Orenco® SYSTEMS *Instructions*

Fiberglass Tank Burial

Orenco® Injection-Molded FRP Tanks: 500-gallon through 2000-Gal. (2000-L through 7570-L)

Before You Begin

Correct installation is critical for proper function. Read these instructions before installing Orenco's 500-, 1000-, 1500-, or 2000-gallon fiberglass tanks (2000-, 3785-, 5680-, or 7570-L). These tanks are not approved for use with potable water.

IMPORTANT *— Take all reasonable safety precautions when installing the tank!*

Step 1: Excavation and Installation Planning

Step 1a: Determine the excavation depth based on the factors below:

- **Tank height** — See Table 1 for tank volumes and dimensions.
- **Slope** — The tank has to be buried at the right depth for the proper fall from the building sewer to the tank inlet. It must also meet applicable regulations governing slope. Orenco recommends a minimum slope of ¼ inch per foot (20 mm per meter).
- **Soil type** — If the native soil is rocky or unstable (for example, peat, quick-sand, muck, landfill, or very soft or highly expansive clay), the hole should be over-excavated and a gravel bed or concrete pad laid in the bottom for stability.
- **Buoyancy** — Things that influence tank buoyancy include ...
  – High groundwater
  – Seasonal high groundwater or flooding
  – Attached AX20 treatment unit
  – Native soil conditions
  – Fill material

  Tank buoyancy can be counteracted by adjusting burial depth, by addition of supplemental ballast, or by a combination of the two.

IMPORTANT: *Tank depth is measured from final grade to the top of the tank. Do not set tanks shallower than 12 inches (305 mm) or deeper than 48 inches (1220 mm) without Orenco's written authorization.*

Step 1b: Determine the width and length of the excavation. The excavation should be 24 inches (610 mm) beyond all sides of the tank to allow room to compact the backfill. See Table 1 for tank volumes and dimensions.

Step 1c: Determine the type of bedding and fill materials needed.

- **Bedding** — Use compacted ≤ ¾ -inch (≤ 19-mm) rounded gravel, crushed stone, pea gravel, or sand.
- **Fill** (below midseam flange) — Use ≤ ¾-inch (≤ 19-mm) rounded gravel, crushed stone, or pea gravel.
- **Fill** (above midseam flange) — Use native material, ≤ ¾-inch (≤ 19-mm) rounded gravel, crushed stone, pea gravel, or flowable concrete.

Note: *Do not use sand for fill material. Do not use native material to backfill if it is primarily sand; very soft or highly expansive clay; or if it contains debris, large rocks (> ¾-in. or 19-mm), sharp rocks, peat, or muck.*

