



5

TECHNICAL MANUAL

WATER TREATMENT

**Positioning of
underground tanks**

MADE IN ITALY



valsir®

QUALITY FOR PLUMBING



POSITIONING OF UNDERGROUND TANKS

POSITIONING OF UNDERGROUND TANKS

5.1 Underground installation of tanks

5.1.1 Preliminary operations

- 1) Tanks are delivered with all pre-mounted elements with the exception of switchboards and/or rain sensor and/or blowers, to be installed on suitable areas outside the excavation by qualified personnel.
- 2) When performing all operations, the Italian Legislative Decree No. 81/08, and following amendments, on mobile or temporary construction site safety must be observed.
- 3) Checks the presence of all the standard documentation (technical data sheets, installation instructions, etc.). A copy can be requested by contacting the Valsir Technical Department.
- 4) Before introducing the tank in the excavation, its integrity and completeness must be checked.
- 5) Do not pull or drag the tank on the floor: the bottom may damage.
- 6) Only handle the tanks when they are completely empty and using the lifting eyebolts; never lift the tanks by the inlet or outlet pipes.
- 7) Excavation must be at a minimum of 1 metre from any structures or according to what stated by the local authority.
- 8) In the event of complete tank with pump, check the pump is properly fixed; Report any defects encountered.
- 9) In the event of the installation of the pump, it is compulsory to connect to the presetting for pump venting on the tank, a sufficiently dimensioned pipe to be taken on surface.
- 10) In the event of a tank with floats, always check their position/adjustment.

5.1.2 Laying phases

Make the excavation wide enough to ensure safe access for the operator who has to make the connections and, at the same time, to use the necessary equipment for compacting the backfilling (approx. 40/50 cm all around the tank).

Spread a 15-20 cm thick bed of very moist sand or washed gravel with a grain size between 2 and 6 mm on the bottom of the excavation. Alternatively, it is always possible to create a slab with lean concrete, at least 10 cm thick, and then cover it with a layer of wet sand of approximately 5 cm. Only after making sure that the base is accurately levelled, it is possible to proceed by lowering the tank into the excavation with the help of the rope holes provided in all our products.

Figure 5.1 Step 1.



Connect the pipes to the drainage system: the slope of the drainage pipe must be between 0.5% and 4% depending on the design requirements provided for by standards EN 12056 and EN 1610. Connect the tank to the sewage system through the provided outlets.

Figure 5.2 Step 2.



Proceeding in layers of 15-20 cm thickness, first prepare the structure by pouring water into it, and only after that make the backfilling using washed gravel with a grain size between 2 and 6 mm. Proceed in this way, alternating between filling the tank, backfilling and compacting it, until the pipe level is reached. Each layer must be compacted carefully and with the appropriate equipment until a minimum Proctor coefficient of 90% is achieved. It is strictly forbidden to use the excavated material and/or material with sharp edges as a backfilling which may damage the tank.

Figure 5.3 Step 3.



Place any extensions and manhole covers. Complete the covering of the tank with soil and create a lightened concrete slab 10 cm thick and wider than the excavation. This will prevent any loads from bearing directly on the structure but on the backfill and undisturbed soil. If applicable, have authorised electricians install the electrical system for pump supply and/or other.

Figure 5.4 Step 4.



5.1.2.1 Laying steps in areas with a surface water table

In order to install a tank underground in the presence of a surface water table (Figure 5.5) a geotechnical report by a specialist is recommended, which calculates the thrust level of the water table and sizes the backfilling and slab. Create a CLS concrete slab at the bottom of the excavation, approximately 15 cm thick, on top of which a bed of washed gravel (10 cm thick and 2-6 mm grain size) is to be laid to fill in the corrugations at the bottom of the tank. In order to prevent damage to the tank, the excavation must be filled with at least two concrete castings, 24/36 hours apart, taking care to fill the structure with water at the same time to prevent it from collapsing. By using electro-welded mesh, the strength of the backfilling can be increased.

Figure 5.5 Laying with surface water table.



5.1.2.2 Laying steps in areas with clay soil

When a reservoir is to be installed underground in areas with a predominantly clayey/silty substrate (Figure 5.6), with reduced drainage capacity, a geotechnical report by a specialist is recommended, for the calculation of the soil thrust level (in this case high) and the size of the backfilling. In this case it is necessary to cover the bottom of the excavation with a bed of washed gravel (grain size 2/6 mm) and to backfill the tank with gravel (grain size 20-30 mm) to facilitate drainage. Place a drainage system at the bottom of the excavation.

Figure 5.6 Laying with clayey soil.



