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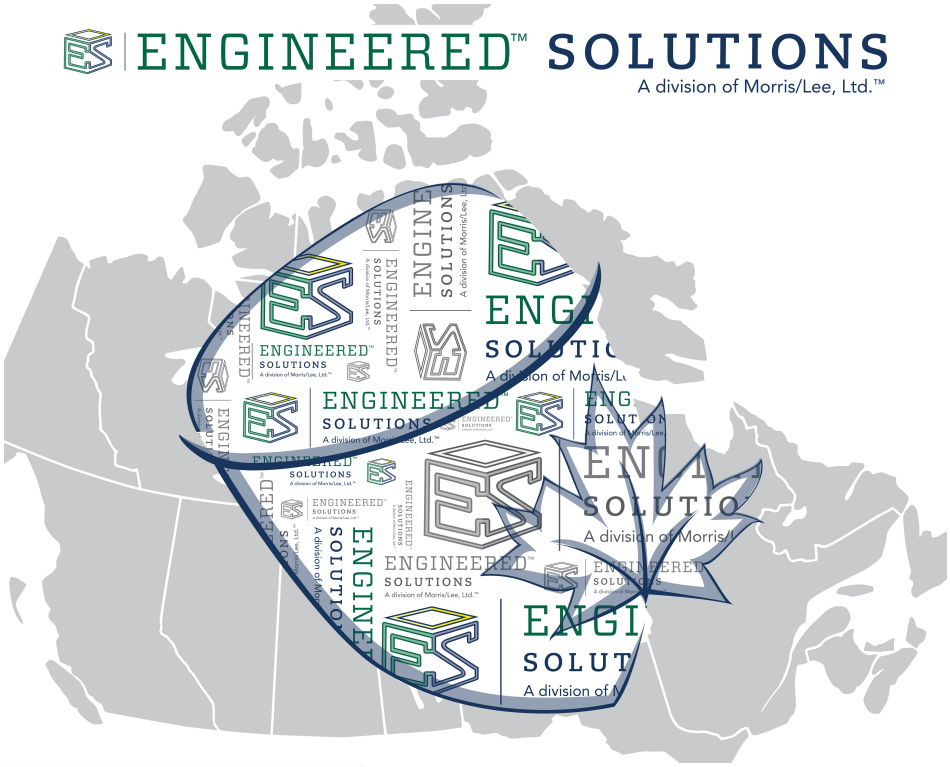


INTEWA PRODUCTS

PURAIN-HD-150/200/300/400
Rainwater filter for sub-surface installation
Heavy duty category

Installation and operation instructions

WATER IS OUR ELEMENT

Contents

1. Introduction and scope of application

PURAIN rainwater filters (previously known as hydraulic jump filters) deliver innovation in the filtering of rainwater from roof areas of 60 m^2 to over 15,000 m^2.
This hydraulic jump technology means that the filter cleans itself automatically. The design model for PURAIN Rainwater filters comes from nature itself: At almost every course in a stream, you can see how the hydraulic jump functions. The water flows over one of the stones, smooth and rounded by the action of the water over time. The water flow is substantially changed by the height drop, from a sub-critical to a super-critical flow. At the bottom of the dip, the waterflow changes again to a subcritical flow in a process now commonly known as an hydraulic jump. This resulting increase in water power is similar to a strong eddy and forces any impurities over the next level to be washed away downstream.

The application areas of PURAIN filters, with sample uses, as well as their dimensioning can be found at:

http://www.ca.intewa.net/en/products/purain/

The **PURAIN-HD (Heavy Duty)** model SLW60 (Heavy duty vehicles up to 60 Tons), is designed as a sub-surface variant. PR-HD rainwater water filters are made accessible with conventional manhole lids and rings.

The advantages of these filters are:

- Highest quality and load classes of up to 60 Tons
- Use of cost efficient, conventional, locally available manholes and lids, is possible
- Allows for the use of the total tank volume (especially with large rainwater systems)
- Saves on the costs of a separate rainwater filter chamber
- Saves piping expenses as the filter can be directly used as the tank overflow
- Patented, self-cleaning filter principle, offering minimum maintenance costs and best efficiency

