

Product brochure **Rigofill® ST-A / Rigofill® ST-S**



Underground storage/infiltration modules according to EN 17152-1 / ISO 4981

Drainage Systems www.fraenkische.com

The sponge city principle

Back to the natural water cycle

The principle of a sponge city is revolutionising the way our cities will deal with water in the future. Inspired by nature, the principle strives to imitate the natural water cycle in urban environments and compensate for urban planning deficiencies. Instead of simply draining it, sponge cities collect stormwater in underground retention chambers, store it and allow it to slowly infiltrate into the ground. This prevents flooding during heavy rainfall and raises the groundwater level. Cisterns, which make the collected stormwater reusable for irrigation purposes and non-potable applications, play a key role in a sponge city.

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Rigofill® ST - systems



NB

In what follows, the Rigofill ST stackable module systems are explained using the green Rigofill ST-A as an example. All properties and advantages also apply to the Rigofill ST-S system. The systems have been optimised for different installation situations.



In the following, please be sure to pay attention to this sign. Statements marked with this sign apply to both Rigofill ST-A and Rigofill ST-S.

Complies with EN 17152-1 / ISO 4981

The Rigofill ST variants meet all requirements

EN 17152-1 is the first product standard for storage/ infiltration modules on a European basis. It was published in November 2019 together with the test standards for short-term compressive strength (**EN 17150**) and long-term compressive strength (**EN 17151**). This allows determining and comparing the long-term compressive strength based on a European standardised test method for the first time.

The standard will now gradually replace national approvals or be used as a basis for the test requirements of approvals. The focus is on determining the long-term breaking load. This is determined from extensive tests lasting up to several 1000 h. Using statistical, standardised evaluation methods, long-term compressive strength is then determined for a service life of at least 50 years.

While EN 17152-1 only requires proof of the vertical longterm compressive strength when the storage/infiltration modules are used in infiltration systems, proof of the vertical and horizontal long-term compressive strength is required when they are used as a storage or temporary storage system. Furthermore, there are detailed specifications for the material tests as well as the requirement of an EN-compliant marking of the modules, in which, depending on the application, long-term compressive strength is also required for the first time.

Internationally recognised standard

With ISO 4981, there is now also an internationally recognised standard. As ISO 4981 and EN 17152-1 only differ in a few details, the Rigofill module designs also comply with ISO.

This means that both module designs comply with the latest product standards for storage/infiltration modules both in Europe and internationally.



EN 17152-1compliant





Rigofill ST-Advanced – the universal storage component

Basic element for underground water storage facilities

Rigofill ST-A are plastic tanks to be installed underground (storage/infiltration modules) in which water is collected and stored. The storage space consists of numerous Rigofill ST-A modules which can be combined threedimensionally to form large systems.





Structure

Rigofill ST-A is a modular system which is characterised by high flexibility, rapid installation and a high level of user-friendliness. The blocks have a modular design and consist of two stackable base elements. The low weight of the base elements allows effortless and quick handling during on-site assembly in the excavation pit.

Requires little space for storage

The storage/infiltration modules are supplied in compactly stacked units consisting of 2 pallets with 34 base elements each. When assembled, the 68 base elements form 34 full blocks with a net storage volume of approx. 14 m³. When stacked, the approx. 14 m³ stand compactly on minimum base of approx. 1.60 x 0.80 m (1.28 m²).

The stackability offers decisive advantages for transport, storage and on-site handling.

While considerable module quantities can be stored even in confined construction site conditions, these quantities can also be moved quickly and easily into the excavation pit. The approx. 14 m³ net storage volume mentioned above can be moved with just one stroke. This saves labour and machine time in particular.



Base 1.60 x 0.80 m, height 2.55 m



Module designs



Full block

The universal component for stormwater management can be used for infiltration, retention, harvesting and fire water storage. With dimensions L/W/H of 0.80/0.80/0.66 m and a storage coefficient of 96 %, the full block has a net storage volume of approx. 406 l.





Half block

The Rigofill ST-A half block is used for systems that only permit shallow building depths, e.g. under high groundwater levels. The half block can also be used in together with full blocks to create half-layer staggered system heights. With the dimensions L/W/H of 0.80/0.80/0.35 m and a storage coefficient of 95 %, the half block has a net storage volume of approx. 212 l.





Full block with supporting grid

The supporting grid increases the horizontal strength of the Rigofill ST-A modules and extends the range of applications for increased requirements, e.g., in the case of groundwater outside the system or multiple-layer storage/infiltration systems with great installation depths. With dimensions L/W/H of 0.80/0.80/0.66 m and a storage coefficient of 95 %, the full block has a net storage volume of approx. 401 l.

Modular design

Flexible in terms of size and geometry

The sizes (length and width) of Rigofill storage/infiltration systems can be freely designed with hardly any limitations. The square 800 mm block layout can be easily adapted to fit nearly any layout.

With heights of 660 mm (full block) and 350 mm (half block), systems can be built in various sizes to accommodate any single-layer or multiple-layer combination. Therefore, the system can be very easily adapted to on-site requirements. Under high groundwater levels or low permeability of the native soil, for example, rather shallow-depth systems or systems with large bases are to be preferred. For soils with good permeability, however, high and compact systems are favourable and may be built accordingly. The maximum space available is used.



