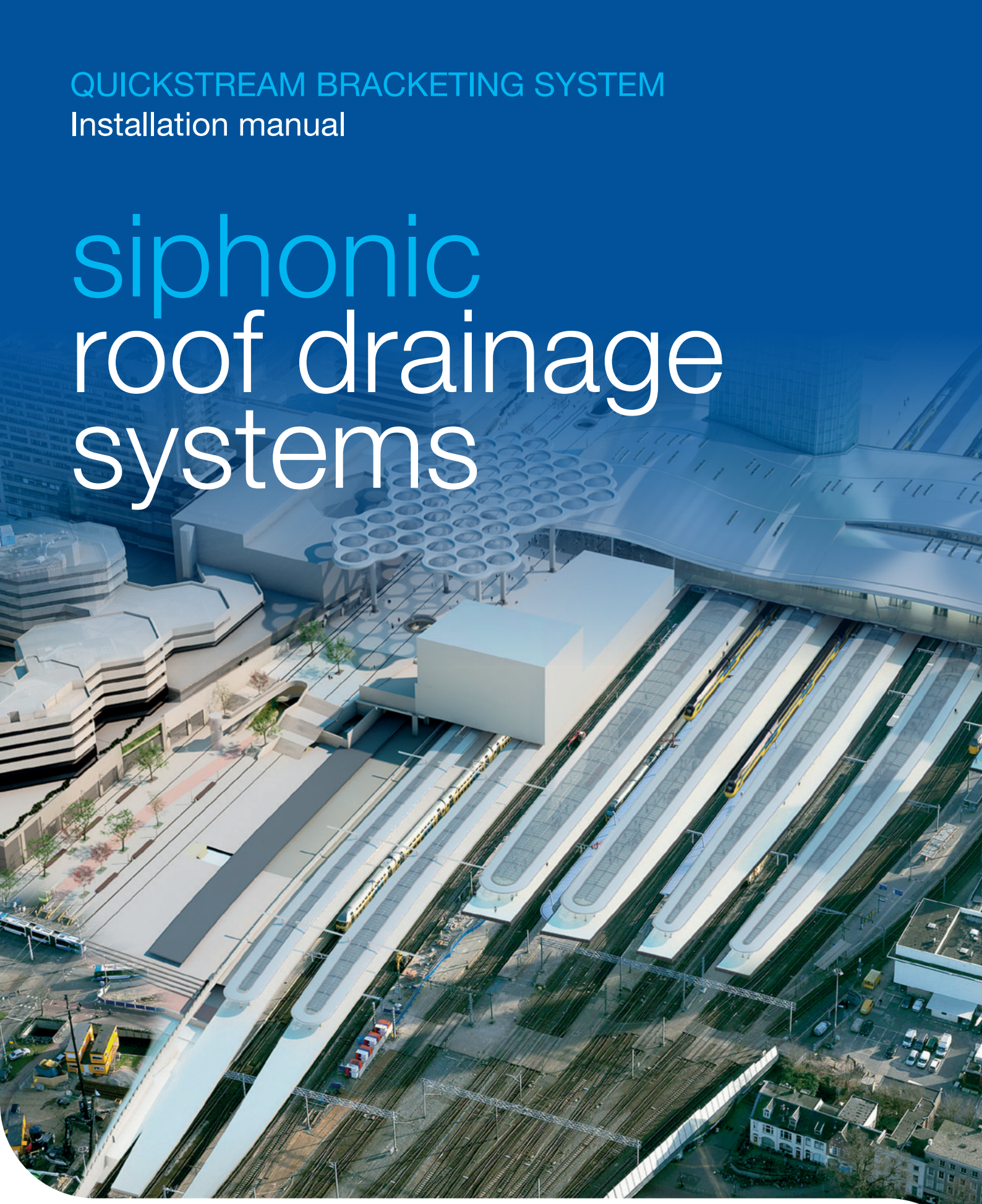
QUICKSTREAM BRACKETING SYSTEM

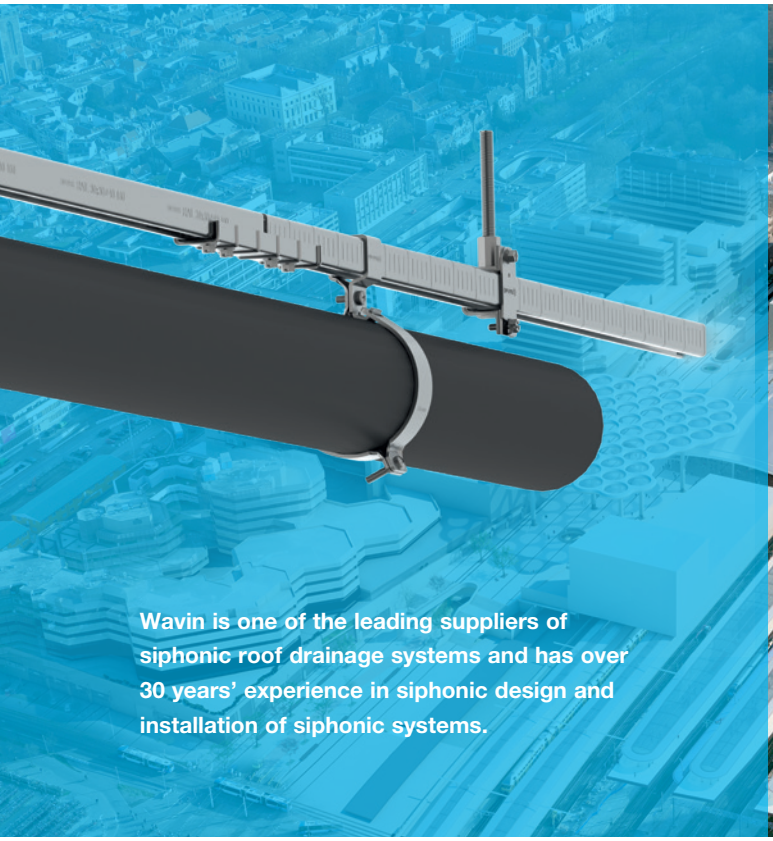
Installation manual

siphonic roof drainage systems



wavin

QuickStream Bracketing System



Wavin is one of the leading suppliers of siphonic roof drainage systems and has over 30 years' experience in siphonic design and installation of siphonic systems.

