

FIBERGLASS STORAGE TANKS



CONTAINMENT
SOLUTIONS

Installation Instructions

Petroleum Tanks
Flowtite® Water Tanks
Oil/Water Separators



Table of Contents

A. Handling/Preparation	4
B. Bed and Backfill	5
C. Pre-installation Testing	6
D. Testing Single and Double-Wall Tanks	
D1. Testing Single-Wall Tanks	7
D2. Testing a Single-Wall Compartment Tank with a Double-Wall Bulkhead	7
D3. Testing a Single-Wall Compartment Tank with a Single-Wall Bulkhead	7
D4. Testing Double-Wall Tanks with Dry Annular Space	8
D5. Testing a Double-Wall Compartment Tank with a Dry Annular Space and Double-Wall Bulkhead(s)	9
D6. Testing a Double-Wall Compartment Tank with a Dry Annular Space and Single-Wall Bulkhead(s)	10
D7. Testing Double-Wall Tanks with Liquid Filled Annular Space (Hydrostatically Monitored)	10
D8. Testing a Double-Wall Hydrostatically Monitored Compartment Tank with Double-Wall Bulkheads	11
D9. Testing a Double-Wall Hydrostatically Monitored Compartment Tank with Single-Wall Bulkheads	12
D10. Alternative Water Test for a Non Air-Testable Tank	13
E. Excavation and Tank Clearance	
Stable Excavations	13
Unstable Excavations	14
F. Geotextile Fabric	14

G. Burial Depth & Cover

No Traffic Load	15
Traffic Loads	15

H. Anchoring

General Anchoring Requirements	16
Anchor Point Loads	16
Fiberglass Anchor Strap	16
Drop-Forged Turnbuckles	17
Wire Rope	17
Deadmen Anchors	17
Concrete Anchor Pad	18
Split Strap Anchoring System	18

I. Tank Installation

Tank Vertical Diameter Measurements	19
Installation Procedure	19
Backfill to Subgrade	21

J. Adding Tanks at Existing Locations

K. Piping & Bottom Sump Clearances

L. Venting

M. Filling Tanks

N. Manways

O. Annular Space Monitoring

Hydrostatic Monitoring	23
Dry Annular Space Monitoring Systems	24
Dry Annular Space Vacuum or Air Pressure Monitoring Systems	24

P. Containment Collars and Tank Sumps

Q. Conversion Formulas

R. Supplemental Documents

Appendix

App. A. Anchor Chart	26-27
----------------------------	-------

App. B. Standard Tank Sizes	28
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Tank Installation Checklist (INST 6002)

Field Service Department
Mt. Union, Pennsylvania
(800) 822-1997 • (814) 542-8520

Tank Technical Support
Conroe, Texas
(800) 537-4730 • (936) 756-7731

INTRODUCTION

The purpose of this manual is to provide detailed instructions for installing Containment Solutions, Inc. (CSI) single and double-wall fiberglass underground storage tanks and oil/water separators.

If you do not have the proper experience and you have not completed CSI training for tank installation in the last 24 months, please contact a licensed contractor, or call CSI for a list of trained contractors.

These instructions have been developed and refined from the experience of over 300,000 tank installations.

Proper installation is required to assure the long-term performance of CSI Storage Tanks. These instructions must be followed

SAFETY

These instructions should not be interpreted in any way to put one's health at risk, or to harm property and/or the environment.

The following definitions will serve as a guide when reading this manual:

⚠️ WARNING

Indicates a potentially hazardous situation, which if not avoided could result in death or serious injury.

⚠️ CAUTION

Indicates a potentially hazardous situation, which if not avoided may result in minor or moderate injury.

CAUTION

Indicates a potentially hazardous situation, which if not avoided may result in property damage.

IMPORTANT INFORMATION

Proper installation of each tank is essential:

- To ensure the safety of all the individuals involved in the tank installation.
- To prevent tank damage and/or failure, which could lead to product loss and environmental contamination.
- To validate the tank structural warranty.

IMPORTANT REMINDERS

- In addition to these instructions, the installation must comply with NFPA (30, 30A, and 31), OSHA and all applicable Federal, State, Local, or Provincial, construction, safety and environmental codes and regulations.
- Any variances or deviations which are in direct conflict with these published installation instructions must be approved in writing prior to the installation by Containment Solutions Tank Technical Support.

- These instructions provide the minimum requirements for the successful installation of a fiberglass underground storage tank under normal conditions. Containment Solutions does not design or engineer the actual installation. The owner's Engineer of Record for the installation can exceed these minimum requirements and is responsible for the final design.
- The presence of any Containment Solutions representative at the job site does not relieve the contractor of responsibility to follow these installation instructions.

TANK WARRANTY ACTIVATION

- These instructions must be followed.
- The Tank Installation Checklist (Pub. No. INST 6002) must be properly completed and signed by the tank owner's representative and the installing contractor.
- The Tank Installation Checklist, these instructions and any correspondence related to the tank installation must be retained by the tank owner and provided to CSI to validate any future warranty claim.
- The warranty in effect at the time of tank delivery will apply and is available from Containment Solutions.

BEFORE YOU BEGIN

- Read, understand and follow these instructions.
- Barricade the tank area until the job is completed.
- Review and prepare to complete the installation checklist.
- Check with local authorities for building codes, underground utilities and testing requirements.
- If you have installation questions or need alternate installation methods, contact CSI Tank Technical Support.
- If you have other questions regarding tank modifications, such as adding fittings or manways or tank repair, contact Containment Solutions Field Service.
- A list of supplemental documents is found in Section R.

⚠️ WARNING

Do not stand on or under tank while tank is being lifted. This could result in personal injury or death.

⚠️ WARNING

Do not enter tank or sumps unless following OSHA guidelines for confined space entry. Failure to follow OSHA guidelines could result in death or serious injury.



ASPHYXIATION



FIRE



EXPLOSION

A. HANDLING AND PREPARATION

Common Terms for:

- Petroleum Tanks (see Figure A-1).
- Non Petroleum Tanks (see Figure A-2).

Figure A-1

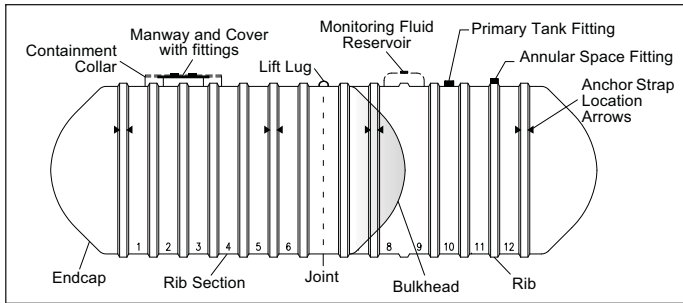
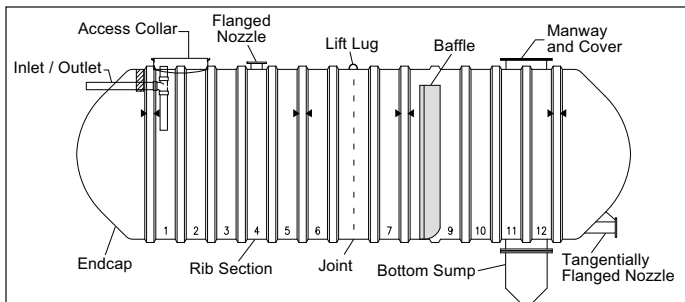


Figure A-2



WARNING

Straps securing the tank to the truck should never be released before the appropriate lifting equipment is properly secured to the tank's lift lugs. This could result in personal injury or death.

- The contractor is responsible for rigging, unloading and securing the tank.
- Tanks must be mechanically unloaded under the direction of a qualified rigger.
- Upon tank delivery and when lifting tank, visually inspect entire exterior surface of the tank for shipping or handling damage. If the tank has a wet annular space, inspect for monitoring fluid on the exterior surface.
- Before unloading a tank from the truck, the contractor must make sure all tools, hardware, supplies and anything else capable of damaging the tank are removed from the trailer bed.
- The contractor is responsible for making sure the tank is secure before removing shipping straps so the tank does not roll off the truck or trailer.
- For tanks with a bottom sump or bottom fittings, be sure the bottom sump or fittings are not damaged by contact with any object. Refer to Supplemental Documents (Section R) for additional information.
- For temporary storage of tanks at job site:
 - Set on smooth ground (no protruding rocks or hard objects) or on the shipping pads oriented to allow for tank rotation as needed.

- Chock with sandbags.
- If high winds are anticipated, tie the tanks down to prevent damage.
- When the tank must be rolled for air/soap test, roll only on shipping pads or smooth surface free of protruding rocks or hard objects. Ensure fittings and/or collars do not come in contact with the ground.
- Protect collars from water accumulation in freezing conditions or tank damage may occur.

To avoid tank damage,

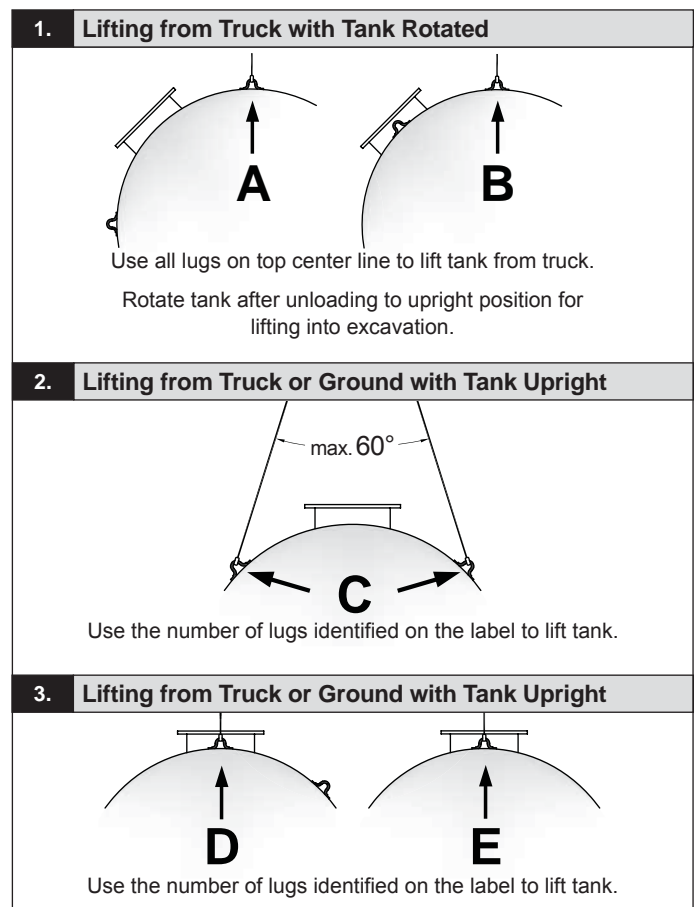
- Do not allow tank to rotate or swing during off loading.
- Do not use chains or cables around tanks.
- Do not allow metal hardware to contact the tank.
- Do not allow fittings, collars, manways, reservoirs, or any accessory to contact ground during rotation.
- Do not drop tank.

LIFTING TANKS

To lift the tank, always use the number of lift lugs indicated on the label adjacent to the lift lugs. Slings may also be used to lift the tank. Refer to Supplemental Documents (Section R) for additional information. Apply equal tension to all lift lugs simultaneously.

Identify the tank lift lug orientation and use the appropriate method to lift the tank. The tank orientations are shown below.

Figure A-3



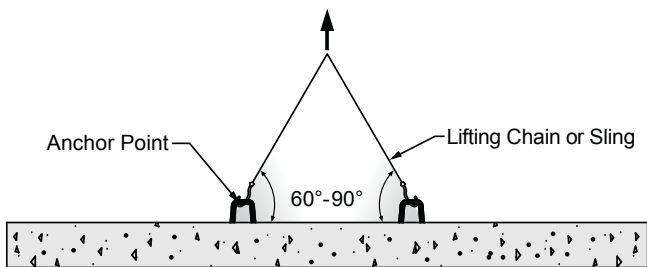
LIFTING CSI DEADMEN

WARNING

Use only the anchor points when lifting and positioning CSI deadmen. Failure to do so could result in death or serious injury.

- Insure lifting equipment is rated to handle the load before lifting. For deadmen sizes and weights use Table A-5.
- Lift deadman using a minimum of two equally spaced anchor points.
- The angle from the deadmen to the lifting equipment should always be between 60° and 90° (see Figure A-4).

Figure A-4



- The deadmen type, lengths, and the number of anchor points are dependent upon the tank diameter, model and capacity.
- Refer to Supplemental Documents (Section R) for additional information on deadmen anchors.

TABLE A-5

Deadmen Anchors			
Length (ft)		Weight	
12" x 12"	18" x 8"	Pounds	Kilograms
12		1,655	750
16		2,250	1,020
18		2,550	1,156
20		2,850	1,293
	14	1,686	765
	18	2,100	952
	22	2,500	1,134

LIFTING TANK SUMPS OR RISERS

- Visually inspect the sump components for shipping damage. If damage is found, contact CSI Field Service.
- Wear gloves.
- Do not roll, drop or bounce.
- Set on smooth surface.
- The sump must be secured to prevent damage from high winds.
- Refer to Supplemental Documents (Section R) for additional information on tank sumps.

B. BED AND BACKFILL

CAUTION

Not using approved backfill material may result in tank failure and environmental contamination.

The use of approved backfill material is critical to long term tank performance.

Do not mix approved backfill with sand or native soil.

Do not backfill tank with sand or native soil.

- Replace all excavated native soil with approved backfill of proper size and gradation. Use backfill which meets ASTM C-33 for quality and soundness.
- Require your backfill supplier to certify, with a sieve analysis, that the backfill meets this specification.
- Sieve analysis must be attached to the Tank Installation Checklist.
- Keep backfill dry and free of ice in freezing conditions.
- Use only approved pea gravel or crushed stone (see Figure B-1):

Figure B-1

PEA GRAVEL	CRUSHED STONE
<p>Maximum Size</p>	<p>Maximum Size</p>
<p>Pea Gravel: Clean naturally-rounded aggregate with particle sizes no larger than 3/4" with no more than 5% passing a #8 sieve. Dry density must be a minimum of 95 pounds per cubic foot.</p>	<p>Crushed Stone or Gravel: Washed, with angular particle sizes no larger than 1/2" with no more than 5% passing a #8 sieve. Dry density must be a minimum of 95 pounds per cubic foot.</p>

Note: If material which meets these specifications is not available, contact Tank Technical Support for information on approved alternate materials and installation instructions. Using other backfill without Containment Solutions' prior written approval will void the tank warranty and may result in tank failure.

C. PRE-INSTALLATION TESTING

WARNING

Do not pressurize 4', 6', 8' and 10' diameter tanks over 5 psig (35 kPa). Do not pressurize 12' diameter tanks over 3 psig (21 kPa). Tank damage or physical injury may result.

The following instructions apply to all air tests described in Sections D-1 to D-9. Some Non Petroleum tanks are not field air-testable and may require a post installation water test (Section D-10).