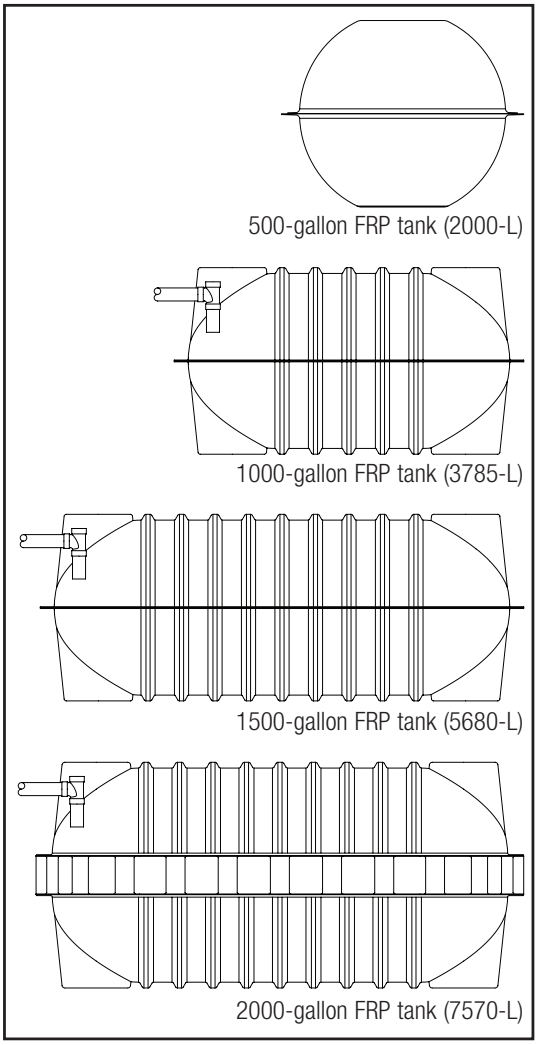


Table 1. Tank Volumes and Dimensions

Volume, Gal. (L), Nominal	500 (2000)	1000 (3785)	1500 (5680)	2000 (7570)
Length, in. (mm)	n/a	123.0 (3120)	169.0 (4290)	169.0 (4290)
Width, in. (mm)	71 dia. (1806)	72.0 (1830)	72.0 (1830)	72.0 (1830)
Height, in. (mm)	60 (1524)	64.5 (1640)	64.5 (1640)	78.0 (1980)
Inlet height*, in. (mm)	n/a	11.0 (280)	11.0 (280)	11.0 (280)
Weight, lb (kg)	200	390 (177)	590 (268)	890 (404)

***Standard** inlet height listed. Measured down from top of tank.*

Step 1d: Determine if the tank requires an antibuoyancy collar. Generally, with cohesive fill material,* no antibuoyancy collar is necessary. With non-cohesive fill material,** an antibuoyancy collar is required for all 500-gallon tanks. It is also required for other Orenco fiberglass tanks if the tank is buried shallower than ...

- 33 inches for 1000-gallon tanks (838 mm for 3785-L)
- 31 inches for 1500-gallon tanks (787 mm for 5678-L)
- 34 inches for 2000-gallon tanks (864 mm for 7571-L)

See Step 7 for more information on installing an antibuoyancy collar.

Step 2: Hole Excavation

Excavate the hole to the depth and width determined in Step 1.

- Excavate 24 inches (610 mm) beyond all sides of the tank.
- Excavate deep enough for a minimum ¼ inch per foot slope (20 mm per meter) to the tank inlet from the building's sewer line(s), once the bottom of the hole is prepped and bedded.
- If the base soil is unstable, overexcavate the site depth and set a firm, compacted base of ¾-inch (19-mm) crushed rock before placing the bedding.
- In some cases, a concrete base is necessary to stabilize the bottom of the excavation. If you have any doubt about the soil's ability to support the tank, consult a local civil or structural engineer.

Step 3: Bedding Prep

Use a mechanical compactor to compact a bed at least 4 inches (100 mm) thick of ≤ ¾ inch (≤ 19 mm) rounded gravel, crushed stone, pea gravel, or sand.

- Be sure that the compacted bed covers any boulders and rock edges, which can damage a fully-loaded tank.
- If sand is used for the bedding material, lightly moisten the sand to compact it. Do not saturate it, or the underlying base soil may become unstable.

Step 4: Tank Placement

Step 4a: Make sure the tank is empty.

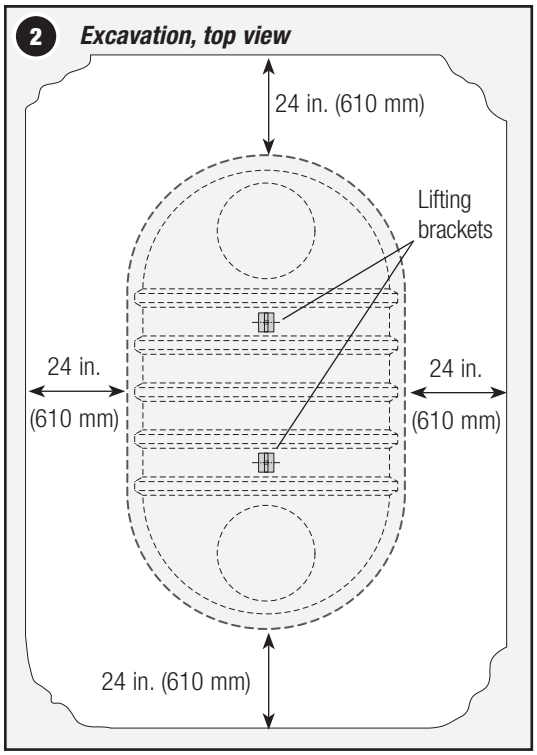
Step 4b: Attach chains or cables to the lifting brackets on the top of the tank.

