ALTERNATE TANK INSTALLATION METHODS

1. INTRODUCTION

1.1. Fiberglass underground tanks must be installed according to these instructions and NFPA 30, 30A and 31, OSHA and all applicable Federal, State, Local, or Provincial, construction, safety and environmental codes and regulations.

1.2. Follow these Supplemental Instructions as well as all instructions covered in the most recent edition of Containment Solutions Tank Installation Instructions. (Pub. No. INST 6001).

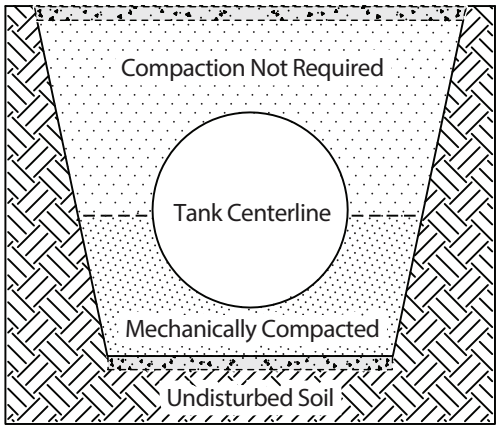
2. DEEP BURY TANKS

2.1. Tanks with a burial depth of greater than 7' from grade to tank top.

2.2. It is critical that special care be taken during the installation to properly place approved backfill (pea gravel or crushed stone) under the haunches of the tank. In addition, the backfill must be compacted in 12" lifts from the bottom of the tank to the vertical centerline with a vibrating plate compactor (see Figure 2-1).

2.3. Compaction may be accomplished by the use of hand held compaction equipment such as a mechanical plate compactor operating at 2,000 to 3,000 vibrations per minute.

Figure 2-1



3. ALTERNATE BACKFILL ABOVE TANK TOP

3.1. Normally fiberglass tanks are installed using pea gravel or crushed stone. However, in certain areas of the United states, approved backfill material may be in short supply or too expensive. In these geographical areas, compacted sand may be used as an alternate backfill material above the tank tops.

3.2. Although Containment Solutions, Inc. (CSI) will allow the use of this procedure, under certain circumstances, the installing contractor should consult with the tank owner's technical representative prior to installation for approval to use this alternate procedure for installation. Also, some tanks owners may require a written report to verify proper compaction of the sand (see figure 3-1).

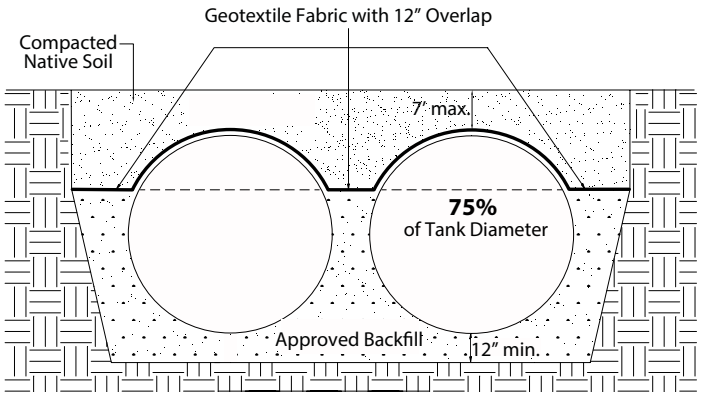
3.2.1. Use specified gravel or crushed stone as identified in INST 6001 for bed and backfill material to a point at least 75% up the side wall of the tank(s). For example 75% of an 8' tank is 6' up the side wall. Push the first two 12" lifts of backfill under the tank to assure the tank bottom is supported.

3.2.2. Separate the select bed and backfill by a continuous layer of geotextile fabric (see Pub. No. INST 6001).

3.2.3. Geotextile fabric must cover the entire surface of backfill below and must overlap onto the tank a minimum of 12". All joints in the fabric must be overlapped a minimum of 12".

3.2.4. Native soil may be used from this point to subgrade and must be compacted to a minimum 85% standard proctor density. Soil should be compacted in maximum 12" lifts.

Figure 3-1



3.3. No vehicular traffic or surface loads imposed by vehicle compaction equipment may be applied to the tank prior to placement of at least 3' of cover over the tank. Soil must be consolidated such that rutting of the soil will not occur from any equipment or vehicles.

3.4. Be sure consider the submerged weight of the native backfill when doing tank anchoring calculations.

3.5. In some areas frost heave may be encountered when using secondary backfill. Consider any frost related problems that may occur.