Optimized bracketing system

Wavin has developed a bracketing system especially dedicated to the Wavin QuickStream system. The bracketing system enables fast installation time and secures a fool proof mounting of the brackets with minimal tooling required.

A controlled absorption of thermal axial pipe stresses in rigid suspension systems by making use of galvanized steel rails is most commonly applied in PE siphonic rainwater discharge systems. The benefits are ease of installation and no unexpected displacements. The thermally induced axial loads are completely absorbed by the suspension and bracketing system.

Once the suspension rails have been installed, pipe segments can then easily be placed in the brackets. In-lays can be placed in the brackets to create a strong and cost effective fix of the pipework against axial displacement. All Wavin QuickStream brackets are designed to enable fast and easy placing of pipe segments and additional closing of the bracket.

The Wavin dedicated bracketing system is simple to use:

- In a few steps the horizontal pipe work is installed in the easiest and safest way.
  - This bracketing system is designed for safe and quick installation by minimizing loose parts and required tools.
- Easy connection at height – clamp is designed to hold pipe in place for easy, quick and safe installation
  - Clamps are delivered in one piece – quick assembly and no loose parts to fall from height to the building floor
- All forces (static, dynamic and thermal induced forces) that occur in the operation of a pressure drainage are safely absorbed by the bracketing system.

Wavin QuickStream - system overview

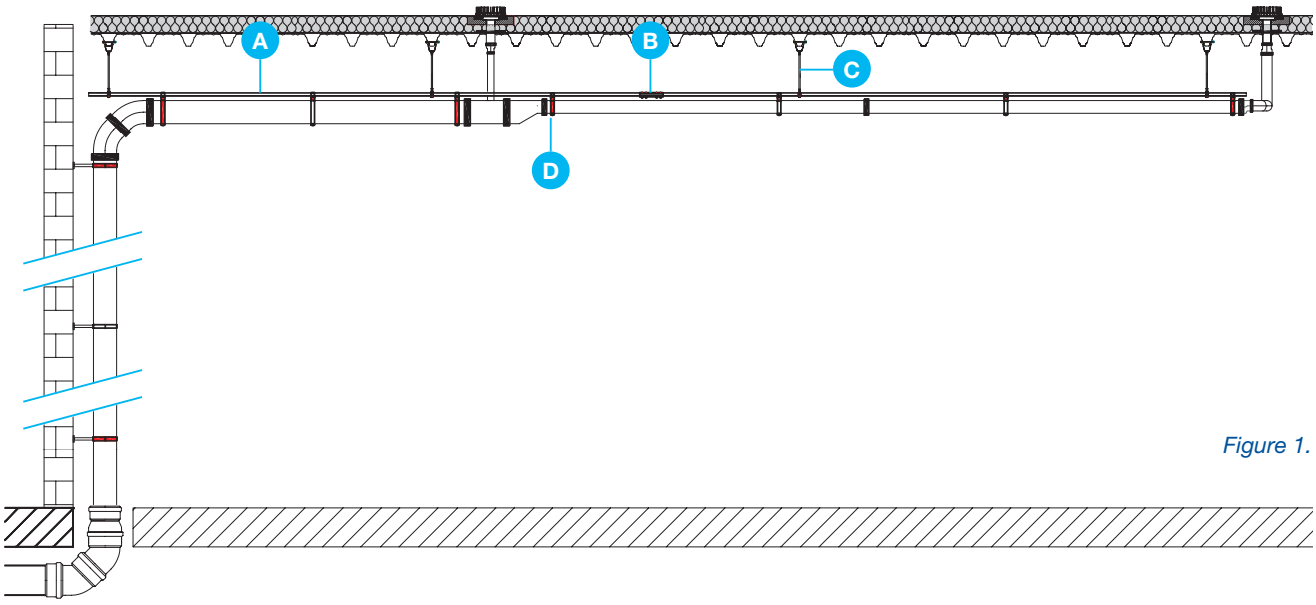
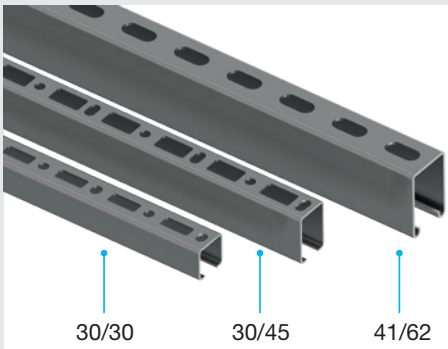


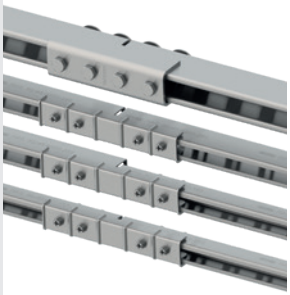
Figure 1.