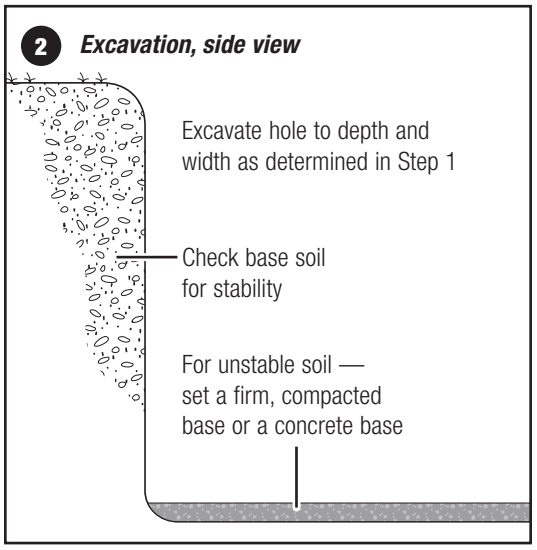
- Use properly sized lifting equipment. See Table 1 for tank weights.

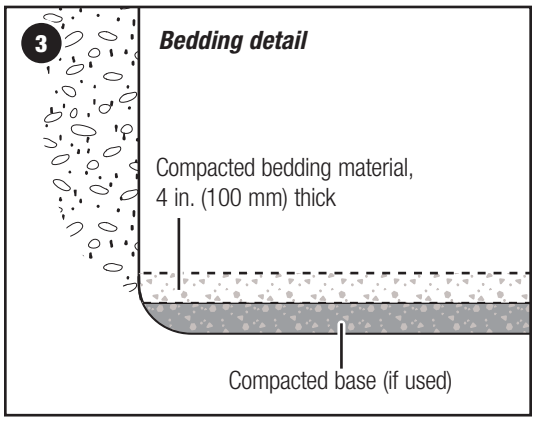
Step 4c: Carefully lift the tank into position over the excavation and slowly lower the tank into the excavation.

- Make sure the tank doesn't shift.

IMPORTANT: *Keep workers away from the excavation while placing the tank.*







* As described in OSHA Standards (29 CFR, Part 1926, Subpart P, Appendix A), cohesive soils include clayey silt, sandy clay, silty clay, clay, and organic clay. Cohesive soil does not crumble, can be excavated with vertical sideslopes, is hard to break up when dry, and when moist, can be rolled into threads without crumbling. For example, if at least a 2-inch (51-mm) length of 1/8-inch (3-mm) thread can be held on one end without tearing, the soil is cohesive.

**Noncohesive soils or granular soils include gravel, sand, or silt with little or no clay content. Granular soil cannot be molded when moist and crumbles easily when dry.