3.6. Native backfill shall not be frozen or contain lumps of frozen material at any time during the tank installation.

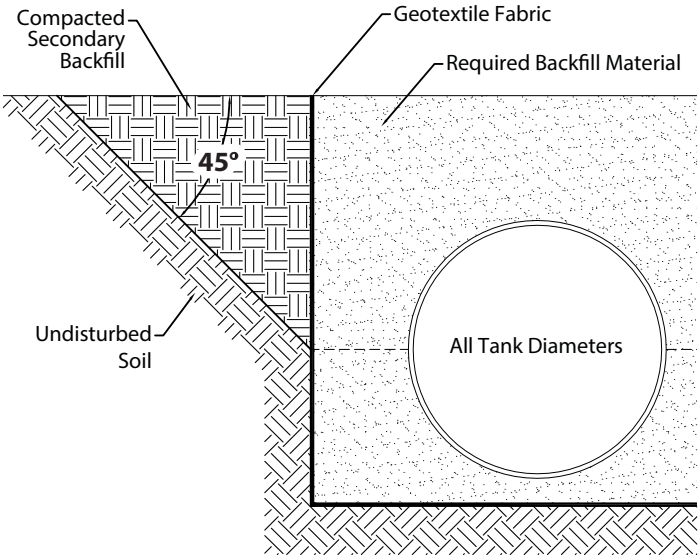
4. SECONDARY BACKFILL ON PERIMETER OF EXCAVATION

4.1. If secondary backfill material is used on the perimeter of the installation, it must be placed and compacted at the same time as the primary backfill material.

4.2. Secondary backfill must be compacted to a minimum 85% Proctor Density.

4.3. Geotextile fabric must be used between secondary perimeter backfill and tank excavation if backfill materials are different (see Figure 4-1).

Figure 4-1



5. BACKFILL DEPTH UNDER TANK

5.1. It is necessary that the bottom of the excavation and the backfill under the tank properly support the tank and provide a stable base to prevent future settling. The instructions currently require the following:

5.1.1. The backfill bed (a layer of backfill filling the bottom of the excavation between the tank and the soil) is limited to:

5.1.1.1. 12” to 24” for a dry hole

5.1.1.2. 18” to 24” for a wet hole

5.1.1.3. The soil in the excavation bottom and sides is undisturbed native soil.

5.1.2. Additional requirements for Unstable Excavations:

5.1.2.1. CSI Tank Installation Instructions (Pub. No. INST 6001) provide direction for stabilizing the excavation sides and bottom.

5.1.2.2. A soils consultant is suggested for additional recommendations.

5.1.2.3. Geotextile fabrics and concrete pads under the tank may be required.

5.2. The CSI installation materials and methods are designed to allowed for a slight amount of consolidation over the life of the installation.

5.3. When it is desired to increase the backfill bed thickness, the controlling consideration is to provide stable backfill that will not consolidate over time and cause the tank to move. CSI will allow an increase in the backfill bed thickness as long as the CSI Installation Instructions are followed along with the following additional requirements:

5.3.1. The soil in the bottom of the hole and the sides of the excavation must be undisturbed.

5.3.2. The soil under the tank can be level or on a slope.

5.3.3. The minimum backfill depth at any point under the tank is 12” in a dry hole and 18” in a wet hole.

5.3.4. If the backfill depth exceeds 24” at any point under the tank, the backfill under the tank (including in some cases the adjacent backfill) must be consolidated mechanically to the point that it will not further consolidate over the life of the installation. The area to be consolidated is shown on the included drawings.

5.3.5. The method and amount of consolidation is the responsibility of the customer and a soils consultant should be used to provide specifications in this regard.

5.3.6. For approved pea gravel, the consolidation must be done in lifts of 12” or less.

5.3.7. For approved crushed stone or gravel, the consolidation must be done in lifts of 12” or less.

5.3.8. Consolidation can usually be accomplished with a vibrating plate compactor.

5.4. The following drawings show various allowed configurations as long as the CSI Installation Instructions (INST 6001) and these special instructions are followed.

5.5. The drawings shown depict two tanks of different diameters. CSI Installation Instructions include tables showing the required A and B dimensions. These dimensions are dependent upon the tank diameter and the stability of the tank hole.

5.6. When the tank diameters differ, the B dimensions shown in the diagrams, are relative to the tank diameter to which it is referenced.

5.6.1. The B1 dimension for Tank 1 will be the B dimension in Table 5-1 for Stable Soil or Table 5-2 for Unstable Soil.

5.6.2. The B2 dimension will similarly be for Tank 2.

5.6.3. The A dimension is based on the larger diameter of adjacent tanks (see Tables 5-1 and 5-2) (see diagrams for Plan View and End View).

Table 5-1

STABLE SOIL

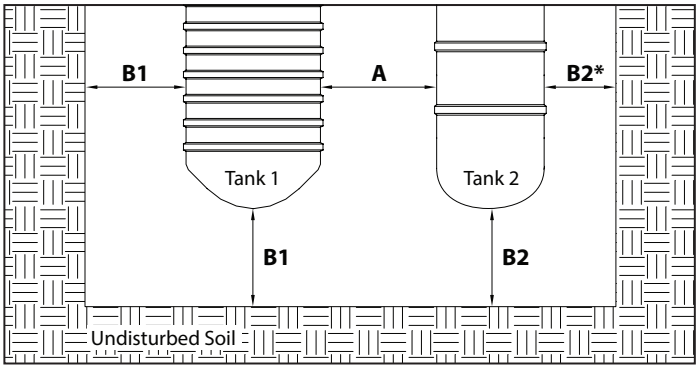
4', 6', 8' Diameter Tanks		
	Minimum	w / 12" x 12" CSI Deadmen
A	18" (457mm)	24" (610mm)
B	18" (457mm)	24" (610mm)
10' Diameter Tanks		
	Minimum	w / 18" x 8" CSI Deadmen
A	18" (457mm)	36" (914mm)
B	24" (610mm)	24" (610mm)
12' Diameter Tanks		
	Minimum	w / 18" x 8" CSI Deadmen
A	24" (610mm)	36" (914mm)
B	24" (610mm)	24" (610mm)