Storage volume



Extremely high volume

The Rigofill ST-A full block provides a storage volume of 406 litres with a gross volume of 422 litres. With a storage volume of more than 96 %, it stores three times as much water as gravel swales. The half block has a height of 350 mm and is used if shallow systems are required, e.g., in case of high groundwater levels. With a gross volume of 224 litres, it offers a storage volume of 212 litres.





Column void

The storage/infiltration module is 100 % available as storage space. Large openings at the column base and at the column connection allow unrestricted filling and emptying of the columns.

Storage/infiltration systems as compared to gravel swales

Pipe swales and gravel swales can only use approx. 30 %of their volume to store water. Therefore, three times the required water storage volume must be provided by excavation. This requires lots of space which is frequently not available in urban areas. Rigofill ST-A

storage/infiltration systems save an enormous amount of space and excavation work due to their high storage volumes. Thus, subsoil storage spaces for stormwater can be built in a very efficient and cost-saving way.



NB

Storage/infiltration systems considerably increase the storage space. High-performance storage/ infiltration systems and storage systems can be installed even in confined spaces.

Application – infiltration

Returning stormwater to nature with a time delay

Due to dense building development and an increasing number of impervious surfaces, cities are heating up more and more, creating urban heat islands. As a result, heavy rainfall with devastating floods is becoming more frequent in urban areas because the sewer system is overburdened. The increase in impervious surfaces prevents infiltration and evaporation where the water accumulates, so that the natural water cycle is interrupted and has to be artificially restored. With our system solutions, we help infiltrate accumulated stormwater, prevent flooding, relieve sewer networks and replenish groundwater reservoirs. Underground storage/infiltration systems temporarily collect stormwater and later discharge it into nature. Decentralised infiltration in the form of underdrained swale systems, pipe trenches or storage/infiltration systems supports the natural water cycle and creates cooling effects through evaporation in urban areas.



Кеу

- 1 Rigofill ST-A storage/infiltration module
- 2 RigoFlor geotextile
- ③ QuadroControl ST-A system shaft



Application – retention



Retaining stormwater - preventing urban flash flooding

Due to the dense urban development, stormwater falls onto roofs, streets and impervious surfaces – and mainly flows into the sewer system. Increasing extreme precipitation events in a short space of time lead to sewer networks being overburdened, with masses of water leaking uncontrollably onto properties and traffic areas and posing a risk to people and infrastructure. The use of stormwater retention systems is necessary to protect waterbodies and sewer networks from large volumes of water. If the subsoil conditions are unfavourable for infiltration, the precipitation should be retained and discharged at a slower rate and with a time delay. Underground retention systems collect the stromwater and release it slowly and continuously. This avoids or reduces intermittent loads on sewer networks, wastewater treatment plants and waterbodies.



Кеу

- 1 Rigofill ST-A storage/infiltration module
- 2 Protective geotextile
- ③ Impermeable membrane (KDB)
- 4 QuadroControl ST-A system shaft
- 5 Adapter



Application – harvesting

Harvesting stormwater - saving precious drinking water

Stormwater is a valuable resource that helps to save precious drinking water and groundwater and reduces the burden on drinking water systems. With modern stormwater management, stormwater can be put to good use wherever drinking water quality is not required. The stormwater stored in underground cisterns can be used in a variety of ways in business, industry, municipalities and households - for example for flushing toilets or cleaning vehicles and public spaces. If it is used to irrigate gardens, urban greenery and sports facilities, it has the positive side effect of evaporation and cooling the city. Used in the commercial sector as cost-effective industrial and process water, it reduces dependence on expensive and scarce water resources and conserves groundwater supplies. The utilisation of collected stormwater for irrigation purposes and non-potable applications is an important component and a sensible alternative to unused discharge into the sewer system.



Key

- 1 Rigofill ST-A storage/infiltration module
- 2 Protective geotextile
- ③ Impermeable membrane (KDB)
- (4) QuadroControl ST-A system shaft
- 5 QuadroLift pump shaft



Application – fire water storage

Keeping stormwater available for emergencies

Drinking water networks are overloaded due to increasing development, which is why in many cases storage tanks are needed to ensure the supply of fire water. The refurbishment of drinking water supplies across Germany is often accompanied by a reduction in the size of the network. As a result, fire water tanks are increasingly required for existing properties for which the supply from the public system was previously sufficient. Instead of straining the scarce and precious drinking water and groundwater resources, stormwater should be used for extinguishing fires. Stormwater stored in cisterns reduces water costs and relieves the burden on the public water supply.



Кеу

- 1 Rigofill ST-A storage/infiltration module
- 2 Protective geotextile
- ③ Impermeable membrane (KDB)
- (4) QuadroControl ST-A system shaft
- 5 QuadroTake fire water tapping shaft





Increased strength for the storage/infiltration system

The supporting grid – for increased requirements



The supporting grid was designed to expand the range of applications for increased requirements, e.g., for cases of watertight systems with groundwater, dammed-up water or strata water outside the system, or multiplelayer systems with high installation depths (> 6m). Installation situations like these lead to increased horizontal loads (e.g. in the form of water pressure) on the block system and installation limits being restricted significantly.