Figure 5.7 Drainage system for poorly permeable soils.



The drainage systems (Figure 5.7) placed at the bottom are made of PPEcoforte® pipes slotted along the top and intact at the bottom; laid in a bed of gravel, they allow the water retained in the soil to be collected and conveyed elsewhere, thus ensuring the installation stability.

5.1.2.3 Laying steps near a slope

If the tank is buried near a slope or in places with a slope (Figure 5.8), it must be confined with reinforced concrete walls in order to balance the lateral thrusts of the soil, protecting the area from possible seepage.

Figure 5.8 Laying near a slope.



5.1.2.4 Pedestrian access class A15

If the tank is to be laid in a pedestrian traffic area (Figure 5.9) a self-supporting reinforced concrete slab with a larger perimeter than the excavation must be built in relation to the external load, in order to prevent the weight of the structure from bearing on the tank. **The self-supporting slab must always be correctly dimensioned, in relation to the flow rate, by a specialised professional. The transit of vehicles within 2 m of the excavation is prohibited.**

Figure 5.9 Pedestrian access class A15.



5.1.2.5 Light vehicle access - Class B 125 EN 124/95 - max 12.5 ton

If the tank is to be laid in a light vehicle traffic area (Figure 5.10) it is necessary to create, in relation to the external load, a suitable self-supporting slab made of reinforced concrete with a greater perimeter than that of the excavation so as to avoid that structure weight affects the tank. It is always recommended to place a concrete slab at the bottom of the excavation, too. **The self-supporting slab must always be correctly dimensioned, in relation to the flow rate, by a specialised professional.**

Figure 5.10 Light vehicle access - class B 125.



5.1.2.6 Heavy vehicle access - Class D 400 EN 124/95 - max 40 ton

In the event of tank installation on a heavy traffic zone (Figure 5.11) it is necessary to provide a reinforced concrete containment structure cast on-site with a suitable concrete slab with the perimeter of the slab larger than the excavation in order to distribute the load on the containment walls and not on the unit itself. **The self-supporting slab must always be correctly dimensioned, in relation to the flow rate, by a specialised professional.**

Figure 5.11 Heavy vehicle access - class D 400.



Alternatively, if the shape of the unit permits, subject to a technician check it is possible to replace the containment structure with a concrete load distributor (Figure 5.12) which, placed around the inlet of the tank, instead of overloading the tank, redistributes the loads on the backfill soil.

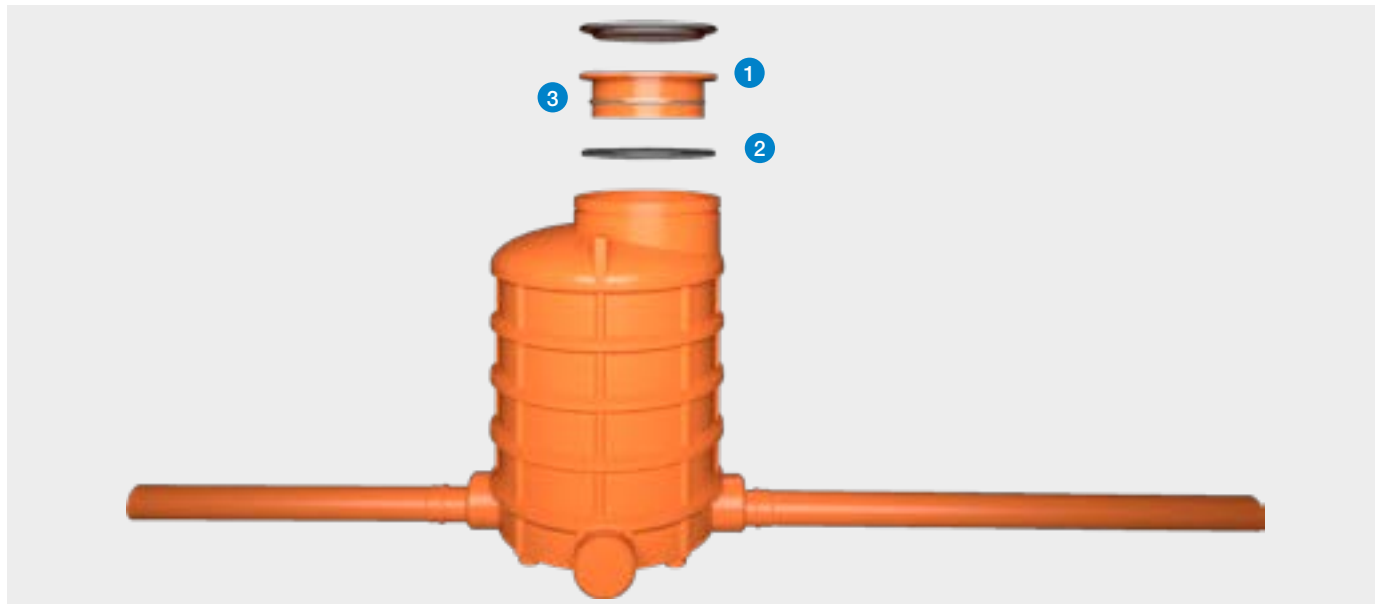
Figure 5.12 Laying with concrete ring to distribute external loads.



