

IMPORTANT WARNINGS!

Failure to follow the warnings below could result in damage to the tank, property damage, serious personal injury, and/or death.

This purpose of this document is to provide supplemental instructions to be used in conjunction with the Fiberglass Tank Solutions (FTS) Installation Guide and Operating Guidelines (IMOG). The installing contractor is still required to thoroughly read and follow the FTS IMOG.

The use of backfill material other than what is specified in the FTS IMOG will void the limited tank warranty and absolve FTS from any obligations under the warranty.

Sand and/or native soils are NOT an approved primary backfill and bedding material.

1. Pre-Installation

1.1. Thoroughly read and familiarize yourself with both this document and the Fiberglass Tank Solutions (FTS) Installation Manual and Operating Guidelines (IMOG) prior to installation.

1.1.1. The FTS Installation Checklist, included within the IMOG, should be completed throughout the installation process, and submitted to FTS following a successful installation as part of the limited tank warranty requirements.

1.2. Bedding and Backfill Material

1.2.1. Only bedding and backfill materials that have been approved by FTS are permitted for tank installation. See the FTS IMOG for bedding and backfill material requirements and specifications.

1.2.2. Approved backfill material should not be mixed with sand and/or native soil. Neither sand nor native soil are considered an acceptable primary backfill material.

1.2.3. The primary backfill material must be utilized throughout the entire backfill process and brought to grade when installing a concrete or asphalt top slab at finish grade. Split backfill installation methods are not to be used when installing a concrete or asphalt top slab.

1.3. Geotextile Filter Fabric

1.3.1. The use of a geotextile filter fabric is required to line the excavation hole and to separate the primary backfill material from any/all native soil and secondary backfill material (see FTS IMOG for split backfill instructions).

1.3.2. Geotextile filter fabric allows for the flow of ground water but prevents the migration/mixing of primary backfill material that structurally supports the tank and the native soil.

1.3.3. The filter fabric material should be Mirafi 160N or an equivalent alternative. Technical data sheets and/or sales tickets for the utilized filter fabric must be submitted with the completed Installation Checklist.

1.3.4. Materials such as polyethylene film are not an acceptable geotextile because they are susceptible to degradation and tearing throughout the service life of the product.

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Over deflection of the tank can cause the tank shell to buckle and result in a complete tank failure.

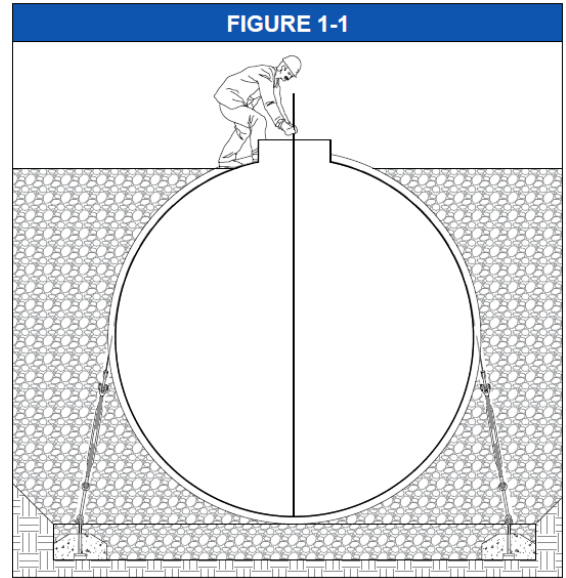
Take safety precautions and follow OSHA regulations throughout the installation process.

1.3.5. All seams between the separate sections of filter fabric must be installed with a minimum of 12 inches of overlap. The filter fabric also must overlap the excavation surface and tank a minimum of 12 inches.

1.4. Taking Deflection Measurements

1.4.1. Prior to installing the tank and throughout the installation process, deflection measurements must be recorded and submitted with the FTS Installation Checklist.

1.4.2. Deflection measurements can be taken by either inserting a dipstick or tape measure inside a service fitting and measuring the distance from the bottom of the tank to the service fitting. See Figure 1-1.



1.4.3. Four measurements must be recorded throughout the install process during the following stages of installation:

- Measurement #1: Before installation
- Measurement #2: After anchor straps are secured
- Measurement #3: Once backfill is flush with the top of the tank
- Measurement #4: When backfilling is complete and at subgrade

1.4.4. Measurement #1 is to be used as a control in which all other deflection measurements are compared to. To calculate deflection, subtract Measurement #2 from Measurement #1 and record it in the Installation Checklist.

1.4.5. At any time throughout the installation process, deflection measurements can be taken by measuring from the bottom of the tank to the top of the service fitting and subtracting it from Measurement #1. Be sure to use the same service fitting for all measurements.

