

Installation/assembly/maintenance instructions for underground rainwater tanks FLAT, MODULARIS, COMPACT, PROFI, PRIMUS

FLAT S

1.500 L / 3.000 L / 4.500 L / 6.000 L

Order no.

295120 - 295123

FLAT M

3.000 L / 6.000 L / 9.000 L / 12.000 L

295115 - 295118

FLAT L

5.000 L / 10.000 L / 15.000 L

295126 - 295128

FLAT XL

7.000 L / 14.000 L

295170 - 295171



MODULARIS

2.500 L / 5.000 L / 7.500 L /
12.500 L / 15.000 L

Order no.

295022 - 295027



COMPACT

1.600 L / 2.650 L

Order no.

295300 – 295301



PROFI

4.000 L

Order no.

295202



PRIMUS

4.200 L

Order no.

295215



The points described in these instructions must be observed in all cases. Failure to do so will invalidate any warranty claim.

For any additional items purchased through 4rain, you will receive separate installation instructions in the transport packaging.

Missing instructions should be requested without delay.

The tanks must be checked for any damage and leaks before the system is transferred to and filled in the trench.

You can download any missing instructions from www.4rain.com or request them from GRAF directly.

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1 General information

1.1 Safety

All work should be undertaken in compliance with the relevant accident prevention as per BGV C22 regulations.

In addition, the applicable regulations and standards must be respected during installation, assembly, maintenance, repairs etc. Relevant information can be found in the corresponding sections of these instructions.

The entire system must always be switched off and secured against unauthorised switching on again during any work on the system or system components.

Keep tank covers closed at all times. Never leave open tank covers unattended. Tank covers may be opened for inspection, cleaning, and maintenance purposes only. There is a danger of persons or animals falling into the tank. This may result in serious injury or drowning. Nobody must climb into the tank. In the event of an accident, access for emergency services may prove very difficult. Work on tanks may be performed from the outside only. Keep unassigned persons, in particular children, away from open tank covers. Tank covers must be closed in such a manner that they cannot be opened without tools. Before closing, make sure that there are no persons or animals in the tanks.

4rain provides an extensive range of accessories, which are all coordinated and can be combined to form complete systems. The use of other accessories may result in the functionality of the system being impaired and to liability being revoked for any damage incurred.

1.2 Labelling requirement

All industrial water pipes and extraction points must be labelled with “**Not drinking water**” in the form of text or an image (DIN 1988 part 2, section 3.3.2.), in order to avoid mistakenly connecting them to the drinking water network, even years later. Even if the correct labelling is used, confusion may still arise, e.g. on the part of children. All industrial water filling points must therefore be fitted with **child-proof** valves.

2 Installation conditions

2.1 Covering heights with tank dome and cover in landscaped areas

The maximum earth covering measured from the tank shoulder ④ results from the maximum length of the tank dome with cover (maximum 760 mm).

The tank dome must not be extended, but if necessary, can be shortened to min 460 mm.

The soil cover must not exceed 200 mm measured from the tank cover ⑤.

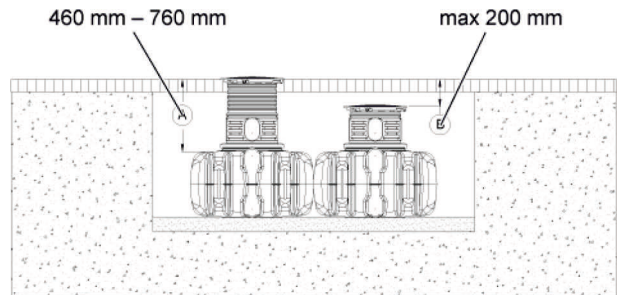


Fig. 1: Covering heights – example with FLAT

2.2 Traffic load

The tanks must not be installed under roadways.

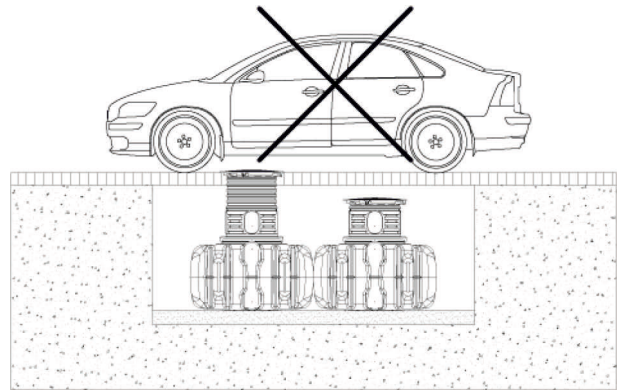


Fig. 2: Traffic load – example with FLAT

2.3 Ground/stratum water

The tanks must not be installed in groundwater/standing groundwater. Even if groundwater/standing groundwater is expected to occur only infrequently, drainage must be installed.

It is difficult to prevent the occurrence of groundwater / standing groundwater. Therefore, we generally recommend laying a drainage pipe (see 5.3.3).

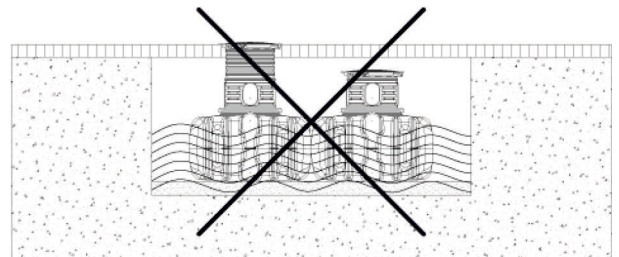


Fig. 3: Ground/stratum water – example with FLAT

3 Technical data

3.1 FLAT S

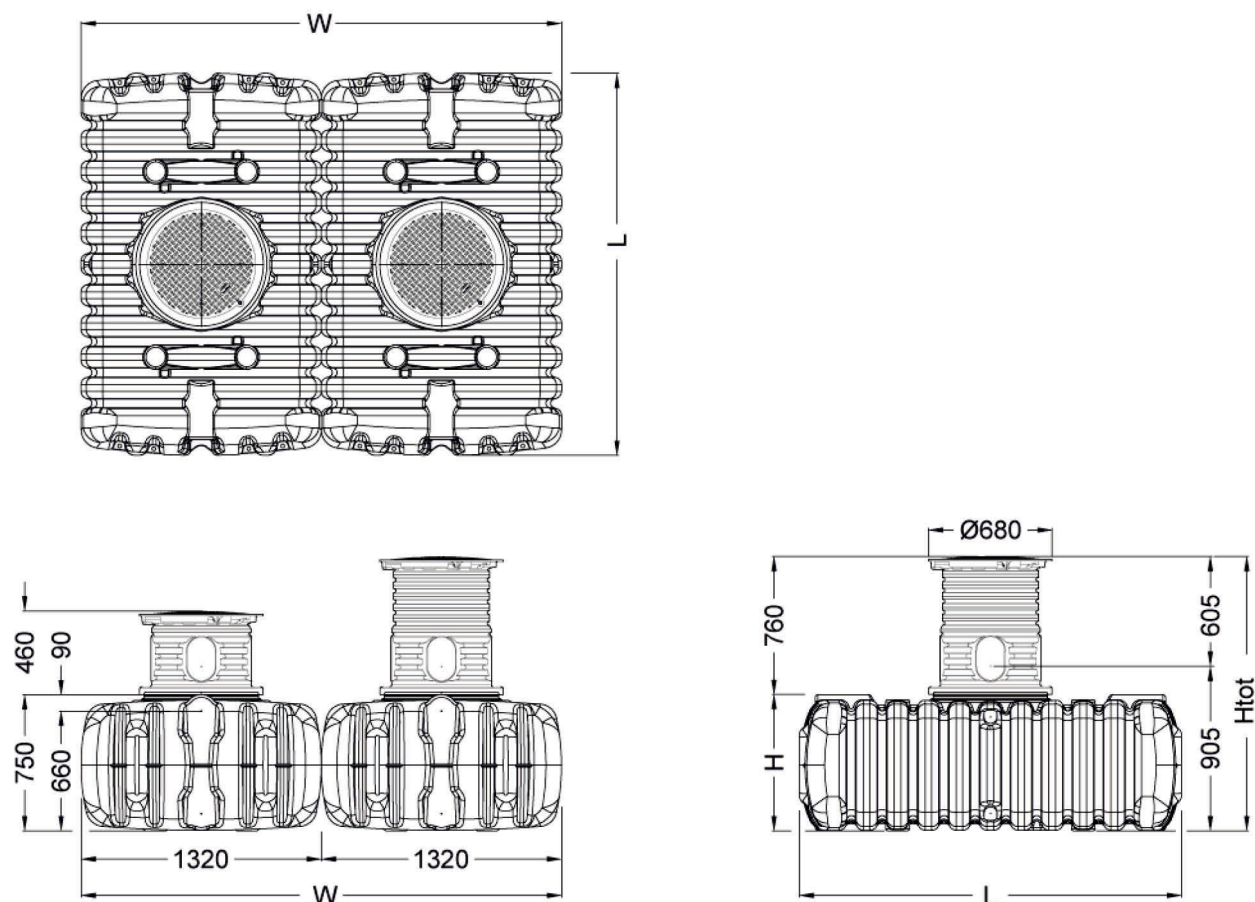


Fig. 4: Measurements – FLAT S

Tank	1.500 L	3.000 L*	4.500 L*	6.000 L*
Item no.	295120	295121	295122	295123
Weight	approx. 80 kg	approx. 160 kg	approx. 240 kg	approx. 320 kg
L	2.100 mm	2.100 mm	2.100 mm	2.100 mm
W	1.320 mm	2.640 mm	3.960 mm	5.280 mm
H	750 mm	750 mm	750 mm	750 mm
Htot (total height)	1.210 – 1.510 mm	1.210 – 1.510 mm	1.210 – 1.510 mm	1.210 – 1.510 mm

Table 1: Technical data – FLAT S

* incl. connecting set(s)

