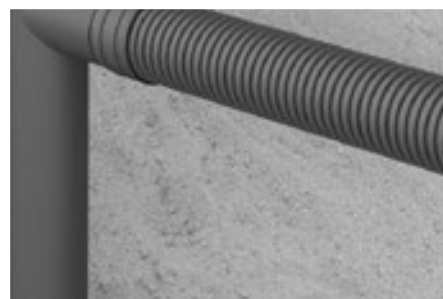


SediSubstrator® L

Installation and maintenance manual Stormwater treatment system



EN | Last modified: May 2018

DRAINAGE SYSTEMS
ELECTRICAL SYSTEMS
BUILDING TECHNOLOGY
INDUSTRIAL PRODUCTS

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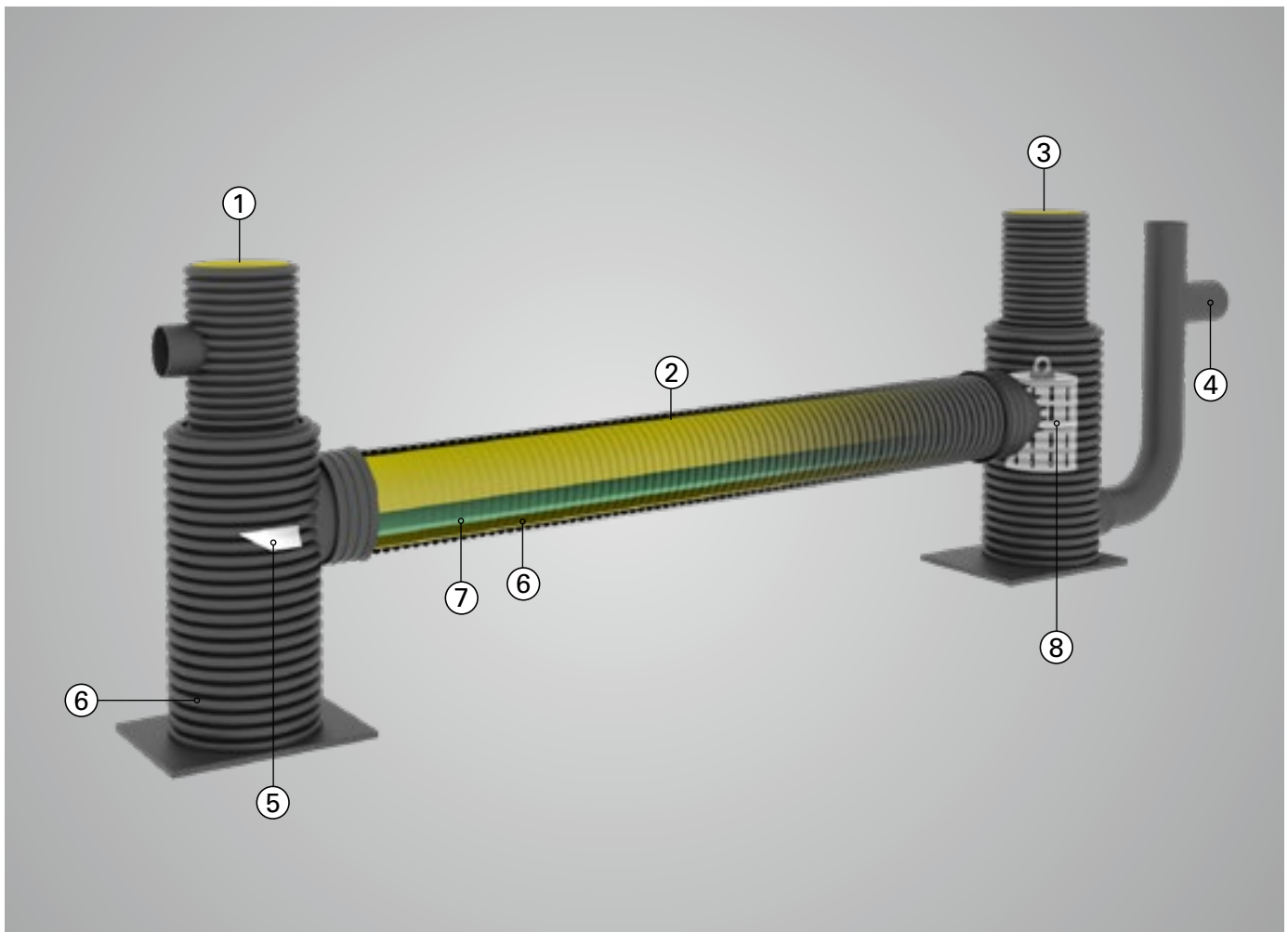
NB

Please read this installation manual carefully and follow our instructions.
















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2. SediSubstrator L at a glance



- | | |
|----------------------|------------------------|
| ① Start shaft | ⑤ Maintenance platform |
| ② Sedimentation path | ⑥ Mud chamber |
| ③ Target shaft | ⑦ Flow separator |
| ④ Outlet | ⑧ Substrate cartridges |

System types	Pipe Ø	Length of sedimentation path	Cartridge elements
SediSubstrator L 600/6	 DN 600		
SediSubstrator L 600/12	 DN 600		
SediSubstrator L 600/18	 DN 600		
SediSubstrator L 600/24	 DN 600		
SediSubstrator L 600/12+12	 DN 600	 6m 12m 18m 24m	

3. System description

3.1 Application

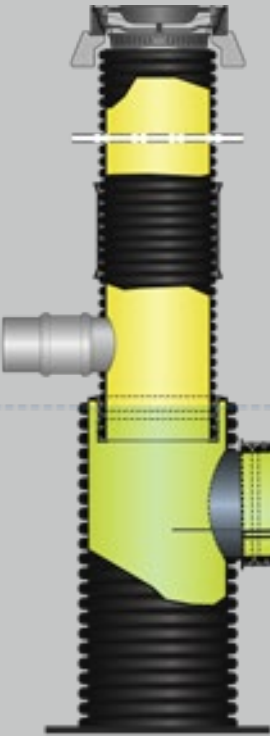
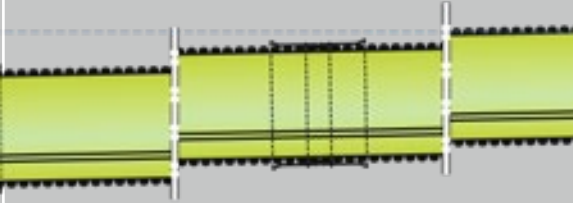
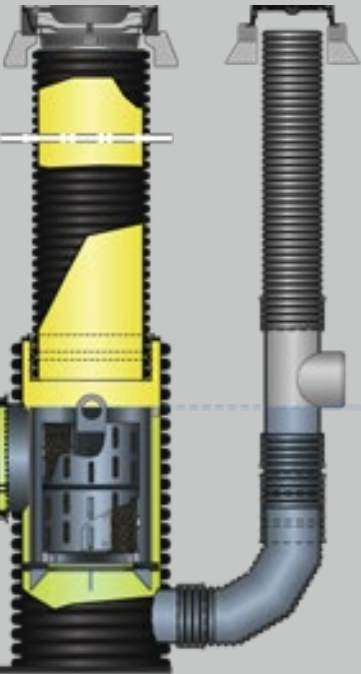
SediSubstrator L is a stormwater treatment system for heavily polluted stormwater runoff, e.g., from traffic areas. The system separates washed-up solids, particle-bound pollutants, dissolved heavy metals and light liquids (oil) from stormwater and reliably retains these materials in the system.

SediSubstrator L has been tested and approved according to the strict DIBt requirements (Z-84.2-20). This facilitates official approval procedures regarding stormwater infiltration systems and, depending on the country, also discharge into surface waterbodies.

3.2 Function description

Sedimentation initially retains the coarse particles in the start shaft. The downstream sedimentation path retains fine particles. The flow separator prevents remobilisation and therefore discharge

of sediment during heavy rain. Dissolved pollutants such as heavy metals and light liquids are bound in the substrate cartridge (adsorption).