VISUAL AIR SOAP TEST

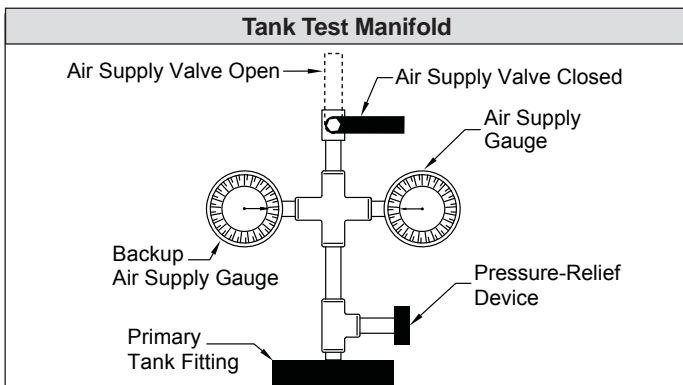
To be performed on all tanks after unloading from the truck and prior to installation.

- CSI tanks must be tested at the job site prior to installation in order to verify the absence of shipping or handling damage (Note: Tanks shipped with vacuum or monitoring fluid in the interstitial space still require a pre-installation air/soap test).
- Tanks must be vented at all times except as defined during testing.

FOR ALL AIR TESTS:

- All petroleum tanks with a UL label and all potable water tanks must be air tested prior to installation.
- Use a contractor supplied "Tank Test Manifold" connected to a tank primary fitting (see Figure C-1).

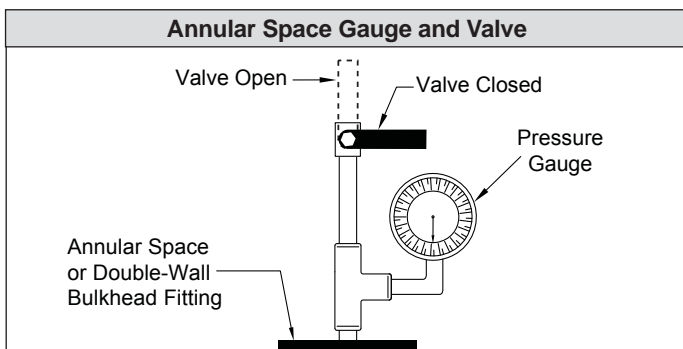
Figure C-1



For tanks with any dry annular space configurations, including double-wall bulkheads:

- Use a contractor supplied "Annular Space Gauge and Valve" connected to the annular space fitting (see Figure C-2).

Figure C-2

**CAUTION**

Do not connect the air supply directly to the annular space monitoring fitting or tank damage will result.

- Prepare for testing.
 - Replace all fitting plugs with plugs suitable for the product to be stored in the tank.
 - Clean factory pipe dope from plugs and fittings.
 - Apply pipe dope suitable for the material being stored in the tank.
 - Reinstall and tighten fitting plugs.
 - Assemble the required number of "Tank Test Manifolds" (Figure C-1) and "Annular Space Gauge and Valves" (Figure C-2).
 - Gauges must have a maximum full-scale reading of 15 psig (40 kPa) with ¼ psig (1 kPa) or smaller increments.
 - Pressure-relief device must be sized and set to prevent the tank from being pressurized in excess of the maximum allowed test pressure (5 psig / 35 kPa maximum or 3 psig / 21 kPa for 12' tanks).

WARNING

Do not stand on or approach endcaps, manways, or fittings while pressurizing tanks. Do not lift or hoist tank under pressure. These actions could result in death or serious injury.

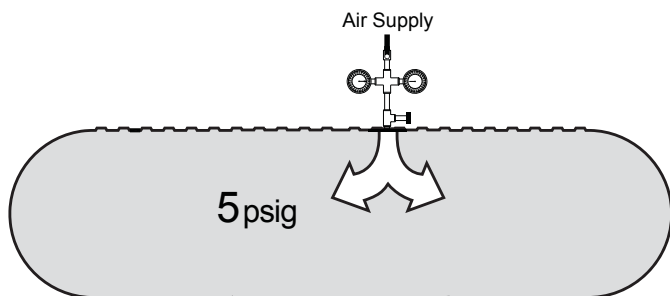
- Do not pressurize 4', 6', 8' and 10' diameter tanks over 5 psig (35 kPa). Do not pressurize 12' diameter tanks over 3 psig (21 kPa).
- Pressure gauge readings can be affected by changes in ambient air temperature. Allow for pressure fluctuations when tanks are subject to temperature changes.
- Prepare Soap Solution.
 - Warm weather soap solution
 - 5 gallons of water
 - 8 ounces of household dishwashing detergent
 - Freezing conditions soap solution
 - 4 gallons of water
 - 8 ounces household dishwashing detergent
 - 1 gallon windshield washer solution
- The entire tank surface must be covered with the soap solution and visually inspected for leaks, as indicated by the presence of active air bubbles.
- Anytime bubbles are observed around fittings, plugs, and gaskets; tighten and retest.
- In the unlikely event a tank leak is discovered, discontinue the installation and immediately call CSI Field Service to schedule a repair.
- If the tank is a Non Petroleum tank and requires post installation water testing, follow the procedures in Section D10.

D1. TESTING SINGLE-WALL TANKS

Perform the following in the order listed.

1. Comply with the requirements of Section C.
2. Connect "Tank Test Manifold" to a tank fitting.
3. Connect the pressure source to the "Tank Test Manifold."
4. Pressurize tank to 5 psig maximum (3 psig for 12' tanks) (see Figure D1-1)

Figure D1-1



5. Monitor the pressure readings for 30 minutes for any loss in pressure from the initial reading which may indicate a leak.
6. While under pressure, cover tank outer surface, including fittings and manway(s), with soap solution and inspect.
7. After completing air test, release pressure.
8. Remove all gauges, valves, and hose assemblies.
9. Replace and tighten fitting plug(s).
10. Replace the plastic vent plugs in the open fittings.

D2. TESTING A SINGLE-WALL COMPARTMENT TANK WITH A DOUBLE-WALL BULKHEAD

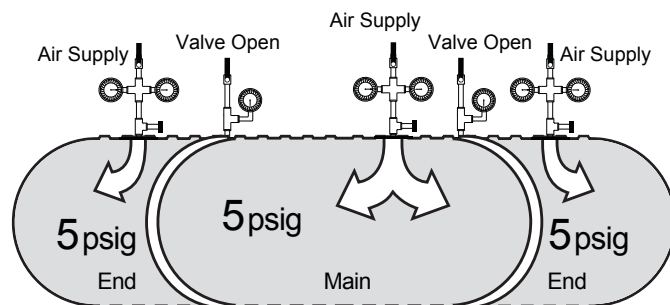
CAUTION

Do not connect air supply directly to the bulkhead monitor fitting or tank damage will result.

Perform the following in the order listed.

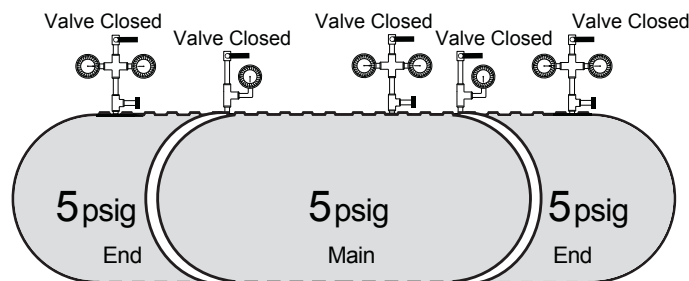
1. Comply with the requirements of Section C.
2. Connect "Tank Test Manifolds" to each compartment.
3. Connect "Annular Space Gauge and Valve" to double-wall bulkhead fittings with valve open.
4. Connect the pressure source to the "Tank Test Manifolds."
5. Pressurize all compartments to 5 psig (3 psig for 12' tanks) (see Figure D2-1)

Figure D2-1



6. Close valve on each compartment "Tank Test Manifold." Disconnect the air supply line.
7. Close valve to double-wall bulkheads. (see Figure D2-2).

Figure D2-2



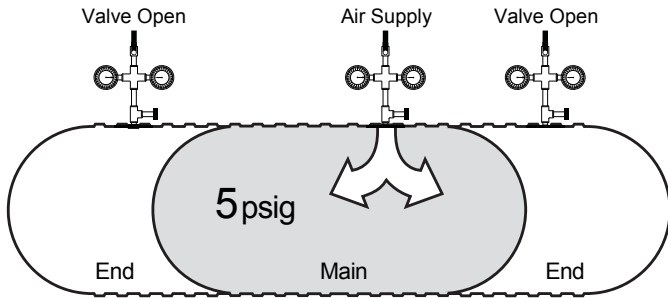
8. Monitor the pressure for 30 minutes for any loss in pressure from the initial reading on the "Tank Test Manifolds" which may indicate a leak.
9. Also monitor the "Annular Space Gauge and Valve" for any increases in pressure which may also indicate a leak.
10. With all compartments under pressure, cover tank outer surface, including fittings and manway(s), with soap solution and inspect.
11. After completing air test, release pressure.
12. Remove all gauges, valves, and hose assemblies.
13. Replace and tighten fitting plug(s).
14. Replace the plastic vent plug in the open fittings.

D3. TESTING A SINGLE-WALL COMPARTMENT TANK WITH A SINGLE-WALL BULKHEAD

Perform the following in the order listed.

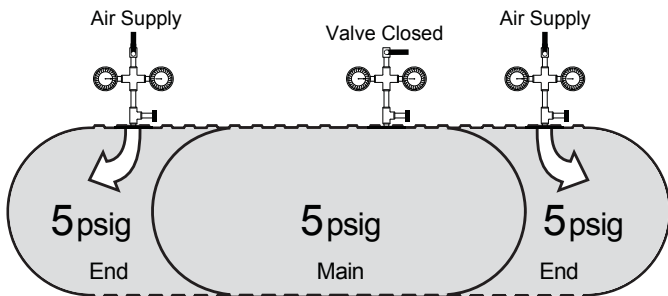
1. Comply with the requirements of Section C.
2. Connect "Tank Test Manifolds" to each compartment.
3. Connect the pressure source to the "Tank Test Manifold" on the main tank.
4. Pressurize the main tank to 5 psig maximum (3 psig for 12' tanks) (see Figure D3-1)

Figure D3-1



5. Close the air supply valve on the main "Tank Test Manifold." Disconnect the air supply line.
6. Monitor the main tank air pressure for 30 minutes before proceeding.
7. Observe and monitor the air gauge for any loss in pressure from the initial reading, which may indicate a leak.
8. Do not release air pressure in main tank.
9. Connect the pressure source to the "Tank Test Manifold(s)" on the end tank(s).
10. Pressurize the end tank(s) to 5 psig maximum (3 psig for 12' tanks). (See Figure D3-2)

Figure D3-2



11. Close the valve(s) on the "Tank Test Manifold(s)." Disconnect the air supply line.
12. Do not release air pressure on main and end tanks.
13. Monitor the pressure readings for 30 minutes for any loss in pressure from the initial reading which may indicate a leak.
14. While under pressure, cover tank outer surface, including fittings and manway(s), with soap solution and inspect.
15. After completing air test, release pressure.
16. Remove all gauges, valves, and hose assemblies.
17. Replace and tighten fitting plug(s).
18. Replace the plastic vent plugs in the open fittings.

D4. TESTING DOUBLE-WALL TANKS WITH DRY ANNULAR SPACE

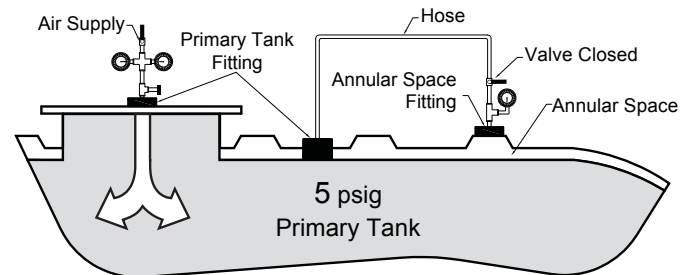
CAUTION

Do not connect the air supply directly to the annular space monitoring fitting or tank damage will result.

Perform the following in the order listed.

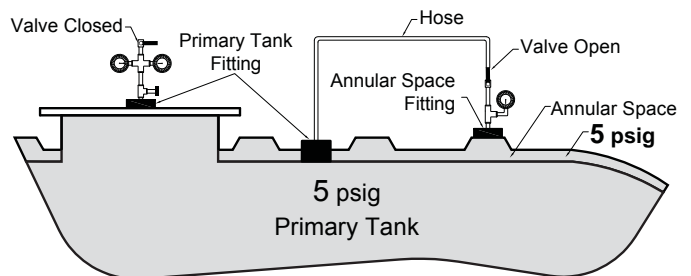
1. Comply with the requirements of Section C.
2. Connect "Tank Test Manifold" to a tank primary fitting.
3. Connect hose between a primary tank fitting and "Annular Space Gauge and Valve."
4. Close valve between primary tank and annular space.
5. Connect the pressure source to the "Tank Test Manifold" on the main tank.
6. Pressurize primary tank to 5 psig maximum (3 psig for 12' tanks). (see Figure D4-1)

Figure D4-1



7. Close the air supply valve to the primary tank.
8. Disconnect the air supply.
9. Open valve between primary tank and annular space in order to pressurize the annular space using the existing pressure in the primary tank (pressure in the primary tank may drop slightly) (see Figure D4-2).

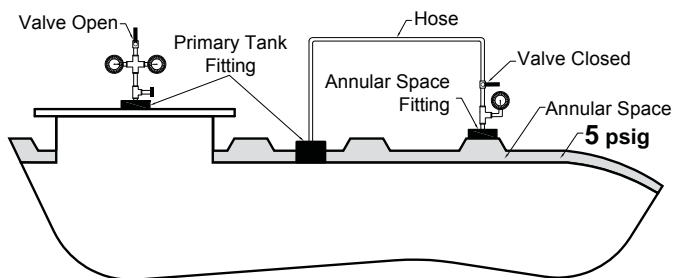
Figure D4-2



10. While under pressure, cover fittings and manway(s), with soap solution and inspect.
11. Close valve to annular space.

12. Open valve to vent primary tank.
13. Maintain pressure on the annular space (see Figure D4-3).

Figure D4-3



14. Observe and monitor the gauge on the annular space for 30 minutes for any loss of pressure which may indicate a leak.
15. While under pressure, cover tank outer surface, including fittings and manway(s) with soap solution and inspect.
16. After completing air test, release pressure.
17. Remove all gauges, valves, and hose assemblies.
18. Replace and tighten fitting plug(s).
19. Replace the plastic vent plugs in the open fittings.

D5. TESTING A DOUBLE-WALL COMPARTMENT TANK WITH A DRY ANNULAR SPACE AND DOUBLE WALL BULKHEAD(S)

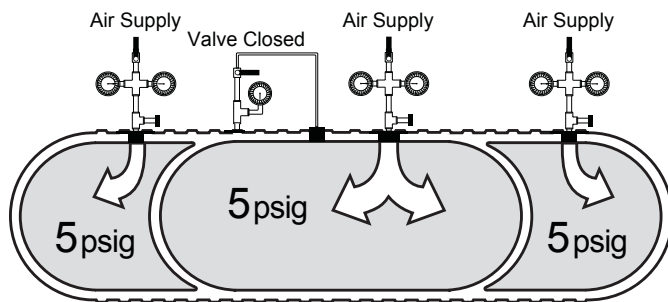
CAUTION

Do not connect the air supply directly to the annular space monitoring fitting or tank damage will result.