3.2 FLAT M

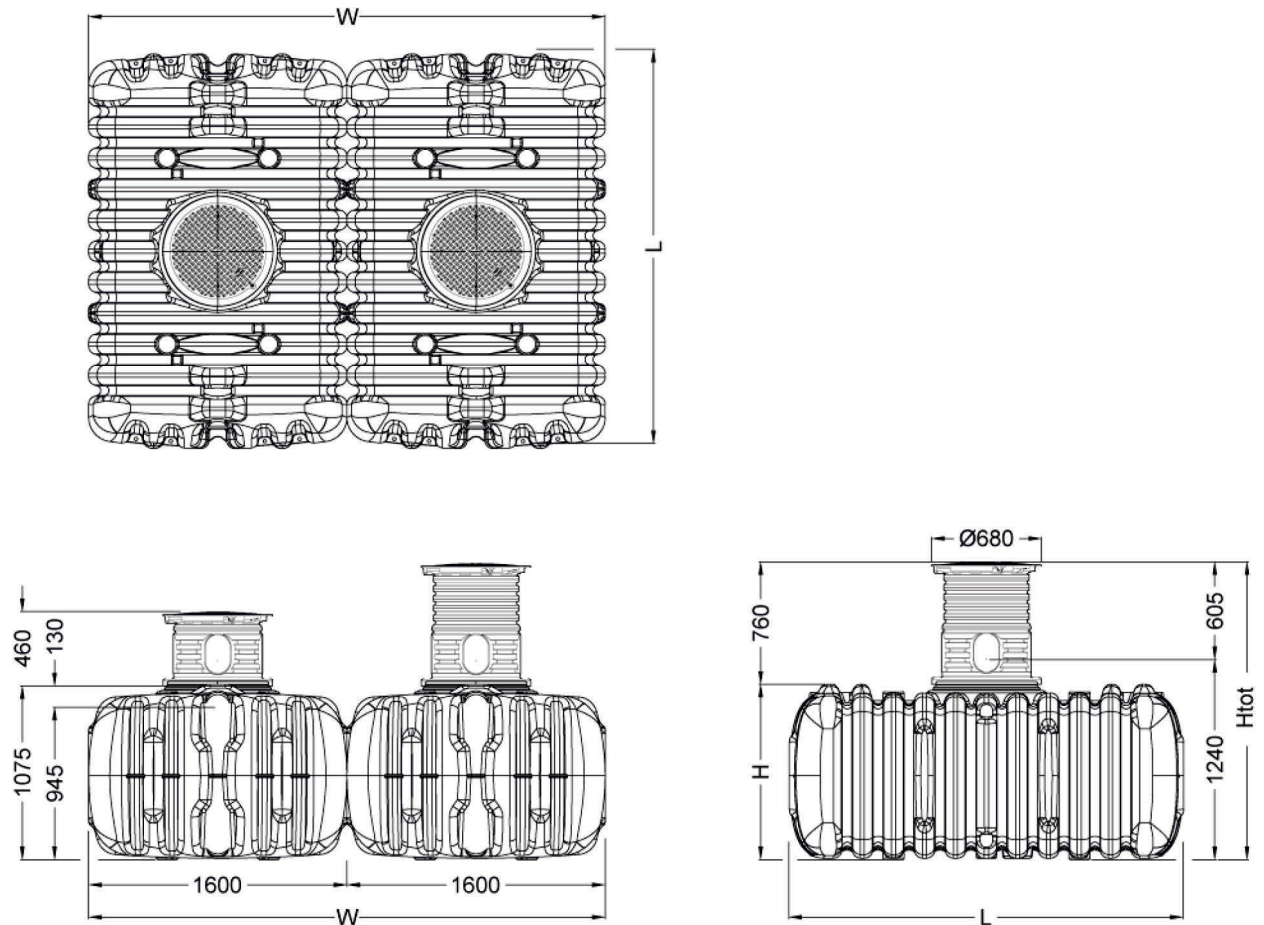


Fig. 5: Measurements – FLAT M

Tank	3.000 L	6.000 L*	9.000 L*	12.000 L*
Item no.	295115	295116	295117	295118
Weight	approx. 115 kg	approx. 230 kg	approx. 345 kg	approx. 460 kg
L	2.445 mm	2.445 mm	2.445 mm	2.445 mm
W	1.600 mm	3.200 mm	4.800 mm	6.400 mm
H	1.065 mm	1.065 mm	1.065 mm	1.065 mm
Htot (total height)	1.525 – 1.825 mm	1.525 – 1.825 mm	1.525 – 1.825 mm	1.525 – 1.825 mm

Table 2: Technical data – FLAT M

* incl. connecting set(s)

3 Technical data

3.3 FLAT L

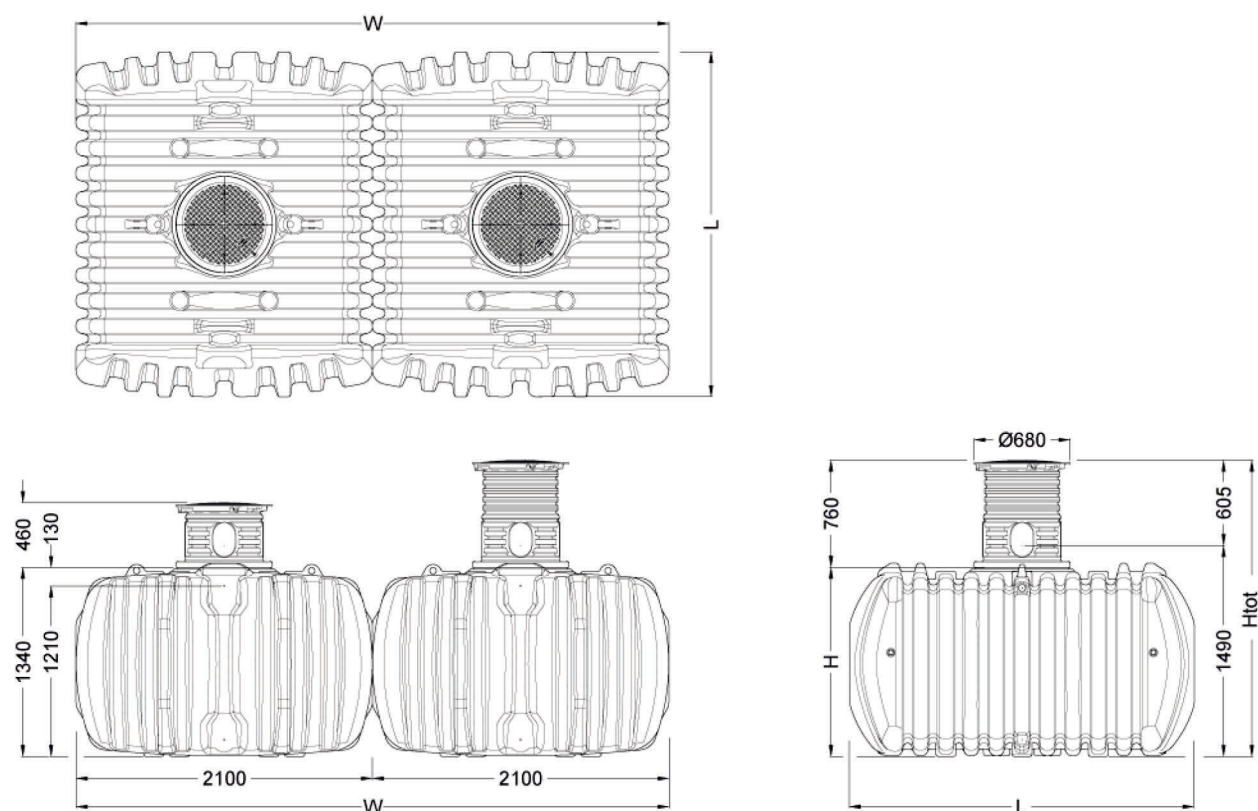


Fig. 6: Measurements – FLAT L

Tank	5.000 L	10.000 L*	15.000 L*
Item no.	295126	295127	295128
Weight	approx. 240 kg	approx. 480 kg	approx. 720 kg
L	2.445 mm	2.445 mm	2.445 mm
W	2.100 mm	4.200 mm	6.300 mm
H	1.340 mm	1.340 mm	1.340 mm
Htot (total height)	1.795 – 2.095 mm	1.795 – 2.095 mm	1.795 – 2.095 mm

Table 3: Technical data – FLAT L

* incl. connecting set(s)

3.4 FLAT XL

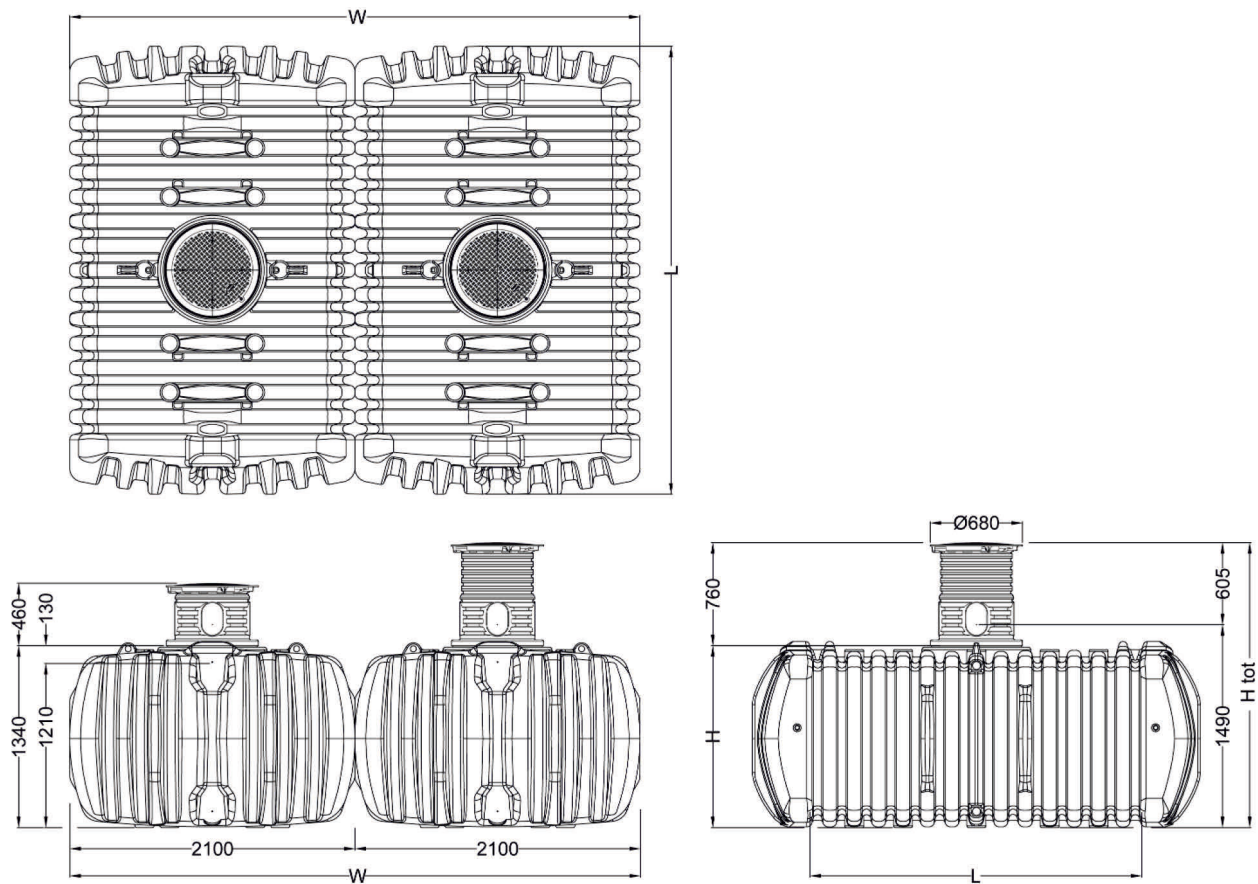


Fig. 7: Measurements – FLAT XL

Tank	7.000 L	14.000 L*
Item no.	295170	295171
Weight	approx. 311 kg	approx. 622 kg
L	3.295 mm	3.295 mm
W	2.100 mm	4.200 mm
H	1.340 mm	1.340 mm
Htot (total height)	1.800 – 2.100 mm	1.800 – 2.100 mm

Table 4: Technical data – FLAT XL

* incl. connecting set(s)