Start shaft	Sedimentation path		Target shaft
			
Retention of coarse particles	Retention of fine particles		Retention of heavy metals and oil
Sedimentation (physical)	Sedimentation (physical)	Sediment control thanks to flow separator	Adsorption (chemical-physical)

3. System description

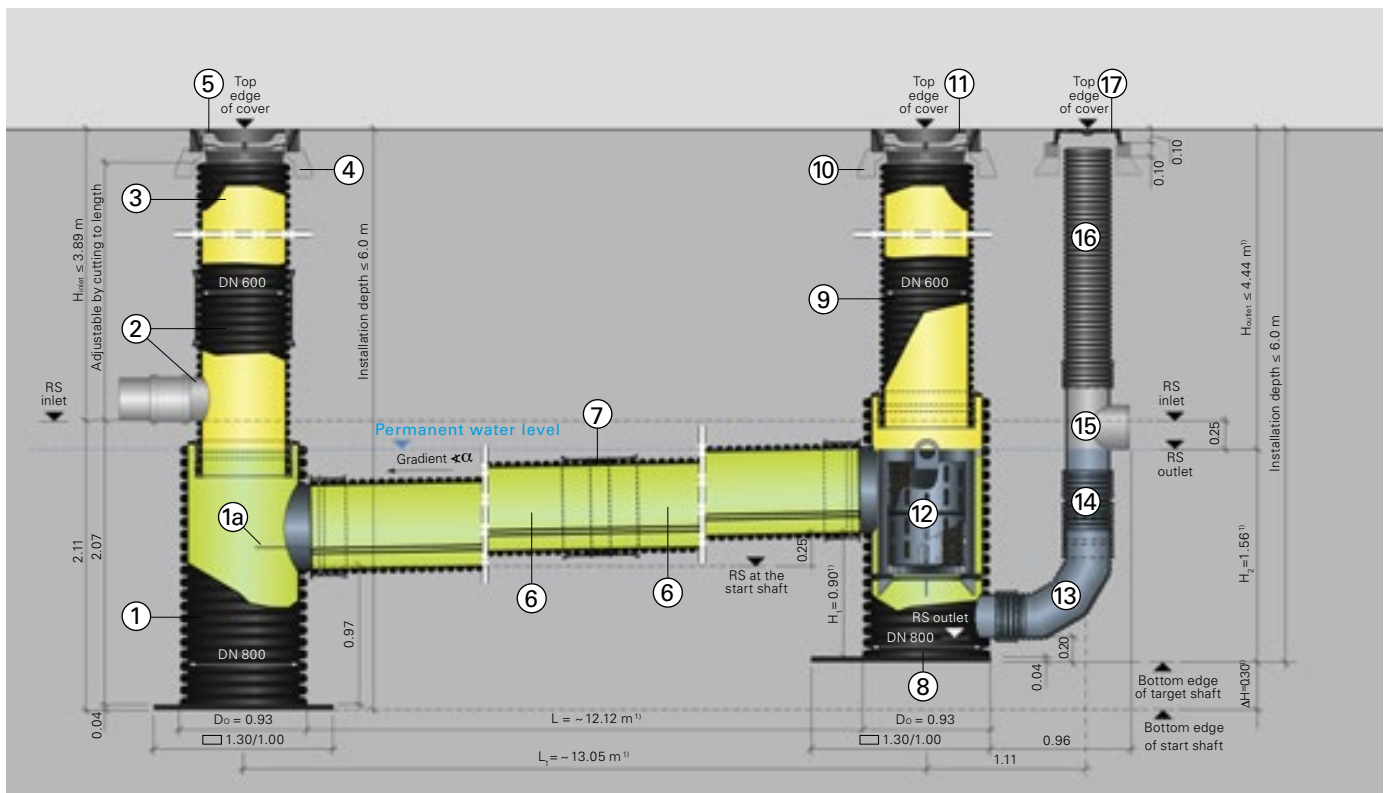
3.3 System description

Depending on the design, the system is comprised of one or two start shafts, one target shaft, the sedimentation path and the outlet.

The start shaft is provided as three-piece system. The target shaft consists of two pieces. The sedimentation path includes

one or several main pipes (DN 600) with an installation length of 6 m each. The sedimentation pipes feature the lower flow separator which prevents the remobilisation of settled sediment. The total length of the sedimentation path depends on the system type and varies between 6 m and 24 m. The

cartridge elements filled with substrate are located in the target shaft. There is a bottom step between inlet and outlet when installed. The sedimentation path features a construction-related slope.



Example: SediSubstrator L 600/12

¹⁾ with SediSubstrator L 600/12

Start shaft components:

- ① Shaft bottom DN 800 with base plate
- ①a With maintenance console
- ② Outlet set DN 600 with connection DN/OD 315, incl. coupling DN 600 and sealing rings
- ③ Extension pipe DN 600
- ④ Class D BARD ring
- ⑤ Cover CW 610 with ventilation (to be supplied on site)

Sedimentation path, components:

- ⑥ Sedimentation pipe(s) DN 600 with flow separator, installation length of 6 m each
- ⑦ Coupling(s) and sealing rings

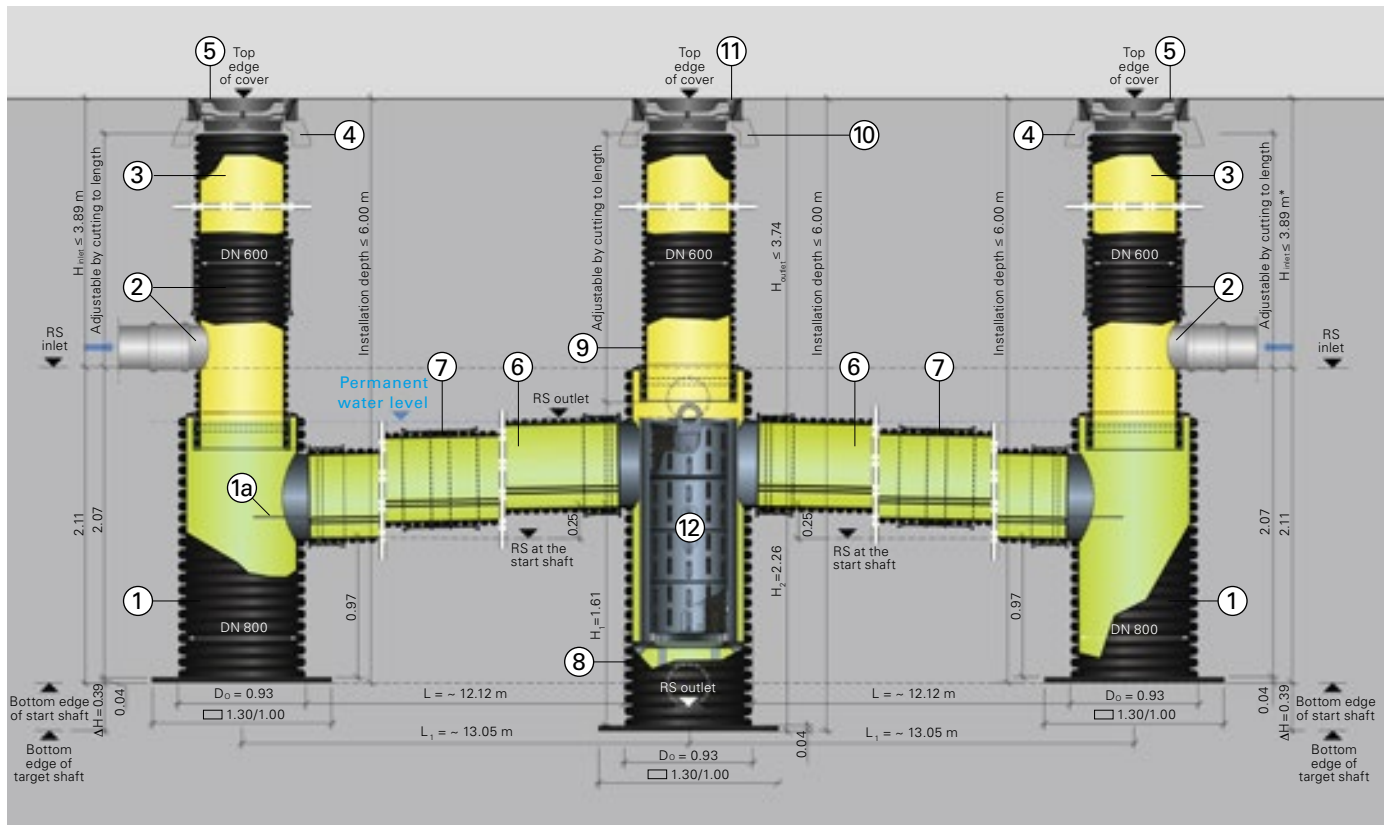
Target shaft, components:

- ⑧ Shaft bottom DN 800 with base plate
- ⑨ Extension pipe DN 600
- ⑩ Class D BARD ring
- ⑪ Cover CW 610 with ventilation (to be supplied on site)
- ⑫ Substrate cartridges (one cover element and up to 3 base elements)

Outlet, components:

- ⑬ Outlet bend
- ⑭ Intermediate pipe DN 300
- ⑮ Outlet tee DN/OD 315
- ⑯ Extension pipe DN 300
- ⑰ Class D 400 cover without ventilation

3. System description



Example: SediSubstrator L 600/12+12

3.4 Technical data

SediSubstrator L	600/6	600/12	600/18	600/24	600/12+12
Length "L" [m]	6.10	12.12	18.17	24.22	12.12 + 12.12
Length "L ₁ " [m]	7.03	13.05	19.10	25.15	13.05 + 13.05
Height "H ₁ " [m]	0.90	0.90	1.27	1.61	1.61
Height "H ₂ " [m]	1.56	1.56	1.86	2.26	2.26
Height "ΔH" [m]	0.30 ¹⁾	0.30 ¹⁾	0.05 ²⁾	0.39 ²⁾	0.39 ²⁾
Height of inlet H _{inlet} [m]	≤ 3.89	≤ 3.89	≤ 3.89	≤ 3.89	≤ 3.89
Height of outlet H _{outlet} [m]	≤ 4.44	≤ 4.44	≤ 4.14	≤ 3.74	≤ 3.74
Diameter of the sedimentation path [mm]	600	600	600	600	600
Length of the sedimentation path [m]	6	12	18	24	12 + 12
Sedimentation path slope [%]	4.0	2.0	1.3	1.0	2.0
Sedimentation path slope as angle α	2.3°	1.1°	0.8°	0.6°	1.1°
Number of substrate cartridges	1	2	3	4	4
■ of which cover element	1	1	1	1	1
■ of which base element	0	1	2	3	3
Collecting volume of light liquids ³⁾ [litres]	2100	3390	4840	6290	6650
Collecting volume of the mud chamber [litres]	770	970	1180	1390	1950
Permanent water level volume [litres]	3270	4870	6630	8400	9310
Sedimentation pipe material	PP	PP	PP	PP	PP
Shaft material	PP	PP	PP	PP	PP

¹⁾ Bottom edge of start shaft is lower than bottom edge of target shaft

²⁾ Bottom edge of start shaft is higher than bottom edge of target shaft

³⁾ Retention of light liquids in case of spills

3. System description

3.5 Installation depths

The maximum installation depth of the shafts from the top edge of terrain to the shaft bottom is 6 m, also in case of groundwater. The structural integrity of the system has been proven through a

standard stress at ground temperatures of up to 23 °C. The minimum depth of the system derives from the minimum required distance between the pipe crown, inlet and/or outlet channel and

the bottom edge of the BARD ring of 35 cm. When using a conventional class D cover without equalisation ring, this corresponds to a inlet channel soil depth of 1.02 m.