Perform the following in the order listed.

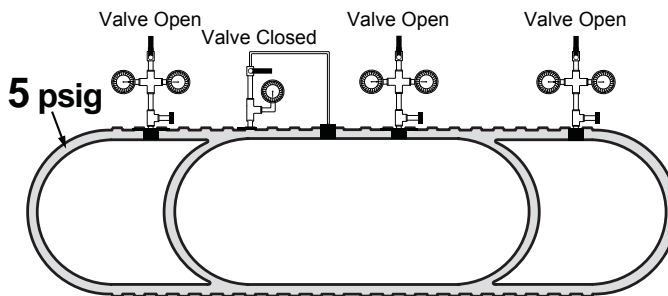
1. Comply with the requirements of Section C.
2. Connect "Tank Test Manifolds" to each compartment.
3. Connect hose between a primary tank fitting and "Annular Space Gauge and Valve" (refer to Figure D4-1).
4. Close valve between primary tank and annular space.
5. Connect the pressure source to the "Tank Test Manifold" on each compartment.
6. Pressurize all compartments to 5 psig (3 psig for 12' tanks). (see Figure D5-1)

Figure D5-1



7. Close valve on each compartment "Tank Test Manifold." Disconnect the air supply line.
8. Monitor the pressure for 30 minutes for any loss in pressure from the initial reading which may indicate a leak.
9. With all compartments under pressure, cover fittings and manway(s) with soap solution and inspect.
10. Open valve between primary tank and annular space in order to pressurize the annular space using the existing pressure in the primary tank (pressure in the primary tank may drop slightly).
11. Close valve to annular space.
12. Open valves to vent all compartments (maintain 5 psig on annular space) (see Figure D5-2).

Figure D5-2



13. Monitor the pressure for 30 minutes for any loss in pressure from the initial reading which may indicate a leak.
14. While under pressure, cover tank outer surface, including fittings and manway(s), with soap solution and inspect.
15. After completing air test, release pressure.
16. Remove all gauges, valves, and hose assemblies.
17. Replace and tighten fitting plug(s).
18. Replace the plastic vent plug in the open fittings.

D6. TESTING A DOUBLE-WALL COMPARTMENT TANK WITH A DRY ANNULAR SPACE AND SINGLE-WALL BULKHEAD(S)

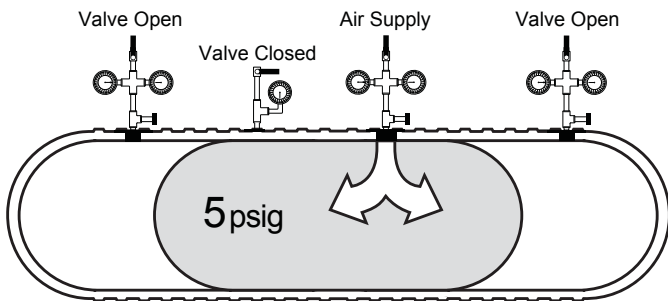
CAUTION

Do not connect the air supply directly to the annular space monitoring fitting or tank damage will result.

Perform the following in the order listed.

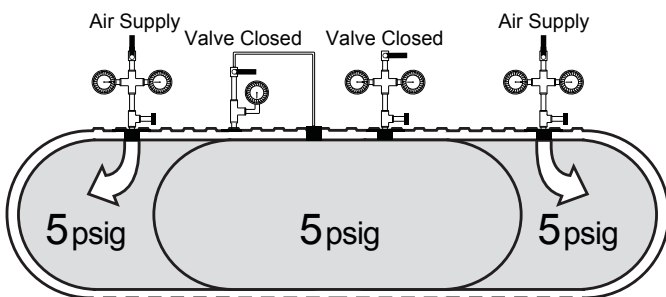
1. Comply with the requirements of Section C.
2. Connect "Tank Test Manifolds" to each compartment.
3. Connect hose between a primary tank fitting and "Annular Space Gauge and Valve" (refer to Figure D4-1).
4. Close valve between primary tank and annular space.
5. Connect the pressure source to the "Tank Test Manifold" on one compartment.
6. Pressurize the compartment to 5 psig (3 psig for 12' tanks). (see Figure D6-1)

Figure D6-1



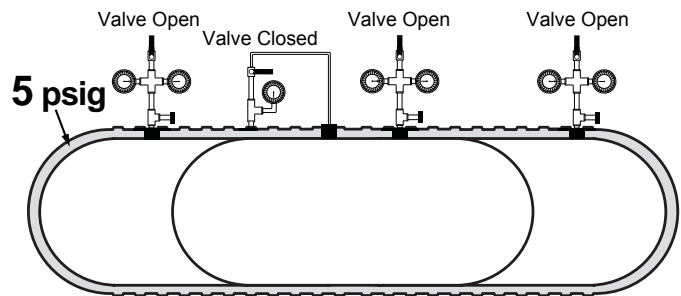
7. Close the valve on the "Tank Test Manifold." Disconnect the air supply line.
8. Monitor the pressure readings for 30 minutes for any loss in pressure from the initial readings which may indicate a leak.
9. Do not release air pressure.
10. Repeat steps 5 through 9 for each remaining compartment (see Figure D6-2).

Figure D6-2



11. With all compartments under pressure, cover fittings and manway(s) with soap solution and inspect.
12. Open valve between primary tank and annular space in order to pressurize the annular space using the existing pressure in the primary tank (pressure in the primary tank may drop slightly).
13. Close valve to annular space.
14. Open valves to vent all compartments (maintain 5 psig on annular space) (see Figure D6-3).

Figure D6-3



15. Monitor annular space pressure for 30 minutes for any loss in pressure from the initial readings which may indicate a leak.
16. While under pressure, cover tank outer surface, including fittings and manway(s), with soap solution and inspect.
17. After completing air test, release pressure.
18. Remove all gauges, valves, and hose assemblies.
19. Replace and tighten fitting plug(s).
20. Replace the plastic vent plug in the open fittings.

D7. TESTING DOUBLE-WALL TANKS WITH LIQUID FILLED ANNULAR SPACE (HYDROSTATICALLY MONITORED)

CAUTION

Never pressurize a wet annular space. Doing so may damage the primary tank or cause tank failure.

This tank has a hydrostatic monitoring system that includes a nontoxic (30% calcium chloride) green monitoring fluid pre-installed between the tank walls.

In the unlikely event of a tank leak, this monitoring fluid will leave a green trace on the tank.

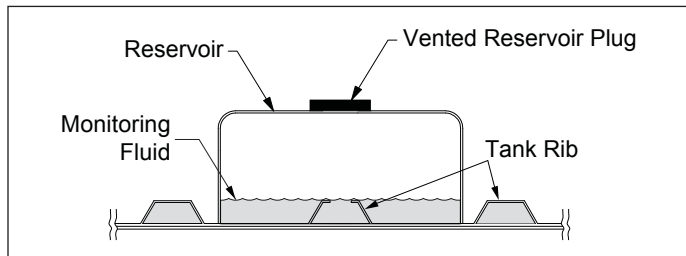
If monitoring fluid is found on the tank inner or outer surface during any test, discontinue the installation and immediately contact Containment Solutions Field Service.

Perform the following in the order listed.

1. Comply with the requirements of Section C.
2. Closely inspect outer wall for any trace of green monitoring fluid.

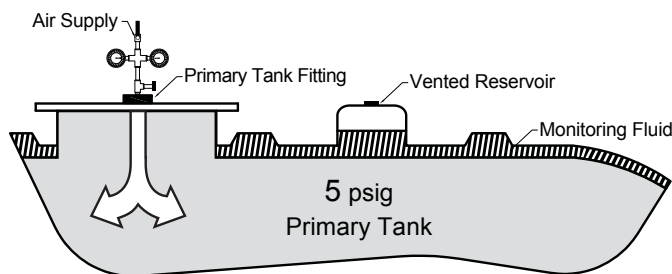
3. With tank in upright position, remove the 4" vented plug from the reservoir fitting.
4. Add only enough monitoring fluid to cover the rib inside the reservoir. Do not overfill past the rib at this time (see Figure D7-1). Final monitoring fluid levels will be set later in the installation process.

Figure D7-1



5. Reinstall vented reservoir plug to ensure annular space is vented at all times.
6. Remove enough tank fitting plugs to see inside the primary tank.
7. With a light, look inside for any monitoring fluid.
8. Replace and tighten fitting plug(s).
9. Connect "Tank Test Manifold" to a primary tank fitting.
10. Connect the pressure source to the "Tank Test Manifold."
11. Pressurize primary tank to 5 psig maximum (3 psig for 12' tanks) (see Figure D7-2).

Figure D7-2



12. Close valve on "Tank Test Manifold." Disconnect the air supply line.
13. Monitor the pressure for 30 minutes for any loss in pressure from the initial reading which may indicate a leak.
14. While under pressure, cover fittings and manway(s) with soap solution and inspect.
15. After completing air test, release pressure.
16. Remove all gauges, valves, and hose assemblies.
17. Replace and tighten fitting plug(s).
18. Replace the plastic vent plugs in the open fittings.

D8. TESTING A DOUBLE-WALL HYDROSTATICALLY MONITORED COMPARTMENT TANK WITH DOUBLE-WALL BULKHEADS

CAUTION

Never pressurize a wet annular space. Doing so may damage the primary tank or cause tank failure.

This tank has a hydrostatic monitoring system that includes a nontoxic (30% calcium chloride) green monitoring fluid pre-installed between the tank walls.

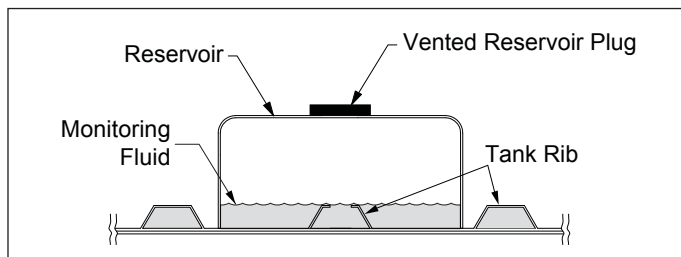
In the unlikely event of a tank leak, this monitoring fluid will leave a green trace on the tank.

If monitoring fluid is found on the tank inner or outer surface during any test, discontinue the installation and immediately contact Containment Solutions Field Service.

Perform in the following the order listed.

1. Comply with the requirements of Section C.
2. Closely inspect outer wall for any trace of green monitoring fluid.
3. With tank in upright position, remove the 4" vented plug from the reservoir fitting.
4. Add only enough monitoring fluid to cover the rib inside the reservoir. Do not overfill past the rib at this time (see Figure D8-1). Final monitoring fluid levels will be set later in the installation process.

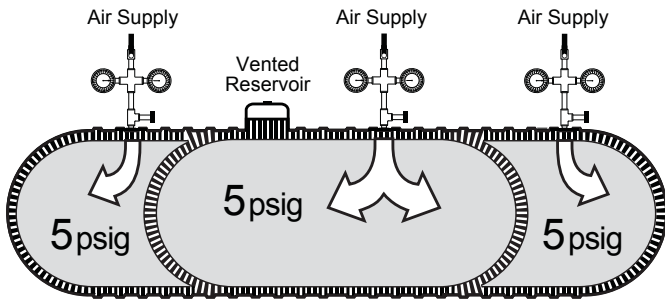
Figure D8-1



5. Reinstall vented reservoir plug to ensure annular space is vented at all times.
6. Remove enough tank fitting plugs to see inside each compartment.
7. With a light, look inside for monitoring fluid.
8. Replace and tighten fitting plug(s).
9. Connect "Tank Test Manifold(s)" to each compartment.
10. Connect the pressure source to the "Tank Test Manifold" on each compartment.

11. Pressurize all compartments to 5 psig (3 psig for 12' tanks). (see Figure D8-2)

Figure D8-2



12. Close valve on each "Tank Test Manifold." Disconnect the air supply line.
13. Monitor the pressure for 30 minutes for any loss in pressure from the initial reading which may indicate a leak.
14. With all compartments under pressure, cover fittings and manway(s) with soap solution and inspect.
15. After completing air test, release pressure.
16. Remove all gauges, valves, and hose assemblies.
17. Replace and tighten fitting plug(s).
18. Replace the plastic vent plug in the open fittings.

D9. TESTING A DOUBLE-WALL HYDROSTATICALLY MONITORED COMPARTMENT TANK WITH SINGLE-WALL BULKHEADS

CAUTION

Never pressurize a wet annular space. Doing so may damage the tank or cause tank failure.

This tank has a hydrostatic monitoring system that includes a nontoxic (30% calcium chloride) green monitoring fluid pre-installed between the tank walls.

In the unlikely event of a tank leak, this monitoring fluid will leave a green trace on the tank.

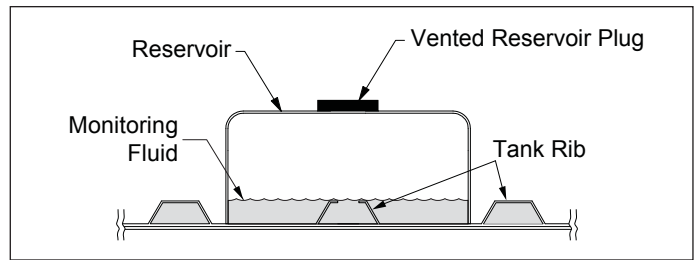
If monitoring fluid is found on the tank inner or outer surface during any test, discontinue the installation and immediately contact Containment Solutions Field Service.

Perform the following in the order listed.

1. Comply with the requirements of Section C.
2. Closely inspect outer wall for any trace of green monitoring fluid.
3. With tank in upright position, remove the 4" vented plug from the reservoir fitting.

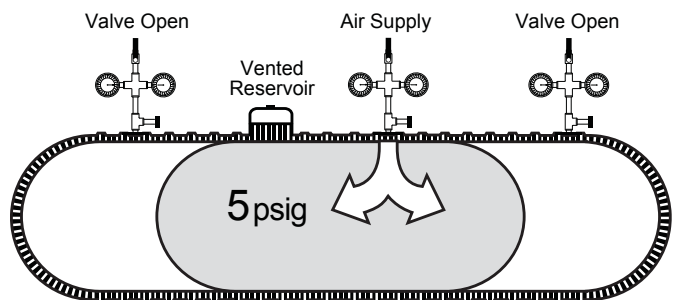
4. Add only enough monitoring fluid to cover the rib inside the reservoir. Do not overfill past the rib at this time (see Figure D9-1). Final monitoring fluid levels will be set later in the installation process.