3.5 MODULARIS

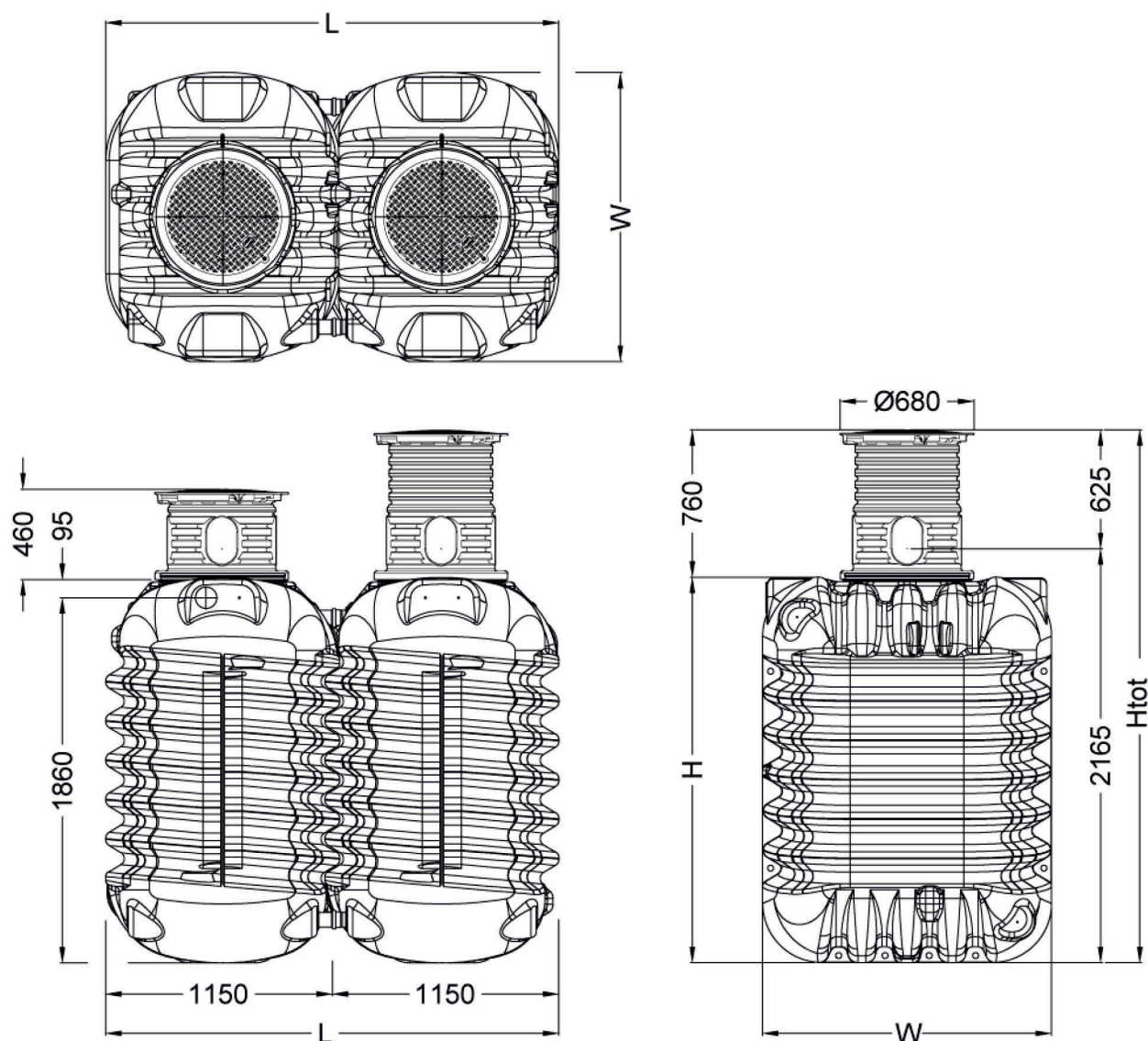


Fig. 8: Measurements – MODULARIS

Tank	2.500 L	5.000 L*	7.500 L*	10.000 L*	12.500 L*	15.000 L*
Item no.	295022	295023	295024	295025	295026	295027
Weight	approx. 87 kg	approx. 174 kg	approx. 261 kg	approx. 348 kg	approx. 435 kg	approx. 522 kg
L	1.190 mm	2.305 mm	3.460 mm	4.610 mm	5.760 mm	6.910 mm
W	1.470 mm	1.470 mm	1.470 mm	1.470 mm	1.470 mm	1.470 mm
H	2.010 mm	2.010 mm	2.010 mm	2.010 mm	2.010 mm	2.010 mm
Htot (total height)	2.470–2.770 mm	2.470–2.770 mm	2.470–2.770 mm	2.470–2.770 mm	2.470–2.770 mm	2.470–2.770 mm

Table 5: Technical data – MODULARIS

* incl. connecting set(s)

3.6 COMPACT

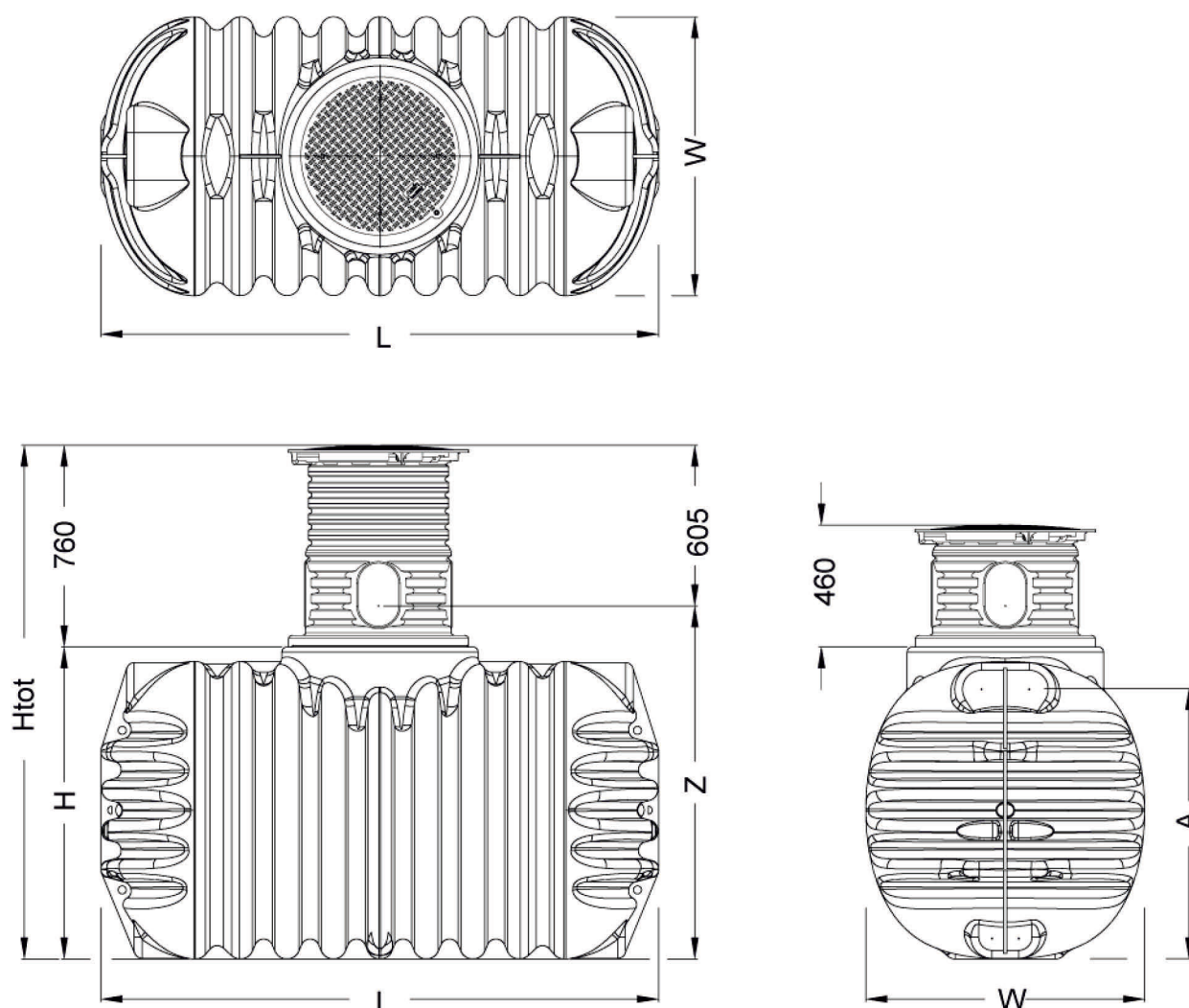


Fig. 9: Measurements – COMPACT

Tank	1.600 L	2.650 L
Item no.	295300	295301
Weight	approx. 65 kg	approx. 100 kg
L	2.100 mm	2.100 mm
W	1.050 mm	1.300 mm
H	1.175 mm	1.455 mm
A	1.015 mm	1.290 mm
Z	1.330 mm	1.610 mm
Htot (total height)	1.635 – 1.935 mm	1.915 – 2.215 mm

Table 6: Technical data – COMPACT

3.7 PROFI

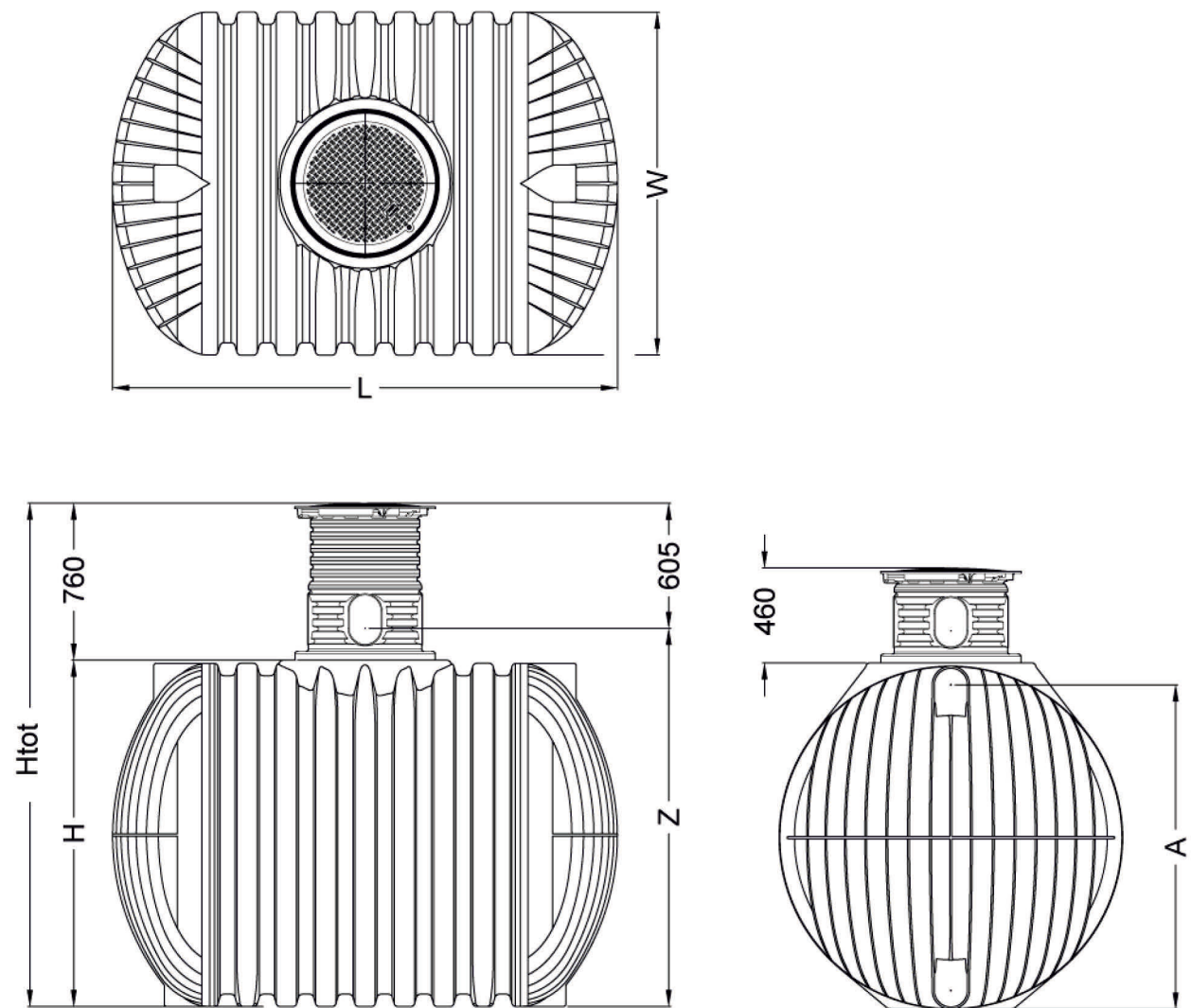


Fig. 10: Measurements – PROFI

Tank	4.000 L
Item no.	295202
Weight	approx. 165 kg
L	2.440 mm
W	1.660 mm
H	1.675 mm
A	1.570 mm
Z	1.830 mm
Htot (total height)	2135 – 2435 mm