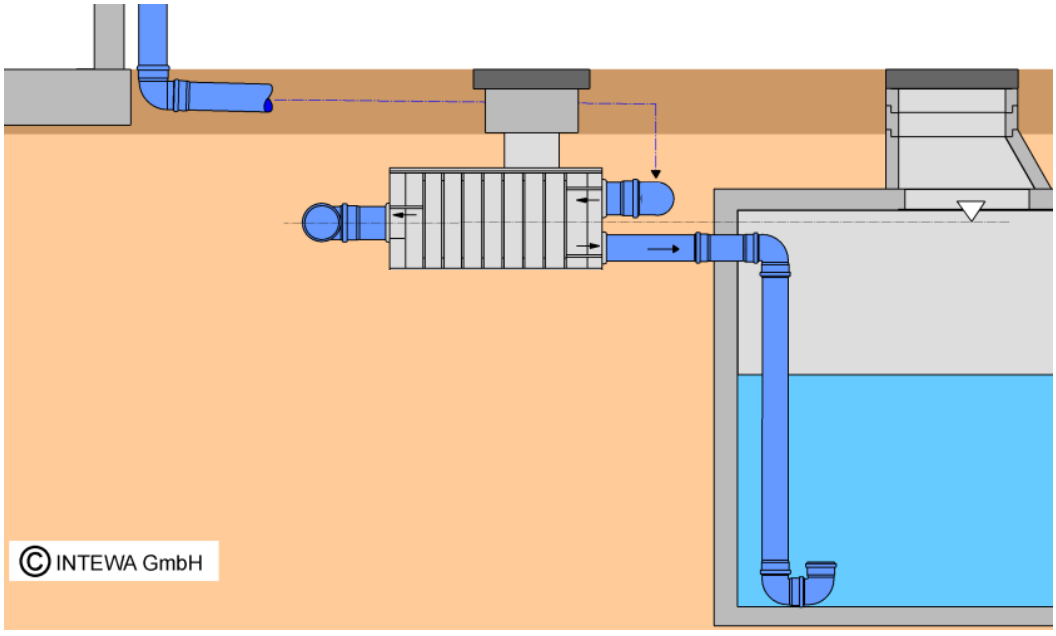


Fig. 1: Sample application of PURAIN-HD rainwater filter for subsurface installation