Figure D9-1



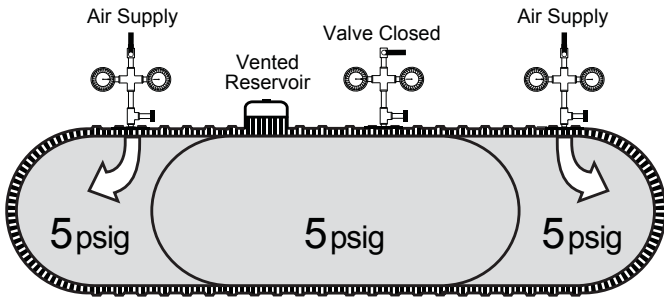
5. Reinstall vented reservoir plug to ensure annular space is vented at all times.
6. Remove enough tank fitting plugs to see inside each compartment.
7. With a light, look inside for monitoring fluid.
8. Replace and tighten fitting plug(s).
9. Connect "Tank Test Manifold" to each compartment.
10. Connect the pressure source to the "Tank Test Manifold" on a compartment.
11. Pressurize the compartment to 5 psig (3 psig for 12' tanks). (see Figure D9-2)

Figure D9-2



12. Close the valve on the "Tank Test Manifold." Disconnect the air supply line.
13. Monitor the pressure for 30 minutes for any loss in pressure from the initial reading which may indicate a leak.
14. Do not release air pressure.
15. Repeat steps 10 through 14 for each remaining compartment (see Figure D9-3).

Figure D9-3



16. With all compartments under pressure, cover fittings and manway(s) with soap solution and inspect.
17. After completing air test, release pressure.
18. Remove all gauges, valves, and hose assemblies.
19. Replace and tighten fitting plug(s).
20. Replace the plastic vent plug in the open fittings.

D10. WATER TEST FOR A NON AIR-TESTABLE TANK (NON PETROLEUM TANKS)

CAUTION

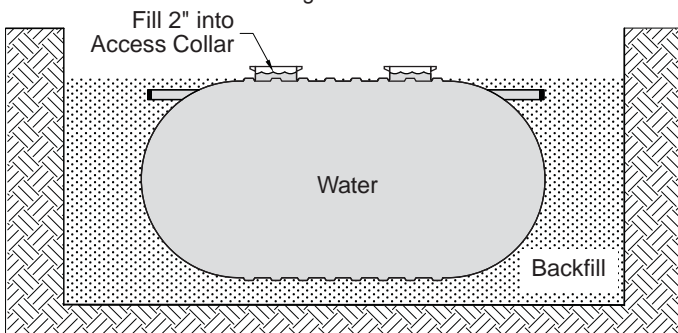
If the tank is to be water tested, it must be supported by backfill on all sides to the top of the tank. Failure to do so may result in tank damage.

These instructions are for tanks that require a post installation water test.

Perform the following in the order listed.

1. Comply with the requirements of Section C.
2. Tanks may only be water tested if the backfill is at tank top (see Figure D10-1).

Figure D10-1



3. Expose tank penetrations on tank top by temporarily removing backfill.
4. So water does not exit the inlet/outlet pipe, install a turned up elbow or plug.
5. Completely fill the tank with water to a level 2" into the access collar(s).

6. Wait at least 30 minutes, if the water level in the collar does not drop more than 1/4", the tank is considered acceptable and leak free.
7. If the level drops more than the 1/4", ensure that inlet and outlet pipe caps or plugs and collars are not leaking, then refill the tank and retest.
8. After the tank is proven to be watertight, remove the water in the tank to below the pipe invert.
9. For additional testing instructions for a Non Petroleum tank, refer to Supplemental Documents (Section R).

E. EXCAVATION AND TANK CLEARANCE

WARNING

Do not enter the tank excavation unless in compliance with OSHA regulations. Follow OSHA guidelines for tank excavation.

Collapsing excavation walls can cause injury or death.

STABLE EXCAVATIONS

- When your excavation is in stable, undisturbed soil; use the minimum spacings (per Figure E-1 and Table E-2).

Figure E-1

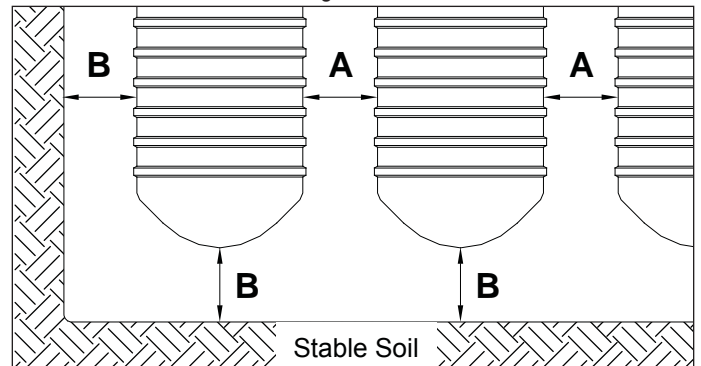


TABLE E-2

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)

UNSTABLE EXCAVATIONS

- An unstable excavation is any of the following:
 - Muck, bog, peat, swamp, quick sand, flowing water, landfill type areas or any other situations where the soil is inherently unstable.
 - Soil less than 750 lbs./sq. ft. cohesion per ASTM D2166 (Test Method for Unconfined Compressive Strength of Cohesive Soil), or have an ultimate bearing capacity less than 3,500 lbs./sq. ft.

CAUTION

If the soil is unstable, the tank owner should consult a professional engineer to ensure a proper installation and avoid the potential for tank or property damage.

- A soils consultant can provide additional recommendations, including when a reinforced pad is needed under the tank.
- When a bottom pad is used, it should extend to the excavation walls.
- Unstable excavations may also require geotextile fabric (see Section F).
- When the soil is unstable, with or without shoring, use the minimum spacings (per Figure E-3 and Table E-4).

SHORING REMOVAL

- After the backfill is properly placed completely around the tank(s):
 - Vibrate shoring and pull slowly to top of backfill.
 - Fill any voids created by the pulled shoring with approved backfill.
- All shoring should be removed and all voids must be filled using a long handled probe before continuing installation.
- If shoring is left in place, the shoring must not degrade over the life of the installation.

TANK LOCATION - NEARBY STRUCTURES

- The tank owner or the tank owner’s representative is responsible for determining the proper location of a tank excavation.
- The location of a tank can be affected by the location of nearby structures. When selecting a tank site, care must be taken to avoid undermining the foundations of new or existing structures.
- Ensure that downward forces from loads carried by the foundations and supports of nearby structures (constructed before or after tank installation) are not transmitted to the tanks. (Refer to NFPA 30 for additional details).

F. GEOTEXTILE FABRIC

Geotextile fabric (filter fabric) allows the passage of water but prevents the migration of approved backfill into the native soil and native soil into the approved backfill. Migration may compromise the backfill support of the tank.

GEOTEXTILE FABRICS ARE REQUIRED FOR ANY OF THE FOLLOWING INSTALLATIONS

- Areas subject to tidal conditions.
- Areas subject to frequently changing ground water levels.
- Water conditions with silty soil.
- Muck, bog, peat, swamp, landfill type areas or any other situations where the soil is inherently unstable.
- Soils with less than 250 lbs./sq. ft cohesion or with ultimate bearing capacity of less than 500 lbs./sq. ft.
- Geotextile fabrics may also be used in alternate installation methods (see Supplemental Documents, Section R).

The tank owner or tank owner’s representative may also specify the use of geotextile fabrics.

Non-degradable geotextile fabric can be either woven or non-woven and should have a minimum grab tensile strength of 120lbs/inch (ASTM D4595) and a maximum apparent opening size of #50 US sieve (0.300mm) (ASTM D4751).

Do not use plastic, or any other material that may tear or degrade over time, as a replacement for geotextile fabric.

Figure E-3

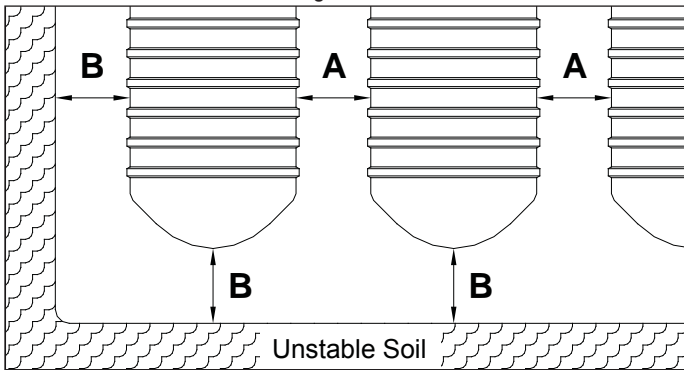


TABLE E-4

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

GEOTEXTILE FABRIC INSTALLATION

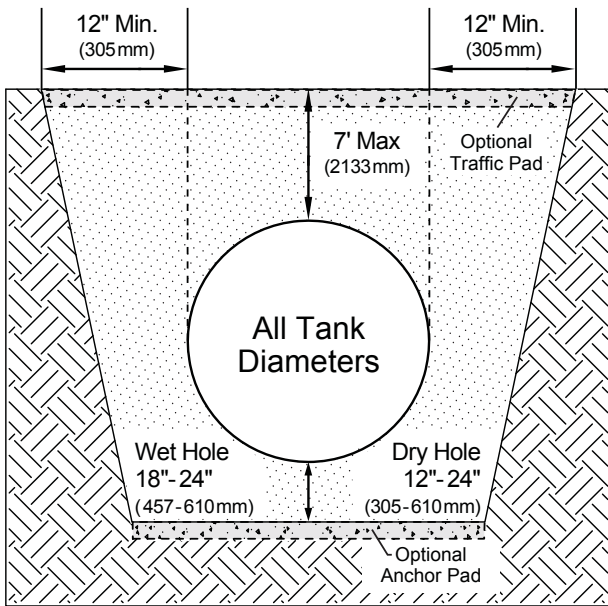
- Line the side and bottom of the excavation with geotextile fabric.
- Overlap adjoining geotextile panels a minimum 12".
- Place backfill on top of the geotextile fabric to hold it in place.
- In wet hole conditions, backfill on top of the geotextile fabric is necessary to sink and hold it in place.

G. BURIAL DEPTH AND COVER

Adhere to the minimum and maximum dimensions in this section.

In wet conditions, sufficient overburden and/or an appropriate anchoring system must be used to offset buoyancy of the tank. Refer to the "Anchor Chart" (Appendix A) for minimum burial depth in buoyant conditions.

Figure G-1

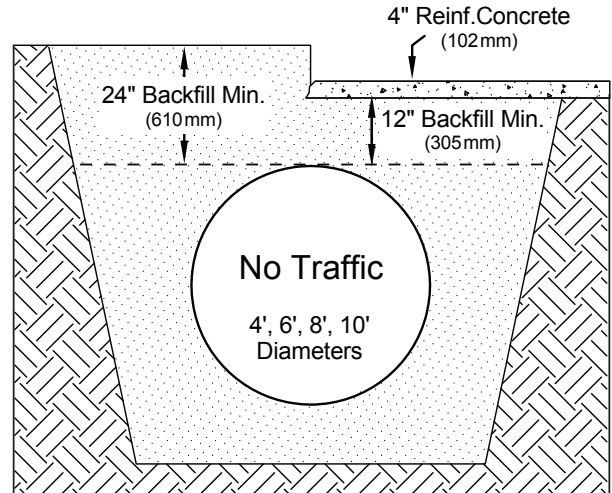


- Traffic pad must extend at least 12" beyond tank perimeter in all directions.
- The maximum burial depth is 7' from the tank top to grade elevation. Tanks can be designed for burial depths greater than 7', contact your local CSI representative prior to tank purchase.
- Dry hole excavations must have a minimum of 12" and a maximum of 24" backfill between the bottom of the tank and either the bottom of the excavation or the top of the concrete anchor pad.
- Wet hole excavations must have a minimum of 18" and a maximum of 24" backfill between the bottom of the tank and either the bottom of the excavation or the top of the concrete anchor pad.

MINIMUM BURIAL DEPTH - NO TRAFFIC LOAD

- 4' - 10' tanks need a minimum cover of 24" backfill or 12" backfill plus 4" reinforced concrete (see Figure G-2).
- 12' tanks need a minimum cover of 42" backfill or 38" backfill plus 4" reinforced concrete.
- Local codes may require deeper minimum burial depth.

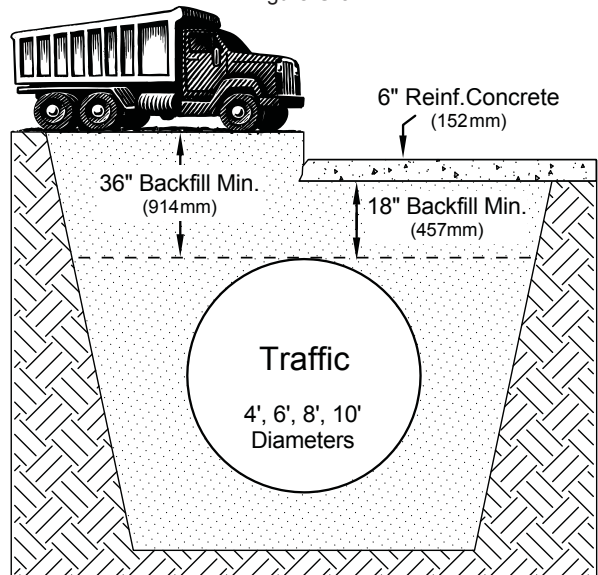
Figure G-2



MINIMUM BURIAL DEPTH - TRAFFIC LOADS

- The following burial depths are suitable for HS20 traffic loads (32,000 lbs/axle).
- The concrete traffic pad, reinforcement and thickness, must be designed for job conditions and traffic loads to assure concrete traffic pad integrity. It is the responsibility of the tank owner or tank owner's representative to design the traffic pad for all loads.
- 4' - 10' tanks need a minimum cover depth of 36" backfill or 18" of backfill plus 6" of reinforced concrete (see Figure G-3).
- 12' tanks need a minimum cover of 48" backfill or 36" backfill plus 6" reinforced concrete.

Figure G-3



H. ANCHORING

CAUTION

Every site should be evaluated for buoyant conditions including but not limited to local water tables, flooding and trapped water. Failure to provide sufficient overburden and/or appropriate anchoring may result in tank failure and property damage may occur.

It is the responsibility of the tank owner or tank owner's representative to determine the appropriate anchoring method and to design the anchoring system.

CSI has provided an "Anchor Chart" at the end of this instruction booklet (Appendix A) that covers the minimum burial depths for the three common methods of anchoring tanks.

The three common methods are:

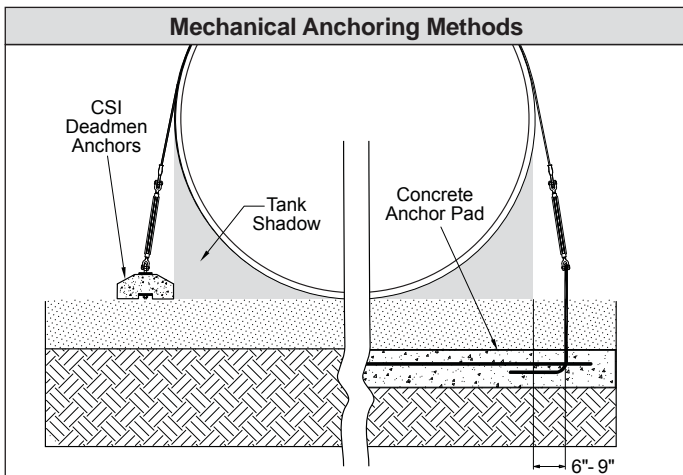
1. Deadmen Anchors
2. Concrete Anchor Pad
3. Overburden (no mechanical anchoring)

CSI offers an engineered mechanical anchoring system designed for each size tank consisting of deadman anchors, straps, and hardware.