3.6 Overview of the system component sets

In the ordering process, each system is comprised of two sets and the covers CW 610 with ventilation openings to be supplied on site. The first set is the SediSubstrator system itself. The

second set includes the connection to the sewer in the inlet and outlet. The sets are available in different designs to ideally adapt the complete system to the project-specific requirements.

You can select as follows depending on the desired system size and installation depth:

Set 1: SediSubstrator L basic set

System size	600/6		600/12		600/18		600/24		600/12+12	
Cat. no.	515.98.891		515.98.892		515.98.893		515.98.894		515.98.896	
	pc(s).	m	pc(s).	m	pc(s).	m	pc(s).	m	pc(s).	m
Shaft bottom start shaft DN 800 with base plate; connection 1x DN 600 Labelling: "Start shaft bottom SediPipe L oSS L"	1	2.0	1	2.0	1	2.0	1	2.0	2	2.0
Sedimentation pipe DN 600 with lower flow separator, installation length of 6 m each	1	6.0	2	6.0	3	6.0	4	6.0	4	6.0
Coupling DN 600	0	-	1	-	2	-	3	-	2	-
Profile sealing ring DN 600	2	-	4	-	6	-	8	-	8	-
Tubes of lubricant, 500 ml	2	-	3	-	4	-	5	-	5	-
Shaft bottom target shaft DN 800 with base plate; connections 1x DN 600, 1 x DN 300 Labelling: "SediSubstrator L target shaft bottom"	1	2.0	1	2.0	1	2.3	1	2.6	0	-
	... 612		... 612		... 618		... 624		... 61212	
Shaft bottom target shaft DN 800 with base plate; connections 2 x DN 600, 1 x DN 300 Labelling: "SediSubstrator L target shaft bottom 61212"	0	-	0	-	0	-	0	-	1	2.6
Substrate cartridge cover element	1	-	1	-	1	-	1	-	1	-
Substrate cartridges base element	0	-	1	-	2	-	3	-	3	-
Outlet bend DN 300	1	-	1	-	1	-	1	-	1	-
Intermediate pipe DN 300	1	0.4	1	0.4	1	0.8	1	1.1	1	1.1
Profile sealing ring DN 300	2	-	2	-	2	-	2	-	2	-



3. System description

Set 2: SediSubstrator L connection set

SediSubstrator L connection set, DN/OD 315, for basic set 600/6, 600/12, 600/18, 600/24

Inlet channel soil depth up to 2.5 m (cat. no. 515.98.850)	Inlet channel soil depth greater than 2.5 m ¹⁾ (cat. no. 515.98.851)
<ul style="list-style-type: none"> ■ 1 inlet set DN 600 with connection DN/OD 315, incl. coupling DN 600 with sealing ring ■ 1 extension pipe DN 600, 1.6 m length ■ 1 extension pipe DN 600, 2.2 m length ■ 3 profile sealing rings DN 600 ■ 2 BARD rings class D ■ 1 outlet tee DN 300 to DN/OD 315 ■ 1 extension pipe DN 300, 2.15 m length ■ 2 profile sealing rings DN 300 ■ 1 shaft cover CW 410, class D 400 without ventilation openings, incl. concrete support ring ■ 3 tubes of lubricant, 500 ml 	<ul style="list-style-type: none"> ■ 1 inlet set DN 600 with connection DN/OD 315, incl. coupling DN 600 with sealing ring ■ 1 extension pipe DN 600, 2.9 m length ■ 1 extension pipe DN 600, 4.1 m length ■ 3 profile sealing rings DN 600 ■ 2 BARD rings class D ■ 1 outlet tee DN 300 to DN/OD 315 ■ 1 extension pipe DN 300, 4.15 m length ■ 2 profile sealing rings DN 300 ■ 1 shaft cover CW 410, class D 400 without ventilation openings, incl. concrete support ring ■ 3 tubes of lubricant, 500 ml

¹⁾ Max. soil depth from Chapter 3.4 "Height of inlet H_{Inlet} [m]" and "Height of outlet H_{Outlet} [m]"

SediSubstrator L connection set, DN/OD 315, for basic set 600/12+12

Inlet channel soil depth up to 2.5 m (cat. no. 515.98.855)	Inlet channel soil depth greater than 2.5 m ¹⁾ (cat. no. 515.98.856)
<ul style="list-style-type: none"> ■ 2 inlet sets DN 600 with connection DN/OD 315, incl. coupling DN 600 with sealing ring ■ 2 extension pipes DN 600, 1.6 m length ■ 1 extension pipe DN 600, 2.2 m length ■ 5 profile sealing rings DN 600 ■ 3 BARD rings class D ■ 1 outlet tee DN 300 to DN/OD 315 ■ 1 extension pipe DN 300, 2.15 m length ■ 2 profile sealing rings DN 300 ■ 1 shaft cover CW 410, class D 400 without ventilation openings, incl. concrete support ring ■ 4 tubes of lubricant, 500 ml 	<ul style="list-style-type: none"> ■ 2 inlet sets DN 600 with connection DN/OD 315, incl. coupling DN 600 and sealing ring ■ 2 extension pipes DN 600, 2.9 m length ■ 1 extension pipe DN 600, 4.1 m length ■ 5 profile sealing rings DN 600 ■ 3 BARD rings class D ■ 1 outlet tee DN 300 to DN/OD 315 ■ 1 extension pipe DN 300, 4.15 m length ■ 2 profile sealing rings DN 300 ■ 1 shaft cover CW 410, class D 400 without ventilation openings, incl. concrete support ring ■ 4 tubes of lubricant, 500 ml

¹⁾ Max. soil depth from Chapter 3.4 "Height of inlet H_{Inlet} [m]" and "Height of outlet H_{Outlet} [m]"




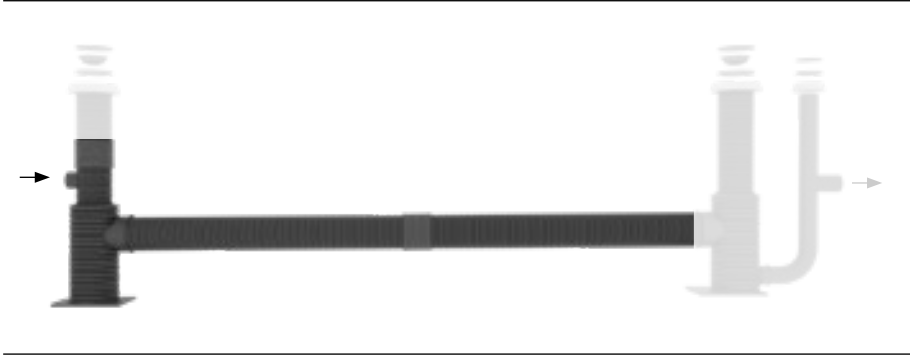
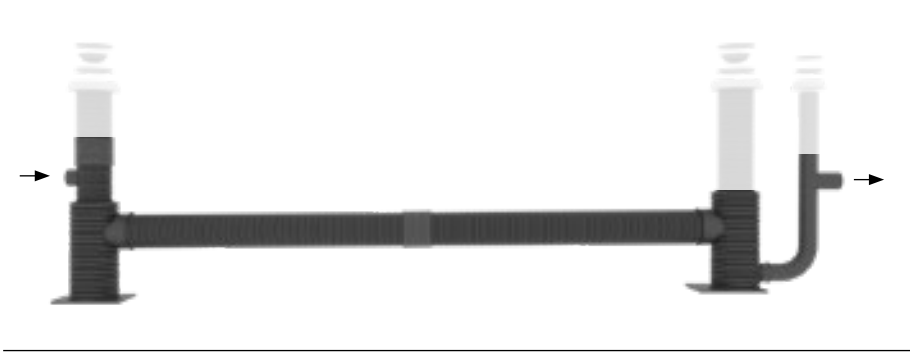

4. Installation

Depending on on-site conditions, installation of the system can begin either at the start shaft or at the target shaft:

Supply pipe available:
begin at start shaft
Chapter 4.1





Drainage pipe or storage/infiltration system available:
begin at target shaft
Chapter 4.2

4.1 Installation overview - beginning at the start shaft

	<p>Start shaft bottom with inlet set Chapter 4.6 Chapter 4.7</p>
	<p>Sedimentation path Chapter 4.8</p>
	<p>Target shaft bottom and outlet Chapter 4.9 Chapter 4.10</p>
	<p>Extension pipes, covers and substrate cartridges Chapter 4.13 Chapter 4.15 Chapter 4.16 Chapter 4.17</p>

4. Installation

4.2 Installation overview - beginning at the target shaft

	Target shaft bottom and outlet Chapter 4.10 Chapter 4.6
	Sedimentation path Chapter 4.8
	Start shaft bottom with inlet set Chapter 4.9 Chapter 4.7
	Extension pipes, covers and substrate cartridges Chapter 4.13 Chapter 4.15 Chapter 4.16 Chapter 4.17

4. Installation

4.3 Transport and construction site storage

The components must be specifically prepared for transport and lifting. Use one or two wide hoisting slings or round slings for this purpose.