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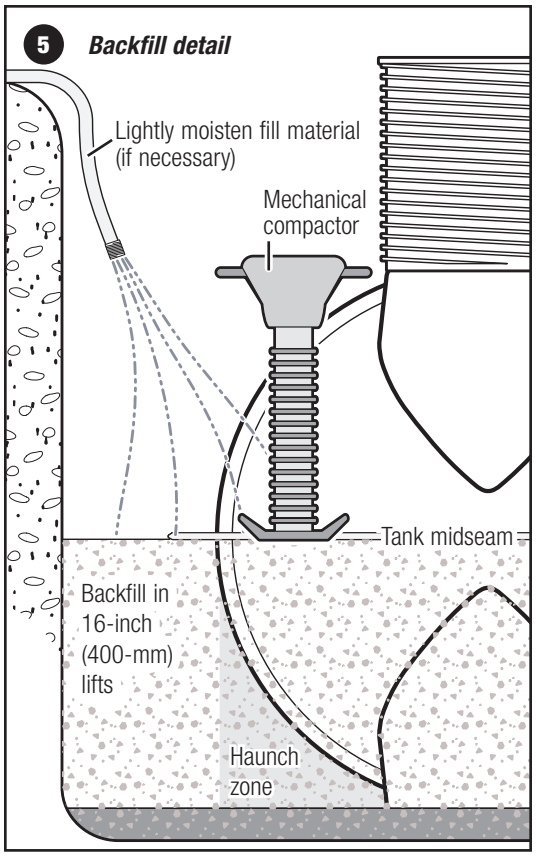
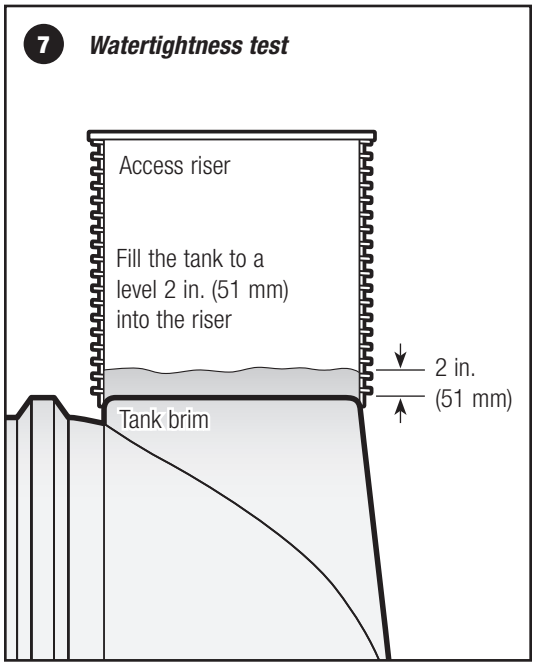




Step 4d: Make sure the tank is level and oriented correctly on the bedding.

Step 4e: Remove the chain or cable from the tank.

Step 5: Backfilling to Midseam Flange

Step 5a: Fill the tank with about 16 inches (406 mm) of water (measured from the tank bottom), to support it from within and settle it down into the bedding.

Step 5b: Backfill a 16-inch (400-mm) layer of fill material around the tank.

- Don't backfill with sand.
- Use ≤ ¾ inch (≤ 19 mm) rounded gravel, crushed stone, or pea gravel as fill material. It should be washed, free-flowing, and free of debris.
- If you're using flowable concrete, layering and compacting aren't necessary.

Step 5c: Use a mechanical compactor to thoroughly compact the fill, especially in the haunch zone, to minimize settlement and provide support for the tank's wall.

- It's critical that the haunch zone is backfilled in order to minimize settling and stabilize the tank.

Step 5d: Fill the tank with water to the midseam flange.

Step 5e: Continue adding and compacting backfill material in 16-inch (400-mm) lifts, to a level just below the midseam flange.

- Each lift should be uniform and of equal height around the entire tank.
- Don't backfill above the midseam before the watertightness test is complete.

Step 6: Tank Adapter and Riser Installation (If Needed)

Step 6a: If tank adapters are needed and they haven't been installed, install them now.

- See NIN-TA-FRTA-1 for tank adapter installation.

Step 6b: If access risers have not been installed, install them now.

- See NIN-RLA-RR-1 for riser installation instructions.

Step 7: Watertightness Testing

Make sure the adhesive is cured before you perform the watertightness test.

Step 7a: Plug the inlet and outlet of the tank with a temporary, watertight plug.

Step 7b: Fill the tank with water to a level 2 inches (51 mm) into the risers.

Step 7c: Wait 30 minutes (or as required by local rules) and inspect for leaks.

- There should be no drop in liquid level and no visual leakage from seams, joints, pinholes, or other imperfections.

Step 7d: When the tank passes the watertightness test, drop the water level in the tank to below the invert of the inlet or outlet, whichever is lower.

Step 8: Add Antibuoyancy Collar, (If Necessary)

Follow the directions below to make a concrete-and-reinforcing mesh (remesh) antibuoyancy collar. The collar provides sufficient ballast for the tank even if there is groundwater to grade.

- The collar is 18 inches (460 mm) wide × 6 inches (150 mm) thick with a 12-inch (305-mm) width of remesh in the center.
- The collar requires about 2 cubic yards (1.5 cubic meters) of concrete with a minimum compressive strength of 2500 psi (17.23 MPa).
- The collar's width — not its weight — provides the necessary antibuoyancy.

Step 8a: Make a backfill dam around the tank to use as a form. The form should be 6 inches tall by 18 inches wide (150 mm by 460 mm).