Burial depth, straps, turnbuckles, shackles, wire rope, deadmen and anchor pads can be combined to provide anchoring using the information provided in this section.

The mechanical anchoring methods are shown in Figure H-1.

Figure H-1



GENERAL ANCHORING REQUIREMENTS

- Prior to anchoring, take the first deflection measurement after the tank is lowered into the excavation. If mechanical anchoring is used, take the second deflection measurement of the tank after the anchoring is complete and record the results on the Tank Installation Checklist (Additional information on deflection measurements can be found in Section I).
- Use only CSI anchor straps
- Use correct length anchor straps for each diameter tank.

- Anchor points must be aligned with designated anchor ribs $\blacktriangleright \blacktriangleleft$ ($\pm 1"$). Do not use straps between ribs except on 4' tanks.
- Maintain proper distance between anchor points across the diameter of the tank:
 - For deadmen, place inside edge of deadman at the tank shadow.
 - For bottom anchor pad, position anchor points 6" for 4', 6', 8' tanks and 9" for 10' and 12' tanks from tank shadow.
- All anchor straps must be uniformly tightened with turnbuckles or come-a-longs. Straps should be snug, but not cause tank deflection.

ANCHOR POINT LOADS

- For any anchoring system, the tank strap and all hardware should be designed for the following maximum working loads (see Table H-2).

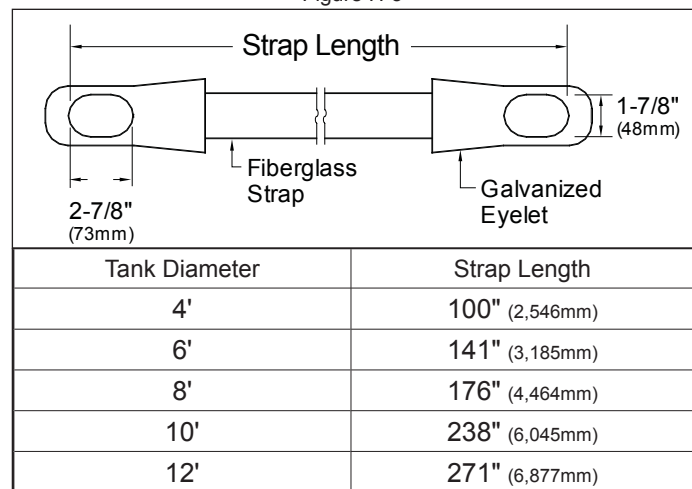
TABLE H-2

Anchor Point Load Allowed	
Tank Diameter	Maximum Load
4'	1,261 lbs (572 kg)
6'	5,405 lbs (2,452 kg)
8'	7,508 lbs (3,406 kg)
10'	7,508 lbs (3,406 kg)
12'	7,508 lbs (3,406 kg)

- The installing contractor is responsible for providing hardware and anchor points of sufficient size and strength.
- For specific information on hardware and usage, consult the hardware manufacturer or supplier.

FIBERGLASS ANCHOR STRAP

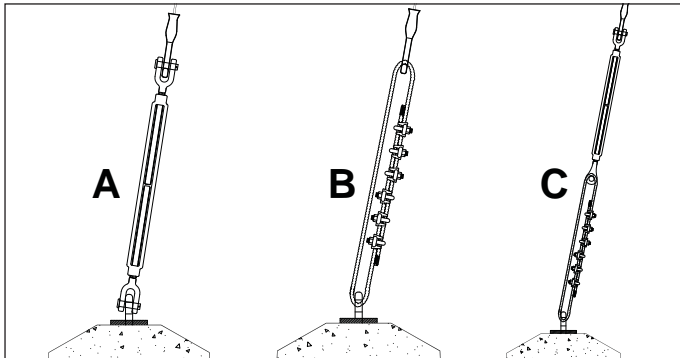
Figure H-3



When connecting the end of a hold-down strap to the anchor, common methods include: (see Figure H-4)

- Drop-forged turnbuckle (A)
- Looped wire rope (B)
- Combination of both A and B (C)
- After hardware is installed, all exposed metal on the anchoring system must be protected against corrosion.

Figure H-4



DROP-FORGED TURNBUCKLES

May be used in place of all or a portion of wire rope described in this section.

TABLE H-5

Tank	Minimum Turnbuckle Diameter (by type)				Minimum Working Load Limit*
Dia.	Hook	Jaw	Eye		
4'	1/2"	3/8"	3/8"	1,200 lbs	
6'	3/4"	1/2"	1/2"	2,200 lbs	
8'	2 3/4"	3/4"	3/4"	5,200 lbs	
10'	2 3/4"	3/4"	3/4"	5,200 lbs	
12'	2 3/4"	3/4"	3/4"	5,200 lbs	

* ultimate load should be 5 times working load limit

WIRE ROPE

CAUTION

Wire rope should never be in direct contact with any portion of the tank or damage may occur.

- A method to use wire rope on the ribs over the tank top is available (see Supplemental Documents, Section R).
- Use 6 x 19 Improved Plow Steel IWRC, or better, wire rope.

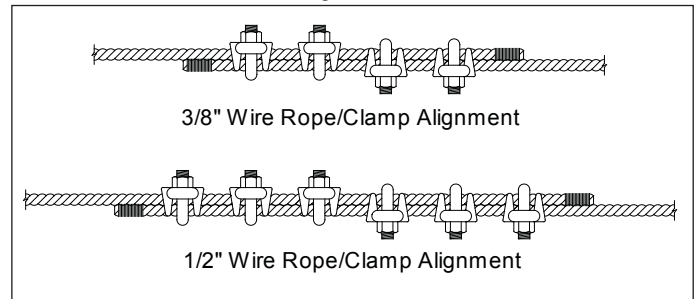
- Refer to Table H-6 for minimum wire rope diameter and strength.

TABLE H-6

Wire Rope		
Tank Diameter	Minimum Diameter	Minimum Ultimate Strength
4'	3/8" (10mm)	13,120 lbs (5,951 kg)
6', 8', 10', 12'	1/2" (13mm)	23,000 lbs (10,433 kg)

- Follow recommendations of the wire rope manufacturer, as well as all industry standards when selecting, handling, attaching or connecting wire rope.
- Tighten all hardware uniformly and follow the manufacturer's torque specifications. Double check the tightness once the anchoring system is complete.
- When forming a loop in the wire rope, a splice is required for connecting the two ends together. Use a minimum of four clamps for 3/8" wire rope and a minimum of six clamps for 1/2" wire rope. Place the rope ends parallel to each other and install the clamps as shown in Figure H-7.

Figure H-7

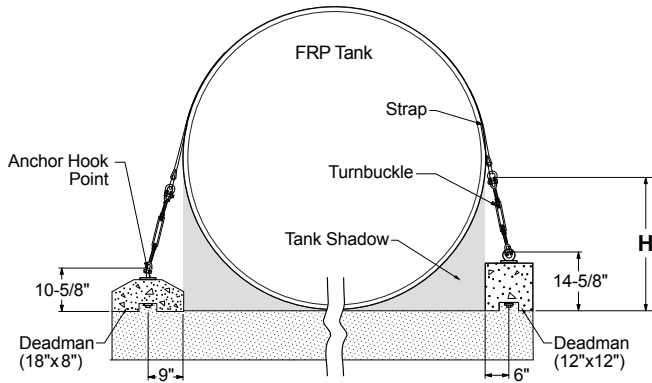


DEADMEN ANCHORS

Deadmen are made of reinforced concrete, designed according to the American Concrete Institute (ACI) code, at least 12' long, placed end to end equal to tank length, and with at least two anchor points per deadman.

- Refer back to Table A-5 for CSI deadmen dimensions and weight.
- Each tank requires its own deadman on both sides, or if one deadman is used between adjacent tanks, it must be doubled in width.
- A separate anchor point must be provided for each strap.
- CSI deadmen are engineered and sized to the tank ordered.
- Placement of CSI deadmen is the same as standard deadmen.
- Lay the deadmen in the excavation parallel to the tank and outside of the tank shadow. (see Figure H-8).

Figure H-8



Tank Diameter	*Dimension "H"
4'	16"
6'	27"
8'	36"
10'	42"
12'	50"

* Hook point on anchor strap to bottom of deadman. The bottom of the deadman should be even with the bottom of the tank.

- CSI deadmen are supplied with 3/4" diameter, galvanized, adjustable anchor points.
- Move anchor points to match the hold-down strap locations on the tank ► ◀ ±1" with CSI split straps, this must be done before placing deadmen in the hole.
- Place multiple deadmen, in contact, end to end.
- Use one anchor point per strap end.

CONCRETE ANCHOR PAD

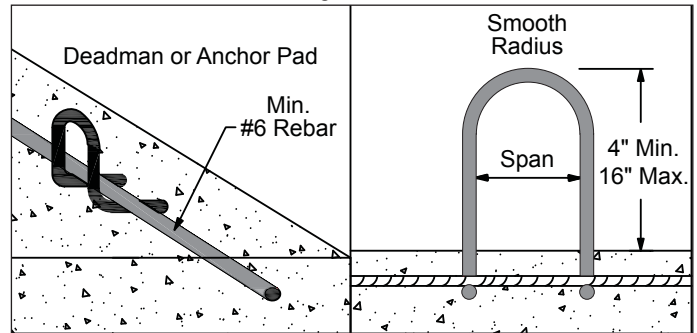
The weight of the overburden acting on the concrete anchor pad and the tank provides the anchoring force (not the weight of the concrete anchor pad).

- As a minimum, to counteract buoyancy, the anchor pad for stable excavations must be at least 8" thick, with #6 rebar on 12" centers each way, constructed per current ACI code.
- For stable conditions the pad must extend a minimum of 18" beyond the tank shadow. The pad must also be at least the same length as the tank.
- For unstable excavations, it is the responsibility of the tank owner or tank owner's representative to design the bottom pad thickness and reinforcement. Regardless of design, the anchor pad should extend to the excavation walls.
- Poor soil conditions, local codes, seismic activity, etc. may require increased reinforcement and anchor pad thickness. Contact a soils consultant for specifications.

Embedded anchor points should be designed for the working loads in Table H-2.

When embedding anchor points at the time the pad is fabricated, the following design will meet the minimum required anchor points (see Figure H-9).

Figure H-9



Tank Diameter	Minimum Rebar Loop Size (1 strap/anchor point)	Rebar* Span
4'	#6	7 1/2"
6'	#8	10 1/2"
8'	#8	10 1/2"
10'	#10**	13 1/2"
12'	#10**	13 1/2"

* Note: Wider or narrower span will reduce the strength of the anchor points below the required value.

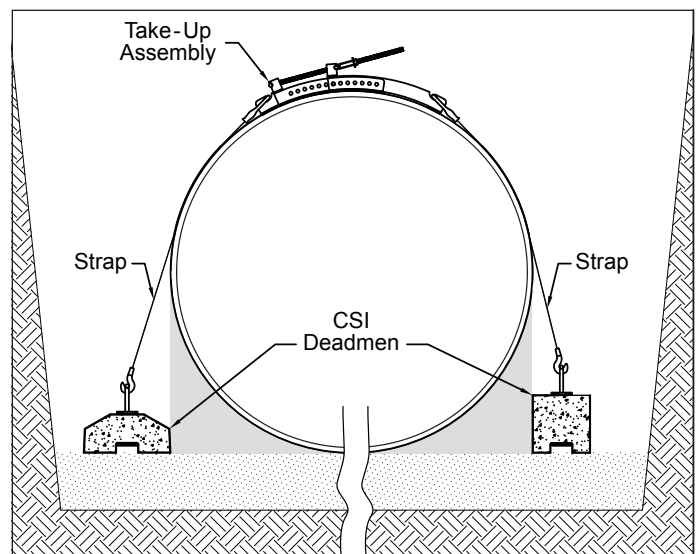
** 3/4" turnbuckles require a wire rope loop or shackle between turnbuckle and rebar anchor point because #10 rebar will not fit into 3/4" eye turnbuckle.

SPLIT STRAP ANCHORING SYSTEM

The CSI split strap anchor system is designed for use in installations when personnel may not enter the hole. This system includes a two part strap and take-up assembly at the tank top that may be used in conjunction with CSI deadmen.

When using the split strap anchoring system, the placement of components is critical (see Figure H-10). For detailed instructions on using the split strap anchor system refer to Supplemental Documents (Section R).

Figure H-10



I. TANK INSTALLATION

WARNING

Do not enter the tank excavation unless all OSHA requirements are followed.

Collapsing excavation walls may cause death or serious injury.

BEFORE YOU BEGIN

It is important to review all instructions to make sure you are compliant with the proper procedures. This includes:

- Bed and Backfill
- Pre-Installation Testing
- Hole Size/Burial Depth
- Anchoring

TANK VERTICAL DIAMETER MEASUREMENTS

Each vertical diameter measurement is used to determine the tank's deflection. If at any point the deflection measurements exceed the values in Table I-1, stop the installation and contact Tank Technical Support.

During installation, vertical diameter measurements must be taken and recorded on the Tank Installation Checklist after each of the following steps:

- "First Vertical Diameter Measurement"
 - Placement of tank on backfill bed
- "Second Vertical Diameter Measurement"
 - Anchoring completed (only applicable if mechanical anchoring is used.)
- "Third Vertical Diameter Measurement"
 - Backfill to tank top.
- "Fourth and Fifth Vertical Diameter Measurements"
 - Backfill to subgrade, before the concrete pad.

Separate vertical diameter measurements must be recorded for each tank compartment.

- All measurements for vertical deflection are made from the bottom of the tank to the bottom of the fitting.
- All measurements should be made in inches or millimeters using a standard nonmetallic gauge stick.
- All measurements should be made through the fitting closest to center of tank or each compartment.

Refer to Table I-1 for maximum deflection values.