This led to the development of an additional supporting element for the Rigofill ST designs, i.e., the so-called supporting grid. The supporting grid features a honeycomb design and exactly matches the column structure of the two half elements. It is installed between two half base elements. The additional support increases the horizontal strength by approx. 60 %, thus allowing a significant expansion of the installation limits.

NB

When you place an enquiry, we will check and determine whether or not the supporting grid is required. The verifiable static verification can be prepared by FRÄNKISCHE projectspecifically and made available, if required.



Rigofill ST-A with supporting grid



Installation in groundwater



High installation depth of a multiple-layer storage/infiltration system

Designed & engineered in Germany

Future-proof system

Strong and durable storage/infiltration systems require technically reliable and ideally matched components. All Rigofill ST-A and Rigofill ST-S system components combine to a reliable system for stormwater storage which withstands any stress for decades. Repairs in case of damage are complicated and expensive in particular with large underground systems. In the production of all system components, FRÄNKISCHE attaches greatest importance to using tried-and-tested materials. Consistent quality control and the certification of stormwater management systems by independent testing institutes provide design engineers, investors, building companies and installers with utmost reliability.



Superior materials

Rigofill ST-A and Rigofill ST-S modules are made of polypropylene and are especially robust and durable. The modules and all system components are manufactured in Germany according to certified processes. Ideal storage and transport conditions furthermore guarantee that customers receive the kind of quality they expect when buying FRÄNKISCHE products. The materials can also be recycled at the end of their useful life.

Installation

Easy construction site handling



Requires little space for storage

The base elements of the storage/infiltration modules are supplied in compact, stacked units consisting of 2 pallets with 34 base elements each. When assembled, the 68 base elements form 34 full blocks with a net storage volume of approx. 14 m³. When stacked, these approx. 14 m³ rest compactly on a base area of approx. 1.60 x 0.80 m (1,28 m²). The easy stackability of the Rigofill ST-A modules allows them to be stored even in confined construction spaces.



Assembly inside/outside the excavation pit

Depending on the requirements, Rigofill ST-A modules can be assembled in no time at all, both outside and inside the excavation pit in just one easy step. Easy high tensile strength snap connections allow for combining two base elements to create a reliable unit in only a short period of time. This can be easily done by one person only without requiring any additional tools. The moveable parts of the snap connection are recessed and thus protected from damage.



Easy assembly inside the excavation pit

There is no need to adhere to any complex installation pattern – the pre-assembled modules or base elements can just as well be connected to create a single unit. The low weight allows this to be done by one person only. Connectors establish firm connections between the individual modules. The surface can be accessed immediately without any risk of accidents, since the hole size of the columns is dimensioned respectively (< 100 mm). Thus, no additional covers of column holes are required.





Single-layer connector for installation in the roof slab of **half-/single-layer** systems



Multiple-layer connector for installation in **multiple-layer** systems between different layers, for connecting layers with each other

Connectors

Connectors help secure the modules in place. Secure modules using connectors on the top surface of the module in the centre of each edge that is adjacent to another module.

Inspection

CCTV inspection even when filled



Storage/infiltration systems are durable structures for urban drainage; they must work reliably for decades. Durability and reliability are essential requirements. The best way to inspect the state of a system using state-of-the-art technology is CCTV inspection. Thus, a storage/infiltration system can be checked excellently – for final acceptance or later. This establishes safety for authorities, engineers, construction companies, customers, and operators.

Inspection shafts

The inspection shaft is the "gateway" to the system, both its accessibility and its number ultimately determine the level of inspection of the entire system. With regard to the 50-year service life, it is therefore important to consider this during the planning stage. Thanks to the QuadroControl ST-A shaft, CCTV inspection technology can be brought to the spot. The generously dimensioned access diameter (DN/ID 500) allows unobstructed access "from aboveground" using camera dollies and standard flushing technology.





Cross-shaped inspection tunnel

Rigofill ST-A modules have a cross-shaped tunnel which makes the storage/infiltration system camera-accessible and flushable in two axes and thus in four dimensions. The special and open design of the inspection tunnel allows for an unobstructed view of the entire interior and not only the inspection tunnel. The optimised, level running surface ensures problem-free and largely vibration-free driving. For example, the load-bearing elements, the state of the connections, the condition of the geotextile and the entire soil area can be visualised. Rigofill ST-A provides excellent possibilities for inspecting the interior of the system at any time.

Recommended camera equipment



Certified CCTV accessibility



Rigofill ST-A has been designed for the use of modern CCTV inspection technology. The inspectability of the Rigofill ST-A and QuadroControl ST-A system unit has been tested and confirmed by leading manufacturers of pipe CCTV inspection technology!

Recommended: tender invitation for final acceptance inspection



Final acceptance of sewers using camera inspection has long since become a matter of course in sewer construction. The final acceptance inspection is also important in the construction of storage/infiltration systems! Planning engineers should absolutely include this in their tender documents.



Loading

Storage/infiltration systems are subsoil structures and must have sufficient load-carrying capacity against impacting soil and traffic loads. The stability must be proven according to EuroCode, taking into account partial safety factors and/or limiting factors under the boundary conditions prevailing on site. A minimum service life of at least 50 years is considered in this regard. Possible installation depths and depths of cover depend heavily on the backfill material and the subsequent surface utilisation (traffic load). Storage/ infiltration modules such as Rigofill ST-A are small structural miracles that feature high strength despite their low material content. For this reason, the "components" can also be arranged together as a system under a wide variety of traffic areas and can easily withstand HGV 60 traffic loads.