Rail



A

Rail connector



41/62-41/62

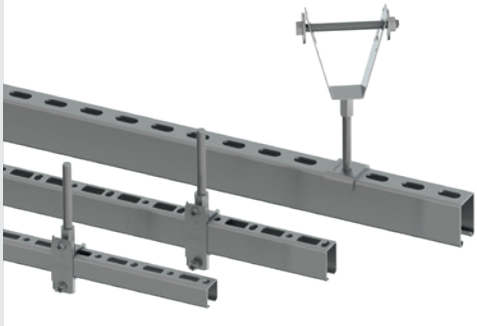
30/45-30/45

30/45-30/30

30/30-30/30

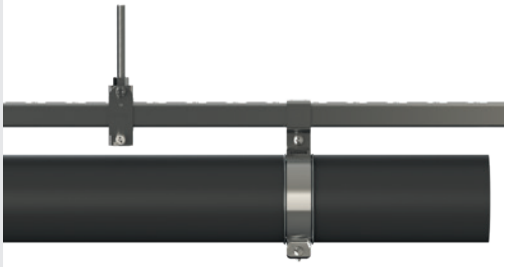
B

Suspension element



C

Fixed-point bracket



D

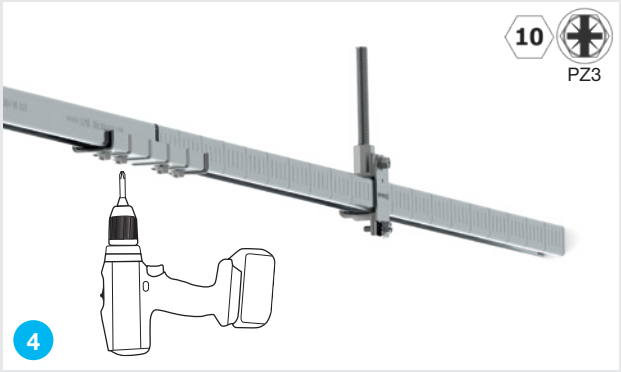
QuickStream
Installation instructions

Installation of the suspension element and fixation of the rail

Install the suspension element at the correct height using a M10 threaded rod.

Fix the rail into the suspension element and fasten the two bolts.

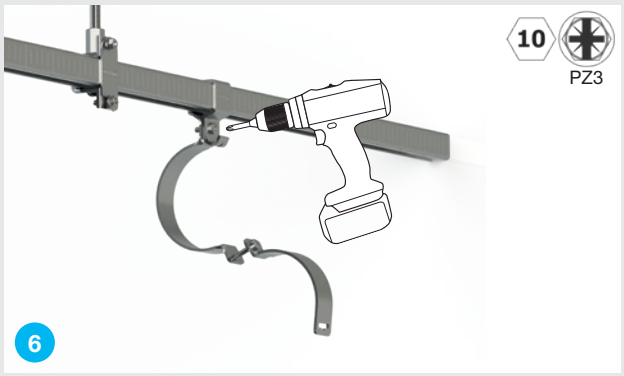
Insert the rail connector approximately halfway into the rail.



Fix the next rail to the rail connector and fasten the 4 bolts (it is not required to place the rails against the previous one).

Installation of brackets

Click the bracket at the right location on the rail (see table 2 for the bracketing distance).

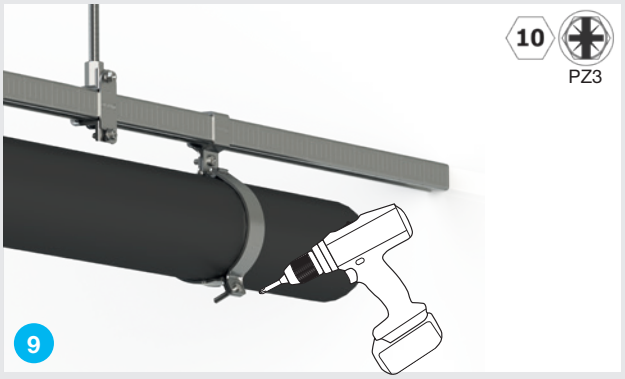


Fix the bracket to the rail by clicking the front part into the rail and fasten the bolt.

Click one stainless steel inlay into the back part of the bracket.

Note: Inlay only required for fixed-point brackets.

Position the PE pipe into the bracket.



Position the front part of the bracket and fasten the bolt.

Bracket installed properly.

Special attention needs to be paid to the following 5 points

1. **Wavin rail connector**
   The suspension rails must be mutually connected with the specific Wavin QuickStream rail connectors that can transfer thermally induced axial loads from one rail to the next one. The rail connector 30 x 30 mm can also be used for rail 30 x 45 mm. It is not possible to make a connection between a 30 x 45 mm rail and a 41 x 62 mm rail, or between a 30 x 30 mm rail and a 41 x 62 mm rail. In cases where it is not possible to use a rail connector, then the extreme brackets on each rail must be of the fixed type. This is only the case at bends and at a diameter change between 315 mm and 250 mm pipe size.

	30 x 30	30 x 45	41 x 62
30 x 30	✔	✔	✖
30 x 45	✔	✔	✖
41 x 62	✖	✖	✔

2. **Install the bottom side of all rails on the same level**
   The bottom side of the different types of rail always needs to be installed on the same level. Special attention to the height of the rail needs to be paid when installation of the rail is started at the upstream side of the horizontal collector pipe and when the pipe size at the downstream side of the horizontal collector pipe is larger than 160 mm. In this situation, the 30 x 30 rail needs to be installed 15 or 30 mm lower to allow a bottom level connection to a 30 x 45 or a 41 x 62 mm rail. When the rail is fixed at the bottom side to e.g. steel beams, a 30 x 15 or a 30 x 30 rail can be fixed between the 30 x 30 rail and the steel beam to adjust the height of the 30 x 30 rail to the height of the 30 x 45 or 41 x 62 mm rail.

3. **Maximum intermediate distances of the suspension elements**
   All Wavin QuickStream rail types 30 x 30, 30 x 45 and 41 x 62 should be suspended to the roof construction at a maximum distance T (see figure 5) of 2 meters between the suspension elements, taking into account the weight of a fully filled pipe, the weight of the suspension rail and the load ability of the roof construction.

4. **Anchoring of the steel rails**
   All rails can be suspended relatively easily using threaded rods to the roof. The length of the threaded rods is of no importance as these only bear the weight of the pipe, pipe clamps and rail construction. Wavin recommends bracing the steel rails to the roof every 12 meters to prevent horizontal movement of the system. The anchors need to be fixed to the wall structure or alternatively installed lateral to the rails and approx. 45° to the roof.