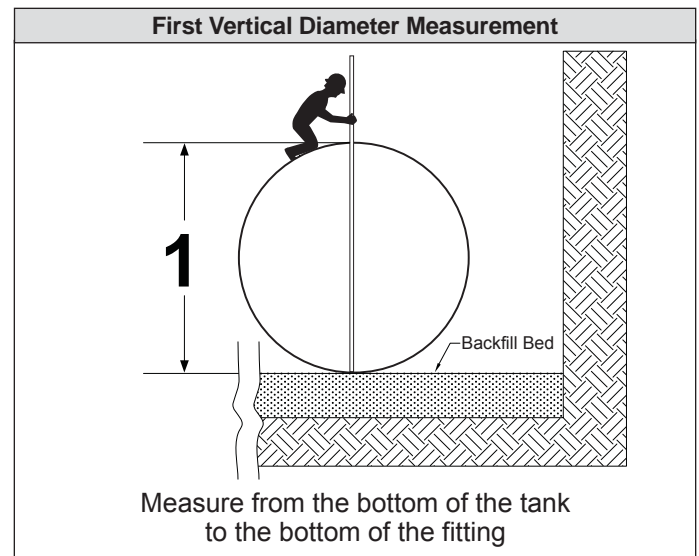
TABLE I-1

Tank Diameter	Maximum Deflection
4'	1/2" (12mm)
6'	3/4" (19mm)
8'	1 1/4" (31mm)
10'	1 1/2" (38mm)
12'	1 1/2" (38mm)

INSTALLATION PROCEDURE

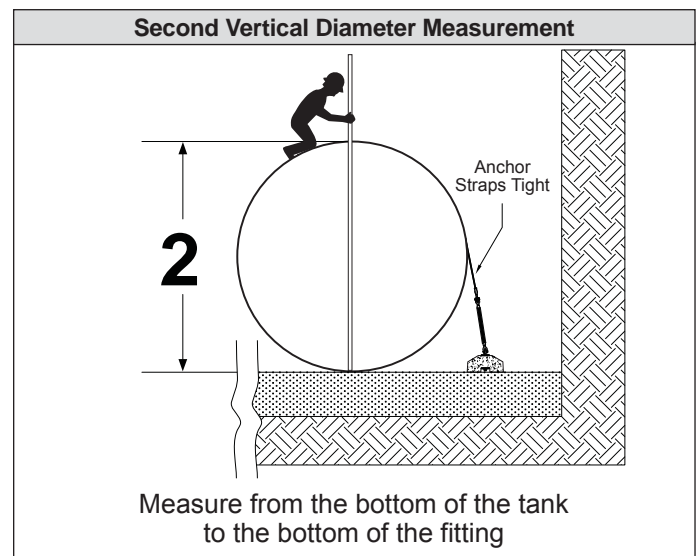
- Determine if geotextile fabric is required for your installation (see Section F for details).
- All tank holes must have a minimum of 12" (18" for wet holes) and a maximum of 24" of approved backfill between the bottom of the tank and the bottom of the excavation or concrete anchor pad.
- Place tank in excavation with lifting cables attached to lift lugs provided on tank, while maintaining control of tank with guide ropes (see Figure A-2 or A-3).
- Set tanks directly on backfill bed.
- Take the "First Vertical Diameter Measurement" and record the value on the Tank Installation Checklist (see Figure I-2).

Figure I-2



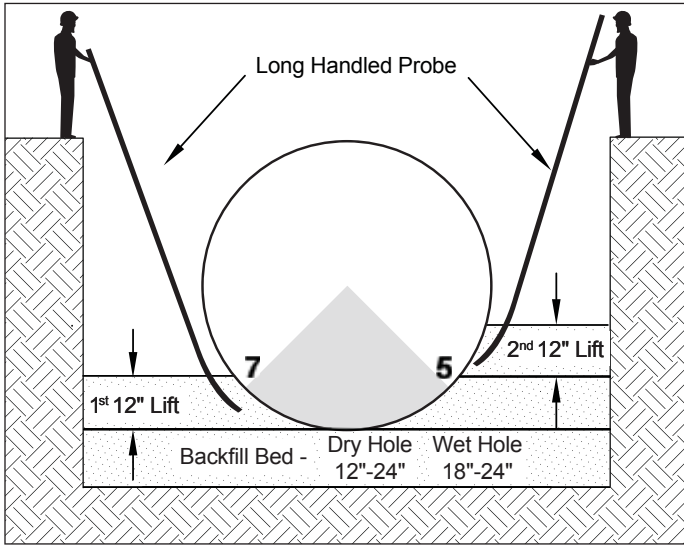
- If mechanical anchoring is used, after anchoring is completed, take the "Second Vertical Diameter Measurement" and record the value on the Tank Installation Checklist. If this value does not equal the "First Vertical Diameter Measurement", loosen the anchor straps (see Figure I-3).

Figure I-3



- Proper backfilling is required to provide necessary support for the tank.
- Use approved backfill.
- Place the first 12" lift of approved backfill material evenly around the tank. From the edge of the hole or the top of an adjacent tank, push the backfill in place by using a probe long enough to reach beneath the tank. Work the backfill material under the entire length of the tank between and around ribs and endcaps, eliminating all voids, so the tank is fully supported (see Figure I-4).

Figure I-4

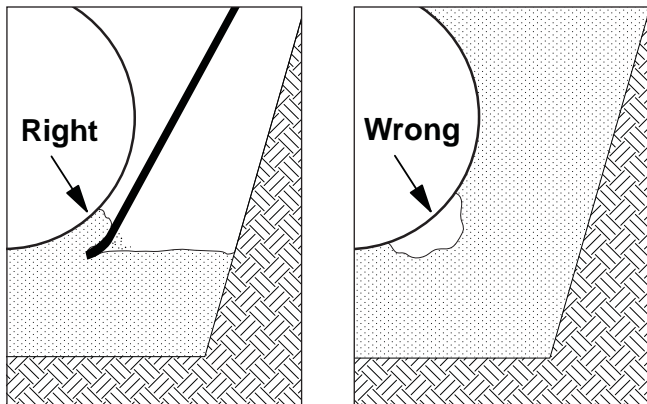


CAUTION

Do not strike the tank with the probe or tank damage may result.

- Eliminate all voids by using a long handled probe to push backfill:
 - Completely beneath tank bottom.
 - Completely between the 5 o'clock and 7 o'clock positions along the entire length of the tank between and around all ribs and endcaps. It is critical to tank performance that this area offers full support under the tank and end caps (see Figure I-5).
- Repeat this process with a second 12" lift.

Figure I-5



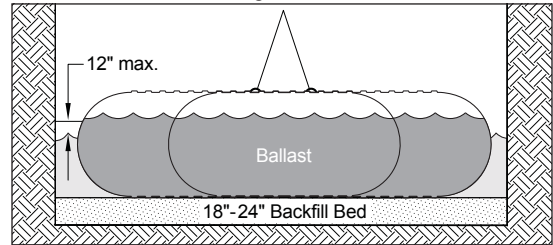
- After completion of second lift, backfill can be brought to tank top without additional handwork.
- Special Instructions for a wet hole installation:
 - Water level in the excavation should be maintained at lowest practical level by using pumps.

CAUTION

Keep tank vented to prevent pressurization of tank when adding ballast. As the tank nears full, reduce the fill rate to prevent pressurization or tank damage may occur. This may result in personal injury or property damage.

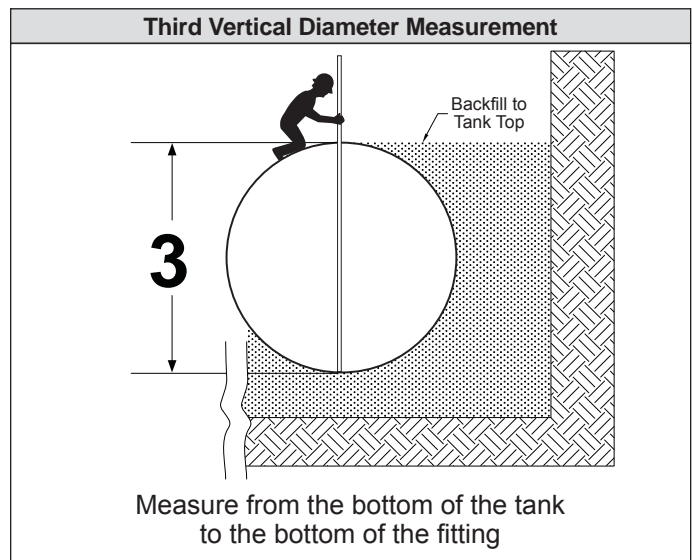
- Ballast the tank if ground water cannot be lowered.
- For compartment tanks, add ballast to compartments as needed to keep tank level. Add enough ballast to sink the tank. Ballast level inside all tank compartments should not be more than 12" above ground water level outside tank (see Figure I-6).

Figure I-6



- Backfill to the tank top.
- Take the Third Vertical Diameter Measurement and record the value on the Tank Installation Checklist and verify measurement A does not exceed the value in Table I-1. (see Figure I-7).

Figure I-7



CAUTION

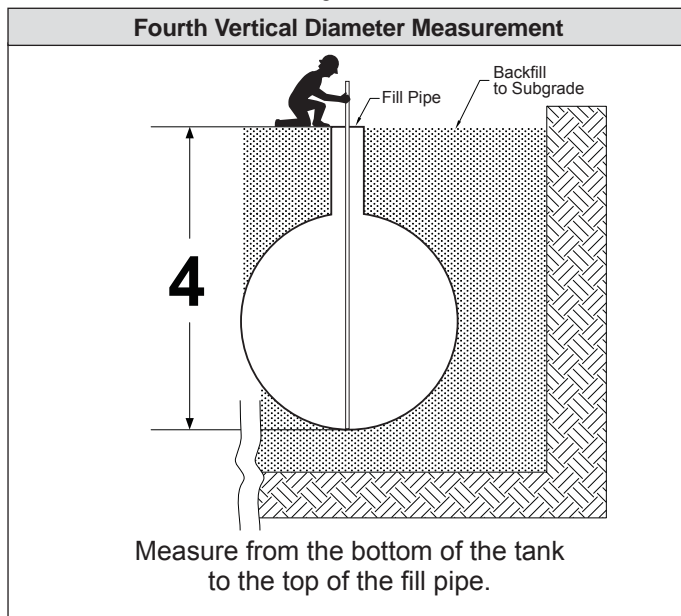
Do not ballast tank until backfill is even with tank top or tank damage can occur.

- After backfill is even with tank top, fill all tank compartments with ballast to minimize chance of tank buoyancy.
- Additional information on alternate installation techniques is available (see Supplemental Documents, Section R).

BACKFILL TO SUBGRADE

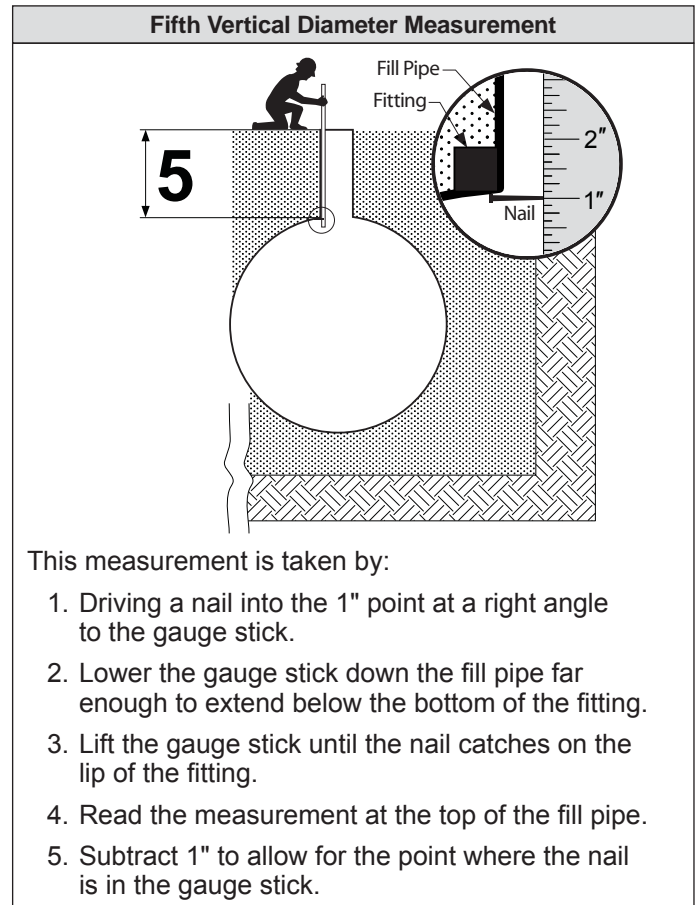
- When the tank has been lowered into the excavation and all testing, backfilling, venting and piping has been completed; add the remaining backfill material to subgrade.
- If alternative smaller or finer backfill material is used above the tank top, geotextile fabric is required (see Supplemental Documents, Section R).
- Once the tank has been backfilled to subgrade, before placement of concrete pad, take the fourth vertical diameter measurement.
- Take the Fourth Deflection Measurement and record the value on the Tank Installation Checklist (see Figure I-8).

Figure I-8



- Take the Fifth Vertical Diameter Measurement and record the value on the Tank Installation Checklist (see Figure I-9).

Figure I-9



1. Driving a nail into the 1" point at a right angle to the gauge stick.
 2. Lower the gauge stick down the fill pipe far enough to extend below the bottom of the fitting.
 3. Lift the gauge stick until the nail catches on the lip of the fitting.
 4. Read the measurement at the top of the fill pipe.
 5. Subtract 1" to allow for the point where the nail is in the gauge stick.
- The inner diameter deflection is calculated using the "Fourth Vertical Diameter Measurement" and "Fifth Vertical Diameter Measurement".
 - After the final measurement has been recorded, complete the Vertical Diameter Measurement section of the Tank Installation Checklist. Verify the values in Table I-1 have not been exceeded.
 - If the final deflection measurement exceeds the values in Table I-1 you should stop the installation, prior to pouring the concrete pad, and immediately contact CSI Tank Technical Support for directions.

J. ADDING TANKS AT EXISTING LOCATIONS

Additional tanks may be installed at existing locations using one of the following methods.

PREFERRED METHOD

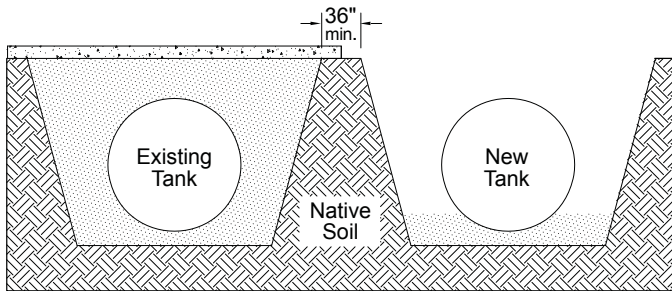
- Install a new tank in a separate hole at least 36" from the original excavation.
- Follow procedures outlined in this Installation Manual.

CAUTION

Avoid surface loads that may result in a collapse of the excavation or disturb any existing tanks.

- Maintain a minimum 36" at grade of native soil between existing and new installation (see Figure J-1).

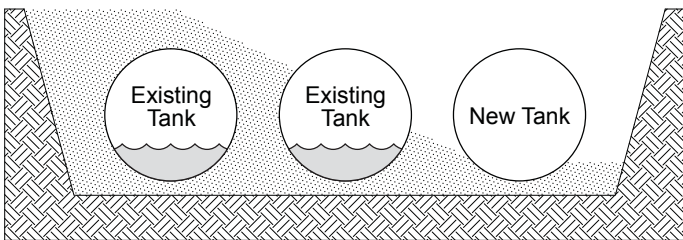
Figure J-1



ALTERNATE METHOD FOR DRY HOLE EXCAVATION

- Lower ballast in existing tanks to less than 25% capacity.
- Remove the surface slab.
- Enlarge the excavation for the new tanks, leaving as much backfill as possible around the existing tanks (see Figure J-2).

Figure J-2



- Install shoring, if necessary, to make sure that existing tanks do not move and sufficient backfill remains.
- Install all tanks following the instructions outlined in this manual.
- Follow and complete the Tank Installation Checklist for all new and existing tanks.