1.4.6. Calculated deflection measurements are to be compared to the allowable deflection listed in Table 1-1. It indicates that the tank is not properly installed if deflection exceeds the allowable limit.

TABLE 1-1	
TANK DIA.	ALLOWABLE DEFLECTION
4 Ft	1/2" [1.3 CM]
5 Ft	1/2" [1.3 CM]
6 Ft	3/4" [1.9 CM]
8 Ft	1 1/8" [2.9 CM]
10 Ft	1 1/2" [3.8 CM]
12 Ft	1 3/4" [4.5 CM]

Mailing: P.O. Box 326
 Montreal, MO 65591
 MFG: 147 Opportunity Rd.
 Camdenton, MO 65020

www.ftgsolutions.com
 Phone: 573-317-9620

Failure to follow the warnings below could result in damage to the tank, property damage, serious personal injury, and/or death.

Under no circumstances should the tank be installed directly onto timbers, cradles, concrete, sand, or native soil.

Ensure that the distance between the deadmen is greater than the outside diameter of the tank and that the deadmen are set on a smooth level surface. Failure to do so could result in straps being too long or too short.

Do not use metal probes or tamping rods to backfill around the tank. At no point during the installation process should tamping rods, probes, or shovels come in contact with the tank.

It is critical that the tank does not shift during installation. The tank must be removed and reinstalled if the tank shifts at any point throughout the installation.

It should be noted that a fiberglass tank shell relies on the granular backfill material to support the full weight of the tank contents. Voids in the backfill material can compromise the support of the tank shell.

2. Dry-Hole Installation

2.1. Level out the bottom of the excavation using primary backfill to fill in any low spots as needed.

2.1.1. Line the excavation hole with geotextile filter fabric.

2.1.2. Set the deadmen in hole so that they are below the tank within the bedding. For 8-foot diameter tanks, the deadmen must be placed on top of the 12" of bedding. Allow for adequate spacing between the deadmen so the deadmen do not fall within the shadow of the tank. See Figure 2-1.

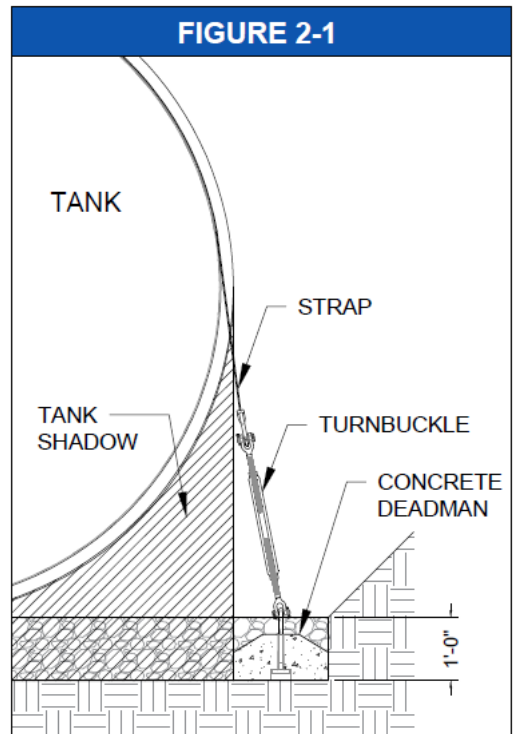
2.1.3. Create a smooth level bed of approved primary backfill material that is a minimum of 12 inches thick. Bedding must be compacted to 85% density proctor and recorded in the Installation Checklist.

2.1.4. Mount any bottom sumps to the tank if applicable. See section 2.3.

2.1.5. Set the tank on the bedding and record the first deflection measurement. The tank must be centered between the deadmen.

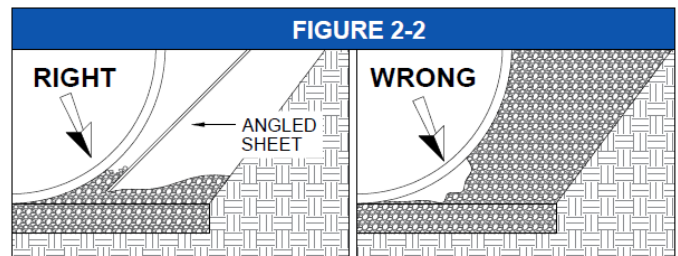
2.1.6. Install the hold down straps and turnbuckles per Figure 2-1. Strap locations are marked by arrowhead vinyl stickers on the tank shell and on the custom tank submittal drawings. Align the adjustable galvanized anchor points in the deadmen with the strap locations.

2.1.7. All straps and turnbuckles should be uniformly tightened so that they are snug on the tank but not overly tightened to the point that they cause the tank to deflect. Record the second deflection measurement at this time.



