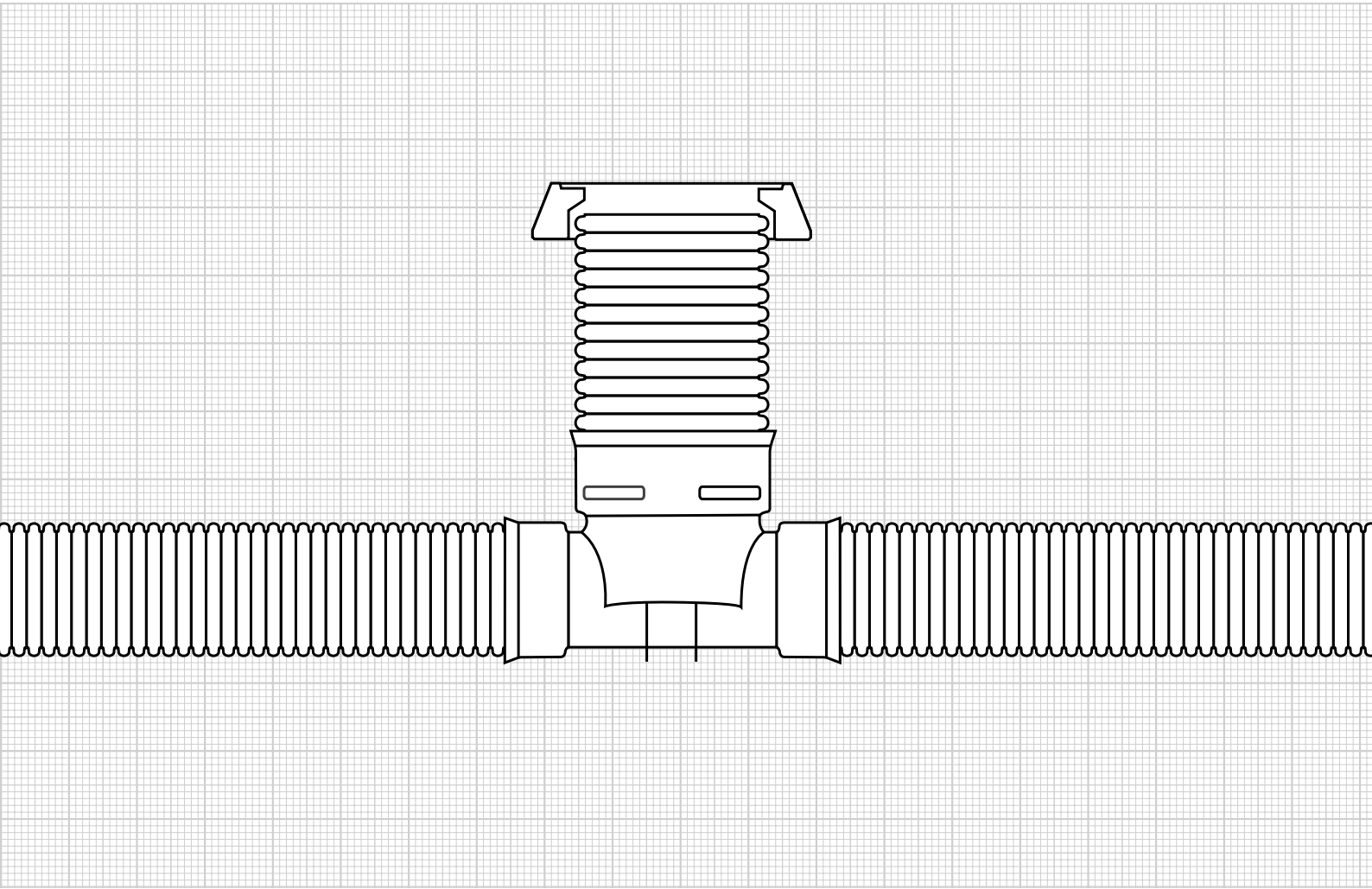
FRÄNKISCHE

Installation manual

RailPipe® system



The system for ideal railway track drainage

Drainage Systems
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Note

Please read this installation manual carefully and follow our instructions.