5. **Check weight limitations, which can be suspended to the (roof) construction**
   Care should be taken that the roof constructions have sufficient strength to bear the whole piping construction.
   The total weight per meter of a fully filled pipe and the suspension system can be taken from table 1. When the rail system is suspended every 2 meters, the design strength of each suspension point to the roof should be at least 2 times the total weight/m according to table 1.

Horizontal anchoring of the steel rails

Type of anchoring

In order to prevent the anchor from moving horizontally due to dynamic forces, a fixed connection of the anchor to the building structure (e.g. joists) is required. In addition, in case of interruptions (e.g. deflections) of the anchor, a firm connection should be made at both ends of the anchor to the building structure. The connection to the building structure is made with material provided by the customer (see figures 2, 3 and 4). If the pipe system (anchor rail with pipe) is subjected to temperature on one side (e.g. solar radiation or heat sources in the hall), we recommend additionally bracing the anchor laterally every 5 m in these areas. Our project team is at your disposal will gladly assist you with the realization.

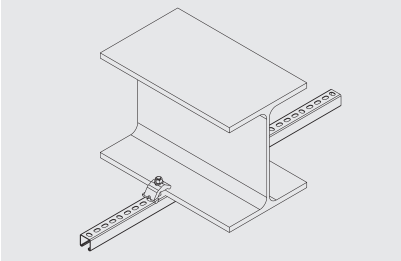


Figure 2: Steel.

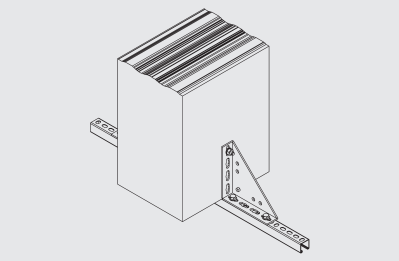


Figure 3: Concrete.

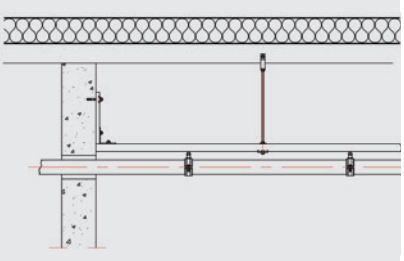


Figure 4: Mounting overview.

Fixing of the anchor

The fixing of the anchor rail to the building structure consists of the rail suspension, a threaded rod and the connection to the load-bearing component. All Wavin QuickStream rail types should be suspended to the roof construction at a maximum distance T (see table 1 and figure 5) of 2 meters between the suspension elements, taking into account the weight of a fully filled pipe, the weight of the suspension rail and the load ability of the roof construction. Figure 5 shows likewise the total weight of the individual pipe dimensions, including full filling and fastening material. The distance T of the rail suspension must not be exceeded according to table 1. Depending on the roof construction however, it may be necessary to reduce the distance between the mountings or use dual point suspension (see table 2).

Anchoring	**Type 1**									**Type 2**		**Type 3**
DN - Pipe diameter [mm]	40	50	56	63	75	90	110	125	160	200	250	315
T – max. Distance [m]	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Weight* [kg/m]	3,4	4,2	4,7	5,4	6,7	8,8	12,1	15,0	23,3	35,8	54,6	86,9
F – max. Force (kg/T)**	6,8	8,4	9,4	10,8	13,4	17,6	24,2	30,0	46,6	71,6	109,2	173,8

* Weight of the pipe including suspension and 100% filled with water.

** Resulting weight/point load per suspension with suspension distances

Table 1: Maximum distance anchoring.

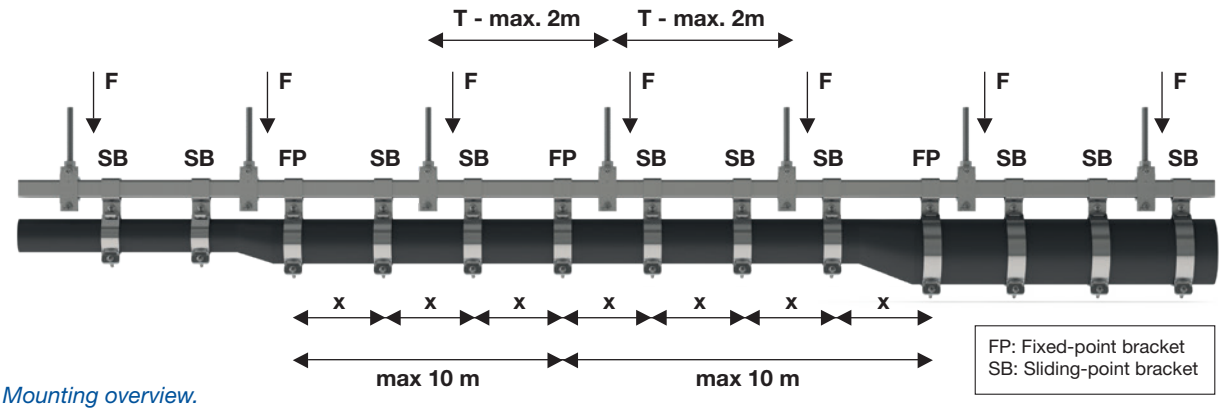


Figure 5: Mounting overview.