The heaviest component is the shaft base element of the target shaft, weighing 210 kg.

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.



Storage on sleepers



4.4 Temporary construction site cover

The shaft bottoms and extension pipes are delivered with temporary construction site covers. Make sure that no dirt, e.g., backfill material, enters the system 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.

4. Installation

4.5 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 of the start shaft and target shaft, the sedimentation path and the outlet set.

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 embed-

ding according to DIN EN 1610. You generally have to create the embedding 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

The bearing heights of start shaft and target shaft and the required height difference must be created according to design specifications.

4.6 Installing the first shaft bottom



Place the shaft bottom at the appropriate height on the prepared planum and secure it to prevent shifting. Connect the supply pipe and drainage pipe according to design specifications. Make sure no backfill material enters the shaft (use temporary construction site cover).

NB

If you want to start with the target shaft, you must install the outlet first (see Chapter 4.10), only after that can you install the target shaft.

ATTENTION

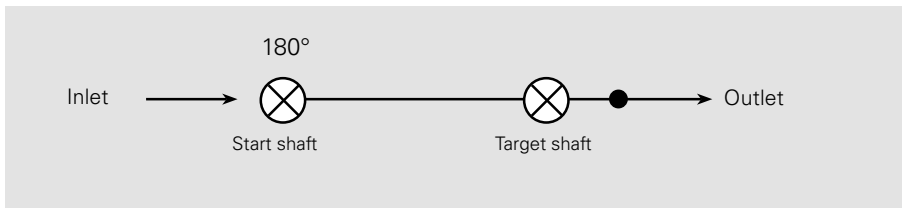
The crown markings of pipe and coupling must match exactly for all pipe installations!

4. Installation

4.7 Installing the inlet set

Connect the height of the supply pipe according to design specifications. Remove the shaft bottom's temporary construction site cover and subsequently place it on the coupling of the inlet set. Install the inlet set in the top coupling of the start shaft bottom.

The coupling factory-mounted to the shaft inlet for later installation of the extension pipe is at the top. Connect the connection at the inlet set according to the direction of the connection of 180° to the inlet channel.



Plan: Admissible angle at the inlet

Keep the pipe, sealing ring and the coupling clean. The sealing rings are mounted onto the second corrugation trough.

Apply a sufficient amount of lubricant to the sealing ring and coupling. Ensure that the sealing area is free of dirt.



4. Installation

4.8 Installing the sedimentation path

1. Mount profile sealing rings onto the first corrugation trough on each side while still outside the excavation pit. The pipe must be clean.
2. Move the sedimentation pipe to the installation position using lifting equipment. The crown marking must face upwards! The flow separator integrated in the pipe faces downwards!
3. Keep the pipe, sealing ring and the coupling clean. Apply a sufficient amount of lubricant to the sealing ring and coupling. Ensure 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.
4. 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. Afterwards, create the pipe slope by aligning the pipe. When completing the lower embedding by means of tamping, make sure that the bottom side of the pipes rests completely on the compacted foundation.
5. Secure the pipes to prevent shifting during installation.

ATTENTION

The crown marking of the pipe section must face upwards. The flow separators of the individual sedimentation pipes then form an overall consistently level surface.



Installation of sealing ring onto sedimentation pipe



Sealing ring with lubricant



Installation of sedimentation pipe

4.9 Installing the second shaft bottom



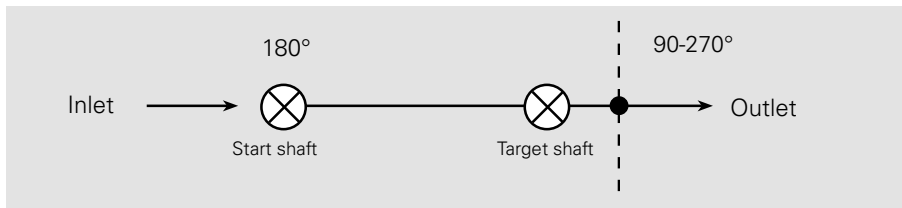
Place the second shaft bottom at the appropriate height on the prepared planum and secure it to prevent shifting during installation. Afterwards, prepare the coupling connection and mount the shaft onto the sedimentation pipe.

4. Installation

4.10 Installing the outlet at the target shaft bottom

Install the outlet without the extension pipe at first. To do so, connect the pipe and the bend with the couplings as shown. Turn the connecting tee to

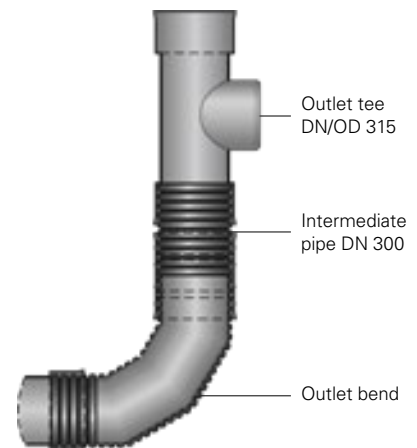
establish the outlet angle. The direction of the outlet channel defines the direction.



Plan: Admissible angle of the outlet is realised at the tee

Keep the pipe, sealing ring and the coupling clean. The sealing rings are mounted onto the second corrugation trough.

Apply a sufficient amount of lubricant to the sealing ring and coupling. Ensure that the sealing area is free of dirt.



4. Installation

4.11 Creating upper embedding, lateral backfilling and cover (up to the top edge of the shaft bottom)



Compacting of lateral backfilling

The specifications of the latest version of DIN EN 1610 must be adhered to when creating the upper embedding, lateral backfilling and cover up to the top edge of the shaft bottom. If country-specific regulations or deviating specifications conflict with this, these must be agreed upon with FRÄNKISCHE, if necessary.

Fill 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 the shafts and sedimentation pipes do not shift during backfilling of the excavation pit.

ATTENTION

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

4.12 Tests before backfilling and impermeability test

Before backfilling the excavation pit, check the system for proper installation and leak-tightness.

The following tests must be performed in particular:

- | | | | |
|--|-------------------------------------|---|-------------------------------------|
| 1 Height of the shafts according to design specifications | <input checked="" type="checkbox"/> | 5 Total insertion depth at the couplings | <input checked="" type="checkbox"/> |
| 2 Exact adjustment of the shafts | <input checked="" type="checkbox"/> | 6 Position and matching of crown markings (top). | <input checked="" type="checkbox"/> |
| 3 Check for damage, foreign objects or coarse contamination | <input checked="" type="checkbox"/> | 7 Impermeability test | <input checked="" type="checkbox"/> |
| 4 Axial direction of the system | <input checked="" type="checkbox"/> | | |

Tip

We recommend having the system approved by the site management before backfilling.

4. Installation

4.13 Installing extension pipes

First remove the temporary construction site cover from the start shaft inlet set, target shaft bottom and outlet at the tee. Then install the extension pipe on the coupling of the inlet set at the start shaft. Afterwards, install the ex-

tension pipe in the embedded coupling at the shaft bottom of the target shaft. Finally, install the extension pipe of the outlet set in the integrally moulded coupling of the tee. Keep the pipe, sealing ring and the coupling clean.

The sealing rings are mounted onto the second corrugation trough. Apply a sufficient amount of lubricant to the sealing ring and coupling. Ensure that the sealing area is free of dirt.



4.14 Completing cover and creating main backfilling

Backfilling work is finished after installing the extension pipes. Provide a cover of at least 30 cm for the sedimentation path. The materials for main backfilling must be filled and compacted according to design specifications. Make sure

that the shafts and sedimentation 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!

4.15 Cutting extension pipes

Cut the extension pipes such that they reach the support ring. Cut the pipes 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.

You might have to cut the coupling as well in case of minimum covers. The BARD ring has a sufficient diameter and can be pushed over the coupling.



NB

Pipe DN 600:
height adjustment extension pipe
per corrugation crown ~7 cm

Pipe DN 300:
height adjustment extension pipe
per corrugation crown ~4 cm

4. Installation

4.16 Installing shaft covers

4.16.1 Covers start shaft and target shaft CW 610

The BARD ring (class D concrete support ring by FRÄNKISCHE) transfers traffic loads into the soil.