The recommendations are based on DIN EN 1610, DWA-A 139, DWA-A 127, and the regulations of the DB Netz AG (Ril 836; DBS 918064). They apply in addition to the following information.

The relevant safety provisions of the building industry apply.

2. 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. Note this down on the delivery note.

3. 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.

4. Unloading the lorry

Using excavator and crane

Generally use hoisting slings (e.g., textile slings). Do not use chains and ropes. Avoid dropping, dumping as well as hitting the pallets, pipes, shafts, shaft components and accessories hard against each other. Attach hoisting slings in the middle of the pallet spaced 3.5 m apart. Help controlling the pallets by hand. Do not move pallets on the lorry using crowbars or rods.

Using forklifts

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

5. Storage at the construction site

Do not dump pipe pallets with a jerk on hard ground. Store these on even ground that is sufficiently hard to prevent pallets and/or base battens from bogging down. Pipes and fittings can be stored outside; the storage period outside should, however, not exceed one year. The outdoor storage period is shorter if pipes are exposed to direct sunlight and/or UV radiation.

Observe the following in terms of storage:

1. Store pipes such that proper even bearing is guaranteed.
2. Do not stack loose pipes higher than 1 m. Secure pipe stacks at the sides.
3. You may stack packeted pipe pallets on top of each other. Do not stack more than 2 pallets on top of each other.
4. Protect plastic pipes against overheating during extreme summer heat. We recommend that the pipes should be stored in the shade or covered with brightly coloured, light-tight tarpaulin.
5. Store shafts on their base on even and solid ground.

6. Transport to the pipe trench

Thanks to their low weight, the transport of individual pipes and accessories up to a nominal diameter of DN 300 and of shafts to the pipe trench does not require any special lifting equipment. Use suitable tools (e.g., wide textile slings) in connection with lifting equipment for larger nominal diameters. Lifting equipment and fixtures must not pose any risk of damaging pipes and shafts.

Implicitly avoid hooks, chains, cables or other tools which could lead to edgy or jerky stresses and slip. If transport is effected in pallets, the specifications according to the Section "Unloading the lorry" apply. Transporting individual pipes using chains or ropes is forbidden.

7. Excavation and trench width

The values specified in the following tables apply regarding the minimum trench width (analogously and/or in compliance with directive Ril 836 and DIN EN 1610), and/or provisions from certification conditions.

Please note that too narrow trenches impede proper installation (compaction of the embedding area). Trenches that are too wide increase costs. Also generally consider larger trench widths for the internal pressure range.

Create a small recess in the bottom around the coupling area of pipe and shaft to ensure continuous pipe and shaft bearing.

A minimum trench width according to DIN EN 1610 and/or following the certification conditions specifications is required in the shaft area to allow professional embedding. A breadth of working space of at least 0.6 m shall be provided.

Minimum trench width when using pipes in the external pressure range and outside the pressure range

Nominal width	Shored trench and unshored trench (ß > 60 degrees)	Unshored trench (ß < 60 degrees)
DN 150 – DN 200	D_O + 0.40 m	D_O + 0.40 m
DN 250 – DN 350	D_O + 0.50 m	D_O + 0.40 m
DN 400 – DN 600	D_O + 0.70 m	D_O + 0.40 m

NB

Use of pipes in the internal pressure range

DN		150	200	250	300	400	500	600
Minimum trench width with min h_c	[m]	0.8	0.8	0.9	1.1	1.4	1.8	2.2
Minimum trench width with max h_c	[m]	1.0	1.0	1.0	1.1	1.4	1.8	2.2

h_c = height of cover

NB

Use of shafts in the internal pressure range

Minimum breadth of working space	[m]	0.6
Minimum trench width	[m]	1.9

8. Installation

Generally adhere to the provisions of DIN EN 1610 during installation. If pipe stress calculations are available, install the bedding and backfill materials and compact these to the specified standard. This is the only way to make sure that the deformation to be expected equals the deformation determined through pipe stress calculations, and that the minimum safety standards in the stress and stability analysis are complied with.