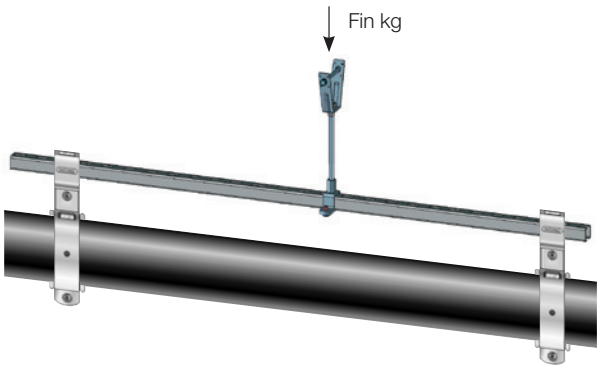
Mounting options of the pipe system depending on the maximum suspension load

An important validation step is the assessment of the resulting loads on the trapezoidal sheet metal roof. Due to the weight of the pipelines in operation are subject to loads (weight loads on the trapezoidal sheet metal). The permissible load is determined by the responsible planning office. The values for suspension according to table 2 must be followed in different installation ways:

Single point suspension

The result of the pipe weight and mounting distance is the load. These resulting loads for maximum mounting distance (2 m) are shown in table 2, is specified.

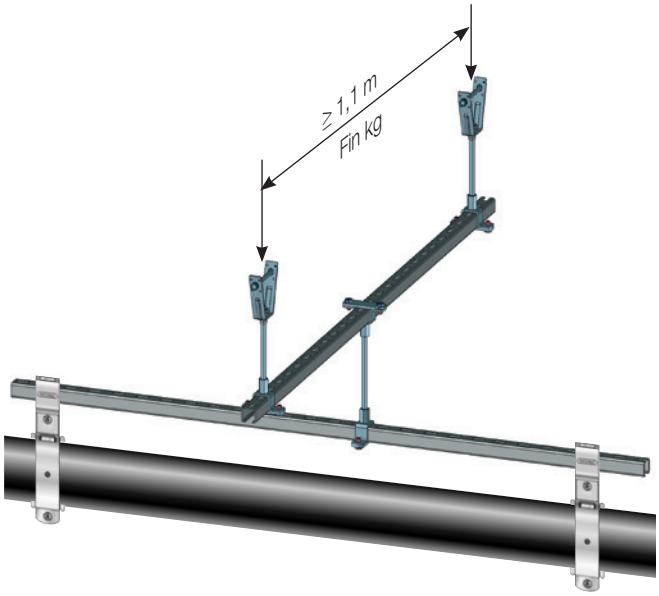
If the loads exceed the maximum possible weight load of the trapezoidal sheet metal, e.g. the mounting distance (see figure 2 distance T). This reduces the weight load per suspension.



Dual point suspension

Analogous to the possible reduction of the mounting distances with two-point suspensions, the load is additionally transverse rail is divided into two points (suspensions).

The weight of the pipeline remains unchanged. The forces but are limited to twice the number of suspensions and are thus halved.



Note for single/two-point suspensions

The possible weight load of trapezoidal sheets is often expressed in kg/point or kg/m^2. The fixing distances of the anchor channels cannot be reduced at will. The roof is divided into so-called load squares (1 m - 1 m).

With mounting distances < 1 m, a load square attacked or loaded twice. The fixing distance and the distance of the load distribution (see figure “two-point suspension”) should never be less than 1.1 meter and must in each case coordinated with the responsible calculating office as the weight loads are always taken into account in the calculation including for example heating and ventilation.

1	2	3	4	5	6	7	8	9	4	5	6	7	8	9
			15 kg/m² **T** - Distance		20 kg/m² **T** - Distance		25 kg/m² **T** - Distance		30 kg/m² **T** - Distance		35 kg/m² **T** - Distance		40 kg/m² **T** - Distance	
DN [mm]	F [kg/m]	T_{max} [m]	1-point [m]	2-point [m]	1-point [m]	2-point [m]	1-point [m]	2-point [m]	1-point [m]	2-point [m]	1-point [m]	2-point [m]	1-point [m]	2-point [m]
40	3,4	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
50	4,2	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
56	4,7	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
63	5,4	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
75	6,7	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
90	8,8	2,0	1,70	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
110	12,1	2,0	1,24	2,0	1,65	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
125	15,0	2,0	X	2,0	1,29	2,0	1,67	2,0	2,0	2,0	2,0	2,0	2,0	2,0
160	23,3	2,0	X	1,29	X	1,72	X	2,0	1,29	2,0	1,50	2,0	1,72	2,0
200	35,8	2,0	X	X	X	1,12	X	1,40	X	1,68	X	1,96	1,12	2,0
250	54,6	2,0	X	X	X	X	X	X	X	X	X	1,28	X	1,47
315	86,9	2,0	X	X	X	X	X	X	X	X	X	X	X	X

1 DN - Pipe diameter [mm]
2 Weight* [kg/m] Weight of the pipe including suspension and 100% filled with water
3 T_{max}. Distance [m] maximum distance between the suspension elements
4,6,8 Mounting with a single point suspension
5,7,9 Mounting with a dual point suspension
X Standard assembly is not possible, in this case a special solution can be developed for specific projects

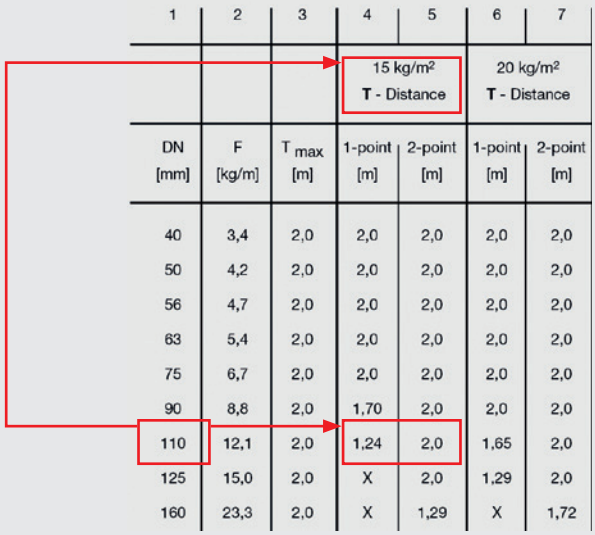
Table 2: Distance for single or dual suspension.

