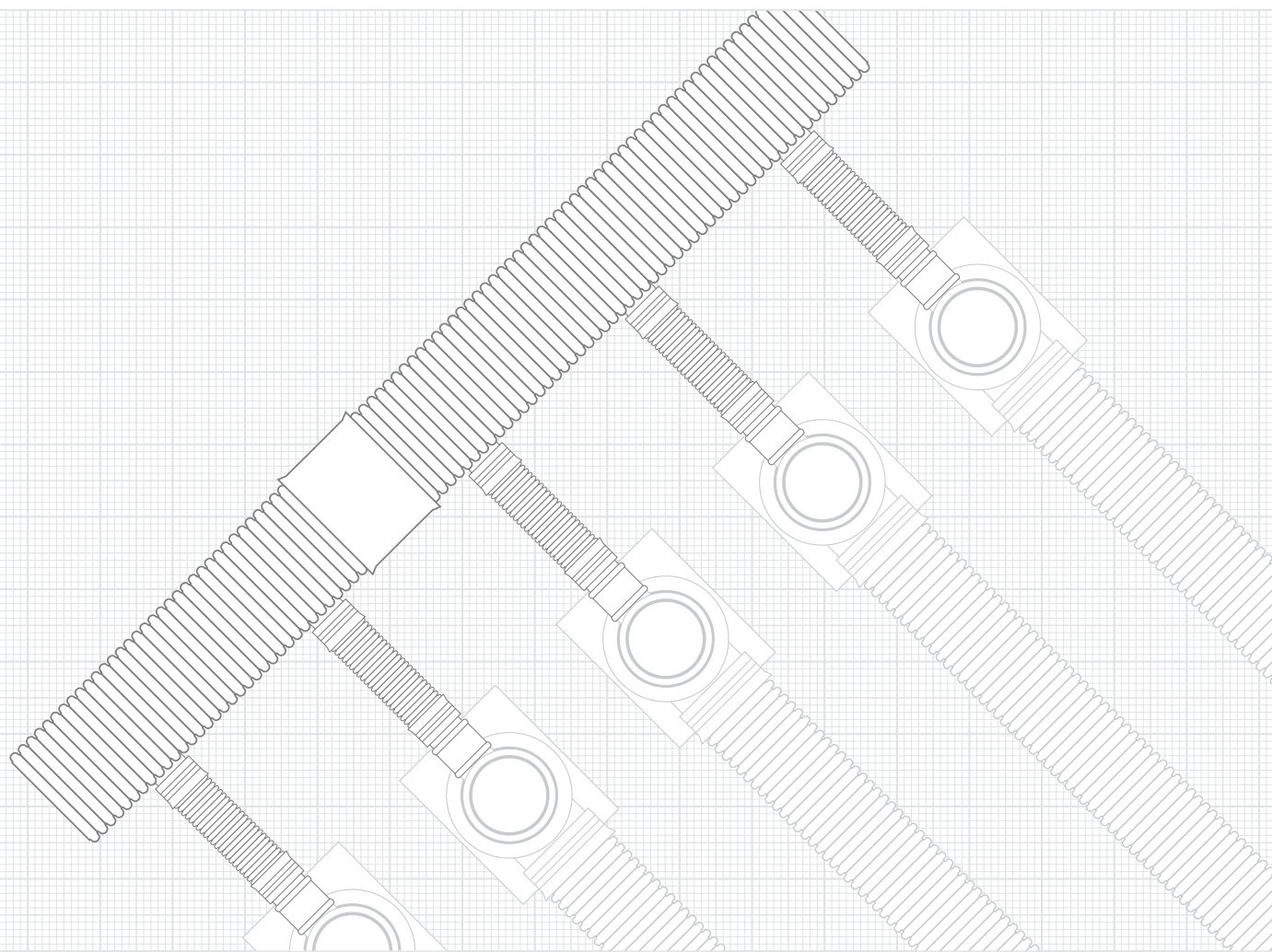
The system is part of an entire network. During installation, maintenance, service and repair work on one component, always consider the entire system. Avoid work during rain.

Changes or modifications to the system may only be carried out with the agreement of the manufacturer. For safety reasons, use original spare parts and accessories approved by the manufacturer. The use of other parts voids the liability for any consequences arising therefrom.

General information on using our products and systems:

Information about or assessments of the use and installation of our products and systems is exclusively provided on the basis of the information submitted. We do not assume any liability for damage caused by incomplete information. If the actual situation deviates from the planned situation or if a new situation occurs or if different or new installation techniques are applied, these must be agreed upon with FRÄNKISCHE, since these situations or techniques may lead to different conclusions. Notwithstanding the above, the customer is solely responsible for verifying the suitability of our products and systems for the intended purpose. In addition, we do not assume any liability or responsibility for system characteristics and system functionalities when third-party products or accessories are used in combination with FRÄNKISCHE systems. We only assume liability if original FRÄNKISCHE products are used. For use in other countries than Germany, country-specific standards and regulations must also be observed.

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