NB

The installation conditions laid down in the EBA certification must be applied to the use of the systems in the internal pressure range.

8.1 Bearing

If not specified otherwise in the design specifications, create and compact the pipe and shaft bearing with at least 10 cm to 15 cm of stoneless, compactable material. Materials shall comply with the specifications of DIN EN 1610. Preferably use compactable material such as soils of the categories G1 (non-cohesive soils – GE, GW, GI, SE, SW, SI), G2 (slightly cohesive soils – GU, GT, SU, ST) or G3 (cohesive mixed soils – silty clay and gravel – GU, GT, SU, ST). Embed the pipe on the sides according to the specified bedding angle.

NB

Use materials of the category G1 for the use of the system in the internal pressure range.

Push the shaft (shaft bottom) with its base into the bearing. This does not require any additional recess in the bedding. Do not use concrete as bearing. Install the shaft analogously to the pipe support.

Make sure that the trenches are free from water, e.g., stormwater, infiltration water, spring water or water leaking from pipes, during installation. The way of dewatering must not influence the embedding area and the pipe system. Take measures to avoid washout of fines during drainage. Consider the influence of drainage measures on groundwater movements and the stability of the surroundings. Sufficiently seal all construction site drainage after finishing dewatering measures.

8. Installation (contd.)

8.2 Installation of pipes and shafts

8.2.1 Material inspection

Before installation, check pipes, pipe components, shafts, shaft components and accessories for damage which might have occurred during transport and/or storage. Damaged components must not be installed.

8.2.2 Pipe installation

Pipes have red crown marking which must face upwards. Connect pipes using push-fit couplings. For this purpose, pipes are delivered including PP push-fit couplings and EPDM sealing rings.

1. Clean the pipe end to be inserted (area up to the third complete corrugation crown) and the insides of the insertion areas of the coupling from dirt using a rag or similar.
2. Insert the profile sealing ring continuously and without overexpanding individual spots into the **second** complete corrugation trough at the spigot.
3. Evenly apply a sufficient amount of the lubricant delivered by FRÄNKISCHE onto the profile sealing ring and the inside of the coupling's insertion area. Do not use oils and greases.
4. Right before installation, check couplings and pipe end again for foreign objects, in particular gravel, sand or crushed stones, and remove if necessary.
5. Insert pipes until they reach the stop and/or to the end of the marking (short beam-shaped vertical line). Protect the pipe section using a square timber and distribute installation forces equally during installation.

ATTENTION

Lubricated pipe ends must not be placed on the bedding (risk of material adhesion from the embedding).

8. Installation (contd.)

8.2 Installation of pipes and shafts (contd.)

8.2.3 Shortening pipes

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.

8.2.4 Shaft connections to RailControl

Proceed as follows:

1. Clean the insertion area of the pipe and the insides of the shaft connections at RailControl from dirt using a rag or similar.
2. Insert the profile sealing rings continuously and without overexpanding individual spots into the first complete corrugation trough of the RailPipe at the spigot (when cutting pipes, make sure that the cuts are in the middle of the corrugation trough and there is no damage to the corrugation edge).
3. Evenly apply a sufficient amount of the lubricant delivered by FRÄNKISCHE onto the profile sealing rings and the inside of the shaft connection. Do not use oils and greases.
4. Right before installation, check the shaft connection and pipe ends again for foreign objects, in particular gravel, sand or crushed stones, and remove if necessary.
5. Insert pipes until they reach the stop. Protect the pipe section using a square timber and distribute installation forces equally during installation. Slight alignment of the pipes (approx. 1 %) facilitates installation.

8. Installation (contd.)

8.2 Installation of pipes and shafts (contd.)

8.2.5 Embedding and backfilling of pipes and shafts

Select and install the infiltration and filter layers according to design specifications.
If not otherwise specified, the provisions of directive Ril 836, Sections 4601 to 4803 apply.
Especially observe the provisions regarding filter stability.