Table 5-2

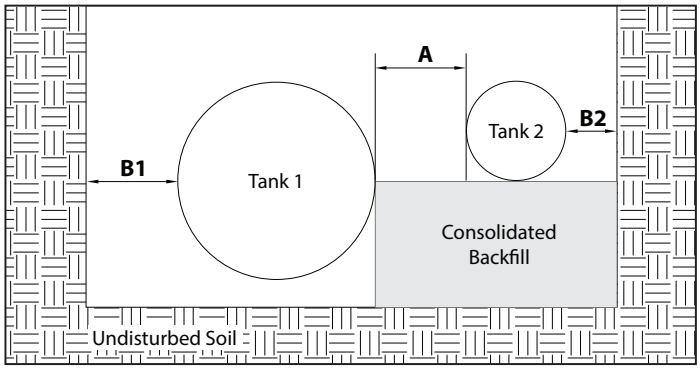
UNSTABLE SOIL

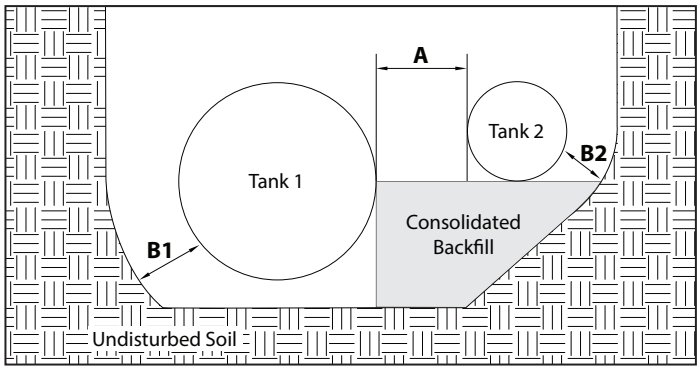
4', 6', 8' Diameter Tanks		
	Minimum	w / 12" x 12" CSI Deadmen
A	18" (457mm)	24" (610mm)
B	½ Tank Diameter	½ Tank Diameter
10' Diameter Tanks		
	Minimum	w / 18" x 8" CSI Deadmen
A	18" (457mm)	36" (914mm)
B	½ Tank Diameter	½ Tank Diameter
12' Diameter Tanks		
	Minimum	w / 18" x 8" CSI Deadmen
A	24" (610mm)	36" (914mm)
B	½ Tank Diameter	½ Tank Diameter

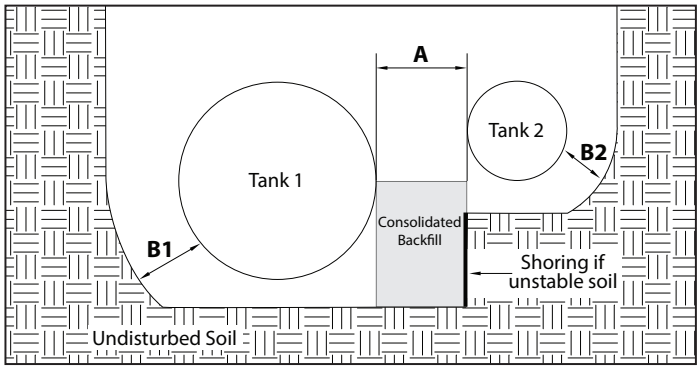
Plan View

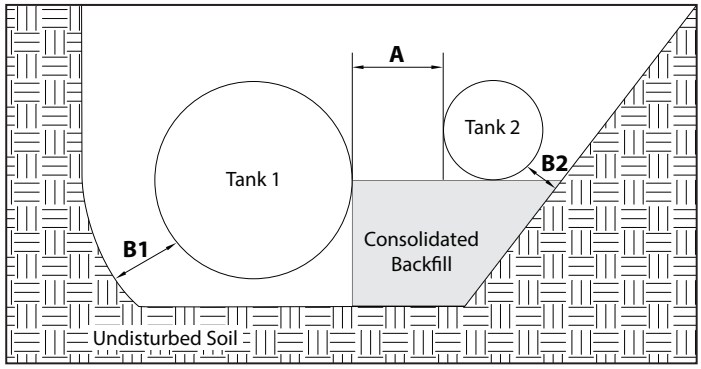


End View









* See applicable end view for definition of B2

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