The structural analysis is usually carried out for vertical and horizontal loads. While the vertical load limits and defines the height of cover, the horizontal load limits the maximum installation depth. Both verifications together provide information about the possible position of the system in the ground.

Particularly in the case of waterproof systems, the influence of dammed-up water and strata water must also be taken into account, as this can increase the horizontal load many times over, thereby reducing the possible installation depth or possibly making the use of supporting grids necessary.





Minimum service life

Installation under traffic areas

When installed under traffic areas, relevant national guidelines, e.g., RStO 12, must be observed. These provide the mathematical basis for calculating a sufficient superstructure thickness depending on the subsequent use of the surface and generally define the requirements for the planum below the road layout.

To build the planum for the road construction, an upper levelling layer must be provided. Unless otherwise defined by national regulations, it is recommended that a uniform modulus of deformation of E_{v_2} larger than or equal to 45 MN/m² be verified for the planum requirements, which means that a levelling layer with a thickness of at least 35 cm must be provided. This should preferably be built as a gravel sub-base, other materials usually result in larger covers or other moduli of deformation lead to greater or lesser layer thicknesses of the levelling layer.

NB

With low cover heights smaller than 80 cm in traffic areas, it is not only the static verification alone that is important, but also the execution during the construction phase must be considered and evaluated in detail due to the low structure heights. If necessary, additional load-distributing measures for construction site traffic must be taken during the construction phase or the installation of the cover materials. Furthermore, it must be ensured that the planned superstructure with its structure and overall thickness can also withstand the challenges of the traffic load without significant deformations, as these would otherwise further reduce the distance between the wheel and the storage/infiltration system over time.

Traffic area	SLW 60/HGV 60	The subsoil structures must have sufficient
Superstructure according to relevant guidelines, e.g., RStO 12	Planum E _{v2} ≥ 45 MN/m ² CBR≥ 12 %	load-carrying capacity against impacting soil and traffic loads to ensure reliable stability. This is why Rigofill ST-A is suitable for traffic loads of up to SLW 60/HGV 60.
Upper levelling layer		depths of cover of $D_c 4$ m and soil depths of $D_s 6$ m are possible for infiltration systems.
	Ds≤6m	A project-specific stability analysis can be prepared by FRÄNKISCHE. * SLW 60, specific weight of soil 19 kN/m ³ , friction angle 30, mean soil temperature max. 23 °C
Rigofill ST-A		
	$Bearing E_{yy} \ge 45 \text{ MN/m}^2 \text{ CBR} \ge 12 \%$	
Lower levelling layer ¹⁾	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0	
	Highest groundwater level	Footnotes illustration
Subsoil		¹⁾ At least the same permeability (k _r) as the subsoil for infiltration systems ²⁾ Lower cover upon request!

Standard installation under a traffic area using Rigofill ST-A (installation depth up to 6 m)

Standard installation under a traffic area using Rigofill ST-S (installation depth up to 4 m)

Traffic area	SLW 60/HGV 60		
Superstructure according to relevant guidelines, e.g., RStO 12	Planum E _{v2} ≥ 45 MN/m² CBR≥ 12 %		
Upper levelling layer		35 cm	
Diracelli CT C			D _s ≤41
Rigotili S I-S	Bearing E _{1/2} ≥ 45 MIV/m² CCR ≥ 12 %		
Lower levelling layer ¹⁾	0,2,00,000,0,0,0,0,0,0,0,0,0,0,0,0,0,0,	approx	. 10 cm
Subsoil	Highest groundwater level		

The Rigofill ST-S storage/infiltration module is suitable for traffic loads of up to SLW 60/HGV 60 and therefore also suitable for the construction of systems under parks, greens and car parks. With conventional installation parameters*, depths of cover of D_c 2.3 m and soil depths of D_s 4 m are possible for infiltration systems. A projectspecific stability analysis can be prepared by FRÄNKISCHE.

* SLW 60, specific weight of soil 19 kN/m³, friction angle 30, mean soil temperature max. 23 °C





NB

Note for groundwater over structure soil: Rigofill ST systems, which are used as watertight storage systems with impermeable plastic membrane, have been designed for application above the highest groundwater level (HGW). Use in groundwater is possible under corresponding technical conditions after consultation with FRÄNKISCHE. Please contact us!



Quadro[®]Control ST-Advanced – system shaft

Integrated inspection shafts

QuadroControl ST-A is a polypropylene inspection shaft which can be integrated in the storage/infiltration system. It is square with a base of 800 x 800 mm and can be used anywhere in the layout. Its height results from the number of layers of the overall system. The shaft allows comfortable access to the inspection tunnel from above ground. High-performance inspection and flushing equipment can easily be inserted into the inspection tunnel. The shaft is integrated into the system and grows layer by layer as construction progresses. QuadroControl ST-A is delivered with all required components and will be assembled on site.



The shaft cone is the transition to the extension pipe. The length of the extension pipe is chosen depending on the installation depth.

The shaft is integrated into the storage/infiltration system and grows layer by layer as construction progresses.

The shaft components are stackable, and delivery includes the cone with all required components.

Arrangement of inspection shafts

Number of and position in the system are above all determined by the size of the system, access, pipe connections, design of the outdoor facilities and the level of inspectability.