Create the embedding of the pipe in the embedding area with stoneless, compactable material. Backfill the bedding material evenly on both sides of the pipe above the pipe crown in layers up to approx. 15 cm and compact carefully. Use light compaction equipment only or, if required, compact by hand. Further filling (as of approx. 15 cm above the pipe crown) must be made in layers with constant compaction of the filling material. Mechanical compaction of main backfilling with light to medium equipment directly above the pipe should only be performed starting from a minimum thickness of 30 cm above the pipe crown. Use heavy compaction equipment only starting from a depth of cover of 1.0 m above the pipe crown.

To avoid load concentration on the pipe, consistent compaction throughout the entire embedding area must be ensured. In addition, the pipes must not come in contact with compaction equipment.

Embed the shaft and compact the bedding material analogously to the pipe. Insert the extension pipe for this process (see Section 8.2.6).

NB

Use materials of the category G1 for the use of the system in the internal pressure range in the piping zone and backfilling area. The conditions of the respective EBA certification shall be generally observed.

8.2.6 Placing the extension pipe

The extension pipe must be inserted into the upper area of the shaft bottom. For watertight systems, place the profile sealing ring into the first corrugation trough of the extension pipe. Evenly apply a sufficient amount of the lubricant delivered by FRÄNKISCHE onto the profile sealing ring and the inside of the insertion area.

Do not use oils and greases. Afterwards, insert the extension pipe until it reaches the inside stop of the insertion area only, not beyond that. The remaining area below the stops serves as possible compensating area. The extension pipe must be aligned upright when backfilling.

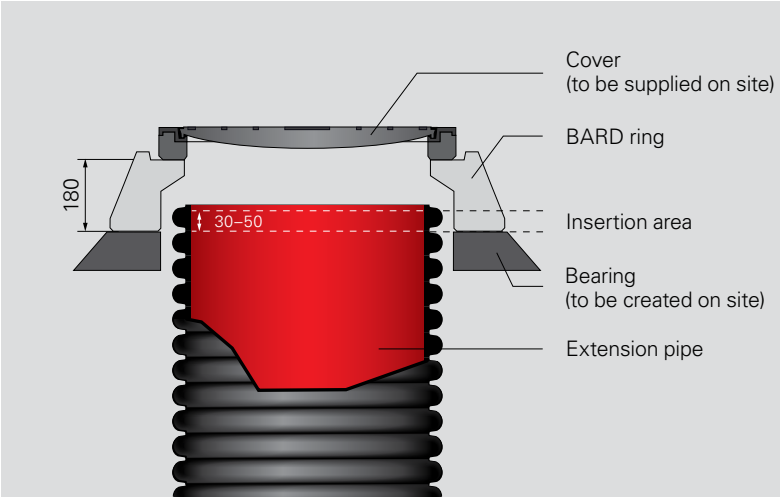
8.2.7 Shortening and cutting the extension pipe

You can shorten the extension pipe on site to adjust the shaft to the required installation depth. Cut the extension pipe to length in the middle of the corrugation trough using a fine-toothed saw or a pipe cutter. Remove edges and irregularities on the cutting surfaces with a grater, file or another suitable tool.

9. Placing shaft covers

RailControl 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!) Use FRÄNKISCHE BARD ring (class D concrete support ring) included in the shaft set as a bearing for the shaft covers. Commercially available standard concrete equalisation rings according to DIN 4034-1 (to be supplied on site, not included in the scope of delivery) can also be placed onto the BARD ring for height compensation.

The BARD ring transfers the load from the cover to the surrounding soil. There must therefore be no direct load transfer between the BARD ring and the extension pipe. See the following illustration. To support the BARD ring, create and sufficiently compact an appropriate bearing according to the load requirements. Place the BARD ring centrally and equally over the extension pipe onto the bearing. The extension pipe shall move freely, i.e., be load separated, and extend at least approx. 3–5 cm in the BARD ring. The BARD ring must not rest on the extension pipe. Afterwards, you can place the cover onto the BARD ring.