2. Scope of delivery

Filter housing with lip-seal

Reinforced cover wirh inspection pit

Stainless steel filter sieve . Features an extended sieve extractor handle

Fig. 2: Components of PURAIN-HD

3. Technical data

3.1 PURAIN-HD 150 and PURAIN-HD 200

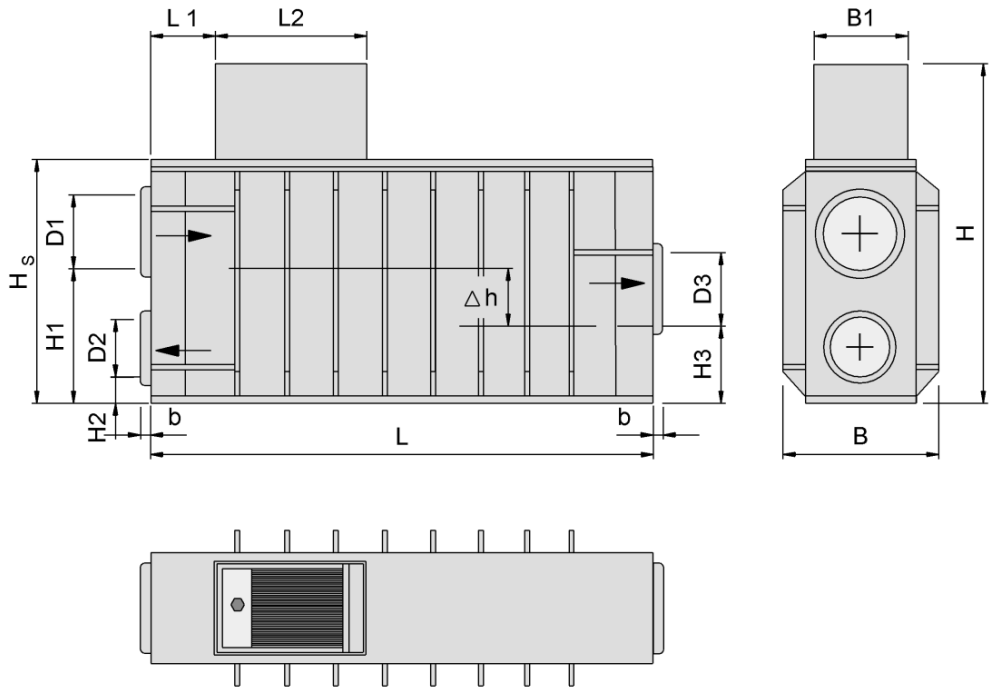


Fig. 3: Dimensions of PURAIN-HD 150 and 200

	PURAIN-HD 150
Order name:	PR-HD-150
L x W x H [mm]:	1031x359x900
Hs Shoulder height:	500 mm
L1:	195 mm
L2:	293 mm
B1 Dome width:	184 mm
D1 Inlet*:	DN150 (Ø160mm)
D2 Clear water to tank*:	DN150 (Ø160 mm)
D3 Emergency overflow / Waste water outlet*:	DN150 (Ø160 mm)
H1 Inlet:	272 mm
H2 Clear water to tank:	48 mm
H3 Emergency overflow:	153 mm
Δ h Height offset:	119 mm
b sealing collar:	13 mm
Width of wedge wire filter:	0,8 mm
Sieve dimensions:	275 x 145 mm
Efficiency:	98%
Material:	PE, NBR, SS
Weight:	40 kg

* Connection with pipe sealing ring

	PURAIN-HD 200
Order name:	PR-HD-200
L x W x H [mm]:	1495x393x1075
Hs Shoulder height:	675 mm
L1:	248 mm
L2:	408 mm
B1 Dome width:	184 mm
D1/Inlet*:	DN200 (Ø200 mm)
D2 Clear water to tank*:	DN200 (Ø200 mm)
D3 Emergency overflow / Waste water outlet *:	DN200 (Ø200 mm)
H1 Inlet:	426 mm
H2 Clear water to tank:	40 mm
H3 Emergency overflow:	235 mm
Δ h Height offset:	190 mm
b sealing collar:	13 mm
Width of wedge wire filter:	0,8 mm
Sieve dimensions:	400 x 145 mm
Efficiency:	98%
Material:	PE, NBR, SS
Weight:	78 kg

* Connection with pipe sealing ring

Tab.1: Technical data of PURAIN-HD 150 and 200 Rainwater filter for subsurface installation