Table 7: Technical data – PROFI

3.8 PRIMUS

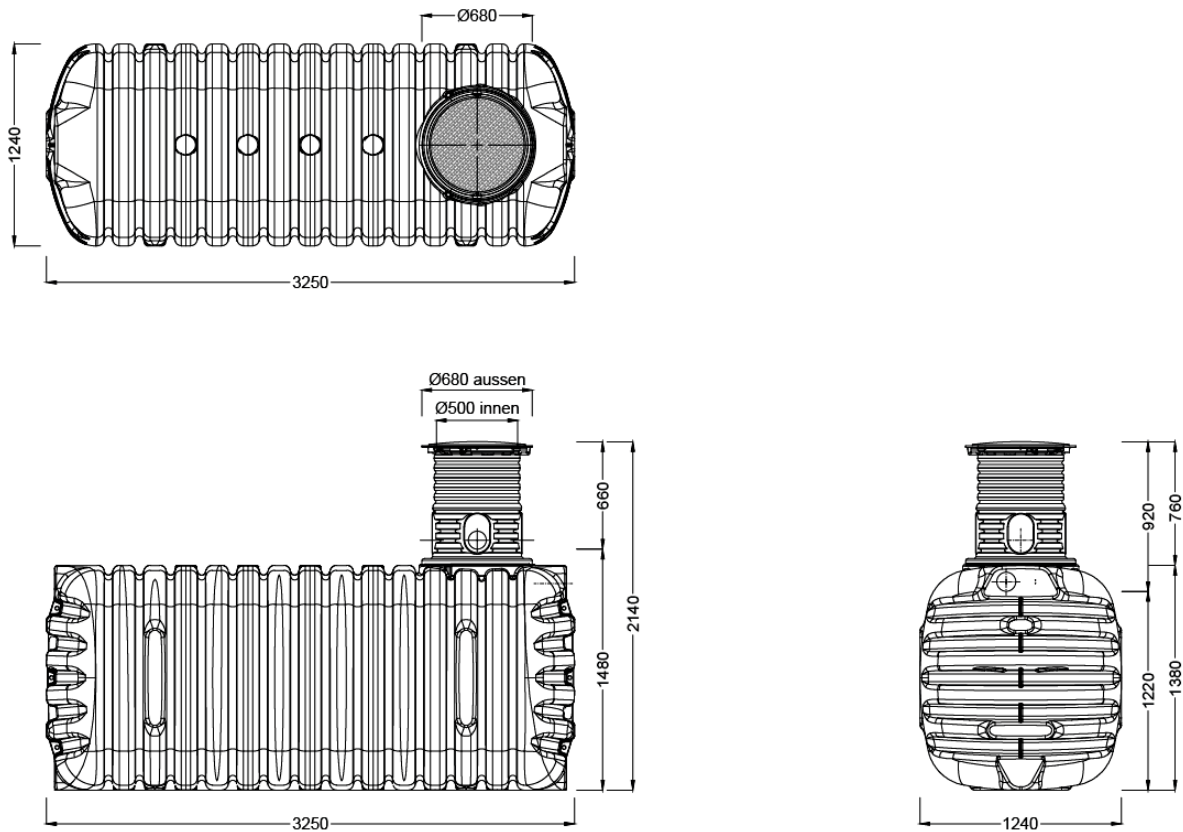


Fig. 11: Measurements – PRIMUS

Tank	4.200 L
Item no.	295215
Weight	approx. 143 kg
L	3.250 mm
W	1.240 mm
H	1.380 mm
Htot (total height)	1.840 – 2.140 mm

Table 8: Technical data – PRIMUS

4 Structure of tank

4.1 FLAT

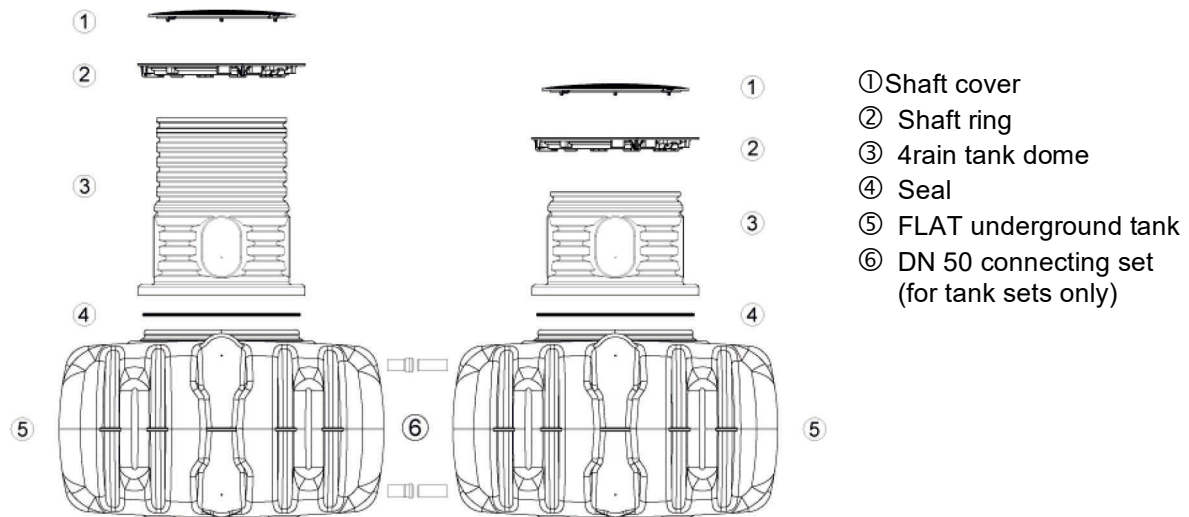


Fig. 12: Components – FLAT

4.1.1 Internal support pipes FLAT S/M



FLAT S/M/L/XL

Check that the support pipes are fitted correctly before transferring the tank to the excavation trench.