2.2. Backfilling the Tank

2.2.1. Place 12 inches of backfill around the tank. Carefully hand tamp the backfill underneath the dome ends and between ribs to remove all voids. See Figure 2-2



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The use of rammer-type compactors over the top of the tank is not permitted.

2.2.2. Approved primary backfill must be installed in 12 inch lifts. Alternate the 12 inch lifts on each side of the tank during the installation

process so as to not create more than a 12 inch difference in backfill elevation on either side of the tank. See Figure 2-3

2.2.3. Angled sheeting/ hand shovels are recommended for crushed stone. Tamping

rods are recommended for free-flowing gravel and coarse sand.

2.2.4. Install a 2nd 12 inch lift by repeating steps **2.2.1.** and **2.2.2.**

2.2.5. Backfill is to be compacted with hand-guided, vibrating-plate, mechanical compactors.

2.2.6. Following the installation and compaction of the 2nd backfill lift, begin the process of bringing the backfill to the top of tank. Install any pipe connections throughout the backfill process as needed.

2.2.7. Once backfill has been installed to the top of the tank, record the third deflection measurement and install the final pipe connections and any risers, containment sumps, and manway extensions.

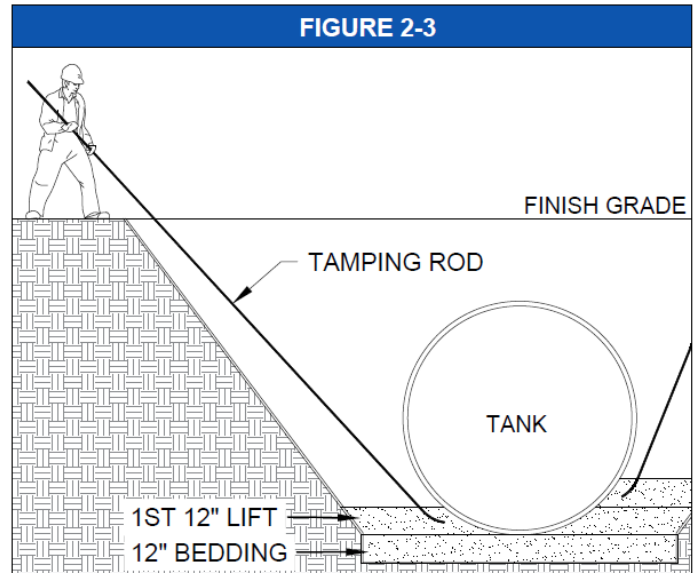
2.2.8. Proceed with backfilling to finish grade or subgrade if a concrete/asphalt top slab is required. Record the final deflection measurement.

2.2.9. Install the reinforced or unreinforced concrete/asphalt top slab at grade if applicable. Refer to the FTS IMOG for H-20 and minimum bury depth requirements. The Installation Checklist should be completed at this time.

2.3. Pipe Connections and Bottom Sumps

2.3.1. All pipe connections to the tank must be made flexible to prevent damage to the tank in the event of settling, misalignment, and/or movement.

2.3.2. For bottom sumps, prior to installing the bedding, dig a hole in the bottom of the excavation large enough to accommodate a minimum 12 inches of clearance between the sides of the hole and the sump.



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The water level in the tank should never exceed the elevation of the backfill material or never exceed the water level in the excavation hole by more than 12 inches.

It should be noted that for many anti-floatation systems that the tank is not fully safe guarded from the buoyant forces of groundwater until backfill has been installed all the way to grade or subgrade.

The tank must be vented to atmospheric pressure throughout the ballasting process.

If applicable, it is important to thoroughly clean and dry the inside of the tank post installation and after the ballast water has been removed. This is especially pertinent for potable water, diesel exhaust fluid, and chemical storage tanks to prevent contamination.

2.3.3. A minimum of 12 inches of compacted bedding must be installed in the bottom of the excavated hole for the bottom sump.

2.3.4. Once the tank is set on top of the bedding, carefully tamp backfill in the hole around the sump ensuring there are no voids around the sump.

3. Wet-Hole Installation

3.1. For wet-hole installations, follow the same procedures outlined in section **2. Dry-Hole Installation** with the additional procedures outlined in this section.

3.1.1. Utilizing pumps, dewater the hole prior to installation. Continue removing water from the excavation throughout the installation process. At no point should the water level exceed the backfill elevation.

3.1.2. Proceed with steps **2.1.** through **2.1.5.**

3.1.3. Partially ballast the tank with water so that it settles firmly onto the compacted bedding. Allow for adequate venting before and during ballasting.

3.1.4. Proceed with steps **2.1.6.** and **2.1.7.**

3.1.5. Proceed with steps **2.2.1.** through **2.2.9.** Continue to ballast the tank with water throughout these steps. The water level in the tank should never exceed the elevation of the backfill material or never exceed the water level in the excavation hole by more than 12 inches.

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