3.2 PURAIN-HD 300 and PURAIN-HD 400

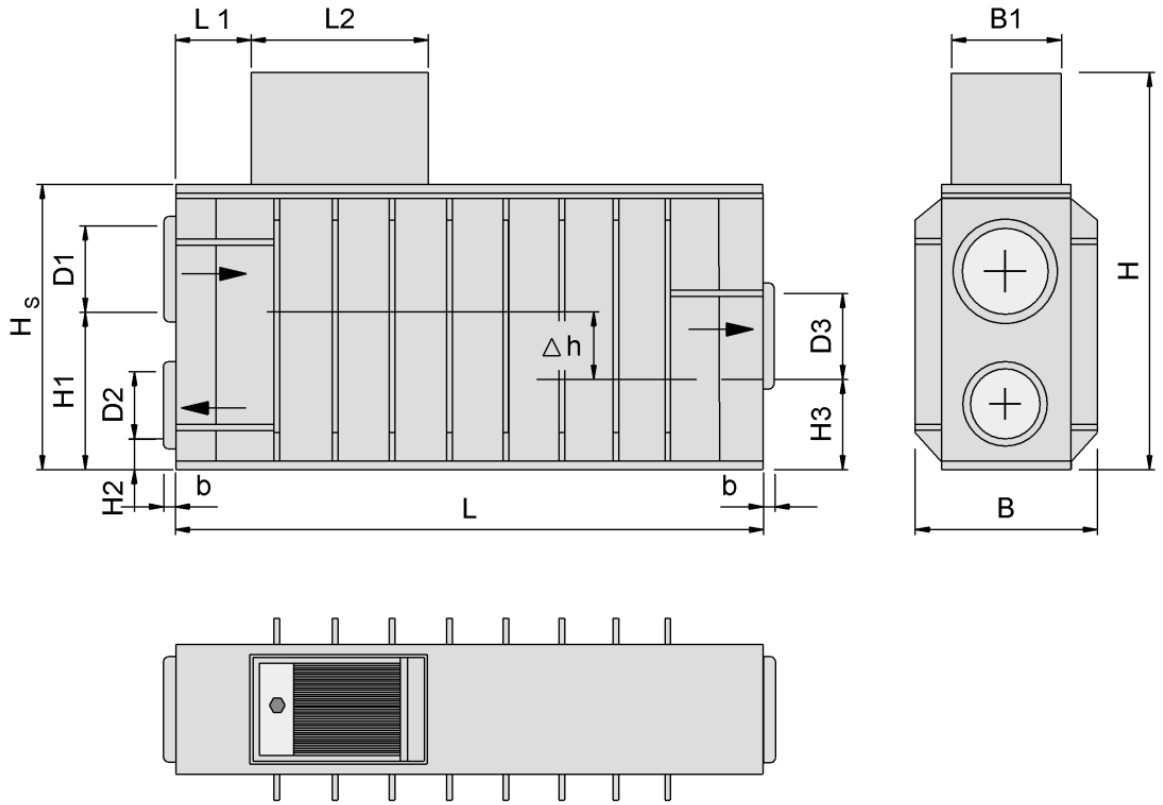


Fig. 4: Dimensions of PURAIN-HD 300 and 400

	PURAIN-HD 300
Order name:	PR-HD-300
L x W x H [mm]:	1786x581x1281
Hs Shoulder height:	881 mm
L1:	363 mm
L2:	460 mm
B1 Dome width:	295 mm
D1 Inflow/Inlet *:	DN300 (Ø315 mm)
D2 Clear water to tank*:	DN200 (Ø200 mm)
D3 Emergency overflow / Waste water outlet*:	DN300 (Ø315 mm)
H1 Inlet:	499 mm
H2 Clear water to tank:	53 mm
H3 Emergency overflow:	228 mm
Δ h Height offset:	271 mm
b sealing collar	13 mm
Width of wedge wire filter:	0.8 mm
Sieve dimensions:	500 x 255 mm
Efficiency:	98%
Material:	PE, NBR, SS
Weight:	117 kg

	PURAIN-HD 400
Order name:	PR-HD-400
L x W x H [mm]:	2043x670x1440
Hs Shoulder height:	1040 mm
L1:	448 mm
L2:	424 mm
B1 Dome width:	370 mm
D1 Inflow *:	DN400 (Ø400 mm)
D2 Clear water to tank*:	DN300 (Ø315 mm)
D3 Emergency overflow / Waste water outlet*:	DN400 (Ø400 mm)
H1 Inlet:	572 mm
H2 Clear water to tank:	54 mm
H3 Emergency overflow:	226 mm
Δ h Height offset:	346 mm
b sealing collar	13 mm
Width of wedge wire filter:	0,8 mm
Sieve dimensions:	500 x 330 mm
Efficiency:	98%
Material:	PE, NBR, SS
Weight:	188 kg

* Connection with pipe sealing ring

Tab.2: Technical data for PURAIN-HD 300 and 400 Rainwater filters for subsurface installation

4 General installation instructions

Professional installation of the PURAIN filter is required as a pre-condition for the functioning and durability. This applies to all the phases of construction, right from ground preparation and backfilling to the covering of the filter with manhole and supported manhole lid.

4.1 Base layer and equalizing layer

The carrying capacity of the existing ground is essential for stability. If the carrying capacity of the natural ground is not enough, then the ground must be strengthened by further measures (such as by a gravel base layer, Geotextile insert etc.). Coarse, non binding, compressible backfilling material must be used as a base layer. The area where the filter will sit must hold a minimum carrying capacity of Ev2 ≥ 45 MN/m^2.

4.2 Filter backfilling and materials

The filter must be backfilled into place with coarse/non-binding and compactable backfilling material.

Backfilling and compacting can only be undertaken in layers of 20cm at a time. The base on which the filter sits must be compacted and this compacted area should overlap the filter dimensions by 400mm all around

The minimum compressed filling above the filter shoulder must be 35 cm. Thereby, the required carrying capacity of E_{V2} = 45MN/m^2 specified for superstructure by ZTV E-StB 09 is ensured.