K. PIPING AND BOTTOM SUMP CLEARANCES

TANKS WITH BOTTOM SUMPS / FITTINGS

To install a large bottom sump in a Non Petroleum tank, refer to Supplemental Documents (Section R).

When installing a tank equipped with a bottom sump/fitting, excavation and backfill must be modified to provide:

- A hole centered at the bottom sump/fitting location.
- Hole should be 12" larger than the bottom sump/fitting in all directions.
- Backfill by hand with approved tank backfill.
- The void around the bottom sump/fitting must be hand tamped prior to adding the first 12" lift of backfill around the tank.

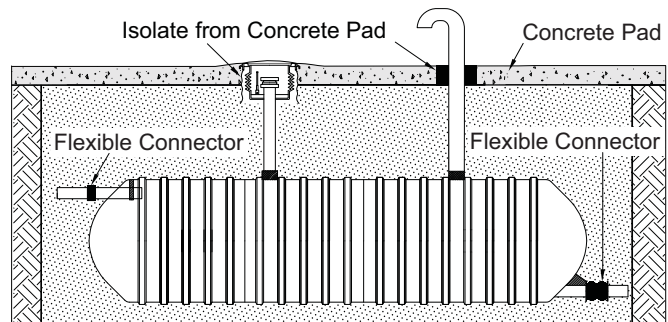
CAUTION

All connections to the tank must be flexible. Provisions must be made to accommodate movement and misalignment between the piping and the tank. Failure to do this may damage the tank or surrounding property.

EXTERNAL PIPING

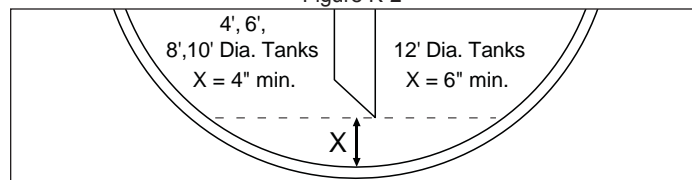
- Isolate the piping from the concrete pad (see Figure K-1).
- A flexible connector must be installed on all tangentially mounted fittings. The flexible connector must allow for 1/2" of differential, angular, expansion, and compression movement.

Figure K-1



- Take precaution during construction to make sure no damage occurs to the exposed pipe(s).
- Internal piping must terminate a minimum of 4" from tank bottom for 4', 6', 8', and 10' diameter tanks and 6" from the bottom for 12' diameter tanks to allow for tank deflection (see Figure K-2).

Figure K-2



CAUTION

Failure to provide adequate clearance may damage the tank and result in environmental contamination.

L. VENTING

- All primary tanks and compartments that contain product must be vented at all times, except as defined during pre-installation testing.
- Tanks are designed for operation at atmospheric pressure only (except for use with vapor recovery systems provided the pressure or vacuum does not exceed 1 psig).
- The tank's venting system must be adequately sized to ensure that atmospheric pressure is maintained at all times, including when filling and emptying the tank.
- Annular space vents must be independent of tank vents.
- For hydrostatically monitored double-wall tanks, the annular space must be vented at all times.
- For dry monitored double-wall tanks, annular space does not need to be vented.

M. FILLING TANKS

CAUTION

Pressurized product deliveries are not recommended as tank damage may occur.

- CSI recommends only gravity-filling of tanks.
- If the delivery vehicle uses pumps to fill the tank:
 - Install positive shut-off equipment in the lines and on the truck to prevent the tank from being overfilled.
 - Pressurization from over filling will damage the tank, even if the tank vent is unrestricted.
 - Do not use a ball float valve for overfill protection.

N. MANWAYS

WARNING

Do not enter tank unless following OSHA guidelines for confined space entry. Failure to follow OSHA guidelines could result in death or serious injury.



ASPHYXIATION



FIRE



EXPLOSION

- The load bearing capacity for a standard 22" manway installed is 1,200 lbs. for single-wall tanks and 2,400 lbs. for double-wall tanks.
- All 30" and 36" manways have a load bearing capacity of 2,400 lbs.
- Do not exceed 50 ft./lb. torque during bolt tightening or manway flange damage may occur.

O. ANNULAR SPACE MONITORING

HYDROSTATIC MONITORING

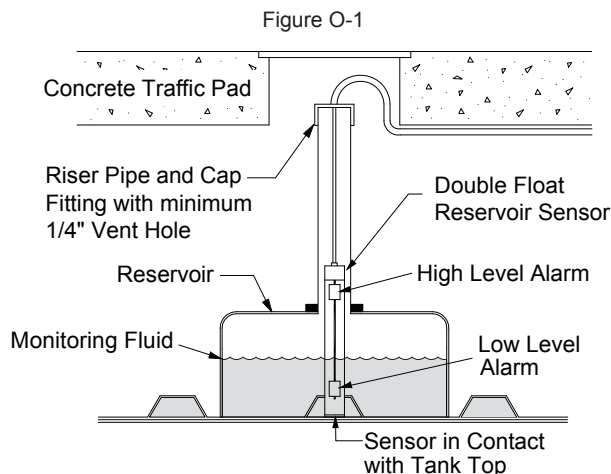
Because of its superior leak detection capability, Containment Solutions recommends the Hydrostatic Tank Monitor for continuous monitoring of the annular space. However, the tank owner or the tank owner's representative is responsible for selecting the monitoring system.

- Tanks with hydrostatic monitoring systems normally arrive with monitoring fluid installed in the annular space and some fluid in the reservoir.
 - After installation, the fluid level in the reservoir must be filled to the proper level.
 - Additional monitoring fluid is supplied with the tank for this purpose.

CAUTION

Hydrostatic monitoring cavity between the inner and outer tank must be vented to the atmosphere. If unvented, pressure buildup can cause tank damage.

- Vent annular space with a minimum 1/4" hole at riser top.
- When installing a double float sensor, the bottom of the sensor must be in contact with the tank top (see Figure O-1).



WARNING

Always wear safety glasses and protective clothing when handling monitoring fluid.

Monitoring fluid spillage may cause surfaces to be slippery.

Refer to MSDS sheet for additional information.

- If a tank has a reservoir installed, and arrives without monitoring fluid pre-installed, the annular space can be filled with monitoring fluid after the tanks have been placed in the excavation and backfilled to the tank top.

- Provisions must be made to access the reservoir for brine filling and the removal of air from the annular space at each end of the tank.
- Contact Tank Technical Support for instructions.
- The standard monitoring fluid is a non-toxic brine solution of 30% calcium chloride in water with a biodegradable green tint.
- Add brine to the reservoir until the reservoir fluid level matches the following table values in Table O-2:

TABLE O-2

Tank Diameter & Capacity	Reservoir Fluid Level Measurement		
	Tank is Empty	Tank is Half Full	Tank is Full
4' (1M and less)	5"	7"	9"
4' (over 1M)	4¼"	4¾"	5"
6' (6M and less)	3¾"	4¾"	5½"
6' (over 6M)	3½"	4¾"	6"
8' (6M and less)	4¼"	4¾"	5¼"
8' (over 6M)	4¼"	5"	6"
10' (12M and less)	4½"	5½"	6½"
10' (13M thru 20M)	5"	6½"	8¼"
10' (21M thru 30M)	3¾"	6½"	9½"
10' (31M thru 40M)	4½"	6"	7½"
10' (over 40M)	4"	6"	8"

- If the reservoir sensor indicates a high or low level alarm, it is necessary to first determine that the alarm is not the result of an incorrect initial fluid level setting.
 - Remove the sensor.
 - Test the sensor for proper operation.
 - Check that the float sensor is positioned on the tank top. The bottom float should be within 2" of the bottom and floats are spaced a minimum of 10" apart.
 - Reset the fluid level in the reservoir by adding or removing fluid as indicated in Table O-2.
 - Reinstall the sensor.

Note: If a second alarm occurs, additional instructions for setting the brine level are available from Containment Solutions Field Service.

DRY ANNULAR SPACE MONITORING

- Consult monitoring equipment manufacturer for proper installation.
- When liquid or vapor sensors are used, the tank may be sloped at time of installation.
- If tank is sloped, place tank so that the lowest elevation is at monitoring end.
- Calibration charts are designed for level tank installation. Sloped tanks will affect the tank calibration chart accuracy.
- Use a wire puller to position sensor at the tank bottom.

- For ease of installation insert the sensor in the tank cavity before installing the monitoring riser pipe to grade. Use a minimum 4" riser to grade for removal and replacement of sensor.
- CSI recommends a permanent pull cable be installed and accessible at grade to facilitate periodic sensor inspections.
- For dry monitored double-wall tanks, annular space does not need to be vented.

DRY ANNULAR SPACE VACUUM OR AIR PRESSURE MONITORING

Consult monitoring equipment manufacturer for proper installation.

- Maximum vacuum for continuous monitoring is 5 psig.
- Maximum pressure for continuous air pressure monitoring is 3 psig.

P. CONTAINMENT COLLARS, TANK SUMPS AND TANK RISERS

CAUTION

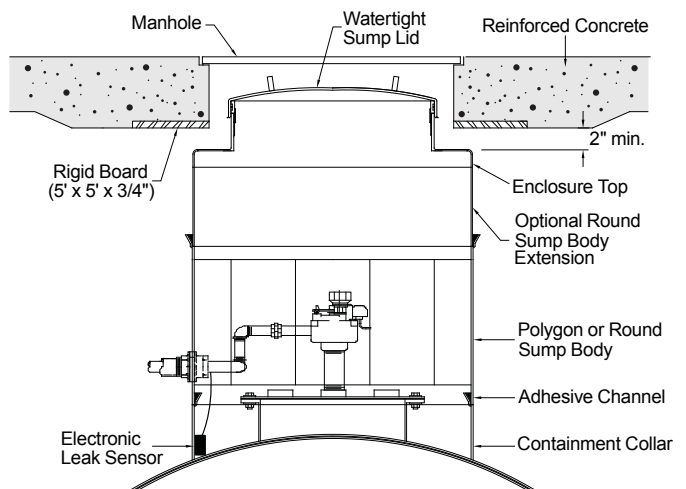
In freezing conditions, protect collar from water accumulation. Freezing water may cause damage.

CAUTION

Secondary containment collar must be continuously monitored for potential spills or leaks.

CSI single and double-wall containment collars are factory installed to the tank top to provide a means of secondarily containing leaks from pumps and piping.

Figure P-1



CSI tank sumps are designed to provide a watertight connection to the tank collar utilizing an adhesive joint.

ALL TANK COLLARS AND SUMPS:

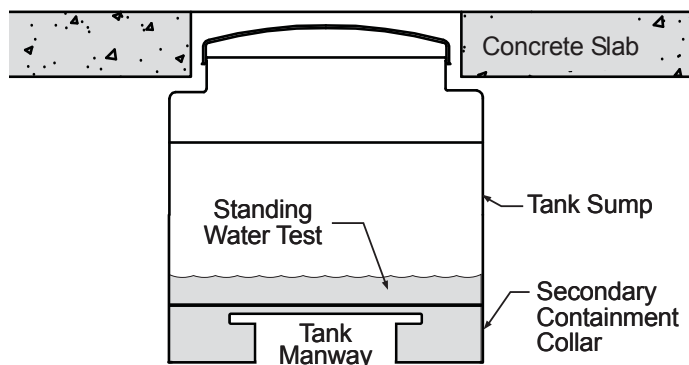
- Must be continuously monitored for leaks using an electronic leak monitoring sensor.
- Must be isolated from direct traffic loading (see Figure P-1).

Single and Double-wall Tank Sump Installation Instructions are available (see Supplemental Documents, Section R).

COLLAR TEST INSTRUCTIONS

- The installation contractor must test the tank sump to the secondary containment collar joint and the secondary containment collar to tank attachment before backfill is around the collar.
- Test the joints by filling the sump with water at least 2" to 3" above the tank sump to the secondary containment collar joint. Record the liquid level. After 24 hours, re-measure and record the liquid level. A liquid level change of more than 1/4" indicates a possible leak (see Figure P-2).

Figure P-2



- Initial Jobsite Testing
 - The installation contractor must leak test this collar and sump before the tank installation is complete.
- Future Periodic Testing
 - The tank owner/operator must leak test this collar and sump at least once a year.
- For double wall collars, see additional instructions for testing the outer wall (refer to INST 6034 Double-Wall Tank Sump Installation Instructions).

ACCESS RISERS (NON PETROLEUM TANKS)

Access Riser Installation Instructions are available in the AC-ADKit for Collar Access Opening (see Supplemental Documents, Section R).

Q. CONVERSION FORMULAS

Use this as a guide if a dimension does not have a metric conversion printed.

LENGTH

- mm = millimeters
- 1" = 25.4 mm
- 1' = 304.8 mm

WEIGHT

- kg = kilogram
- 1 lb = 0.454 kg

CAPACITY

- L = liters
- 1 gal = 3.785 L

PRESSURE

- kPa = kilopascals
- 1 psi = 6.894 kPa

R. SUPPLEMENTAL DOCUMENTS

Supplemental documents, which may apply to specific installations and / or conditions, are available upon request from Containment Solutions Technical Support.

- Single-Wall Tank Sump Installation Instructions (Pub. No. INST 6030)
- Double-Wall Tank Sump Installation Instructions (Pub. No. INST 6034)
- Deadman Anchors and Turnbuckles (Pub. No. ACC 5002)
- Deadman Layout by Tank Size (Pub. No. TNK 1062)
- Split Strap Anchor System (Pub. No. INST 5004)
- Wire Rope over Tank Top (Pub. No. INST 6047)
- Alternate Backfill Above Tank Top Installation Instructions (Pub. No. INST 6014)
- Lifting Tanks with Slings (Pub. No. 6021)
- NYC Special Installation Instructions (Pub. No. INST 6008)
- Fiberglass Oil/Water Separator Tank Installation and Start-Up Instructions (Pub. No. OWS 2013)
- Brine Monitoring Fluid MSDS Sheet (Pub. No. 15002)
- Berm Installation Instructions (Pub. No. 6022)
- Water Tank Supplemental Installation Instructions (Pub. No. INST 6038)
- Triple-Wall Tank Supplemental Installation Instructions (Pub. No. INST 6045)
- Fiberglass Tanks Shipping into Canada Supplemental Installation Instructions (Pub. No. INST 6043-CAN)
- Bottom Sump Installation Instructions (Pub. No. INST 6044)
- AC-AD Kit for Access Collar Opening (Pub. No. INST 6048)
- Urea DEF Supplemental Installation Instructions (Pub. No. INST 6052)

Anchor Chart

Minimum burial depth to achieve 1.2 safety factor against flotation assuming worst case conditions of water to grade and the tank empty. Assumes multiple tank installation.