5.1.3 Installation of extensions for inspection chambers

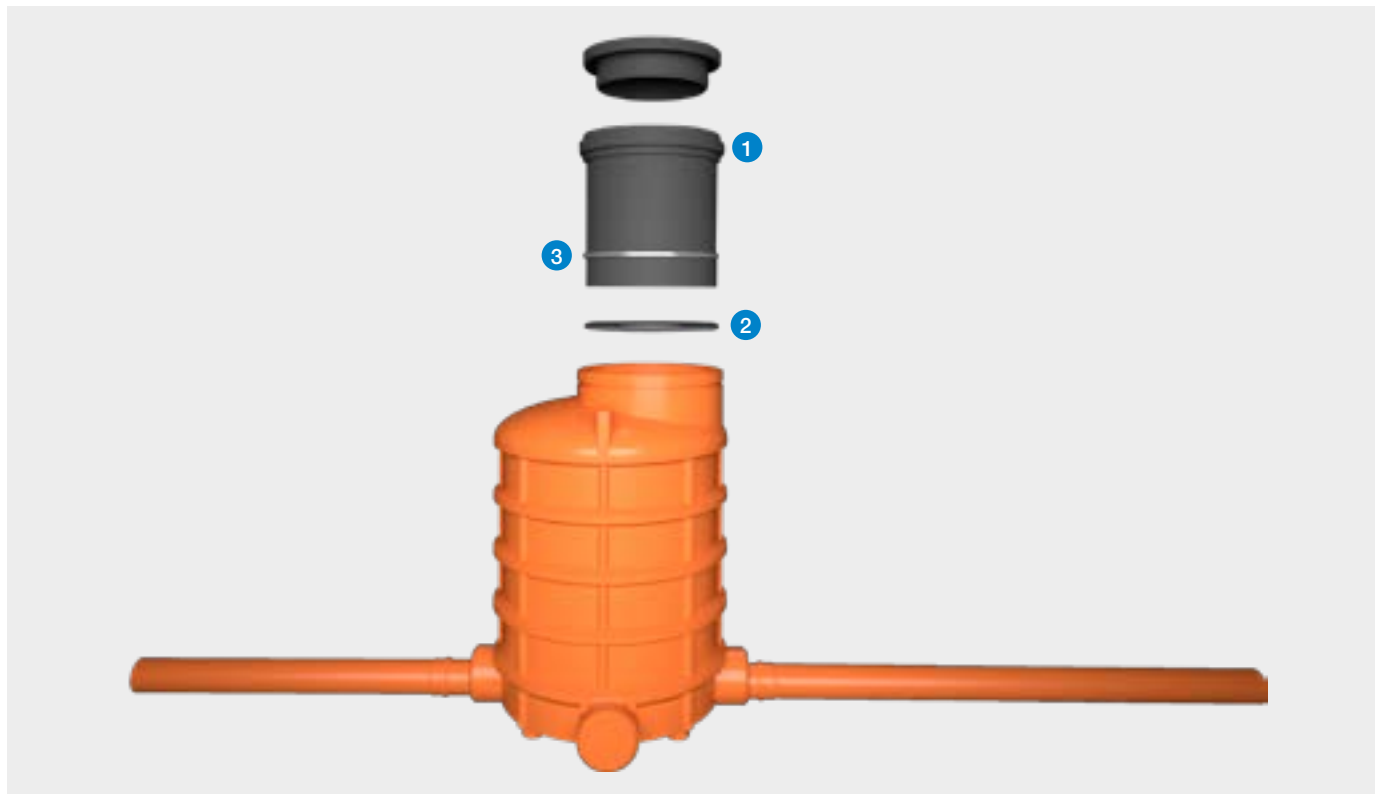
It is possible to extend the inlet flow rate to the tank using various accessories; the first solution involves the adoption of a special extension ❶ (Figure 5.13) for cast-iron manhole covers, not supplied by Valsir, and the gasket ❷ (Figure 5.13) which ensures the hydraulic tightness between the product and the extension. In order to be able to vary the height of the product, two extensions are available, with length of 300 mm or 550 mm. A metal band ❸ (Figure 5.13) is attached to the extensions in order to fix the insertion depth in the tank.