Example calculation:

Given:
Pipe dimension: 110 mm
Maximum suspension load on the trapezoidal roof: 15 kg

Looking for:
Possible suspension type and mounting space.

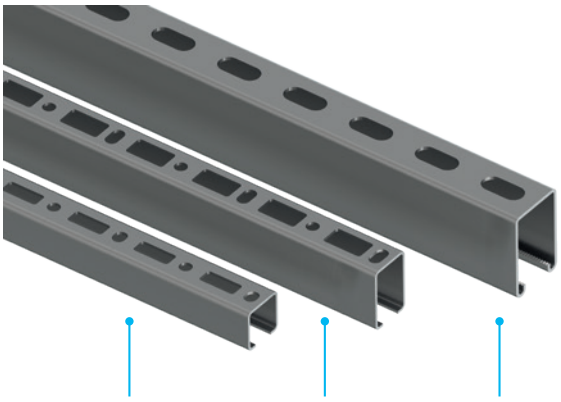
Solution:
Fixing distances:
One point: 1.24 m
Two point: 2.00 m

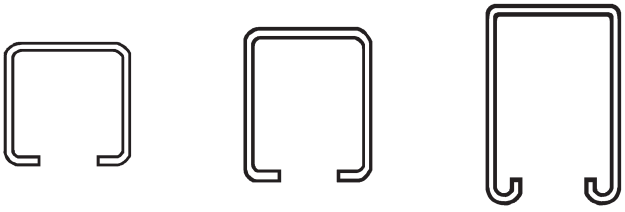


Installation of the suspension element and fixation of the rail

The Wavin QuickStream system compromises three types of suspension rails:

1. Rail 30 x 30 mm for pipe diameters 40-160 mm
2. Rail 30 x 45 mm for pipe diameters 200 - 250 mm
3. Rail 41 x 62 mm for pipe diameter 315 mm





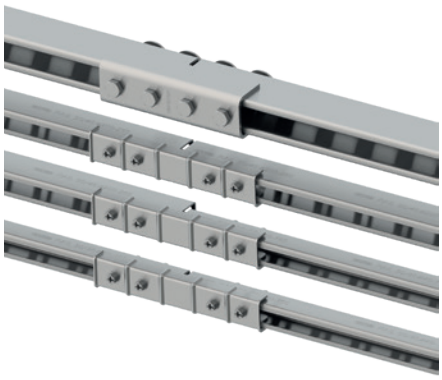
Type 1
30/30 mm

Type 2
30/45 mm

Type 3
41/62 mm

Installation of the rail connector

The suspension rails must be mutually connected with the specific Wavin QuickStream rail connectors that can transfer thermally induced axial loads from one rail to the next one. The rail connector 30 x 30 mm can also be used for rail 30 x 45 mm. The rail connector for the rail can also be used for connecting a 30 x 30 mm rail to a 30 x 45 mm rail. It is not possible to make a connection between a 30 x 45 mm rail and a 41 x 62 mm rail, or between a 30 x 30 mm rail and a 41 x 62 mm rail. In cases where it is not possible to use a rail connector, then the extreme brackets on each rail must be of the fixed type. This is only the case at bends and at a diameter change between 315 mm and 250 mm pipe size.



41/62-41/62

30/45-30/45

30/45-30/30

30/30-30/30

Positioning of the horizontal brackets

A controlled absorption of thermal axial pipe stresses in rigid suspension systems by making use of galvanized steel rails is most commonly applied in PE siphonic rainwater discharge systems.

The benefits are ease of installation and no unexpected displacements. The thermally induced axial loads are completely absorbed by the suspension and bracketing system. Once the suspension rails have been installed, pipe segments can then easily be placed in the brackets. In-lays can be placed in the brackets to create a strong and cost effective fix of the pipework against axial displacement. All Wavin QuickStream brackets are designed to enable fast and easy placing of pipe segments and additional closing of the brackets.

To avoid potential sagging of the pipes, the horizontal maximum supporting bracketing distances from table 3 should be applied in a Wavin QuickStream system. Ensure that the maximum fixing distance according in is not exceeded. For horizontal pipelines < 0,8 m no fixture is required. Figure 5 provides a visual overview of the location of fixed-point brackets in the horizontal collector pipe. Table 3 shows the maximum temperature difference at 40°C (temperature difference between installation temperature of the PE material and the expected operating temperature).

For larger temperature differences, Wavin recommends the use of expansion sockets. In order to prevent the pipelines from bending between the pipe clamps, it is recommended to review and possibly reduce the horizontal mounting distances. The vertical mounting distances do not have to be reduced.

DN [mm]	X[m] ΔT <40°C	Y[m]	T[m]
40	0,8	0,9	2,00*
50	0,8	0,9	2,00*
56	0,8	0,9	2,00*
63	0,8	0,9	2,00*
75	0,8	1,20	2,00*
90	0,9	1,40	2,00*
110	1,10	1,70	2,00*
125	1,25	1,90	2,00*
160	1,60	2,40	2,00*
200	2,00	3,00	2,00*
250	2,00	3,00	2,00*
315	2,00	3,00	2,00*

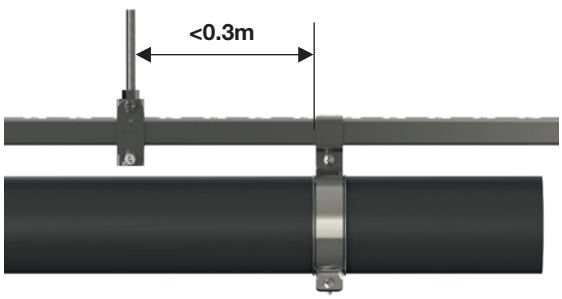
X = Maximum horizontal bracketing distances in meters.
Y = Maximum bracketing distance (in meters) for the vertical downpipe.
T = max. Distance [m] maximum distance between the suspension elements.

*The fixed point within 0,3 meters from a suspension element.

Table 3: Bracketing distance.