	Tank Diameter & Nominal Capacity in Gallons (Including all Compartments)	Space Between Tanks	# of Anchor Straps	# of Sumps or Risers (Backfill to Grade No Traffic / Backfill with 6" Concrete Traffic Pad)				
				0	1	2	3	4
4' Diameter Tanks	up to 1,000 w/ 12"x12" DM	24"	2	24" / 24"	33" / 24"	-	-	-
	up to 1,000 w/ 8" Pad	24"	2	24" / 24"	33" / 24"	-	-	-
	up to 1,000 No Mech	18"	0	29" / 26"	58" / 53"	-	-	-
	1,100 - 1,500 w/ 12"x12" DM	24"	2	24" / 24"	33" / 24"	81" / 68"	-	-
	1,100 - 1,500 w/ 8" Pad	24"	2	24" / 24"	45" / 38"	81" / 68"	-	-
	1,100 - 1,500 No Mech	18"	0	29" / 26"	51" / 46"	74" / 68"	-	-
	1,600 - 2,000 w/ 12"x12" DM	24"	4	24" / 24"	35" / 26"	35" / 26"	-	-
	1,600 - 2,000 w/ 8" Pad	24"	4	24" / 24"	35" / 26"	35" / 26"	-	-
	1,600 - 2,000 No Mech	18"	0	30" / 27"	46" / 41"	57" / 52"	-	-
6' Diameter Tanks	up to 4,000 w/ 12"x12" DM	24"	2	28" / 24"	43" / 38"	52" / 46"	-	-
	up to 4,000 w/ 8" Pad	24"	2	28" / 24"	43" / 38"	52" / 46"	-	-
	up to 4,000 No Mech	18"	0	44" / 41"	62" / 58"	73" / 69"	-	-
	4,100 - 6,000 w/ 12"x12" DM	24"	4	27" / 24"	33" / 29"	36" / 31"	65" / 57"	-
	4,100 - 6,000 w/ 8" Pad	24"	4	26" / 24"	31" / 28"	34" / 28"	65" / 57"	-
	4,100 - 6,000 No Mech	18"	0	46" / 43"	59" / 55"	62" / 58"	75" / 71"	-
	6,100 - 10,000 w/ 12"x12" DM	24"	6	29" / 26"	33" / 30"	36" / 32"	41" / 36"	45" / 39"
	6,100 - 10,000 w/ 8" Pad	24"	6	29" / 26"	33" / 30"	36" / 32"	41" / 36"	45" / 39"
	6,100 - 10,000 No Mech	18"	0	47" / 44"	56" / 52"	57" / 54"	64" / 60"	68" / 64"
8' Diameter Tanks	up to 7,000 w/ 12"x12" DM	24"	2	36" / 32"	47" / 43"	53" / 48"	-	-
	up to 7,000 w/ 8" Pad	24"	2	36" / 32"	47" / 43"	53" / 48"	-	-
	up to 7,000 No Mech	18"	0	58" / 55"	73" / 69"	82" / 78"	-	-
	7,100 - 12,000 w/ 12"x12" DM	24"	4	39" / 35"	45" / 41"	47" / 43"	65" / 60"	65" / 60"
	7,100 - 12,000 w/ 8" Pad	24"	4	38" / 35"	42" / 39"	42" / 39"	65" / 60"	65" / 60"
	7,100 - 12,000 No Mech	18"	0	61" / 58"	72" / 68"	76" / 72"	84" / 81"	NA
	13,000 - 16,000 w/ 12"x12" DM	24"	6	41" / 38"	46" / 42"	47" / 43"	52" / 47"	68" / 61"
	13,000 - 16,000 w/ 8" Pad	24"	6	38" / 35"	42" / 39"	42" / 39"	52" / 47"	68" / 61"
	13,000 - 16,000 No Mech	18"	0	62" / 59"	71" / 68"	73" / 70"	80" / 76"	84" / 81"
17,000 - 20,000 w/ 12"x12" DM	24"	8	42" / 38"	46" / 42"	47" / 43"	50" / 42"	52" / 48"	
17,000 - 20,000 w/ 8" Pad	24"	8	34" / 31"	38" / 35"	41" / 37"	41" / 37"	41" / 37"	
17,000 - 20,000 No Mech	18"	0	63" / 60"	70" / 66"	71" / 67"	76" / 72"	79" / 75"	

Contact Tank Technical Support for alternate anchoring methods.

Note: DM = Concrete Deadman Anchors
 Pad = Concrete anchor pad under tank
 No Mech = No mechanical anchoring
 NA = Not allowed

Anchor Chart

Minimum burial depth to achieve 1.2 safety factor against flotation assuming worst case conditions of water to grade and the tank empty. Assumes multiple tank installation.

Tank Diameter & Nominal Capacity in Gallons (Including all Compartments)	Space Between Tanks	# of Anchor Straps	# of Sumps or Risers (Backfill to Grade No Traffic / Backfill with 6" Concrete Traffic Pad)				
			0	1	2	3	4

10' Diameter Tanks	up to 10,000 w/ 18"x8" DM	36"	3	44" / 39"	50" / 44"	57" / 51"	-	-
	up to 10,000 w/ 8" Pad	24"	3	33" / 29"	39" / 35"	57" / 51"	-	-
	up to 10,000 No Mech	18"	0	78" / 75"	NA	NA	-	-
	10,000 - 18,000 w/ 18"x8" DM	36"	4	47" / 43"	53" / 49"	55" / 50"	76" / 70"	80" / 75"
	10,000 - 18,000 w/ 8" Pad	24"	4	47" / 43"	53" / 49"	55" / 50"	76" / 70"	80" / 75"
	10,000 - 18,000 No Mech	18"	0	83" / 80"	NA	NA	NA	NA
	19,000 - 23,000 w/ 18"x8" DM	36"	6	44" / 40"	49" / 45"	51" / 47"	62" / 60"	72" / 67"
	19,000 - 23,000 w/ 8" Pad	24"	6	41" / 37"	51" / 47"	51" / 47"	62" / 60"	72" / 67"
	19,000 - 23,000 No Mech	18"	0	84" / 81"	NA	NA	NA	NA
	24,000 - 35,000 w/ 18"x8" DM	36"	8	51" / 47"	57" / 53"	70" / 66"	70" / 66"	70" / 66"
	24,000 - 35,000 w/ 8" Pad	24"	8	51" / 47"	57" / 53"	69" / 65"	69" / 65"	69" / 65"
	24,000 - 35,000 No Mech	18"	0	84" / 81"	NA	NA	NA	NA
	36,000 - 40,000 w/ 18"x8" DM	36"	10	49" / 46"	54" / 51"	59" / 55"	60" / 56"	60" / 56"
	36,000 - 40,000 w/ 8" Pad	24"	10	47" / 46"	54" / 51"	59" / 55"	62" / 58"	65" / 60"
	36,000 - 40,000 No Mech	18"	0	84" / 81"	NA	NA	NA	NA

12' Diameter Tanks	up to 25,000 w/ 18"x8" DM	36"	8	59" / 56"	65" / 61"	66" / 63"	72" / 68"	76" / 72"
	up to 25,000 w/ 8" Pad	24"	8	43" / 40"	54" / 49"	62" / 58"	62" / 58"	62" / 58"
	up to 25,000 No Mech	24"	0	80" / 77"	NA	NA	NA	NA
	26,000 - 35,000 w/ 18"x8" DM	36"	10	62" / 59"	67" / 63"	68" / 64"	71" / 68"	75" / 71"
	26,000 - 35,000 w/ 8" Pad	24"	10	49" / 46"	63" / 59"	63" / 59"	63" / 59"	66" / 62"
	26,000 - 35,000 No Mech	24"	0	83" / 80"	NA	NA	NA	NA
	36,000 - 45,000 w/ 18"x8" DM	36"	12	64" / 61"	68" / 64"	68" / 65"	72" / 68"	74" / 71"
	36,000 - 45,000 w/ 8" Pad	24"	12	53" / 50"	63" / 59"	63" / 59"	67" / 63"	67" / 63"
	36,000 - 45,000 No Mech	24"	0	84" / 81"	NA	NA	NA	NA
	46,000 - 50,000 w/ 18"x8" DM	36"	14	64" / 61"	68" / 65"	69" / 65"	72" / 68"	73" / 70"
	46,000 - 50,000 w/ 8" Pad	24"	14	49" / 46"	63" / 59"	63" / 59"	63" / 59"	63" / 59"
	46,000 - 50,000 No Mech	24"	0	84" / 81"	NA	NA	NA	NA

Contact Tank Technical Support for alternate anchoring methods.

- Note:** DM = Concrete Deadman Anchors
- Pad = Concrete anchor pad under tank
- No Mech. = No mechanical anchoring
- NA = Not allowed

Standard Tank Sizes

The following table represents the most popular tank sizes at the various tank diameters.

Tank Diameter	Capacity		Length		Single-Wall Weight		Double-Wall Weight*	
	Nominal	Actual	Feet/Inch	Millimeter	Pound	Kilogram	Pound	Kilogram
4'	600 gal	/ 2,297 L	7' 3"	/ 2,210	320	/ 145	975	/ 442
4'	1,000 gal	/ 3,661 L	11' 1"	/ 3,378	400	/ 181	1,235	/ 560
6'	2,500 gal	/ 10,191 L	13' 9"	/ 4,191	1,300	/ 589	2,650	/ 1,202
6'	3,000 gal	/ 12,594 L	16' 9"	/ 5,105	1,500	/ 680	3,000	/ 1,361
6'	4,000 gal	/ 15,001 L	19' 9"	/ 6,020	1,650	/ 748	3,550	/ 1,610
6'	5,000 gal	/ 19,007 L	24' 9"	/ 7,544	2,000	/ 907	4,350	/ 1,973
6'	6,000 gal	/ 23,418 L	30' 3"	/ 9,220	2,300	/ 1,043	5,100	/ 2,313
8'	5,000 gal	/ 18,749 L	16' 9"	/ 5,105	1,800	/ 816	3,600	/ 1,633
8'	6,000 gal	/ 22,350 L	19' 6"	/ 5,944	2,050	/ 930	4,050	/ 1,837
8'	8,000 gal	/ 29,547 L	25' 0"	/ 7,620	2,450	/ 1,111	5,000	/ 2,268
8'	10,000 gal	/ 36,748 L	30' 6"	/ 9,296	2,900	/ 1,520	5,950	/ 2,699
8'	12,000 gal	/ 43,945 L	36' 0"	/ 10,972	3,350	/ 10,947	7,050	/ 3,198
8'	15,000 gal	/ 55,126 L	44' 6"	/ 13,576	4,500	/ 2,041	9,350	/ 4,241
10'	10,000 gal	/ 38,874 L	20' 11"	/ 6,388	3,600	/ 1,633	7,500	/ 3,402
10'	12,000 gal	/ 44,999 L	23' 8"	/ 7,226	4,000	/ 1,814	8,600	/ 3,901
10'	15,000 gal	/ 57,244 L	29' 2"	/ 8,903	4,750	/ 2,155	10,500	/ 4,762
10'	20,000 gal	/ 75,614 L	37' 5"	/ 11,417	6,100	/ 2,767	13,550	/ 6,146
10'	25,000 gal	/ 94,636 L	46' 0"	/ 14,021	7,550	/ 3,425	17,100	/ 7,756
10'	30,000 gal	/ 113,003 L	54' 3"	/ 16,535	8,750	/ 3,969	20,400	/ 9,253
10'	35,000 gal	/ 132,025 L	62' 9"	/ 19,139	10,050	/ 4,559	24,350	/ 1,1045
10'	40,000 gal	/ 151,047 L	71' 4"	/ 21,742	11,600	/ 5,262	27,750	/ 1,2587
12'	20,000 gal	/ 75,974 L	27' 6"	/ 8,382	8,600	/ 3,900	-	/ -
12'	25,000 gal	/ 96,588 L	34' 6"	/ 10,516	10,400	/ 4,717	-	/ -
12'	30,000 gal	/ 114,257 L	40' 6"	/ 12,344	11,900	/ 5,398	-	/ -
12'	35,000 gal	/ 134,378 L	47' 4"	/ 14,427	13,850	/ 6,282	-	/ -
12'	40,000 gal	/ 152,047 L	53' 4"	/ 16,256	15,400	/ 6,985	-	/ -
12'	45,000 gal	/ 172,452 L	60' 4"	/ 18,390	17,200	/ 7,802	-	/ -
12'	50,000 gal	/ 189,841 L	66' 2"	/ 20,168	18,850	/ 8,550	-	/ -

*The double-wall weights are based on hydrostatically monitored tanks filled with monitoring fluid prior to delivery.

Tank Specific Information

TANK NUMBER

1 2 3 4 5

13. Underwriter Laboratories label or tank serial number. _____

14. Tank type.*
(Indicate SW, DW, SW-OWS, or DW-OWS for each tank) _____

15. Interstitial Monitor type.**
(Indicate HYDRO, DRY, VAC or PRES for each tank) _____

16. Tank capacity.
(Indicate unit of measurement and record the capacities for each tank) _____

Select one: Gallons Liters

17. Tank free of visual damage.
(Document damage found and attach to this form) _____

18. Monitoring fluid visible on inner or outer tank wall.
(Indicate Yes or No for each tank) _____

19. Pre-Installation air/soap test performed without leaks.
Indicate which test in Section D you used per tank: _____

20. Hydrostatically monitored tanks:
Indicate Yes or N/A for each step completed per tank:

- Sensor sits on tank top _____
- Check and record monitoring-fluid level in reservoir _____
- Annular space vented _____

* **SW** = Single Wall Tank • **DW** = Double-Wall Tank • **SW-OWS** = SW Oil/Water Separator • **DW-OWS** = DW Oil/Water Separator
 ** **HYDRO** = Hydrostatic • **DRY** = Dry interstice space with probe • **VAC** = Vacuum • **PRES** = Positive Air Pressure

Tank Deflection Measurements

Measurement instructions are found in Section I of Tank Installation Instructions.

1) First Vertical Diameter Measurement (Section I, Figure I-2) _____

2) Second Vertical Diameter Measurement (Section I, Figure I-3) _____

3) Third Vertical Diameter Measurement (Section I, Figure I-7) _____

Measurement A - Tank deflection with backfill at tank top
(subtract Measurement 3 from Measurement 1 above)

Refer to Table I-1 for max. deflection values.

4) Fourth Vertical Diameter Measurement (Section I, Figure I-8) _____

5) Fifth Vertical Diameter Measurement (Section I, Figure I-9) _____

6) Calculate the final vertical diameter measurement
(subtract Measurement 5 from Measurement 4 above) _____

Measurement B - Tank deflection at subgrade
(subtract Calculated Value (6) from Measurement 1 above)

Refer to Table I-1 for max. deflection values.

CAUTION

If Measurement A or Measurement B exceeds the values shown in Table I-1, immediately contact Tank Technical Support prior to proceeding with the installation.

CSI Tank Technical Support: 936-756-7731

TABLE I-1

Tank Diameter	Maximum Deflection
4'	½" (12mm)
6'	¾" (19mm)
8'	1¼" (31mm)
10'	1½" (38mm)
12'	1½" (38mm)



Technical Support

(800) 537-4730

Fax: (936) 756-7665

Field Service

(800) 822-1997

Fax: (814) 542-5020

Tank Sales

(877) 274-8265

Fax: (936) 756-7665



**CONTAINMENT
SOLUTIONS**

5150 Jefferson Chemical Road • Conroe, TX 77301-6834

Phone: 936-756-7731 • Fax 936-756-7766

www.containmentsolutions.com