There must be no direct load transfer between BARD ring and shaft. The bedding area of the BARD ring must be flat and without stationary loads, and it must achieve an E_{V2} module of at least 100 MN/m^2 . Create the bearing from compacted bearing layer material ($E_{V2} \text{ module} \geq 100 \text{ MN/m}^2$) 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

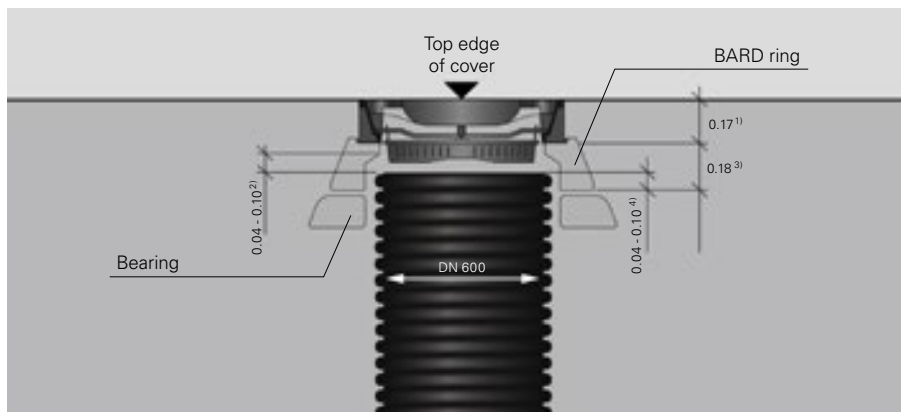
transferred to the load-bearing underground. The BARD ring must be placed centrally without affecting the bearing.

Shaft covers, equalisation rings, gully gutters, bucket handles and buckets are not included in the scope of delivery of FRÄNKISCHE Rohrwerke and must be supplied on site.

Install shaft covers according to DIN EN 124, CW 610, installation according to design specifications. Optionally, place equalisation rings according to DIN 4034 under the shaft cover/gully gutter on the BARD ring. The shaft cover

and/or equalisation ring(s) must be placed on a 10-mm-thick mortar joint to prevent stationary loads between the BARD ring, the equalisation ring and the shaft cover.

Use common dirt traps under the shaft covers. If the start shaft must feature a gully gutter according to design specifications, a bucket handle (or feed hopper) and a bucket according to DIN 4052-A4 must be installed.



- 1) Height of shaft cover incl. 1 cm mortar joint. The dimension is variable, depending on class B or D shaft cover and use of additional support rings (incl. mortar joint to ensure a bearing without stationary loads)
- 2) Compensating area: 4 cm to 10 cm
- 3) BARD ring, inside Ø 745 mm, h=180 mm
- 4) Insertion area: Extension pipe in BARD ring 4 cm to 10 cm, height adjustment in the insertion area accurate to within the last centimetre possible



NB

Height adjustment extension pipe per corrugation crown ~7 cm

4. Installation

4.16.2 Covers outlet set

The cover of the outlet set is included in the set.

Use appropriate and approved lifting equipment, operating wrenches and means of transport for transporting and opening/ closing the cover only.

Observe the maximum load of the shaft cover also during the construction period.

Cover and extension pipe are generally load separated, i.e., the extension pipe is not subject to vertical forces from the free cover bearing. The free bearing transfers loads from the surface to the cover directly to the load-bearing underground.

The cast iron cover can be integrated in the road surface without any problems. As soon as the road superstructure is being prepared, the bearing for the shaft covers must be created.

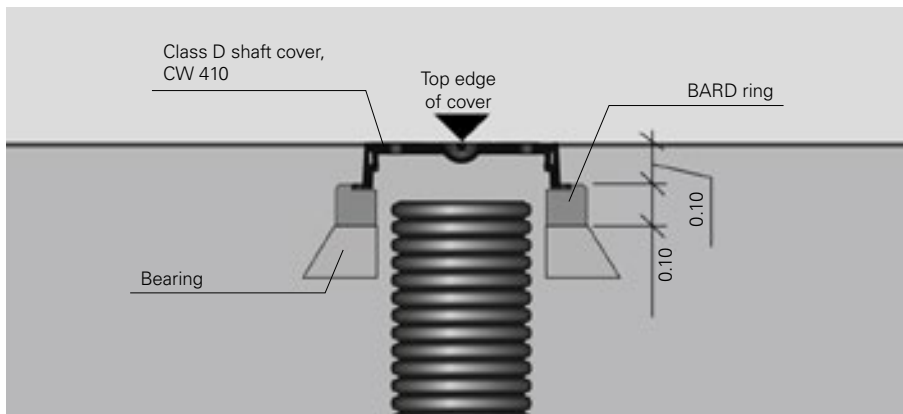
Prepare a lean concrete bearing of min. 10 cm for a safe and free load transfer from the cover to the building ground. Include an expansion joint between the bearing and extension pipe. The bearing surface for the frame must be even. The frame of the shaft cover must rest on the bearing with its entire contact area.

If the cover is outside the road, the bearing for the cover must be prepared separately at least from non-cohesive,

compactable material. The professional compaction with appropriate equipment is essential (compaction 98 % DPr according to ZTV StB). If required, a bearing made of lean concrete makes sense in this case, too.

Using plate compactors or vibrating rollers on the shaft covers is not permitted.

Clean the covers, in particular the contact surfaces, after the work has been completed and/or after every opening.



NB

Height adjustment extension pipe per corrugation crown ~4 cm

4. Installation

4.17 Inserting substrate cartridges

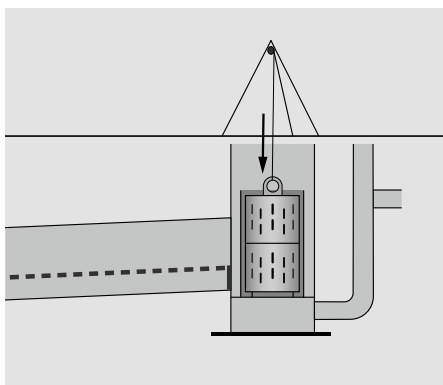
After installation activities and earth-works have been completed, the system must be flushed according to the maintenance manual. The sealing surface of the cartridge holder in the target shaft must be clean.

When the activities have been completed, insert the substrate cartridge elements in the target shaft. Please

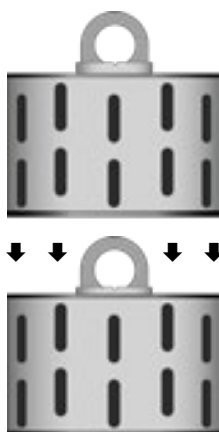
refer to Chapter 3.4 for the number of cartridge elements. The transportation lock situated under the cartridge element in order to protect the sealing must be removed.

Make sure that the sealing is in an appropriate condition and has not been damaged.

The cartridges must be slowly positioned using suitable lifting equipment (e.g., tripod) and put into the cartridge holder. The cartridge must be placed straight, the sealing is done due to its weight only. The cover element (coloured eye and closed cover) must face upwards.



Substrate cartridges in the target shaft



ATTENTION

The system does not work properly unless the transportation lock has been removed. This can lead to a decrease in treatment performance and thus to increased re-entrainment of dirt.

Substrate cartridge element ø 560 mm,
Cover element
55 kg dry weight

Substrate cartridge element ø 560 mm,
Base element
55 kg dry weight



ATTENTION

You can distinguish the cover element easily thanks to its coloured eye (for inserting the hook). In addition, the cover of the cover elements has a closed centre unlike the base elements. The system does not work properly unless the cover element has been installed over the base elements. This can lead to a blocked outlet.

4. Installation

4.18 Filling the system

After the work has been completed, the system must be filled with water up to the permanent water level. This is required to ensure the retention of floatables and light liquids. The system

must be filled with water (e.g., drinking water, service water, from water recovery or treated wastewater from system cleaning) complying with the local discharge conditions.

NB

For permanent water level volume, see Chapter 3.4

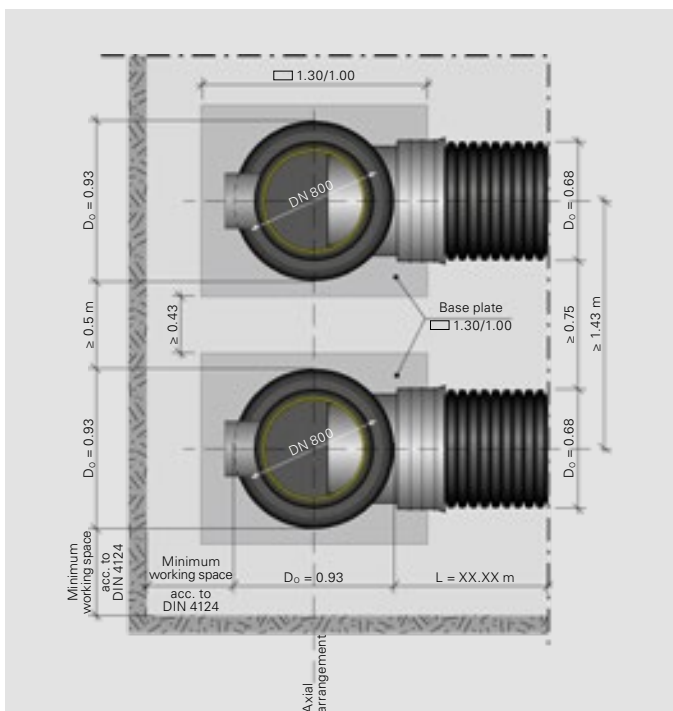
4.19 Arrangement of multiple SediSubstrator L systems