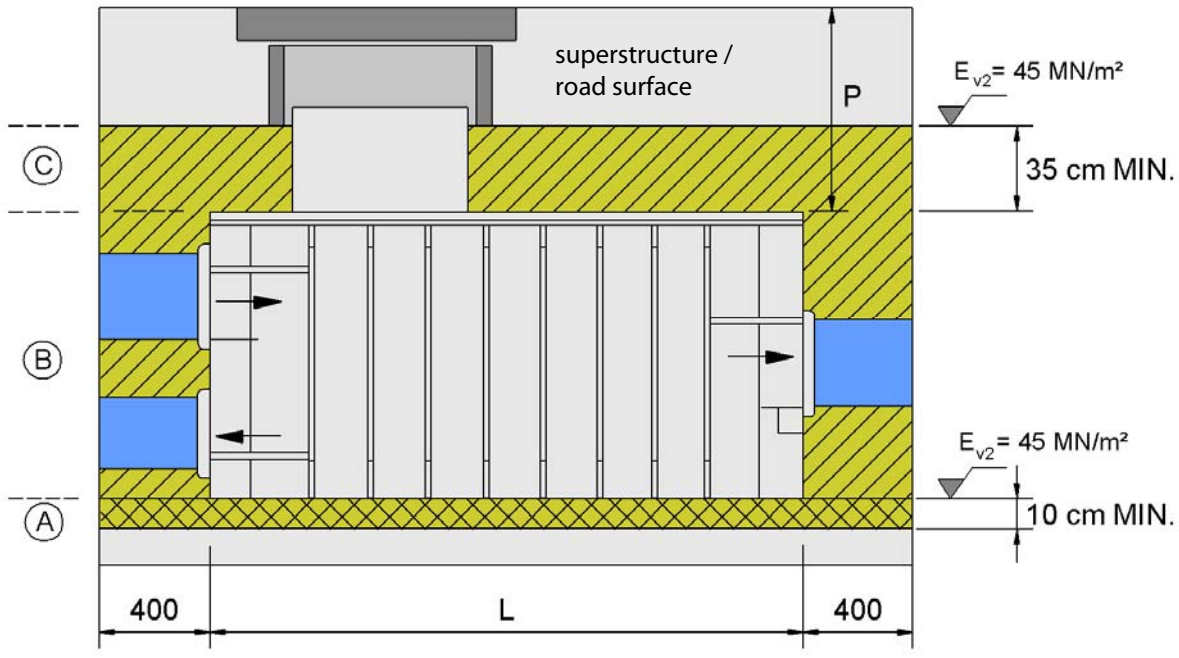


Fig. 5: Construction layers for backfilling with coarse/non-binding and compressible ground materials

The approved backfilling materials, as well as the required carrying capacity of are represented in the following table.

Construction layer		Material	Compacting / Carrying capacity
A, C	Base / equalizing layer and filter overlay	Coarse/non-binding, compressible material of soil classes 3 and 4 according to DIN18300	$D_{pr} \geq 97\%$ min. $E_{V2} = 45 MN/m^2$
B	Lateral filling from all sides of minimum 40 cm	Coarse/non-binding, compressible material of soil classes 3 and 4 according to DIN18300 (Layer compactness of max. 20 cm each)	$D_{pr} \geq 97\%$

Tab. 3: Construction layers and filling material for the backfilling of PR-HD filters

Note: The compacting requirement of ZTV E-StB 09 (Supplementary Technical Terms and Conditions of Contract and Guidelines for Earthworks in Road Construction) are to be observed for vehicular traffic areas.

4.3 Load capacity of the system

The load carrying capacity of the installed filter and the carrying capacity of the contact area are dependant on the overlay height above the filter shoulder.

The better the compactness, the higher the load transfer. The higher the traffic load, the more appropriate compacted construction height is needed.

The total overlay P measurments shown below must always be maintained above the shoulder of filter lid, irrespective of the kind of superstructure used and road surface material.

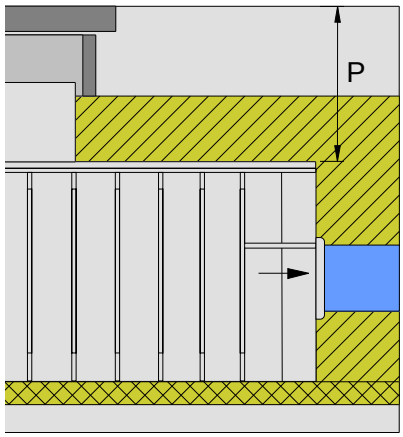


Fig. 6: Total overlay P

Installation situation / Traffic load	Max. Axle load	Overlay P for PR-HD-150 to 400
Walkable gravel area	--	0.50 [1] – 1.90 m
Truck 12 t / Equivalent distributed load = 6.7 kN/m² Paved / gravel area	8.0 t	0.50 [1] - 1.70 m
Truck 30 t (Equivalent distributed load = 16.7 kN/m²) Paved area	13.0 t	0.50 – 1.70 m
Truck 60 t (Equivalent distributed load = 33.3 kN/m²) Paved area	30.0 t	0.60 – 1.50 m