FLAT S/M

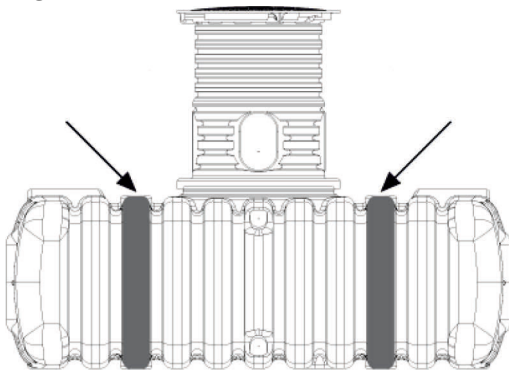


Fig. 13: Section through support pipes – FLAT S/M

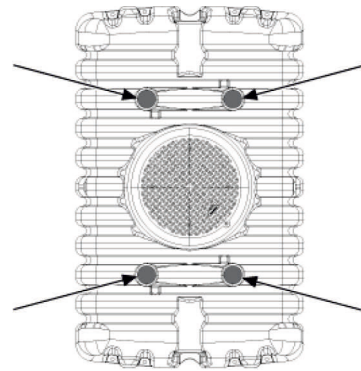


Fig. 14: Support pipe positions – FLAT S/M

FLAT L

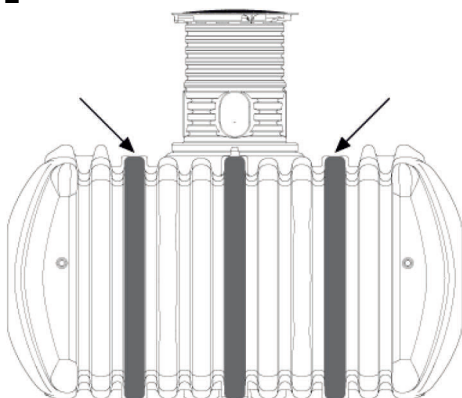


Fig. 15: Section through support pipes – FLAT L

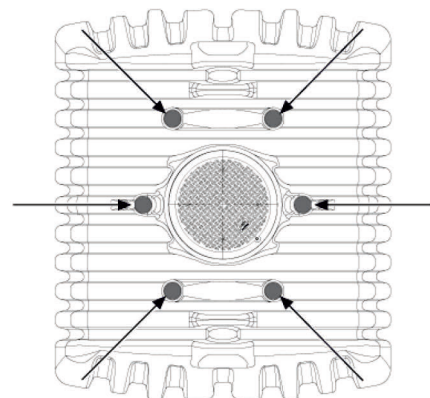


Fig. 16: Support pipe overview/positions – FLAT L

FLAT XL

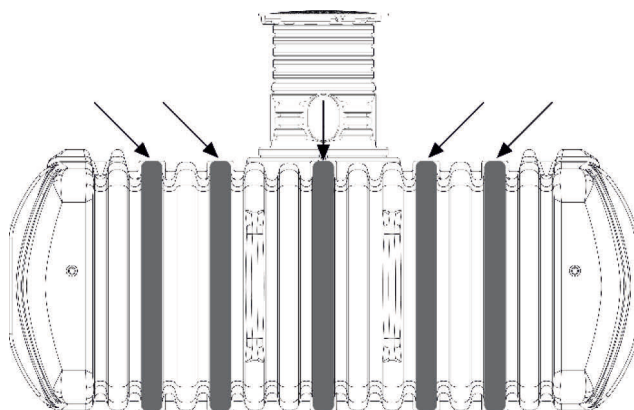


Fig. 17: Section through support pipes – FLAT XL

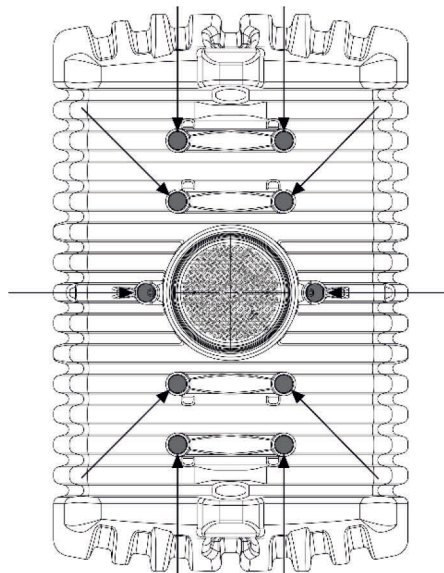


Fig. 18: Support pipe overview/positions – FLAT XL

4.2 Modularis

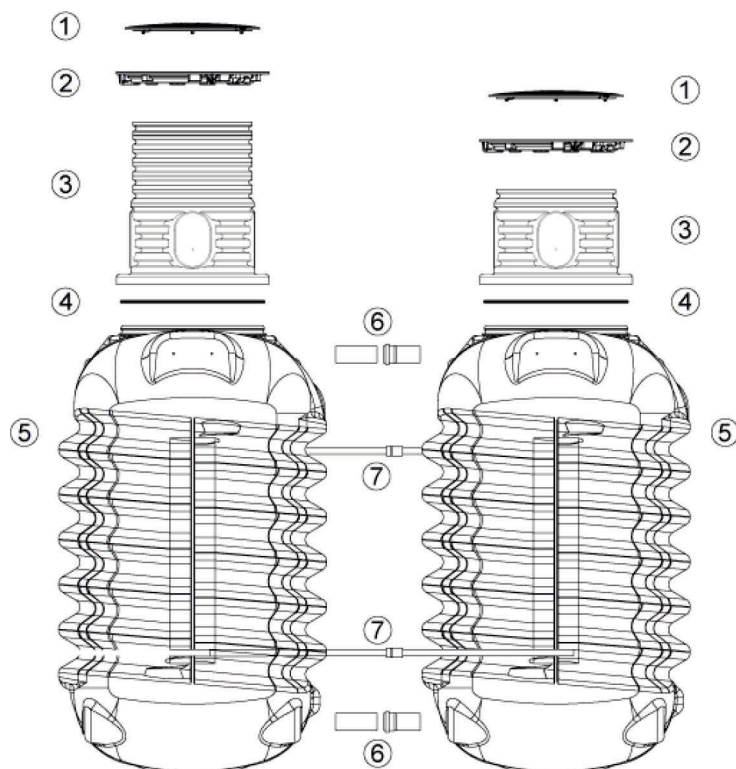


Fig. 19: Components – MODULARIS

- ① Shaft cover
- ② Shaft ring
- ③ 4rain tank dome
- ④ Seal
- ⑤ MODULARIS underground tank
- ⑥ DN 50 connecting set (for tank sets only)
- ⑦ Tensioning belts

4.3 COMPACT

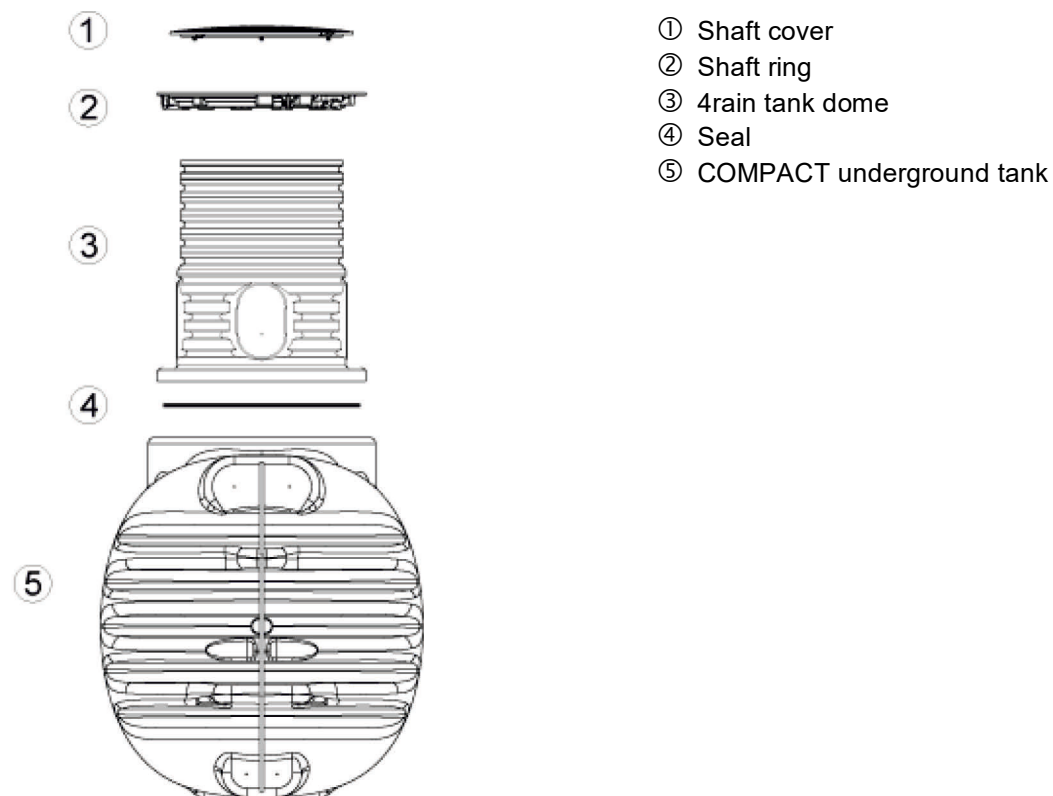


Fig. 20: Components – COMPACT

4.4 PROFI

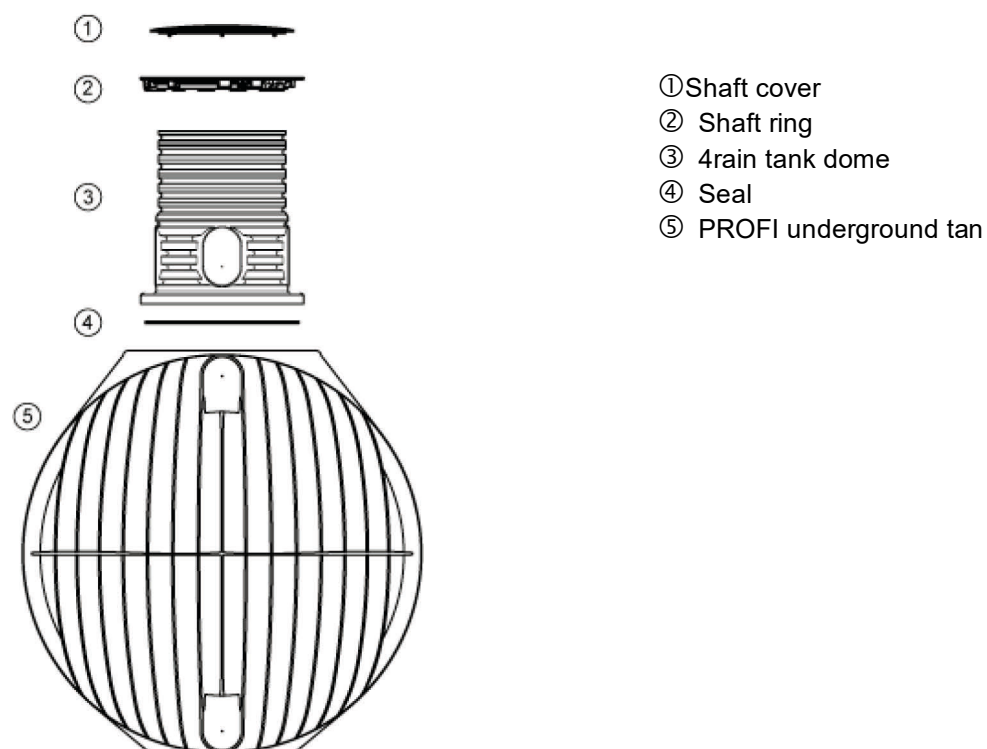


Fig. 21: Components – PROFI

4.5 PRIMUS

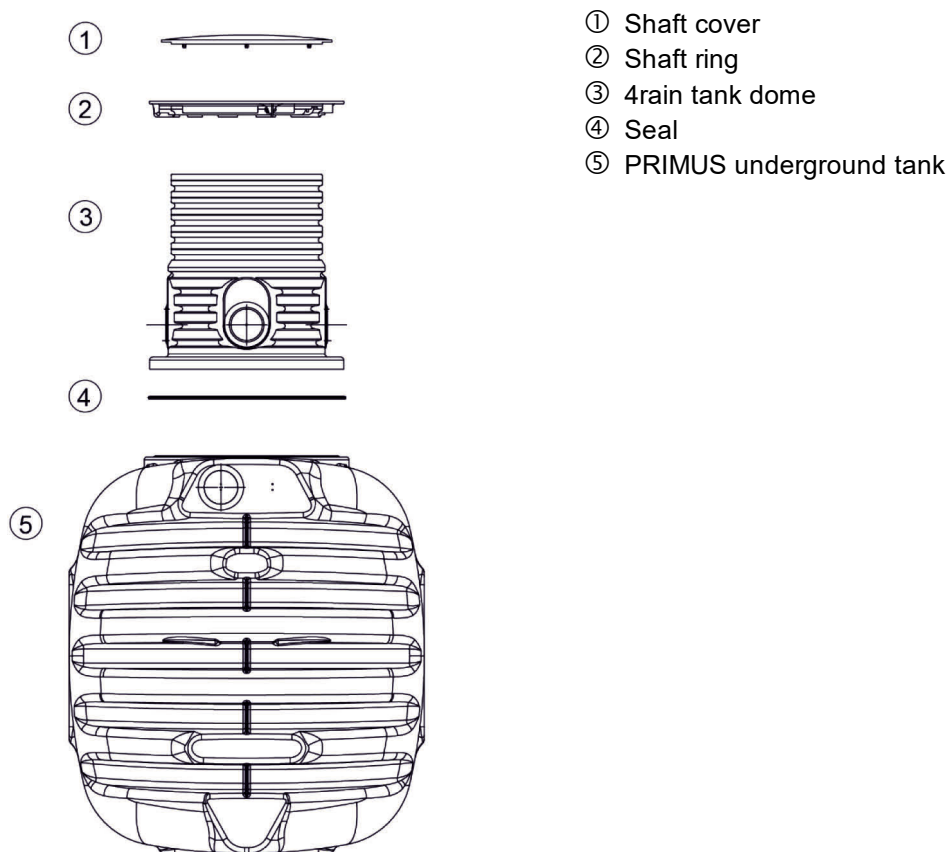


Fig. 22: Components – PRIMUS

5 Installation and assembly

5.1 Overview

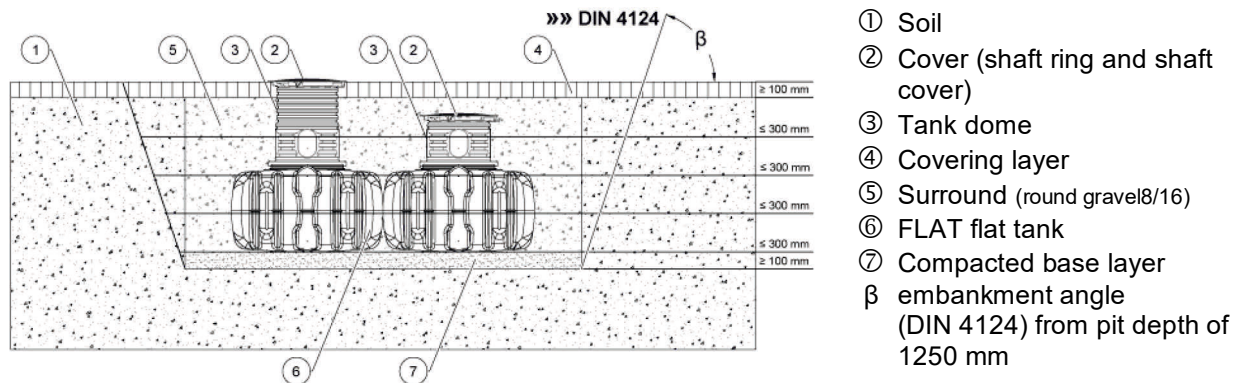


Fig. 23: Recommended installation – example with FLAT

5.2 Foundation

The following criteria must be verified prior to installation:

- The structural suitability of the soil in accordance with DIN 18196
- Maximum groundwater levels / drainage of the subsoil

A soil survey should be requested from the local building authority to determine the physical properties of the soil.