The above sections of the installation manual describe the standard installation as individual system. The following describes the recommendations for the arrangement of multiple systems and the required minimum distances. We draw your attention to the fact that for installation clearances between

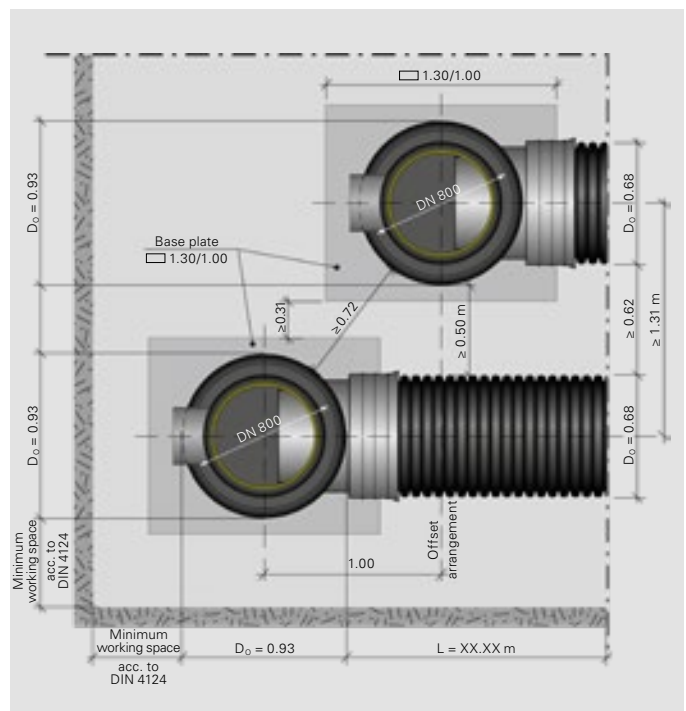
distribution and combining units and the treatment system, the respective fitting dimensions of the connection pipes and their space requirements must be considered for the installation in addition to the general minimum clearances specified by standards.

ATTENTION

Make sure that the system components are not damaged during backfilling or compacting. Observe the installation instructions for individual systems.



Axial arrangement



Offset arrangement

4. Installation

4.20 Commissioning

ATTENTION

Observe Chapter 9 Safety instructions (page 31)!

1 Making system ready for operation

- Clean system of coarse dirt
- Remove auxiliary constructions
- Insert substrate cartridges
- Fill system with water
- Close shaft covers



2 Instruction

1. The following people should be present during instruction:

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

We also recommend participation of operating staff.



2. Instruction

- Explain function of system
- Explain maintenance
- Information regarding cleaning and disposal
- Information about FRÄNKISCHE partner companies



3 Documentation/handling over

- Declaration of conformity of the contractor
- Hand over maintenance and installation manuals
- Hand over documentation folder including operating log
- Proof of system leak tightness
- Expert test report (commissioning test)
- Optionally: documentation of thorough visual inspection



5. Maintenance: Cleaning and substrate change

5.1 Emptying and cleaning the system

All the emptying and cleaning work of the system described in this section must generally be made without accessing the shafts.

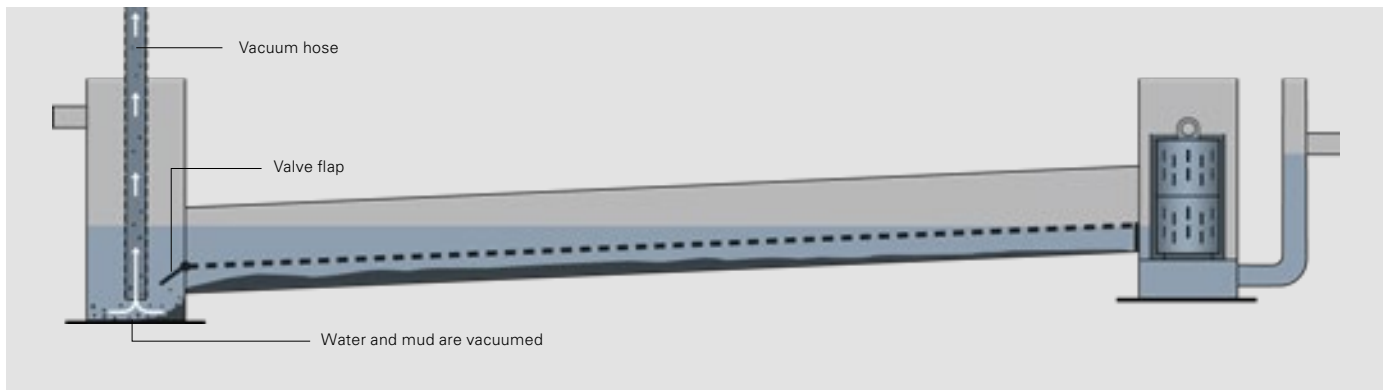
Use a high-pressure cleaning/vacuum vehicle to empty the system and remove the contained water and mud fractions. For this purpose, initially

vacuum the complete contents through the shaft. The valve flap sealing the mud chamber of the sedimentation pipe can now be moved freely. Due to the slope of the sedimentation pipe, most of its mud collector will be emptied of its contents into the start shaft.

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!

Step 1: Emptying with vacuum hose



When empty, the maintenance console mounted at the height of the flow separator is visible in the start shaft. The maintenance console facilitates inserting and guiding the flush hose during high-pressure cleaning.

The flush hose is guided through the maintenance console on the flow separator. The cleaning nozzle is guided up to the target shaft during high-pressure

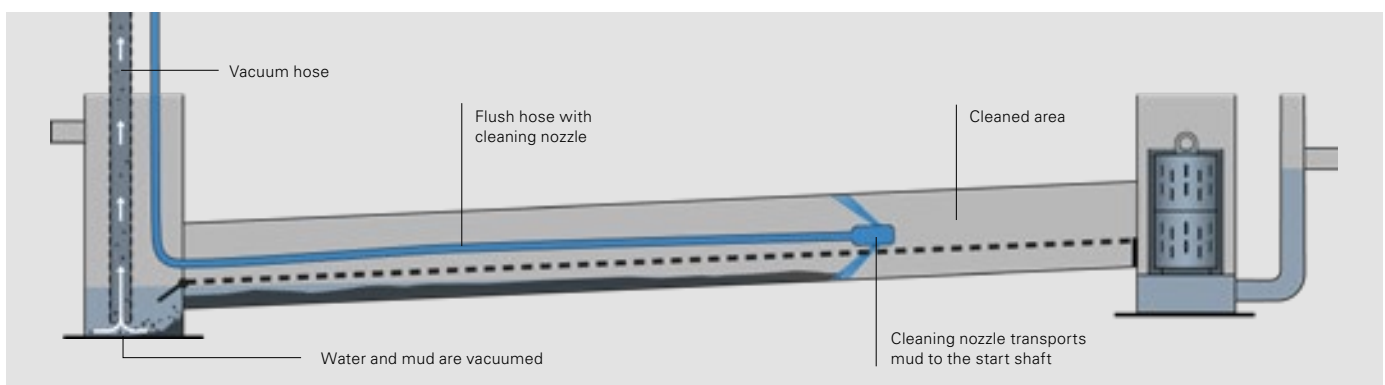
cleaning. Make sure that the nozzle does not enter the target shaft. The efficiency of the vehicle and the cleaning and nozzle parameters must be selected depending on the pipe section, pipe material and degree of pollution to be expected.

Use deflection pulleys to avoid damage to the system.

Tip

Combined flushing-vacuum vehicles with water recovery should be used preferably. This minimises disposal expenses and the treated water can be used to refill the system.

Step 2: Cleaning with vacuum and flush hose

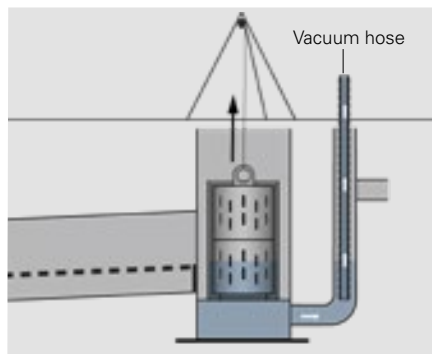


5. Maintenance: Cleaning and substrate change

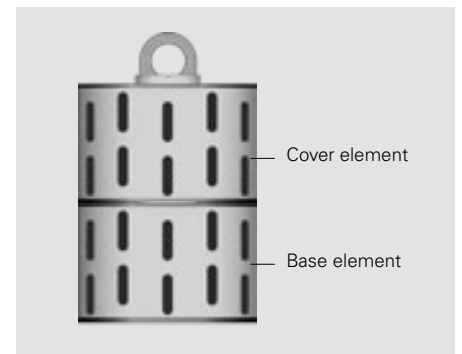
5.2 Exchanging the substrate in the cartridge elements

1. Removing the substrate cartridge

The substrate in the cover and base elements of the cartridge elements must be exchanged every four years during maintenance. The cover element and the base element situated in the target shaft are removed in order to replace the substrate. Suitable lifting equipment (wire-rope hoist on a vehicle or tripod) must be used. A used, wet cover element or base element weighs approx. 80 kg. The water remaining in the target shaft must be removed prior to that, e.g., from the outlet.