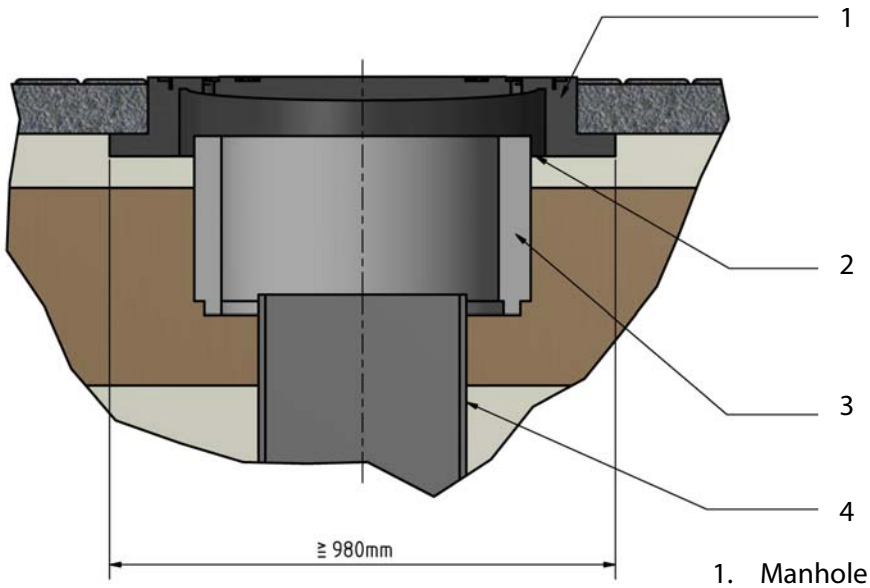
[1] *The formation of tire tracks must be taken into account with gravel roadways. The minimum total overlay must never be allowed to fall below the minimum required measurement!*

Tab. 4: Overview of permitted total overlay P (Traffic loads as per DIN 1072)

4.4 Instructions for manhole and manhole lid

Note: The manhole lid must be fitted so that any load on the lid is transferred directly to the surrounding ground and does not bear weight on the manhole itself.
This means that the load transfer from both the manhole lid and the manhole itself must be separated (floating).

Instructions:
The manhole contact area must be at least 980 x 800 mm (0,25m²).
Manhole and manhole lid must not be locked together!



1. Manhole lid
2. Floating packing, air space
3. Manhole
4. PURAIN inspection pit

Fig. 7.: Floating manhole structure (if necessary, with additional lid plate for distribution of load)

5. Installation instructions

5.1 Compacting machine

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Usually, the direct driving of the filters with construction vehicles or with consolidating devices is not allowed.

Lateral compacting	Vibrating plate: Operating weight: max. 255 kg Plate width: 600 mm x 800 m Specific support pressure: 0.86 da N/cm /vibration force: 35 kN Oscillating frequency: 80Hz	
0 to 20 cm height above filter shoulder	No compacting machine allowed	
from 20 cm height above filter shoulder	Vibrating plate, as described above	
from 40 cm height above filter shoulder	for instance, vibrating plate: Operating weight: ca. 400 kg Plate width: 450 mm /vibration force: 59 kN Oscillating frequency: 65Hz	
from 80 cm height above filter shoulder	for instance, vibrating plate: Operating weight: ca. 760 kg Plate width: 700 mm /vibration force: 100 kN Oscillating frequency: 56Hz	

Tab 5: Permitted compacting machinery specifications

5.2 Installation steps

1.) Create compacted, level ground as a base for the filter.

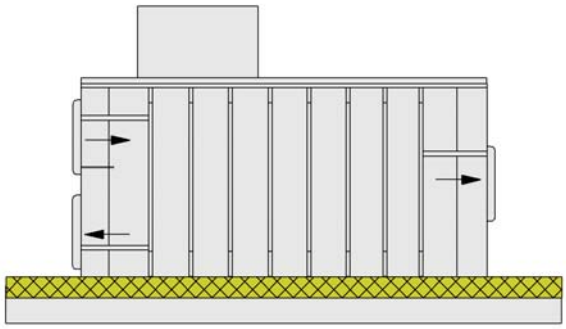

Fig. 8: Creating ground level

2.) Backfill the space and compact in layers of 20 cm at a time, until the required level is reached at the filter shoulder.

!!Attention!!:
Make sure the filter lid is fitted before lateral backfilling is to be done as this supports the lateral load.

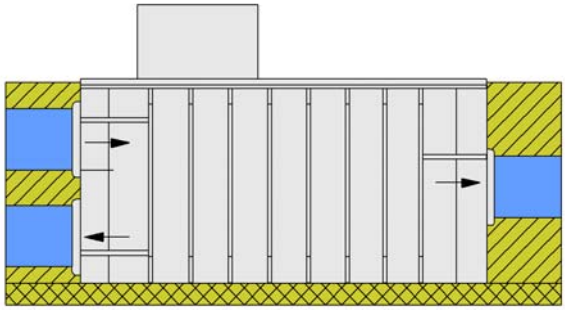

Fig. 9: Layer-wise arrangement of compacting up to filter shoulder

3.) Backfill and compact up to the filter lid level in layers of 20cm at a time.