In order to ensure that the complete system can be inspected, each row should comprise at least one inspection shaft. In addition, the shafts should be positioned such that the shaft covers do not interfere with the design of the outdoor facilities, but can easily be accessed by vehicles for maintenance purposes.

Adjacent shafts should be staggered in the layout.



Design-relevant dimensions



Dimensions





Sidewall grid connection options full block

Full block connection options

DN/OD 125, 200, 250, 315, 500



Connections at the top or at the bottom





Full block connection options DN/OD 110, 160, 270, 400



Connections at the top or at the bottom



NB

Generally, sidewall grids can also be installed turned by 180°. This allows all available nominal diameters to be realised both at the top and the bottom of the module.

Sidewall grid connection options half block

Half block connection options

DN/OD 110, 125, 160, 200, 250, 270

Connections at the bottom





NB

Generally, sidewall grids can also be installed turned by 180°. This allows all available nominal diameters to be realised both at the top and the bottom of the module.

Adapter connection options

Connection options

DN/OD 315, 400, 500







NB

Generally, adapters can also be installed turned by 180°. This allows all available nominal diameters to be realised both at the top and the bottom of the module.

Sidewall grid inside corners

NB

In storage/infiltration designs with inside corners, shortened sidewall grids are used at one side.



Special quality: inside corner



Rigofill ST-S sidewall grid

Cat. no. 51594485

Rigofill ST-S sidewall grid, short

Cat. no. 51594488

Rigofill ST-S half block, short

Cat. no. 51594489

Rigofill ST-A sidewall grid

Cat. no. 51594585

Rigofill ST-A sidewall grid, short

Cat. no. 51594588

Rigofill ST-A half block, short

Cat. no. 51594589

Quadro®Control ST-A dimensions

Connection options A1

DN/OD 200 or DN/OD 315 connection possible

QuadroControl ST-A	h
0.5-layer	350 mm
1-layer	660 mm
1.5-layer	1,010 mm
2-layer	1,320 mm
2.5-layer	1,670 mm
3-layer	1,980 mm
3.5-layer	2,330 mm
4-layer	2,640 mm





Quadro®Control ST-A shaft structure

Structure for inspection shaft Structure for swale emergency overflow Class B, C or D gully gutter acc. to DIN EN 124, CW 610 Class B or D shaft covers acc. to DIN EN 124, CW 610 Support ring acc. to DIN 4034, Support ring acc. to DIN 4034, D_i = 625 mm $D_{i} = 625 \text{ mm}$ 0000 Sediment trap Filter set 000 $D_0 600$ D₀ 600 DOM sealing ring DOM sealing ring Extension pipe Extension pipe D₀ 600 $D_{\circ}\,600$ Sealing ring Sealing ring



1/2-layer

1-layer

1 1/2-layer

2-layer

2 1/2-layer

Rigofill® ST-Advanced – product overview

			Product	Technical data		Cat. no.
В	ase element	WHAT	Rigofill ST-A base element	W x D x H = 800 x 800	x 330 mm	51594500
		- Martin	NB The full block consists of	of two base elements		1
R	oof slab	LINUNELL	Rigofill ST-A roof slab	W x D x H = 800 x 800	x 50 mm	51594501
			NB The half block consists	of one roof slab and one bas	se element.	
Si fu	idewall grid Ill block		Rigofill ST-A sidewall grid full block	W x D x H = 800 x 30 x Connections: DN 110, 1 315, 400, 500	: 660 mm 25, 160, 200, 225, 250,	51594585
			Rigofill ST-A sidewall grid half block	W x D x H = 800 x 30 x Connections: DN 110, 1	: 350 mm 25, 160, 200, 225, 250	51594586
Si ha	idewall grid alf block		Rigofill ST-A sidewall grid, short full block	W x D x H = 770 x 30 x Connections: DN 110, 1 315, 400, 500	. 660 mm 25, 160, 200, 225, 250,	51594588
Si	upporting grid		Rigofill ST-A sidewall grid, short half block	W x D x H = 770 x 30 x Connections: DN 110, 1	350 mm 25, 160, 200, 225, 250	51594589
			Rigofill ST-A supporting grid	for Rigofill ST-A full block W x D x H = 800 x 800 x 40 mm		51594590
A	dapter	STE	Rigofill ST-A adapter full block	W x H = 800 x 660 mm Connections: DN 315, 400, 500		51594587
		Î	Ventilation unit	Connection panel, structured-wall pipe DN 110 (L = 3.0 m), ventilation cowl and profile sealing ring DN 110		51990110
V	entilation unit		Connector single-layer	Requirement for single-row installation	1 pc(s). per module	51594301
Si	ingle-layer	<u>F</u> D	(suitable for single-layer installations)	Requirement for multiple-row installation	2 pc(s). per module	51554501
	connector	-1	Connector multiple-layer (for multiple-laver	Requirement for two-layer installation	1 pc(s). per module	51594302
connector		installations)	Requirement for three-layer installation	1.3 pc(s). per module (factor 1.3)		
	CE 0799-	CPR-55		200 - 1-2 4		E4005000
			PigoElor	200 g/m ² ; 4 m width; 50 m length		51695000
R	igoFlor	1 .	Higor Ioi	200 g/m², 4 m width: 10 m length		51695002
		40				