Substrate cartridge in the target shaft



Substrate cartridge unit comprising cover and base element using the example of SediSubstrator 600/12

2. Cleaning the target shaft

After the substrate cartridge has been removed, the target shaft must be completely cleaned using a combined

flushing-vacuum vehicle, and the remaining mud must be removed. The outlet chamber must be flushed,

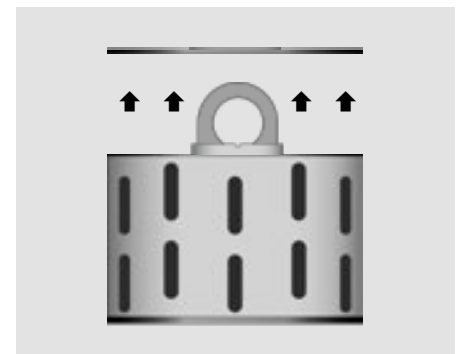
if necessary. If required, the outlet area can be accessed for cleaning via the outlet set DN 300.

3. Opening the substrate cartridge

Remove the cable ties using appropriate tools. Afterwards, the cover is lifted off.



Removing cable ties



Opening cover

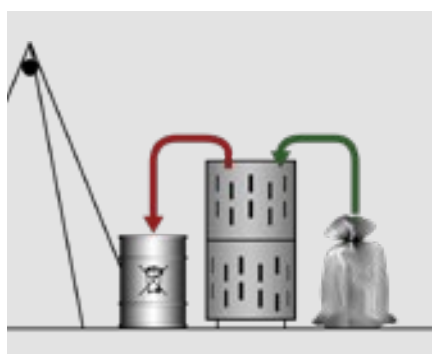
4. Changing the substrate

After the sealing disc under the cover has been removed, the used substrate must be removed and stored in appropriate disposal containers. The housings of the cover element and the base element and the remaining system components must be cleaned and their proper condition must be verified. If damage is detected, the affected parts must be replaced. Use only original spare parts by FRÄNKISCHE for this purpose. New substrate must then be filled in (SediSorp plus, filling volume approx. 37 kg per cover and base element).

The exchange substrate must be purchased in packaging units with a

filling volume of 18.5 kg each, and the entire contents of 2 packaging units must be placed into each cover element and base element. Tap on the housing in

order to compact the substrate until the elements are completely filled. Tap in a circle around the cartridge. Compacting is done layer by layer.



Substrate change



Compacting the substrate

5. Maintenance: Cleaning and substrate change

5. Flushing and inserting the substrate cartridge

Assembly of the cover element and the base element is carried out in reverse order. The elements must then be flushed. The flushing water of the cover element and the base element must be collected and disposed of appropriately (e.g., discharge into the wastewater sewer). The newly filled cover element and base element must be re-inserted

into the target shaft; the base elements are installed first and the cover element follows. Please make sure that the sealing at the bottom of each element is fixed properly and has not been damaged. The cover and base elements must be placed upright in the outlet unit; please ensure that they have not shifted.

ATTENTION

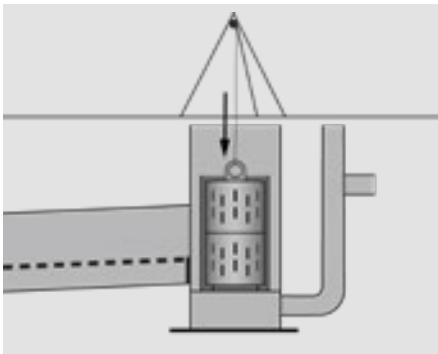
All materials occurring during maintenance and cleaning must be disposed of in accordance with the applicable waste disposal regulations.

ATTENTION

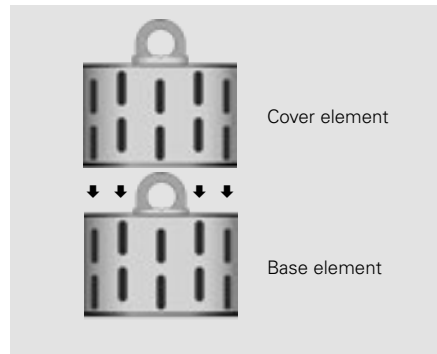
You can distinguish the cover element easily thanks to its coloured eye (for inserting the hook). In addition, the cover of the cover elements has a closed centre unlike the base elements. The system does not work properly unless the cover element has been installed over the base elements. This can lead to a blocked outlet.

NB

New cable ties are attached to the packaging units with SediSorp plus



Substrate cartridges in the target shaft



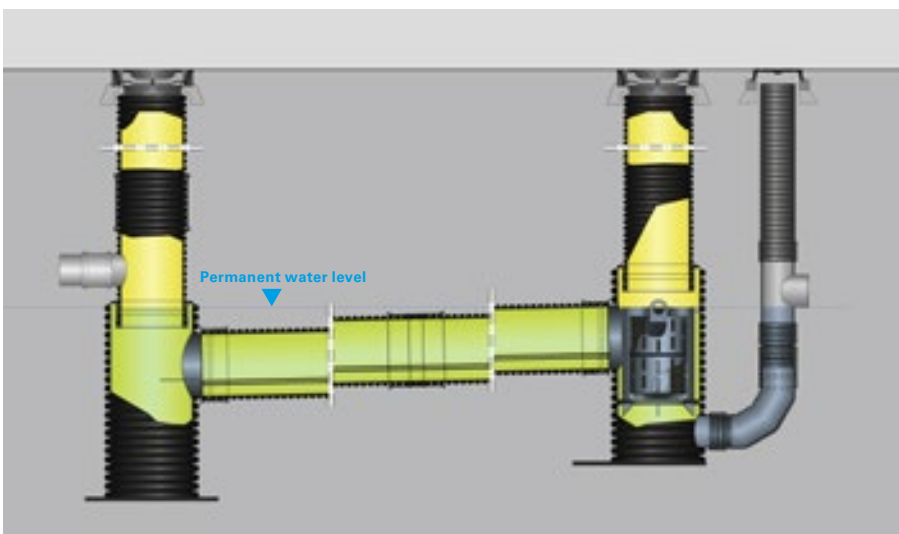
Cover element

Base element

5.3 Filling the system with water

After maintenance work has been completed, the system must be re-filled with water up to the permanent water level. For this purpose, also the water from the

system which has undergone the flushing and suction process (filtration during recovery) can be used.



SediSubstrator L permanent water level

NB

(for permanent water level volume, see Chapter 3.4 Technical data, page 7)

6. Self-inspection, maintenance and examination

6.1 General information

To ensure functionality of the SediSubstrator L system, its condition must be ensured through recurring self-inspections maintenance and checks. All work and findings must be documented in the operating log. We generally recommend entering a maintenance agreement with

an expert (FRÄNKISCHE partner company). Please see www.fraenkische.com for an overview of partner companies trained by FRÄNKISCHE.

ATTENTION

The respective periods and responsibilities are pursuant to the DIBt approval and may differ from authority approvals. In these cases, the authorities' requirements are mandatory and must be observed!

6.2 Self-inspection

The operational capability of the system must be verified by the operator under dry weather conditions at least every three months. For this purpose, open the start shafts and target shafts and visually inspect from the top without accessing the shafts themselves (simple visual inspection).

Check the following:

- structural condition of the system
- height of the permanent water level
- mud level of the start shaft
- superficial pollution of the filter cartridge

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.

6.3 Maintenance

The system must be maintained by an expert at least every 4 years or more frequently if the system is inundated more often than planned.

The following work must be performed:

- emptying and cleaning of the system (see 5.1, page 24)
- exchanging the substrate in the substrate cartridges (see 5.2, page 25 et seq.)
- refilling the system (see 5.3, page 26)

6.4 Examination after five years

Prior to commissioning and afterwards at regular intervals of not more than five years, the wastewater treatment system must be inspected by a specialist relating to its appropriate condition and proper operation. Prior to this inspection, the system must be completely emptied and cleaned.

In order to reduce costs, however, FRÄNKISCHE recommends carrying out this inspection every four years as part of maintenance.

At least the following must be inspected and/or recorded:

- information on the place of inspection, the operator of the system with reference to the stock data, the customer, the examiner and the authority in charge
- structural condition of the stormwater treatment system
- proof of proper exchange of filter materials and disposal of the removed mud
- existence and completeness of required approvals and documents (permits, drainage plans, operating and maintenance manuals, etc.)
- dimensioning, suitability and performance of the wastewater treatment system with regard to the actual volume of waste water

ATTENTION

To carry out an inspection, a test report with reference to the stock data and deficiencies, if any, must be prepared. Deficiencies must be eliminated in coordination with the competent authority, if applicable.

6. Self-inspection, maintenance and examination

6.5 Disposal

Materials removed from the system 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 system.

6.6 Thorough visual inspection

The structural condition of the sedimentation path can be inspected by thorough visual inspection using CCTV inspection. For this purpose, the upper flow area is accessed with a state-of-the-art pan and tilt camera. The lower sedimentation chamber can be inspected visually through the flow separator.

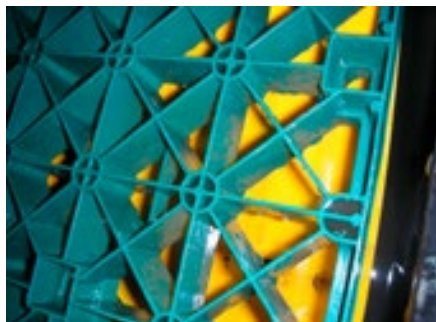
Here, the maintenance console facilitates inserting the dolly and guiding the camera cable. Use appropriate deflection pulleys.