5.3 Trench

To ensure that sufficient working space is available, the base area of the trench must exceed the tank dimensions by > 500 mm on all sides. The distance from fixed structures must be at least 1000 mm.

If the depth of the trench is greater than 1250 mm, an embankment should be built in accordance with DIN 4124. The foundation must be horizontal and even and must offer sufficient load-bearing capacity.

The trench must be deep enough that the maximum earth covering (760 mm above tank shoulder) is not exceeded. For the system to be usable all year round, the tank and water-carrying parts must be installed in a frost-free zone. The frost-free depth is usually approx. 600 mm; for accurate information, please contact the responsible authority.

5.3.1 Substructure

FLAT and COMPACT tanks

Lay the substructure in the form of a layer of **round gravel (max grain size 8/16 mm, depth 100 – 150 mm)**.

MODULARIS tank

Lay the substructure in the form of a layer of **chips (max grain size 2/5 mm, depth 100 – 150 mm)**.

5 Installation and assembly

5.3.2 Positioning on a slope, embankment etc.

If the tank is installed in immediate proximity (less than 5 m) to a slope, mound or embankment (greater than 5° incline), a statically calculated supporting wall must be constructed to bear the pressure of the soil. The wall must exceed the tank dimensions by at least 500 mm in all directions and must be at least 1000 mm away from the tank.

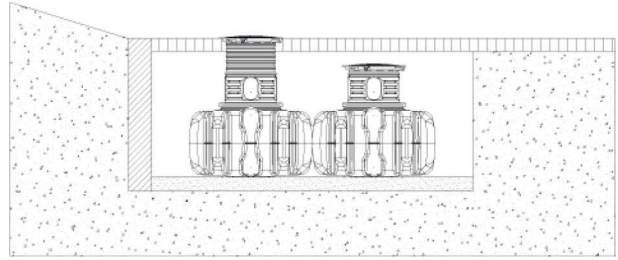


Fig. 24: Installation on a slope – example with FLAT

5.3.3 Groundwater and cohesive (non-water-permeable) soils (e.g. loam)

The tanks must not be installed in groundwater/standing groundwater. Even if groundwater/standing groundwater is expected to occur only infrequently, drainage must be installed.

If necessary, the drainage pipe must end in a vertical DN 315 pipe in which a submersible pressure pump is fitted to pump out the excess water. The pump should be checked regularly.

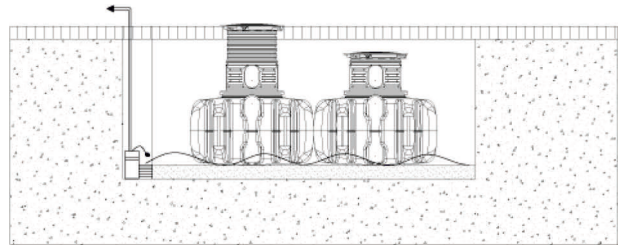


Fig. 25: Installation in a pit carrying water – example 5th FLAT

5.3.4 Installation next to traffic areas

If the underground tanks are installed next to roadways, the minimum distance from these surfaces must be at least the depth of the trench (H).

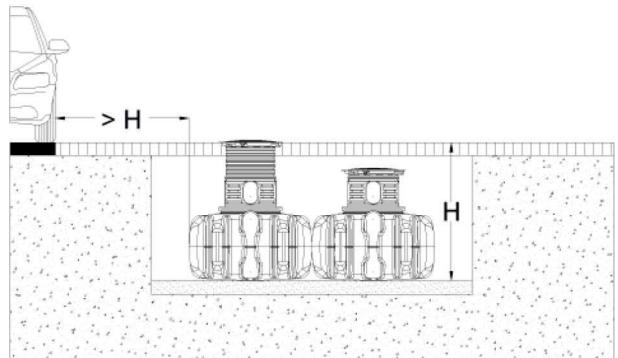


Fig. 26: Distance from roadways – example with FLAT

5.4 Connecting multiple tanks

5.4.1 FLAT

Multiple tanks are interconnected by means of the connecting set and DN 50 HT pipes. The connecting set contains 4 × DN 50 special seal, 4 × DN 50 HT pipe, a lubricant, and a core drill 58 mm in diameter.

Each tank is interconnected via the drill holes at the top and bottom of the tanks. The openings for these connections must be made with a core drill 58 mm in diameter. The openings take the DN 50 special seals. Lubricant should be applied to the seal and the end of the pipes: they can then slide more easily over each other.

Once in the pit, the tanks can be interconnected along their lengths or widths.

The respective distances must be observed ($L \geq 100$ mm, $W \geq 0$ mm).

The connecting pipes may not be shortened and must project by at least 100 mm into the tanks.

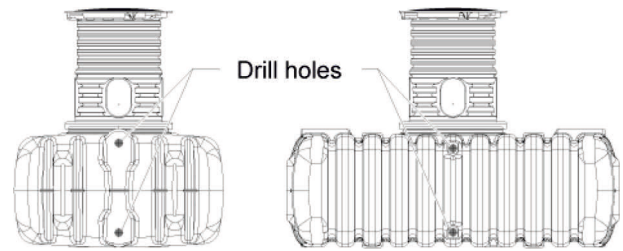


Fig. 27: Drill holes for interconnecting multiple tanks – FLAT

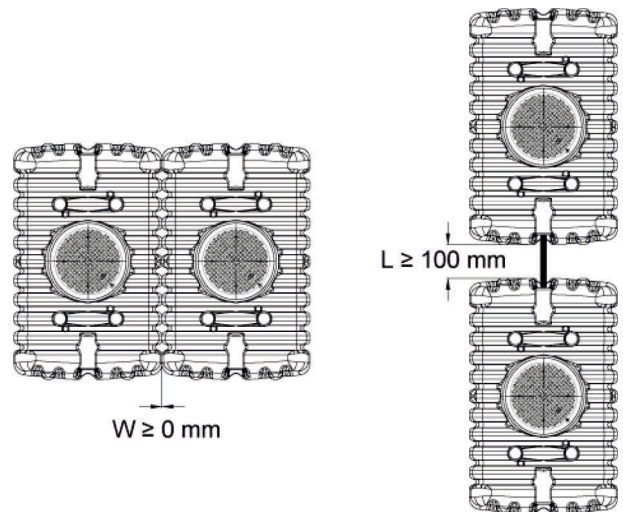


Fig. 28: Interconnecting multiple tanks – FLAT

5.4.2 MODULARIS

Multiple tanks are interconnected by means of the connecting set and DN 50 HT pipes. The connecting set contains 4 × DN 50 special seal, 4 × DN 50 HT pipe, a lubricant, and a core drill 58 mm in diameter.

Each tank is interconnected via the drill holes at the top and bottom of the tanks. The openings for these connections must be made with a core drill 58 mm in diameter. Two adjacent tanks must be drilled on the sides facing each other. The openings take the DN 50 special seals. Lubricant should be applied to the seal and the end of the pipes: they can then slide more easily over each other.

Important: The connecting pipes must not be shortened.

In the pit, the tanks are pushed together with their wide sides facing each other. While the tanks are being pushed together, the connecting pipes (DN 50 HT pipes) are inserted into the openings. The tanks must be pushed together until their ribbing engages and they contact each other.

In the pit, the tanks are secured firmly with tensioning belts that prevent any displacements during back-filling. The tensioning belts must be attached to the eyes on the tank side supporting the pipe connection.

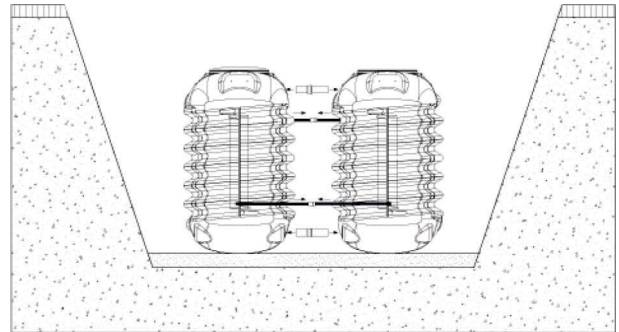
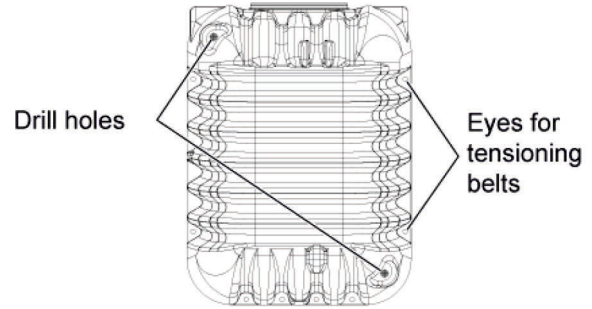


Fig. 29: Interconnecting multiple tanks – MODULARIS

5.4.3 COMPACT

Two or more tanks are connected by DN 50 special seals and HT pipes to the mounts moulded on the bottom of the tanks. The openings for these connections must be made with a core drill 58 mm in diameter. Ensure that there is at least 800 mm between end-to-end tanks and 1000 mm between side-by-side tanks.

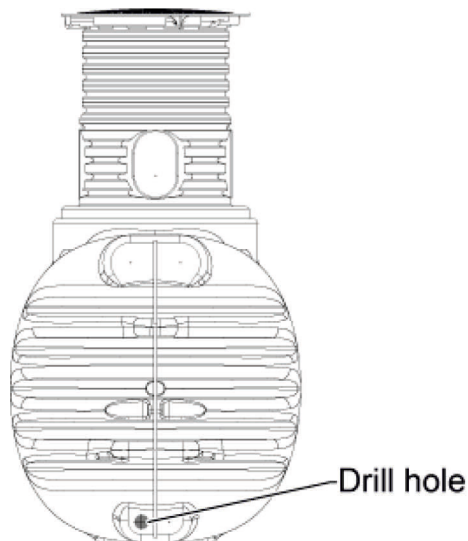


Fig. 30: Interconnecting multiple tanks – COMPACT

5 Installation and assembly

5.4.4 PROFI

Two or more tanks are connected by DN 70 special seals and HT pipes to the mounts moulded on the bottom of the tanks. The openings for these connections must be made with a core drill 83 mm in diameter. Ensure that there is at least 800 mm between end-to-end tanks and 1000 mm between side-by-side tanks.