10. Installation of accessories

Since accessories feature coupling ends, the same procedure applies to their installation as to the installation of RailPipe. Lubricants and sealing rings are also required. Install sealing rings into the second complete corrugation trough at the spigot.

11. 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 of systems, pipes and shafts!

This includes (in extracts):

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

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⚠ 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 psychic strain 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

Systems, pipes and shafts are 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.

12. RailPipe® data sheet

RailPipe® drainage pipe SN 16 made of PP

Locally perforated (LP), totally perforated (TP) and multi-purpose pipe (MP) made of PP in structured-wall design (smooth inside and corrugated outside), black outside, red inside, with red crown marking.
Highly durable (SN 16 according to DIN EN ISO 9969). According to DBS 918064 with manufacturer-related product qualification and EBA certification.

Technical data							
Application	Drainage pipe designed for track drainage; for application in the internal and external pressure range and outside the pressure range						
Material / raw material	PP (polypropylene, new material without filler materials)						
Specification	According to DIN 4262-1, type R2, as LP, TP and MP; structured-wall design according to DIN 16961; according to DBS 918064 of Deutsche Bahn AG; manufacturer-related product qualification (HPQ); EBA certification 21.41–Izbit 032/15; external monitoring by MFPA Leipzig						
Nominal diameter DN/ID	150	200	250	300	400	500	600
Outside diameter (mm)	175	235	294	347	458	570	682
Inside wall thickness (mm)	≥ 3.5						
Pipe length	6 m						
Perforation pattern	According to DIN 4262-1; perforation width 2.5 +0.6/-0.3 mm						
Perforation area	≥ 50 cm²/m for LP, TP and MP						
Ring stiffness	SN 16 (16 kN/m²) according to DIN EN ISO 9969						
Jetting resistance	Material and practice test according to DIN 19523						
Connections	Using coupling and profile sealing ring (in case of the multi-purpose version) made of EPDM according to DIN EN 681 (DIN 4060)						

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Zulassung 21.41 - Izbit 032/15
Eisenbahn-Bundesamt