	Product	Technical data	Cat. no.
	Shaft covers acc. to DIN EN 124	Class B or D; CW 610	
A	Gully gutter acc. to DIN EN 124	Class B, C or D; CW 610	to be ordered/ supplied on site
	Support ring acc. to DIN 4034, Part 1	Height: 100 mm	
	Filter set D _o 600	Swale emergency overflow for shafts D _o 600 comprising dirt trap and geotextile filter bag	51991002
	Geotextile filter bag $D_0 600$	Replacement filter set D _o 600	51991099
and the second s	Sediment trap D _o 600	Suitable for installation under CW 610 shaft covers	51991095
0	DOM sealing ring	For extension pipe D _o 600; for sealing to concrete support ring	51919505
			54550554
		$D_0 600;$ 1 m length	51550551
	Extension pipe	D _o 600; 2 m length	51550552
	without inlet	D _o 600; 3 m length	51550553
		D _o 600; 6 m length	51550556
	Future in the	D _o 600; 1 m length	51550581
	Extension pipe with inlet DN/OD 200	D _o 600; 2 m length	51550582
		D _o 600; 3 m length	51550583
		D ₀ 600; 1 m length	51550591
	Extension pipe	D _o 600; 2 m length	51550592
		D _o 600; 3 m length	51550593
0	QuadroControl ST-A 1/2-layer	$W \times D \times H = 800 \times 800 \times 350 \text{ mm}^{10}$ incl. couple cone and one profile sealing ring	51594505
	QuadroControl ST-A 1-layer	WxDxH = 800x800x660 mm ¹⁾ incl. couple cone and one profile sealing ring	51594510
DING	QuadroControl ST-A 1 1/2-layer	WxDxH = 800x800x1,010 mm ¹⁾ incl. couple cone and one profile sealing ring	51594515
0	QuadroControl ST-A 2-layer	WxDxH = 800x800x1,320 mm ¹⁾ incl. couple cone and one profile sealing ring	51594520
	QuadroControl ST-A 2 1/2-layer	WxDxH = 800x800x1,670 mm ¹⁾ incl. couple cone and one profile sealing ring	51594525
Dir mil	QuadroControl ST-A 3-layer	WxDxH = 800x800x1,980 mm ¹⁾ incl. couple cone and one profile sealing ring	51594530
0110	QuadroControl ST-A 3 1/2-layer	WxDxH = 800x800x 2,330 mm ¹⁾ incl. couple cone and one profile sealing ring	51594535
A REAL	QuadroControl ST-A 4-layer	$WxDxH = 800x800x2,640 \text{ mm}^{10}$ incl. couple cone and one profile sealing ring	51594540

QuadroControl ST-A supporting grid	W x D x H = 800 x 800 x 40 mm	51594591
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¹⁾ Plus 130 mm couple cone total height

1/2-layer



Supporting grid shaft

1 1/2-layer

Rigofill® ST-Standard – product overview

		Product	Technical data		Cat. no.
Base element	INHW!	Rigofill ST-S base element	W x D x H = 800 x 800 x	x 330 mm	51594400
		NB The full block consists of	of two base elements		
Roof slab	LEUNCH	Rigofill ST-S roof slab	W x D x H = 800 x 800	x 50 mm	51594401
		NB The half block consists	of one roof slab and one bas	e element.	1
Sidewall grid full block		Rigofill ST-S sidewall grid full block	W x D x H = 800 x 30 x Connections: DN 110, 12 315, 400, 500	660 mm 25, 160, 200, 225, 250,	51594485
		Rigofill ST-S sidewall grid half block	W x D x H = 800 x 30 x Connections: DN 110, 12	350 mm 25, 160, 200, 225, 250	51594486
Sidewall grid half block		Rigofill ST-S sidewall grid, short full block	, short W x D x H = 770 x 30 x 660 mm Connections: DN 110, 125, 160, 200, 225, 250, 315, 400, 500		51594488
Supporting grid		Rigofill ST- S sidewall grid, short half block	fill ST- S wall grid, short olock W x D x H = 770 x 30 x 350 mm Connections: DN 110, 125, 160, 200, 225, 250		51594489
	No.	Rigofill ST-S supporting grid	for Rigofill ST-S full block W x D x H = 800 x 800 x 40 mm		51594490
Adapter	1. TE	Rigofill ST-S adapter full block	W x H = 800 x 660 mm Connections: DN 315, 400, 500		51594487
Marchine and	Ĩ	Ventilation unit	Connection panel, structured-wall pipe DN 110 (L = 3.0 m), ventilation cowl and profile sealing ring DN 110		51990110
ventilation unit		Connector single-layer	Requirement for single-row installation	1 pc(s). per module	
Single-layer connector		(suitable for single-layer installations)	Requirement for multiple-row installation	2 pc(s). per module	51594301
Multiple-layer connector	TP	Connector multiple-layer	Requirement for two-layer installation	1 pc(s). per module	E1E04202
		installations)	Requirement for three-layer installation	1.3 pc(s). per module (factor 1.3)	51594302
CE 0799	9-CPR-55				
RigoFlor			200 g/m²; 4 m width; 50 m length		51695000
	1	RigoFlor	200 g/m²; 4 m width; 25 i	m length	51695002
			200 g/m²; 4 m width; 10 r	m length	51695003