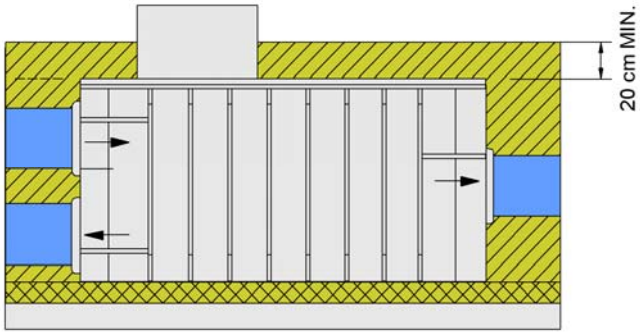

Fig. 10: Backfilling above tank shoulder (max 20 cm at a time)

4.) Backfill and compact up to 35 cm above the filter shoulder (means filter tower protrude 5 cm above the compacted ground level).

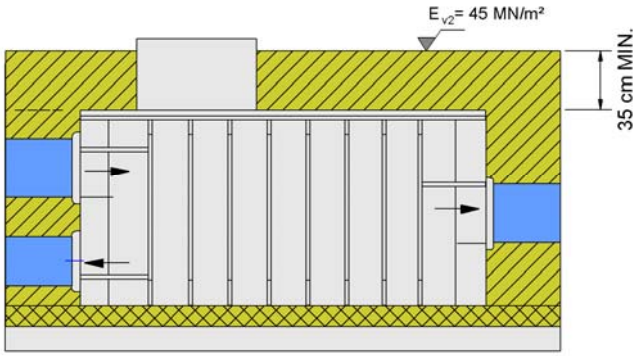

Fig. 11: Backfilling up to 35 cm above tank shoulder

5.) Erecting the manhole on compacted ground.

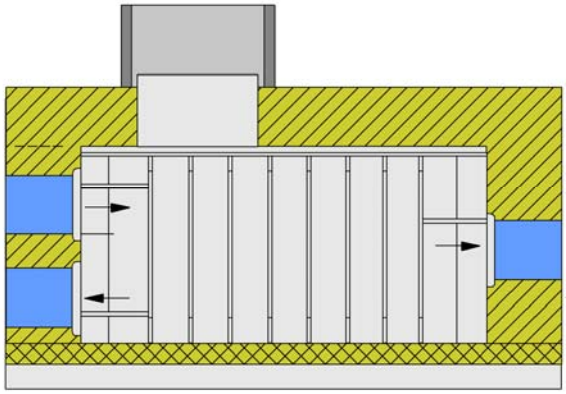

Fig. 12: Erecting manhole

6.) The manhole must overlap the filter tower, which protrudes 5cm above the compacted ground level.

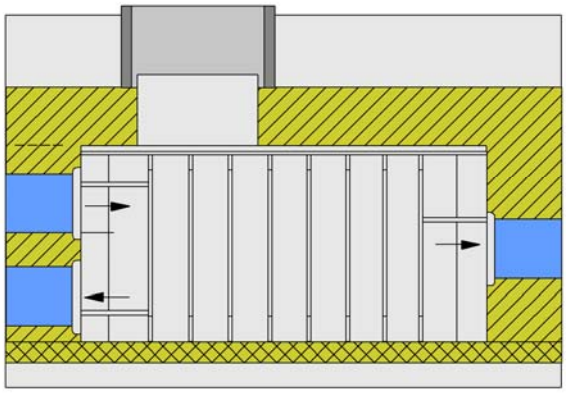

Fig. 13: Creating superstructure

7.) Place manhole lid on the compacted ground and close superstructure.

Attention:
Locking of the manhole lid to the manhole ring is NOT permitted! (refer section 4.4)

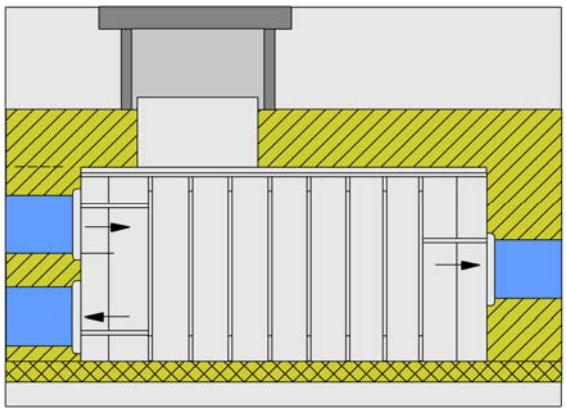

Fig. 14: Floating support of manhole lid

6. Maintenance

The filter requires much less maintenance than other self-cleaning rainwater filters due to the hydraulic jump design and the wedge wire filter design.