Location of fixed points

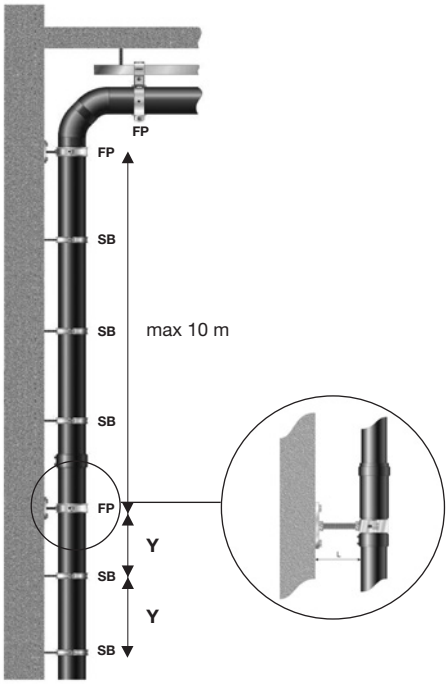
In the event of a change in direction, there is a fixed point required. As a minimum, a fixed-point bracket must be placed on the largest side of every increaser / reducer. If a Tee piece is located at an increaser, then the fixed-point brackets can be situated directly next to the Tee piece. Fixed-point brackets should also be installed directly before and after a change in direction, e.g. at a bend and at each interruption of the rails. The maximum distance between two fixed-point brackets may not exceed 10 meters. The fixed points need to be located within a maximum distance of 0.3 meters from a suspension element.



Positioning of the vertical brackets without expansion sockets

The vertical downpipes can be fixed by the use of Wavin QuickStream rails in a similar way as with the horizontal collector pipes. Most commonly however, the pipework can be installed directly on the wall structure so that for this part of the system the suspension rails can be omitted. A fixed-point brackets needs to be positioned at the top end of the vertical downpipe, as close as possible to the elbows. See table 3 for vertical downpipe bracketing distances (Y).

Furthermore, fixed-points brackets also need to be installed at a maximum spacing of every 10 meters. Be aware of expansion and contractions loads transferred to the wall structure. In table 4 guidance is given for the thickness of the threaded metal pipe for the fixed-points in relation to the distance to the wall and Wavin QuickStream pipe diameter.



L - length of threaded rod (mm)	40	50	56	63	75	90	110	125	160	200	250	315
50	½"	½"	½"	½"	½"	½"	½"	½"	-	-	-	-
100	½"	½"	½"	½"	½"	½"	½"	1"	1"	1"	1"	1"

Table 4: Minimum diameter of the threaded metal rods for fixed-points.

Positioning of the vertical brackets with expansion sockets

Most commonly in the vertical downpipes longer then 6m expansion sockets are used. As there will be always some friction in the sealing system of an expansion joint, it is absolute required to anchor the expansion socket (figure 6). At the top of a vertical downpipe, always a fixed-point bracket should be installed.

All other brackets should be “sliding brackets”. Fixed-points can either be created by placing an electrofusion socket underneath the bracket fixing the expansion socket or by use of a stainless steel insert in the bracket.

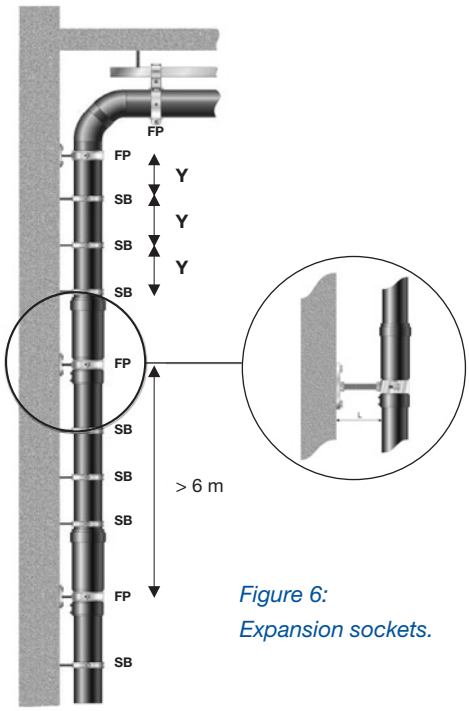


Figure 6: Expansion sockets.

L - distance pipe to wall (mm)	40	50	56	63	75	90	110	125	160	200	250	315
50	½"	½"	½"	½"	½"	½"	½"	½"	½"	-	-	-
100	½"	½"	½"	½"	½"	½"	½"	1"	1"	1"	1"	1"

Table 5: Minimum diameter of the threaded metal rods for fixed-points with expansion socket.

Installation of roof outlet

To prevent the roof outlet being pushed out of the roof due to thermal expansion of the tail pipe, the first bracket should be positioned between 0.5 and 0.8 meters from the outlet. Under no circumstances should sagging be allowed in the horizontal part of the tail pipe. The vertical pipe length directly below the roof outlet is maximum 2 meters. Also in this pipe section, no bracket is allowed. The vertical pipe needs to be installed without tensions. Under no circumstances, bending of this part is allowed.

No horizontal support brackets needed if the horizontal pipe is less than 0.8 meters and no vertical brackets are needed if the vertical pipe is less than 2 meters (figure 7). Install horizontal support brackets if the horizontal distance between roof outlet and collector pipe is between 0.8 and 2.0 meters (figure 8). In the case the horizontal distance is longer then 2.0 meters (figure 9) always requires a steel rail with anchoring and at least two fixed-point brackets. Make sure that the maximum horizontal fixing distance is not exceeded according to table 3.