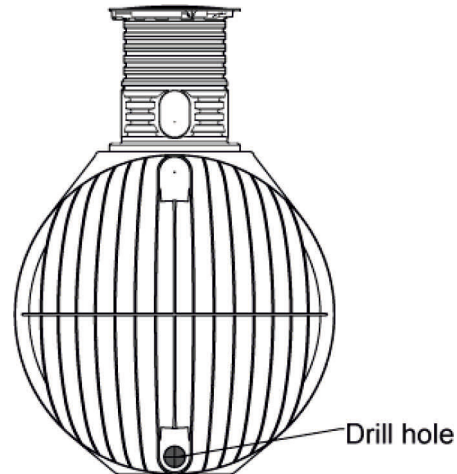


Fig. 31: Interconnecting multiple tanks – PROFI

5.4.5 PRIMUS

Two or more tanks are connected by DN 70 (Art-No 332056) special seals and HT pipes to the mounts moulded on the bottom of the tanks. The openings for these connections must be made with a core drill 89 mm (Art.- Nr. 332006) in diameter. Ensure that there is at least 800 mm between end-to-end tanks and 1000 mm between side-by-side tanks.

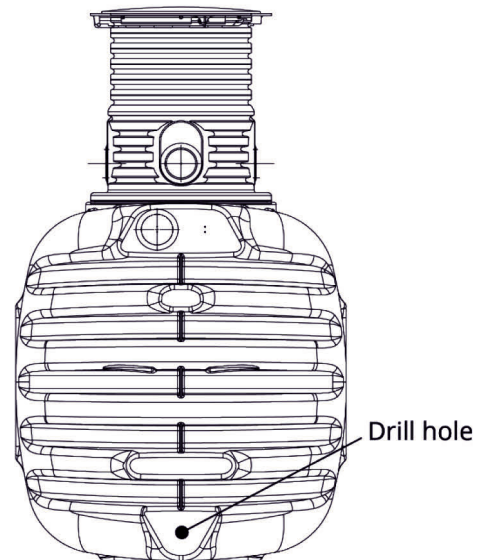


Fig. 32: Interconnecting multiple tanks – PRIMUS

5.5 Transferring the tank to the pit and backfilling

Suitable equipment should be used to move the tanks gently into the prepared pit. Deformations are eliminated when the tanks are filled to a third of their depth with water and checked for leaks before the pit is filled.

The underground tank must be surrounded with a suitable filling material. Unsuitable or inadequately processed filling material might cause damage to the tank and form cavities.

The filling material must:

- be free of sharp or pointed parts and objects
- be well and uniformly permeable to water
- be easily compactable and form a tight packing around the underground tank

We recommend as the filling material round gravel with a max grain size of 8/16 mm. Round gravel need not be compacted.

Lay the surround in successive depths no greater than 300 mm until it reaches the tank's top edge. Compact each layer carefully using a hand tamper. Mechanical compacting machines must not be used under any circumstance. Observe the minimum width of the side surround as set down in Table 9.

Important: Make sure that the filling material fully surrounds the tanks and that it can be compacted easily at the connecting points and inter-tank cavities. Use chips for FLAT tank (max grain size 2/5 mm)!

Tank	Minimum surround width
FLAT S/M/L/XL	100 mm
MODULARIS COMPACT PROFI PRIMUS	500 mm

Table 9: Minimum side filling width – FLAT, MODULARIS, COMPACT, PROFI, PRIMUS

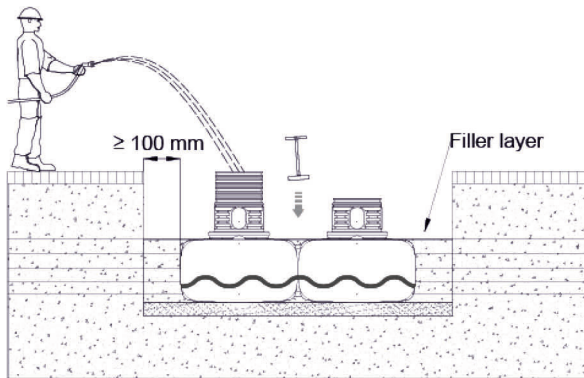


Fig. 33: Insertion and filling – FLAT

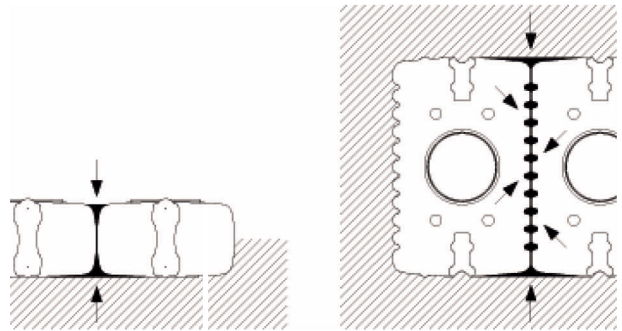


Fig. 34: Inter-tank cavities – FLAT

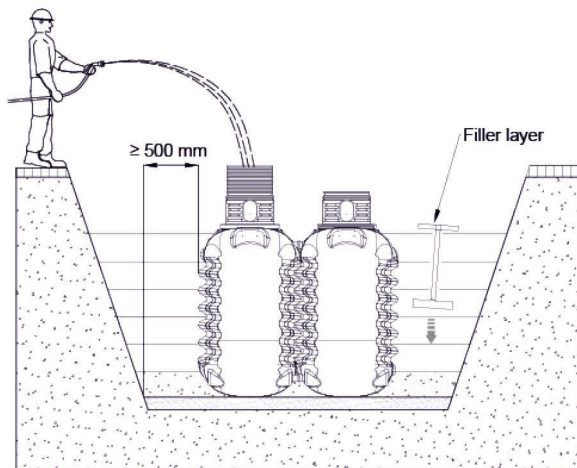


Fig. 35: Insertion and filling – MODULARIS

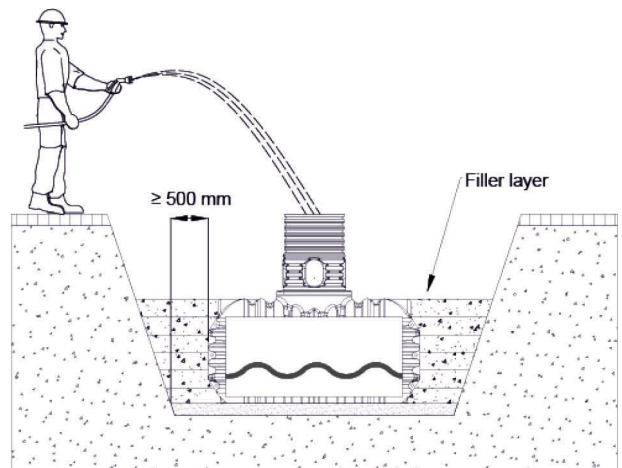


Fig. 36: Insertion and filling – COMPACT, PROFI

5.6 Laying connections

Lay all inlet and overflow lines at a gradient of at least 1% in the direction of flow. Consider possible subsequent settling.

For Flat only: The tank overflow runs through a preinstalled elbow. After connecting, check the correct positioning. The elbow must point up.

In the case of multiple interconnected tanks, we recommend fitting the inlet and overflow lines to the one tank. This minimises the transfer of floating/suspended matter and sediments to the other tanks. This tank's shaft cover must be accessible from ground level for cleaning work.

If the tank overflow is connected to a public sewage network, in accordance with DIN 1986, this must be protected from backflow with a pump (combined sewer) or antiflooding device (pure rain-water pipe).

All intake, pressure, and control lines must be routed in conduits. These conduits must be laid at an angle to the tank, as straight as possible without any sagging. Should elbows become necessary, these should be moulded 30° pieces.

Important: Connect the conduit to an opening **above** the max water level.