The filter should be checked twice a year for contaminants that may become caught in the slotted wire strainer. Dirt and leaves found in the discharge area need not be removed because they will be flushed out through the overflow with the next heavy rainfall. If water has accumulated in the discharge area then the sieve may be blocked, but this is effectively cleaned in a few seconds by using a high pressure cleaner simply directed at the sieve. By doing this the deposits, between the 0.8mm stainless filter sieve, can also be safely removed.

Fig. 15: Cleaning the surface of sieve with high pressure cleaner

Alternatively, the sieve can be removed and cleaned manually.
In doing so, it is important to clean the filter collection area with a high pressure cleaner to flush the dirt out through the emergency overflow before removing the sieve. In this way, the clean sieve can be re-installed without dirt and sludge fouling the lateral support guides to ensure a perfect fit.

Fig. 16: Automatic cleaning with high pressure cleaner

The filter sieve is inserted via the use of the sieve extractor handle as follows:

The sieve can be lowered into the manhole pit and into the filter tower via the extended extractor handle. The sieve slides into the lateral support guides until it touches the stop at the bottom of the filter. The sieve sits correctly if it also lies on sieve support at the water inlet area.

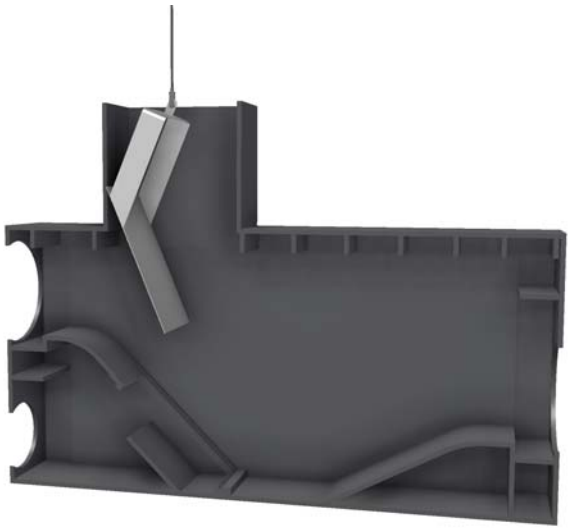

Fig. 17: Directly lower the sieve into manhole pit

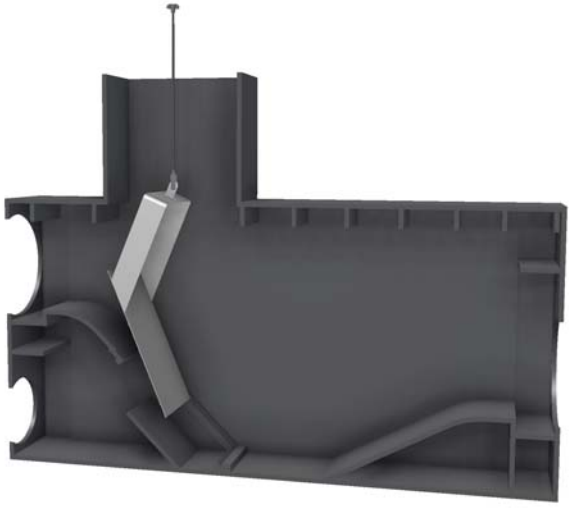

Fig. 18: Slide the sieve down the support guides until it rests in position on the filter bottom

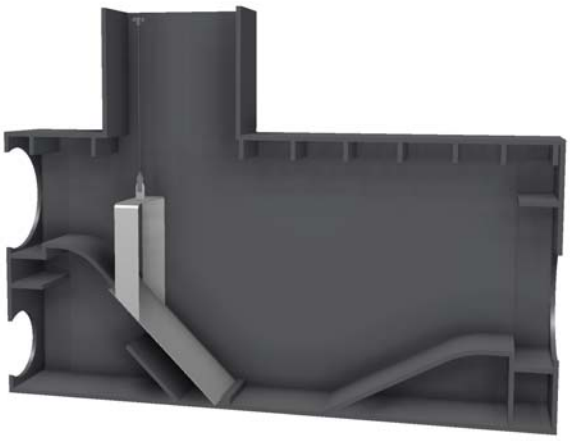

Fig. 19: The sieve is in position when it reaches the bottom of the guide

7. Contact

For any queries, orders for spare parts or service enquiries, please get in touch with our Canadian repenstentive:

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