Inspection equipment should be selected according to DWA worksheet and bulletin series DWA-A/M 149

“Conditions and Assessment of Drain and Sewer Systems Outside Buildings” and should be adjusted to pipe section and pipe material.



Inspection of flushing results with pan and tilt camera, camera on the maintenance console in the start shaft of a SediSubstrator L system



Cleaned, residue-free system, here in the area of the flow separator

7. Overview - Who does what?

	Who	What	When	Documentation
Installation	Specialist	<ul style="list-style-type: none"> - Installation and, if necessary, cleaning and CCTV inspection of the system - Filling the system with water from water recovery or with water complying with the local discharge conditions 		Declaration of conformity Operating log
Self-inspection	Operator	Simple visual inspection <ul style="list-style-type: none"> - Structural condition of the system - Height of the permanent water level - Mud level of the start shaft - Superficial pollution of the substrate cartridge 	at least every 3 months	Operating log
Maintenance	Expert	<ul style="list-style-type: none"> - Emptying and cleaning of the entire system using sewer cleaning vehicle - Exchanging the substrate in the substrate cartridges - Refilling the system with water from water recovery or with water complying with the local discharge conditions 	right after oil spill, otherwise every 4 years	Operating log
Disposal	Specialist/waste disposal company	<ul style="list-style-type: none"> - Disposal of mud and solids - Disposal of substrate - Applicable waste disposal regulations must be observed. 	when the retention volume has been used up, after 4 years at the latest	Operating log Disposal certificates
Verification	Expert	<ul style="list-style-type: none"> - Emptied completely - Cleaning of the system - Information on the place of inspection, the operator of the system with reference to the stock data, the customer, the examiner and the authority in charge; - Structural condition of the stormwater treatment system - Proof of proper exchange of substrate and disposal of the removed mud - Existence and completeness of required approvals and documents (permits, drainage plans, operating and maintenance manuals, etc.) - Dimensioning, suitability and performance of the stormwater treatment system with regard to the actual volume of stormwater. 	before commissioning afterwards every 5 years	Test report Operating log
Repairs	Specialist	Original parts or tailored parts explicitly approved by the manufacturer may be used only.	as required	Operating log

8. Substrate cartridge spare parts order form

Name / Company

Street, No.

City, Post code

Contact

Phone

Date

E-mail

During maintenance of SediSubstrator L, the substrate in the cartridge elements is exchanged; the cartridge elements are refilled and exchanged for this purpose. The procedure is described in the installation and maintenance manual. (Download at www.fraenkische.com)

Only use the SediSorp plus substrate. It is sold in packaging units of 18.5 kg each; you must fill 2 bags of 18.5 kg each into the cover element and the base element respectively. You can obtain SediSorp plus from Fränkische Rohrwerke.

We recommend hiring an appropriate expert company for exchanging the filter substrate in the existing cartridge and proper disposal.

Please refer to www.fraenkische.com for a list of appropriate expert companies (FRÄNKISCHE partner companies) and their contact details.



Spare parts order

☐ Replacement cartridge **base element** (complete)

(filled with 2x 18.5 kg SediSorp plus)

Labelling: **DE**

Cat. no.: **515.98.811**

Quantity: _____ pc(s)

☐ Replacement cartridge **cover element** (complete)

(filled with 2x 18.5 kg SediSorp plus)

Labelling: **DE**

Cat. no.: **515.98.812**

Quantity: _____ pc(s)

☐ SediSorp plus **filter substrate** (18.5 kg/bag)

Cat. no.: **515.98.013**

Quantity: _____ bag

☐ **Bottom seal** for SediSubstrator L base element or cover element

Cat. no.: **515.98.015**

Quantity: _____ pc(s)

☐ **Inside elements** for SediSubstrator L base element or cover element

(complete set with upper sealing disc, inside/outside drainage layer, inside/outside gauze layer, sealing ring)

Cat. no.: **515.98.816**

Quantity: _____ set

Additional notes

Stamp, signature orderer

Fax: +49 (0) 9525 88-9290122 | Bestellformular-drainage@fraenkische.de | **Order via local building material supplier!**

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!

This includes (in extracts):

- Accident prevention regulations
 - Construction work BGV C22
 - Technical wastewater systems GUV-V C5
- Safety regulations for working in enclosed spaces of technical wastewater systems GUV-R 126
- Handling biological working materials in technical wastewater systems GUV-R 145
- Directives for working in tanks and narrow spaces BGR 117
- Standards
 - Excavations and trenches - slopes, planking and strutting, breadths of working spaces DIN 4124
 - Construction and testing of drains and sewers DIN EN 1610
- Tool for safety and health protection in technical wastewater systems.



- 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 psychic strain during work in deep, narrow and dark spaces
- and others



Non-compliance with the operating manual may result in considerable prop-

erty damage, injury or death.



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.

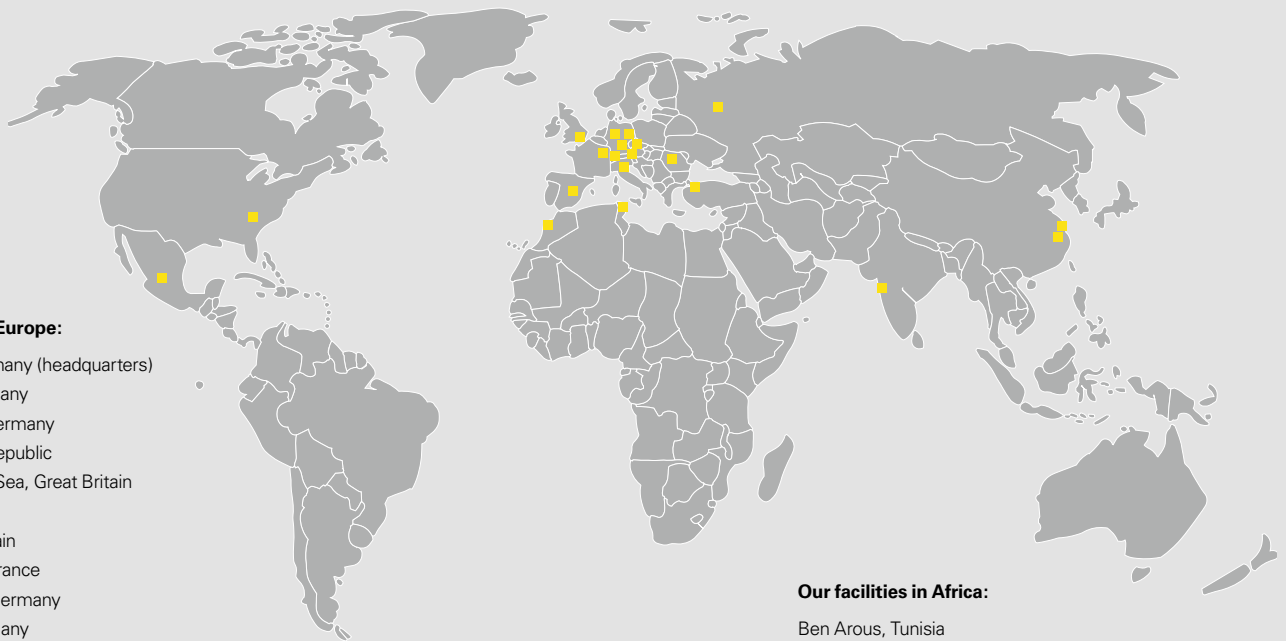
Changes or modifications to the system may only be carried out with the agreement of the manufacturer. For safety reasons, use original spare parts and accessories approved by the manufacturer. The use of other parts voids the liability for any consequences arising therefrom.

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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Rooted in Königsberg – globally successful!



Our facilities in Europe:

Königsberg, Germany (headquarters)
Bückeburg, Germany
Schwarzheide, Germany
Okříšky, Czech Republic
St.-Leonards-on-Sea, Great Britain
Moscow, Russia
Yeles/Toledo, Spain
Torcy-le-Grand, France
Ebersbach/Fils, Germany
Hermsdorf, Germany
Mönchaltorf, Switzerland
Milan, Italy
Istanbul, Turkey
Cluj, Romania
Wels, Austria

Our facilities in Asia:

Anting/Shanghai, China
Hangzhou, China
Pune, India

Our facilities in Africa:

Ben Arous, Tunisia
Casablanca, Morocco

Our facilities in North America and Mexico:

Anderson, USA
Guanajuato, Mexico

FRÄNKISCHE is an innovative, growth-oriented, medium-sized family-owned enterprise and industry leader in the design, manufacturing and marketing of technically superior corrugated pipe systems for drainage, electrical, building technology and industrial applications.

We currently employ about 4,200 people worldwide. Both our many years of experience and expertise in plastics pro-

cessing, our consulting services and the large array of products are highly valued by our customers.

FRÄNKISCHE is a third generation family owned business that was established in 1906 and is now run by Otto Kirchner. Today, we are globally represented with production facilities and sales offices. The proximity to our customers enables us to develop products and solutions

that are perfectly tailored to our customers' needs. Our action and business philosophy focus on our customers and their needs and requirements for our products.

FRÄNKISCHE – Your partner for sophisticated and technologically advanced solutions.