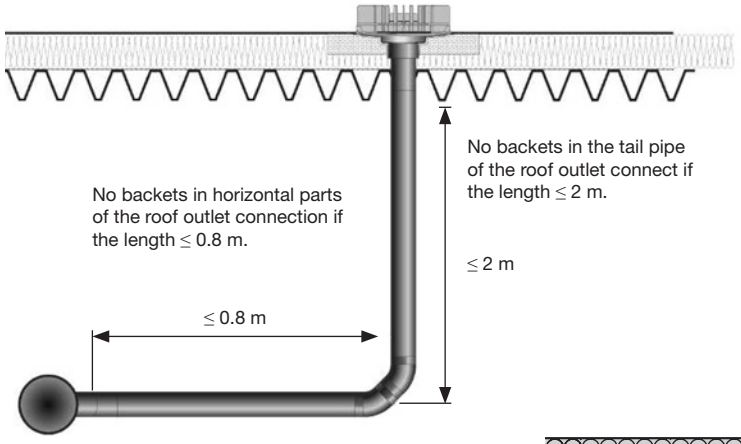


Figure 7: Outlet positioned < 0.8m.

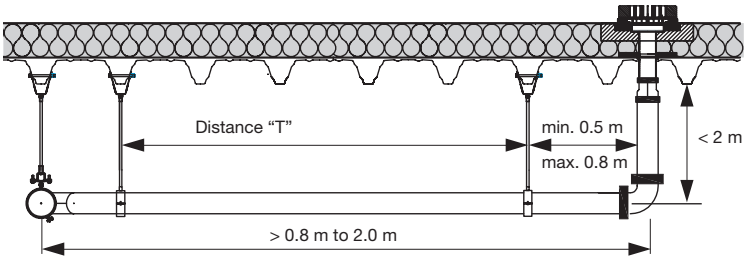


Figure 8: Outlet positioned between 0.8m and 2.0m.

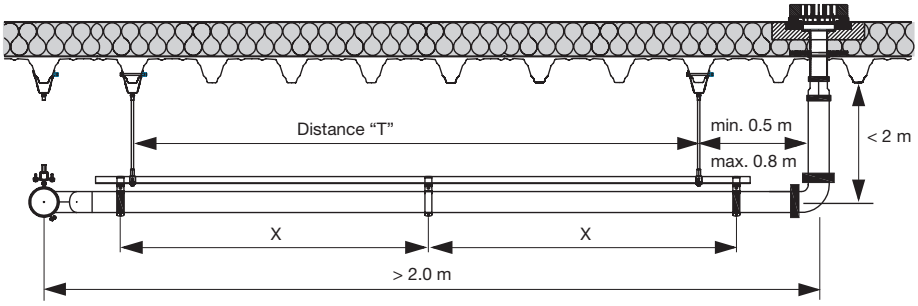


Figure 9: Outlet positioned > 2.0m.

Notes

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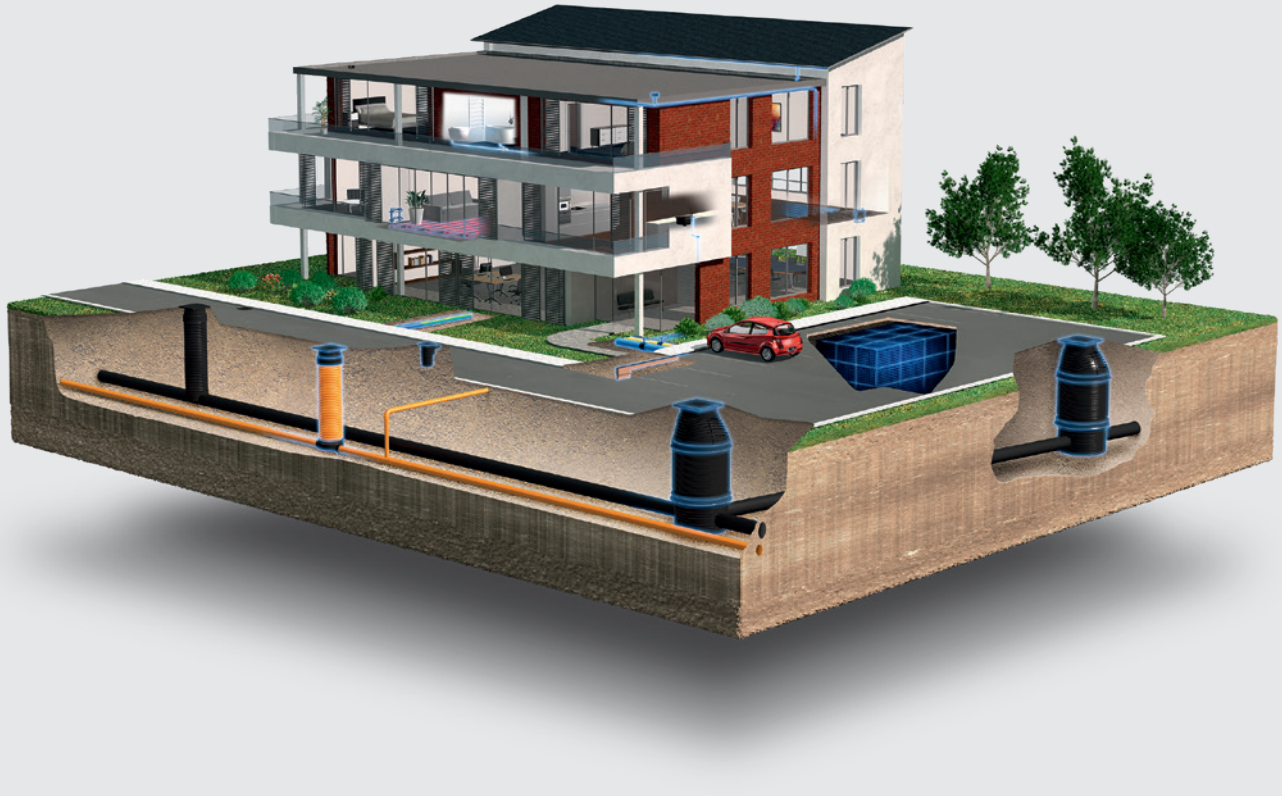

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