D;to be ordered, supplied on siteor D;to be ordered, supplied on sitemmfilergency overflow for shafts $D_0 600$ dirt trap and geotextile filter bagfilent filter set $D_0 600$ fileon pipe $D_0 600$; o concrete support ringfilen lengthfilen lengthfil	Product	Technical data	Cat. no.
or D;to be ordered/supplied on sitemmfor a statergency overflow for shafts $D_0 600$ dirt trap and geotextile filter bagfor a statent filter set $D_0 600$ for a statent filter set $D_0 600$; o concrete support ringfor a staten lengthfor a statefor a statefor a staten lengthfor a state <td>Shaft covers acc. to DIN EN 124</td> <td>Class B or D; CW 610</td> <td></td>	Shaft covers acc. to DIN EN 124	Class B or D; CW 610	
mm imm rgency overflow for shafts D _o 600 dirt trap and geotextile filter bag 51991002 int filter set D _o 600 51991099 int filter set D _o 600; o concrete support ring 51991095 int filter set D _o 600; o concrete support ring 51991095 int filter set D _o 600; o concrete support ring 51991095 int length 51550551 int length 51550552 int length 51550553 int length 51550583 integth 51550582 integth 51550583 integth 51550593 integth 51594405 800x800x350 mm ¹⁰ cone and one profile sealing ring 51594410 800x800x1,010 mm ¹⁰ cone and one profile sealing ring 51594420 300x800x1,670 mm ¹⁰ cone and one profile sealing ring 51594425 300x800x1,670 mm ¹⁰ cone and one profile sealing ring 51594430	Gully gutter acc. to DIN EN 124	Class B, C or D; CW 610	to be ordered/ supplied on site
rgency overflow for shafts $D_0 600$ dirt trap and geotextile filter bag51991002Int filter set $D_0 600$ 51991095Installation under CW 610 shaft covers51991095In length51550551In length51550552Inlength51550556In length51550581In length51550582Inlength51550582Inlength51550593Inlength51550593Inlength51550593Inlength51550593Inlength51550593Inlength51550593Inlength51550593Inlength51550593Inlength51550593Inlength51550593Inlength51550593Inlength51594405Inlength51594410Inlength51594410Inlength51594415Inlength51594415Inlength51594420Inlength51594425Inlength51594430Inlength51594430Inlength51594430Inlength51594430Inlength51594430Inlength51594430Inlength51594430Inlength51594430	Support ring acc. to DIN 4034, Part 1	Height: 100 mm	
rgency overflow for shafts $D_0 600$ dirt trap and geotextile filter bag51991092Int filter set $D_0 600$ 51991095Installation under CW 610 shaft covers51991095In pipe $D_0 600$; o concrete support ring51550551In length51550552In length51550552In length51550553In length51550583In length51550583In length51550583In length51550583In length51550583In length51550593In length51550593In length51550593In length51550593In length51550593In length51550593In length51594405In length51594405In length51594410In length51594410In length51594415In length51594415In length51594415In length51594415In length51594415In length51594415In length51594415In length51594415In length51594420In length51594425In length51594425In length51594425In length51594430In length51594430In length51594430In length51594430In length51594430In length51594430In length51594430In length51594430In length51594430 </td <td></td> <td>1</td> <td></td>		1	
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Installation under CW 610 shaft covers 51991095 Image: construct of the state of	Geotextile filter bag $D_0 600$	Replacement filter set D _o 600	51991099
Installation under CW 610 shaft covers 51991095 In pipe $D_0 600$; 51919505 In length 51550551 In length 51550552 In length 51550553 In length 51550553 In length 51550556 In length 51550583 In length 51550583 In length 51550583 In length 51550583 In length 51550593 In length 51594405 In length 51594405 In length 51594410 800×800×1,010 mm ¹⁰ 51594415 800×800×1,010 mm ¹⁰ 51594415 800×800×1,320 mm ¹⁰ 51594420 800×800×1,670 mm ¹⁰ 51594420 300×800×1,670 mm ¹⁰ 51594430 300×800×1,980 mm ¹⁰ 51594430			
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h length 51550551 h length 51550552 h length 51550553 h length 51550553 h length 51550582 h length 51550582 h length 51550583 h length 51550582 h length 51550583 h length 51550591 h length 51550592 h length 51550593 800x800x350 mm ¹⁾ 51590593 800x800x350 mm ¹⁾ 51594405 800x800x350 mm ¹⁾ 51594405 800x800x1,010 mm ¹⁾ 51594410 800x800x1,010 mm ¹⁾ 51594410 800x800x1,010 mm ¹⁾ 51594415 800x800x1,320 mm ¹⁾ 51594415 800x800x1,670 mm ¹⁾ 51594420 800x800x1,670 mm ¹⁾ 51594425 800x800x1,670 mm ¹⁾ 51594425 800x800x1,980 mm ¹⁾ 51594430	DOM sealing ring	For extension pipe D _o 600; for sealing to concrete support ring	51919505