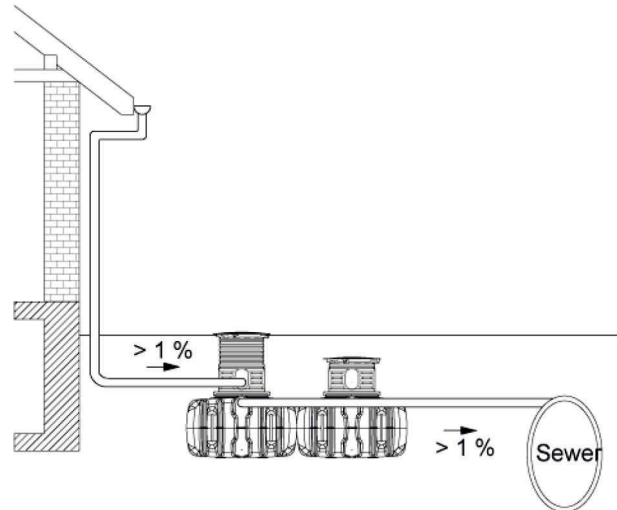


Fig. 37: Recommended connections – example with FLAT

6 Installing the tank dome and cover

6 Installing the tank dome and cover

6.1 Overview

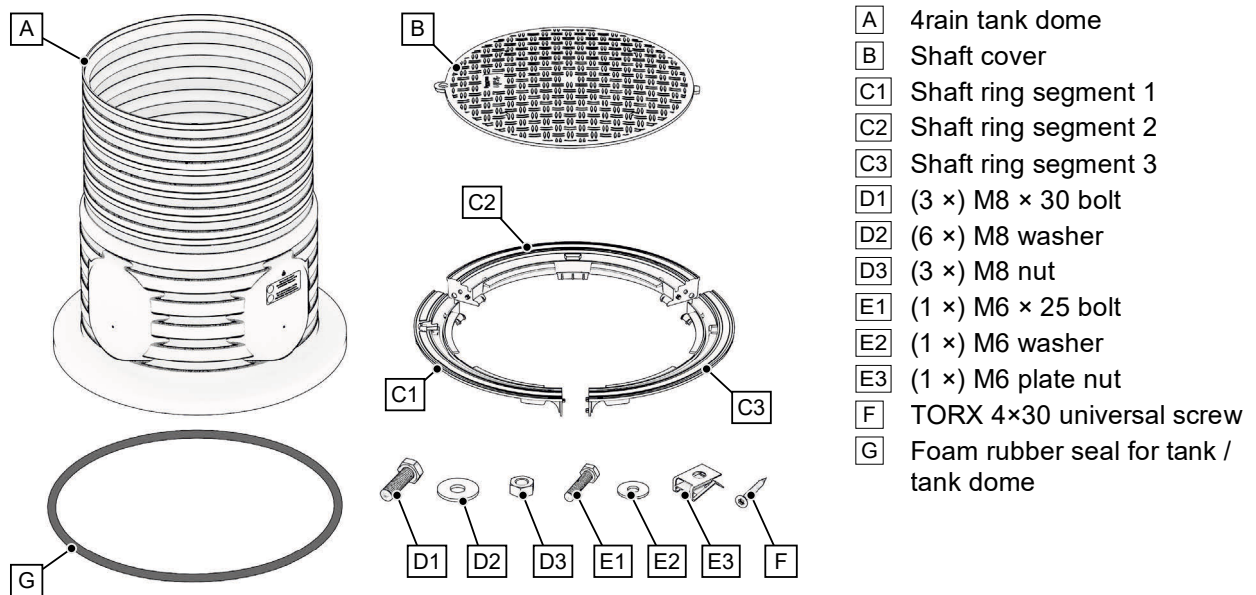


Fig. 38: Tank dome and cover – parts overview

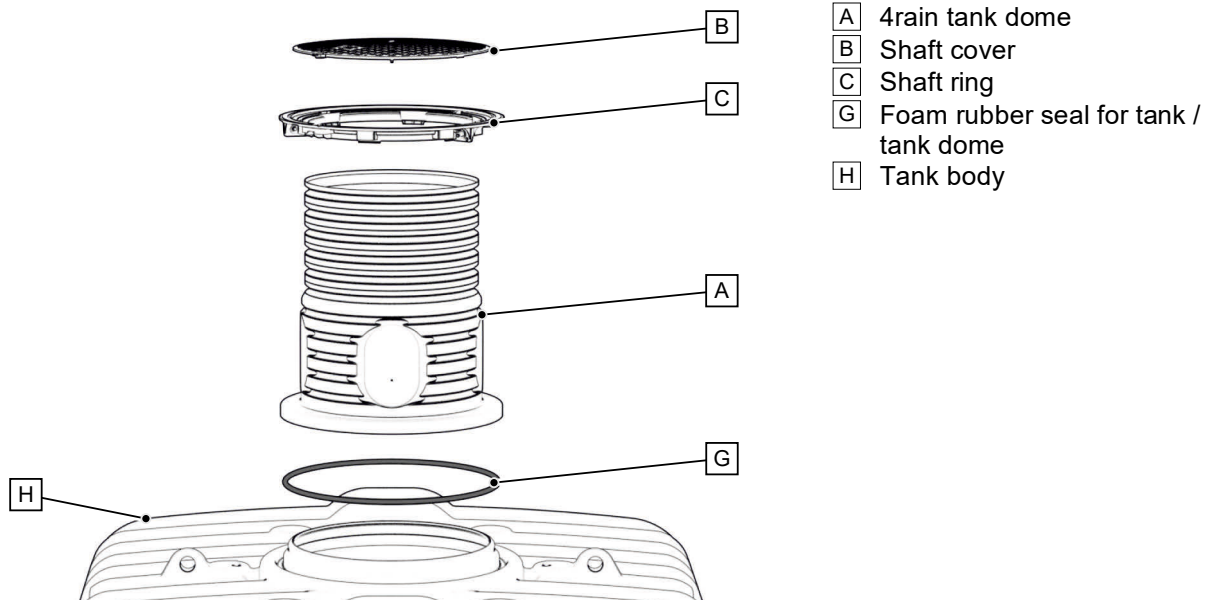
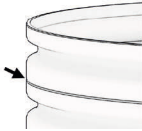


Fig. 39: Tank dome and cover – assembly overview

6 Installing the tank dome and cover

6.2 Assembly



Note

A smaller covering or installation depth may be obtained when the tank dome is shortened by max 300 mm with a saw or abrasive wheel applied to the top ribbing.

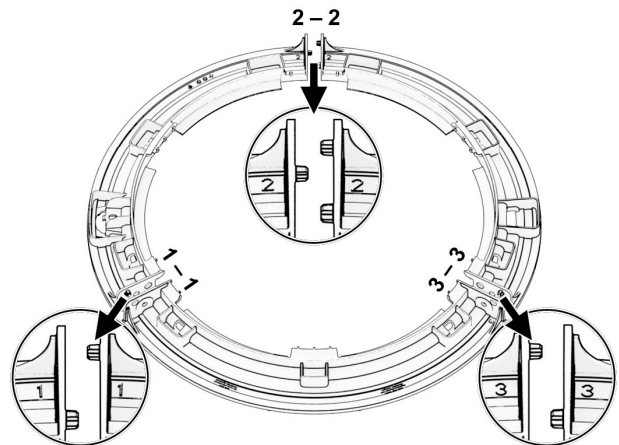
- Shorten the tank dome only at the notch provided for this purpose on the ribbing. Otherwise, the shaft ring might not engage properly.

Required tools:

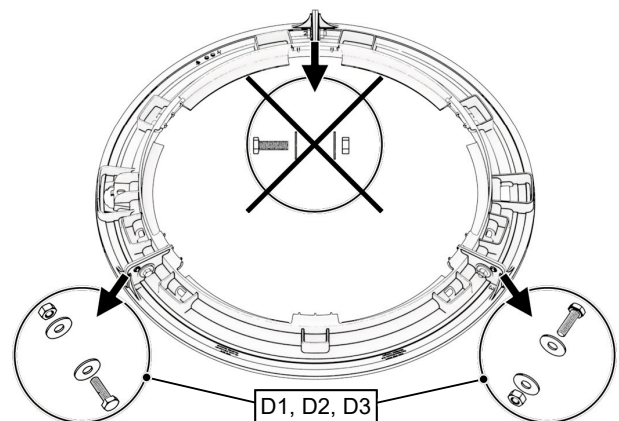
- (2 ×) M8 open-ended / ring spanner
- (1 ×) M6 socket spanner
- Cordless drill driver
- Saw or abrasive wheel (optional for shortening the tank dome)

Assembling the shaft ring

1. Place the three segments of the shaft ring with their top (flat) sides facing down on the floor and assemble them so that their markings coincide at their connecting sites.



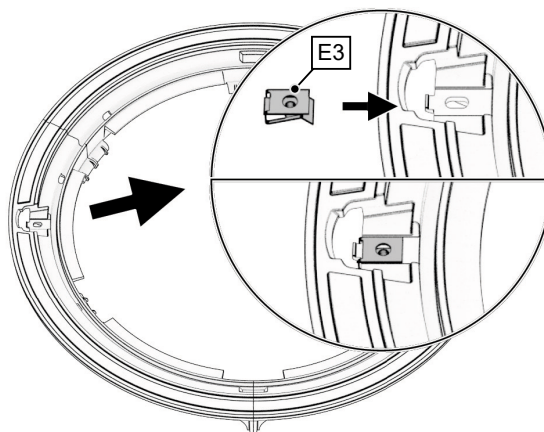
2. Secure the segments at **2 places** using at each 1 × M8 bolt, 1 × M8 nut, and 2 × M8 washer.
 - **Important:** The shaft ring must remain open at one end for later installation on the tank dome.



6 Installing the tank dome and cover

3. On the **shaft ring** segment 1, slide the M6 plate nut on its flat side into the pocket on the base of the cutout and over the elongated hole.

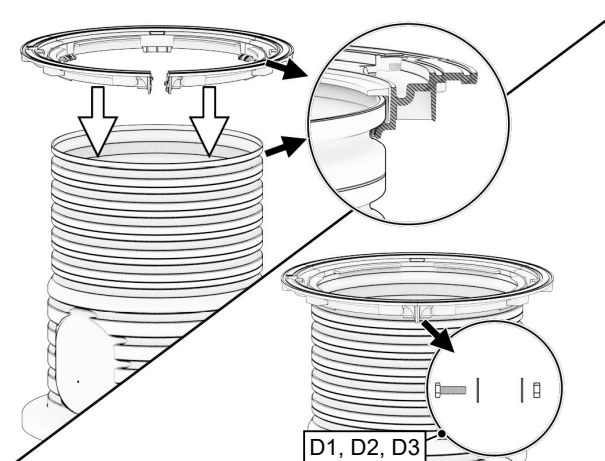
→ The plate nut must engage on the pin on the outer edge of the pocket.



4. Hold the shaft ring with the flat side pointing up, pull the open connecting site slightly apart, and now place this on the tank dome so that the claws on the ring's lower side engage in the tank dome's topmost groove.

→ The shaft ring must lie perfectly level on the tank dome.

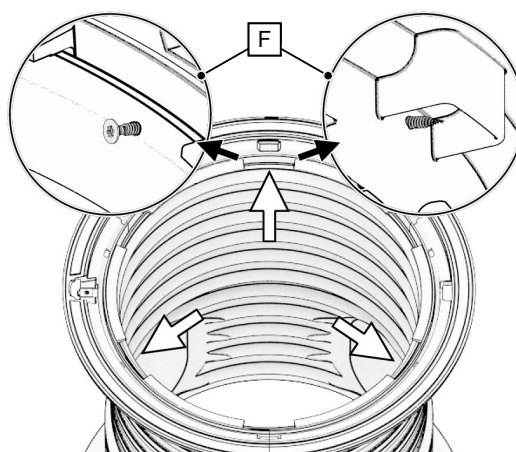
5. Secure the segments to the open place using 1 × M8 bolt, 1 × M8 nut, and 2 × M8 washer.



6. Secure the shaft ring to the tank dome at the pockets on the edge of the topmost rib using 3 × TORX 4×30 universal screw applied from the inside.

→ Drive in the screws as horizontally as possible so that their ends are concealed by the pockets.

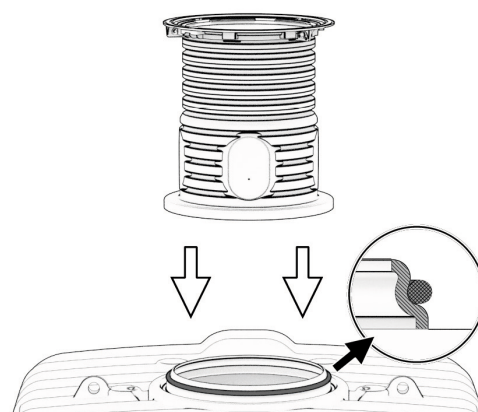
7. After securing, check that the tank dome and the shaft ring are connected firmly to each other at all places.



6 Installing the tank dome and cover

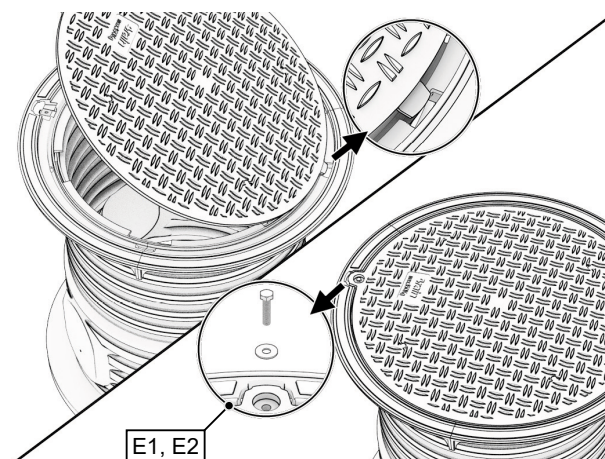
Assembling the tank dome on the tank

1. Fit the foam rubber seal to the tank opening.
→ The seal must sit evenly in the tank opening's groove.
2. Place the tank dome loosely on the tank opening.
→ The tank dome is kept in position by the filler used for the pit and need not be secured in place.
3. Lay the surround around the tank dome in the form of successive layers of round gravel (max grain size 8/16 mm) until just under the shaft ring.



Mounting the shaft cover

1. Hold the shaft cover with its ribbed side pointing up, place it with the pin in the cutout on the shaft ring segment 3, and insert it in the shaft ring.
2. Secure the shaft ring using 1 × M6 bolt and 1 × M6 washer in the plate nut. Tighten the bolt to such an extent that it cannot be released without tools.



7 Inspection and maintenance

Inspect the entire system for tightness, cleanliness, and stability at least once every three months.

The entire system should be serviced approximately every 5 years. All parts should be cleaned and their function checked. Maintenance should proceed as follows:

- Empty tank completely
- Check that all built-in parts are securely mounted



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