- Width is measured from the outside tank wall above the midseam flange.

Step 8b: Pour a 3-inch (75-mm) lift of concrete into the form around the tank.

Step 8c: Place a continuous 12-inch (305-mm) width of remesh around the tank, on top of the concrete.

- Remesh can be 6 × 6 - 10/10 WWF or 6 × 6 - W1.4 × 1.4 (152 × 152 MW9.1/9.1).

Step 8d: Pour a second 3-inch (75-mm) lift of concrete on top of the remesh.

Step 8e: Allow the concrete to set for a minimum of two hours (or longer, if possible) so that it's hard enough for the final backfill.

Note: *An 18- × 12-inch thick collar (460- × 305-mm) can be used in place of the concrete and remesh collar. This requires about four cubic yards (3 m^3) of concrete.*

Step 9: Connections and Backfilling to Final Grade

Step 9a: Before final backfill, be sure to make all tank plumbing connections.

- Make sure inlet and outlet pipes are supported by a compacted base.

Step 9b: Backfill a 24-inch (610-mm) layer of fill material around the tank.

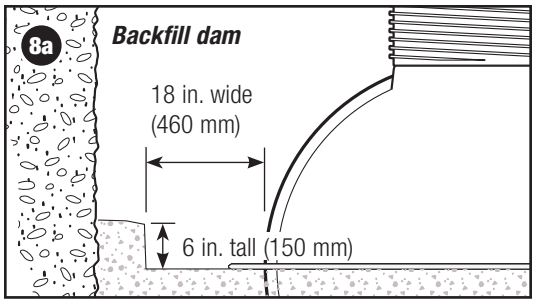
- Don't backfill with sand.
- Don't use native fill that is primarily sand; very soft or highly expansive clay; peat or muck; or if it contains debris, large rocks (> ¾-in. or 19-mm) or sharp rocks.
- If native fill material isn't usable, use ≤ ¾ inch (≤ 19 mm) rounded gravel, crushed stone, or pea gravel as fill material. It should be washed, free-flowing, and free of debris.
- If you're using flowable concrete, layering and compacting aren't necessary.

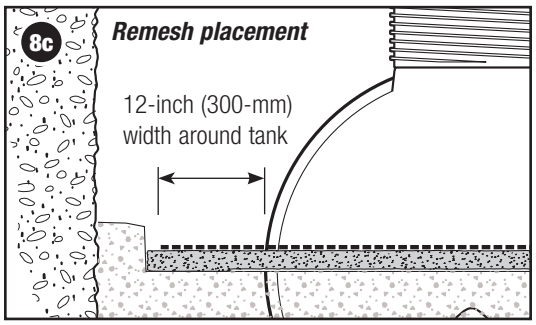
Step 9c: Use a mechanical compactor to thoroughly compact the fill.

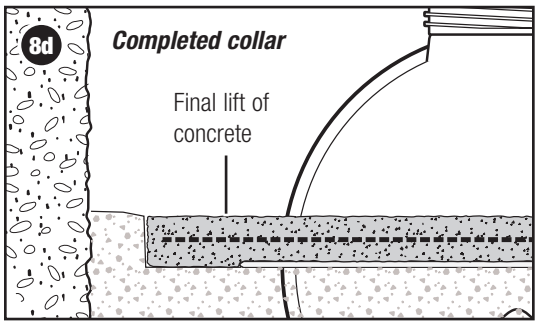
- If a concrete antibuoyancy collar has been poured on the same day as you are backfilling, compact the backfill gently to avoid damaging the collar.

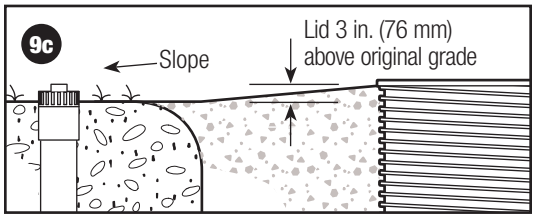
Step 9d: Add and compact fill material in 24-inch (610-mm) lifts to final grade.

- Make sure the tank access risers extend a minimum of 3 inches (75 mm) above final grade to ensure proper drainage away from the risers.









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