Figure 5.13 Installation of extension for cast-iron manhole covers.



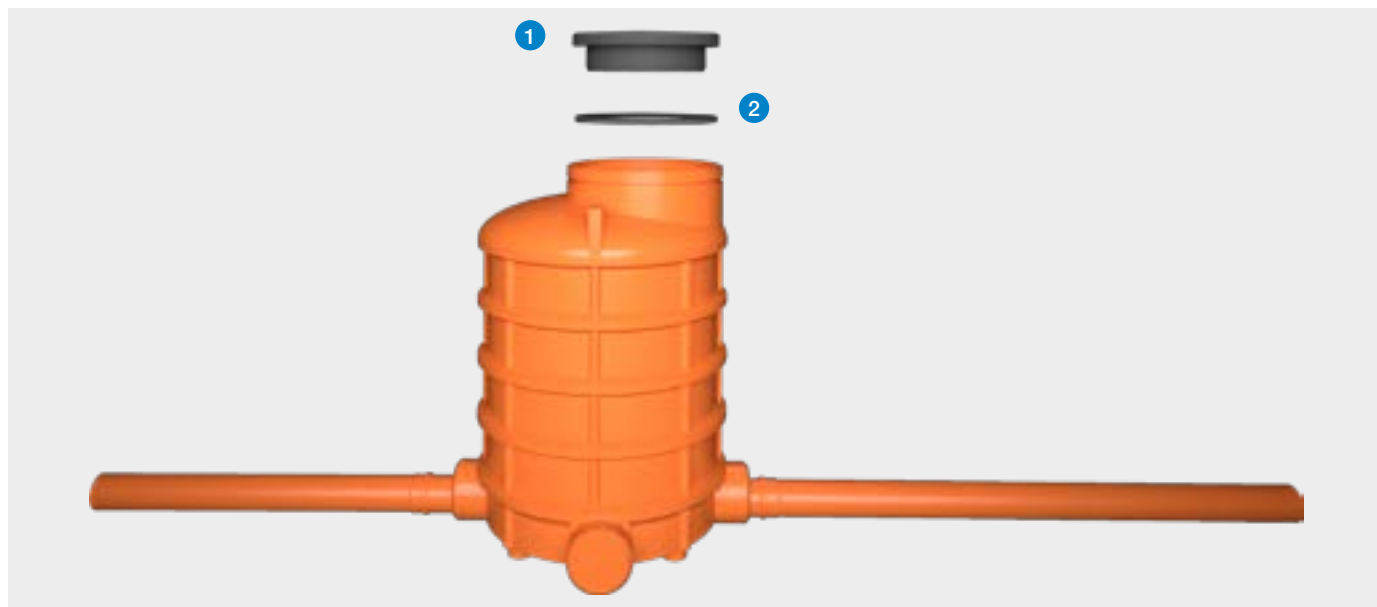
If the product is to be combined with a polymer manhole cover, not supplied by Valsir, a different extension ❶ (Figure 5.14), with a maximum extension of 610 mm, and, as above, the gasket ❷ (Figure 5.14); must be used; the metal closing band ❸ (Figure 5.14) ensures the desired insertion depth.

Figure 5.14 Installation of extension for polymer manhole covers.



When laying the backfill material, the appropriate polymer plugs ❶ (Figure 5.15) and gasket ❷ (Figure 5.15) must be used, so that the covering aggregate does not end up inside the tank, damaging it and obstructing the inlet and outlets.

Figure 5.15 Installation of polymer protective plug.





WASTE SYSTEMS



SUPPLY SYSTEMS



GAS SYSTEMS



FLUSHING SYSTEMS



BATHROOM SYSTEMS



TRAPS



RADIANT SYSTEMS



DRAINAGE SYSTEMS



HRV SYSTEM



ACADEMY



SEWER SYSTEMS



WATER TREATMENT



valsir®
QUALITY FOR PLUMBING

VALSIR S.p.A. - Società a Socio Unico

Località Merlaro, 2
25078 Vestone (BS) - Italy
Tel. +39 0365 877.011
Fax +39 0365 81.268
e-mail: valsir@valsir.it

www.valsir.it

Soggetta all'attività di direzione e coordinamento ex art. 2497 bis C.C.
da parte di Silmar Group S.p.A. - Codice Fiscale 02075160172

L02-869/1 - Febbraio 2023