13. RailControl® data sheet

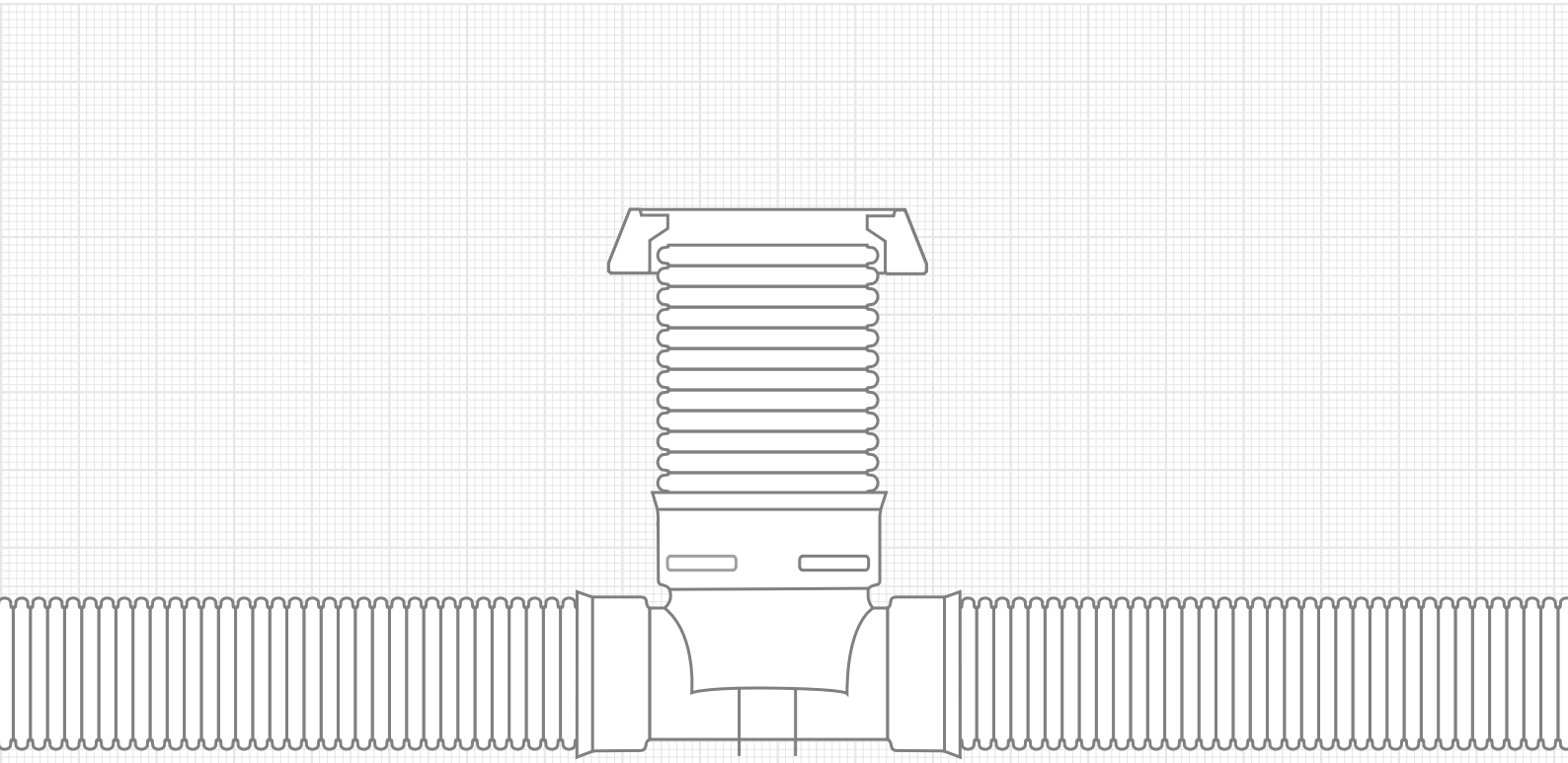
RailControl flushing and inspection shaft

PE/PP flushing and inspection shaft for RailPipe drainage pipes, colour: black, extension pipe with red inside, 180° shaft available in two basic designs, each with inlet and outlet in nominal connection diameters DN 250 and DN 400. According to DBS 918064 with manufacturer-related product qualification and EBA certification.

Technical data			
Application	Flushing and inspection shaft as 180° shaft in connection with RailPipe drainage pipe for track drainage; for application in the internal and external pressure range and outside the pressure range		
Material / raw material	Shaft bottom	PE (polyethylene)	
	Extension pipe	PP (polypropylene)	
Specification	According to directive DBS 918 064 of Deutsche Bahn AG; manufacturer-related product qualification (HPQ); EBA certification 21.43–Izbit 036/17	FRÄNKISCHE Zulassung 21.43 - Izbit 036/17 Eisenbahn-Bundesamt	
Inside diameter of shaft bottom [mm]	≥ 600		
Nominal diameter extension pipe (DN/ID) [mm]	600		
Outside diameter extension pipe D_O [mm] approx.	682		
Nominal connection diameters		2/250	2/400
Heights [mm] approx.	Effective height of shaft bottom	610	750
	Total height of shaft bottom	665	810
Pipe length of extension pipe [m]	1.2		
Ring stiffness [kN/m²]	≥ 16 (SN 16) according to DIN EN ISO 9969		
Usability in cold environments	❄		
External monitoring	MFPA Leipzig		
Connections	Push-fit couplings at the shaft bottom; EPDM profile sealing ring according to DIN EN 681 (DIN 4060); BARD ring (class D concrete support ring)		
Accessories	More accessories: RailControl accessories see product brochure "RailPipe system"	Download www.fraenkische.com	

Notes

Notes



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EN.1434/2.09.2019 | Subject to change without notice | Cat. no. 59999470 | 09/2019