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n length 51550592 n length 51550593 800x800x350 mm ¹⁾ 51550593 800x800x660 mm ¹⁾ 51594405 800x800x660 mm ¹⁾ 51594410 800x800x1,010 mm ¹⁾ 51594410 800x800x1,010 mm ¹⁾ 51594415 800x800x1,010 mm ¹⁾ 51594415 800x800x1,320 mm ¹⁾ 51594420 800x800x1,320 mm ¹⁾ 51594420 800x800x1,670 mm ¹⁾ 51594425 300x800x1,670 mm ¹⁾ 51594425 300x800x1,980 mm ¹⁾ 51594430		D ₋ 600: 1 m length	51550591
an length 51550593 800x800x350 mm ¹⁾ 51594405 800x800x660 mm ¹⁾ 51594405 800x800x660 mm ¹⁾ 51594410 800x800x1,010 mm ¹⁾ 51594410 800x800x1,010 mm ¹⁾ 51594415 800x800x1,010 mm ¹⁾ 51594415 800x800x1,020 mm ¹⁾ 51594420 800x800x1,320 mm ¹⁾ 51594420 800x800x1,670 mm ¹⁾ 51594425 800x800x1,670 mm ¹⁾ 51594425 800x800x1,980 mm ¹⁾ 51594430	Extension pipe	$D_{-}600:2 \text{ m length}$	51550592
800x800x350 mm ¹⁰ 51594405 800x800x660 mm ¹⁰ 51594410 800x800x660 mm ¹⁰ 51594410 800x800x1,010 mm ¹⁰ 51594415 800x800x1,010 mm ¹⁰ 51594415 800x800x1,200 mm ¹⁰ 51594420 800x800x1,320 mm ¹⁰ 51594420 800x800x1,670 mm ¹⁰ 51594425 800x800x1,670 mm ¹⁰ 51594425 800x800x1,980 mm ¹⁰ 51594430	with inlet DN/OD 315	D _o 600: 3 m length	51550593
800×800×350 mm ¹⁾ cone and one profile sealing ring 51594405 800×800×660 mm ¹⁾ cone and one profile sealing ring 51594410 800×800×1,010 mm ¹⁾ cone and one profile sealing ring 51594415 800×800×1,010 mm ¹⁾ cone and one profile sealing ring 51594415 800×800×1,320 mm ¹⁾ cone and one profile sealing ring 51594420 800×800×1,670 mm ¹⁾ cone and one profile sealing ring 51594425 300×800×1,980 mm ¹⁾ cone and one profile sealing ring 51594430			
800×800×660 mm ¹⁾ 51594410 800×800×1,010 mm ¹⁾ 51594415 800×800×1,010 mm ¹⁾ 51594415 800×800×1,320 mm ¹⁾ 51594420 800×800×1,320 mm ¹⁾ 51594420 800×800×1,670 mm ¹⁾ 51594425 800×800×1,670 mm ¹⁾ 51594425 300×800×1,980 mm ¹⁾ 51594430	QuadroControl ST-S 1/2-layer	WxDxH = 800x800x350 mm ¹⁾ incl. couple cone and one profile sealing ring	51594405
$800 \times 800 \times 1,010 \text{ mm}^{11}$ 51594415 $cone and one profile sealing ring 51594415 800 \times 800 \times 1,320 \text{ mm}^{11} 51594420 cone and one profile sealing ring 51594420 800 \times 800 \times 1,670 \text{ mm}^{11} 51594425 800 \times 800 \times 1,670 \text{ mm}^{11} 51594425 800 \times 800 \times 1,980 \text{ mm}^{11} 51594430 $	QuadroControl ST-S 1-layer	WxDxH = 800x800x660 mm ¹⁾ incl. couple cone and one profile sealing ring	51594410
$800 \times 800 \times 1,320 \text{ mm}^{11}$ 51594420 $cone and one profile sealing ring 51594425 800 \times 800 \times 1,670 \text{ mm}^{11} 51594425 800 \times 800 \times 1,980 \text{ mm}^{11} 51594430 cone and one profile sealing ring 51594430 $	QuadroControl ST-S 1 1/2-layer	WxDxH = 800x800x1,010 mm ¹⁾ incl. couple cone and one profile sealing ring	51594415
800×800×1,670 mm ¹⁾ 51594425 cone and one profile sealing ring 51594425 800×800×1,980 mm ¹⁾ 51594430 cone and one profile sealing ring 51594430	QuadroControl ST-S 2-layer	WxDxH = 800x800x1,320 mm ¹⁾ incl. couple cone and one profile sealing ring	51594420
800x800x1,980 mm ¹⁾ cone and one profile sealing ring 51594430	QuadroControl ST-S 2 1/2-layer	WxDxH = 800x800x1,670 mm ¹⁾ incl. couple cone and one profile sealing ring	51594425
	QuadroControl ST-S 3-layer	WxDxH = 800x800x1,980 mm ¹⁾ incl. couple cone and one profile sealing ring	51594430
	QuadroControl ST-S 2 1/2-layer QuadroControl ST-S 3-layer	WxDxH = 800x800x1,670 mm ¹⁾ incl. couple cone and one profile sealing ring WxDxH = 800x800x1,980 mm ¹⁾ incl. couple cone and one profile sealing ring	5159442

1/2-layer

Supporting grid shaft

1 1/2-layer



supporting grid	W x D x H = 800 x 800 x 40 mm	51594

¹⁾ Plus 130 mm couple cone total height

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 Visual representation of the selected system of stormwater treatment systems, storage/infiltration systems and other components.



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