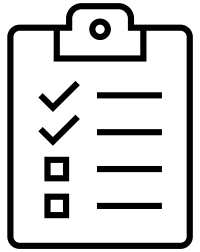
Tank Installation Training Guide

Version 3.4 – 4.29.2026

Pub No- 3001

Tank Installation Checklist



- ✓ The installation checklist is found in the back of this manual or found on the website.
- ✓ The checklist must be completed by the installing contractor and given to the tank owner.
- ✓ The tank limited warranty requires this document be retained by the contractor and owner to validate any future claim.

Pre- Installation Considerations

- Read, understand, and follow all instructions in the installation manual.
- Review and prepare to complete the tank installation checklist.
- Contact local authorities and review building codes, underground utilities, and any mandated testing requirements.
- Keep the Installation Manual available at the installation site as a reference to safety procedures as needed.

Tank Unloading

Tank Arrival

First:

- ✓ Carefully unload all accessories to prevent damage.
- ✓ All tanks must be mechanically unloaded.
- ✓ Visually Inspect tank for damage.
- ✓ Inspect Vacuum Gauges for Dry Tanks

For temporary job site storage.

- Use provided shipping pads or approved tank backfill.
- Place tanks on flat ground and chock with sandbags.
- Tie down tank in anticipation of high winds.
- Protect collars from freezing conditions.

Proper Unloading, Lifting & Guiding Tanks

Reference Section 2.0

Lift Configuration

- When tanks arrive at the job site, they must always be mechanically unloaded.
- For 10’ and 12’ diameter tanks - There are different lift lug orientations for unloading from the truck or lifting into the excavation.
- Identify the tank lift lug orientation and use the appropriate method to lift the tank.
- Reference Figure 2 in Installation Guide

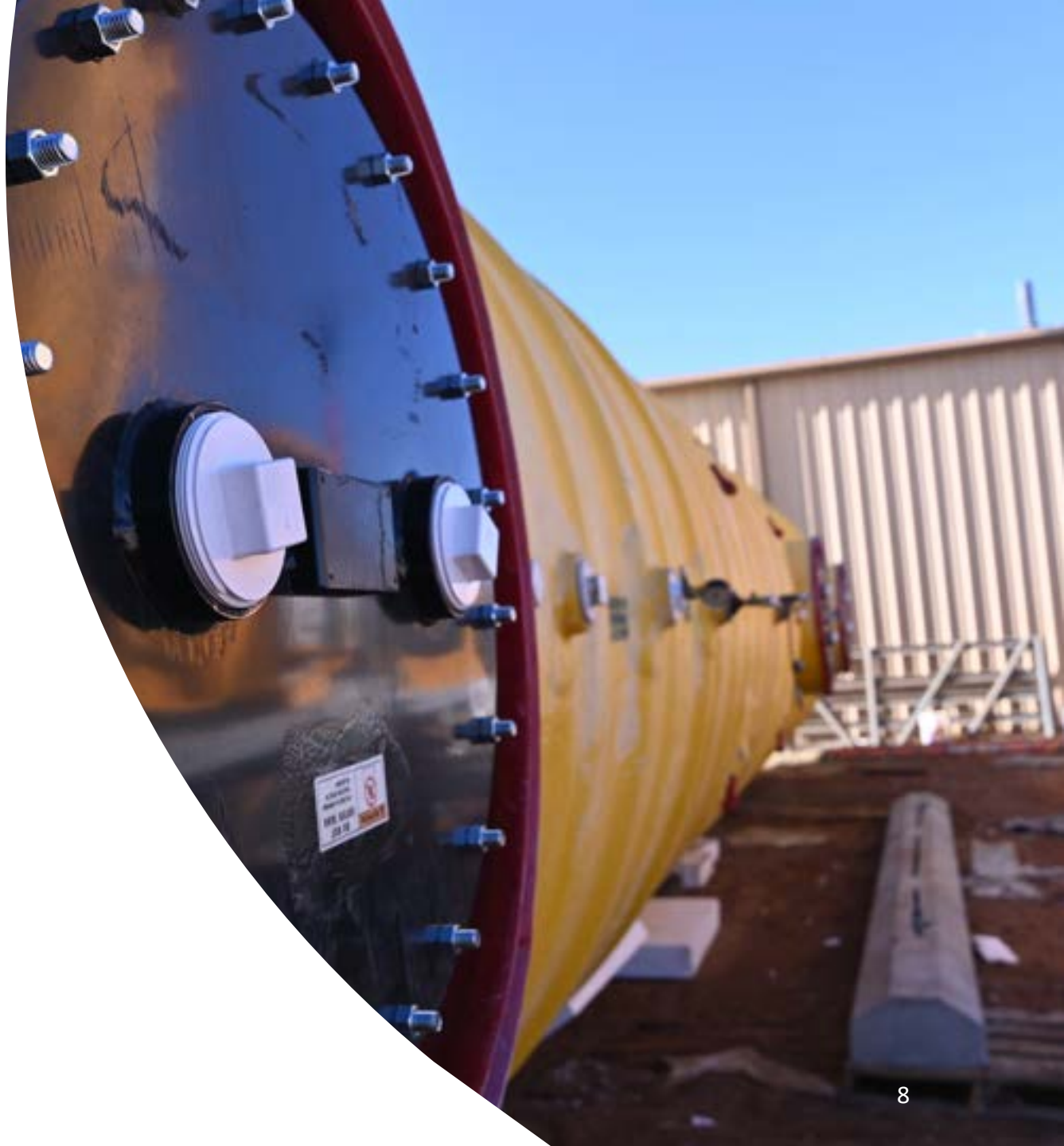
Tank Testing Procedure

Preparing For Testing

- Replace all fitting plugs with plugs suitable for the product to be stored.
- Clean factory pipe dope from all plugs and fittings.
- Apply pipe dope suitable for the product being stored.
- Re-install and tighten all fitting plugs.
- Assemble the required number of “Tank Test Manifolds” Reference Figure 5, one per compartment.
- Use contractor fabricated “Tank Test Manifold(s)”.
- Gauges must have a maximum full-scale reading of 15 [psig] with 1/2 [psig] 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 of:

✓ 5 [psig] for double-wall tanks, interstice only.

✓ 1 [psig] for single-wall tanks, main compartment.



Shipped with Brine

The reservoir of a wet interstice tank is factory filled with monitoring fluid at a level approximately 3” above the tank top.

- This level may vary during shipping and installation for reasons detailed in this section.
- If a tank arrives without monitoring fluid in the reservoir, contact Nationwide Tanks by Hess plant nearest you.

1. Visually inspect the brine reservoir for shipping or handling damage.
2. Check brine level in reservoir, look for fluid inside and outside of tank for wet-monitored double-wall tanks.
3. Visually check the interior and exterior of the tank (each compartment of a multicompartment tank), there should be no visible signs of Brine Fluid

Shipped Under Vacuum

1. The Vacuum date precedes the tank installation *by7-days*; and
2. The factory supplied tank gauge reads a minimum of 10" vacuum.
3. See configuration diagrams in the installation instructions.

*A tank shipped under vacuum can be immediately installed without additional testing if both of the following conditions are met:

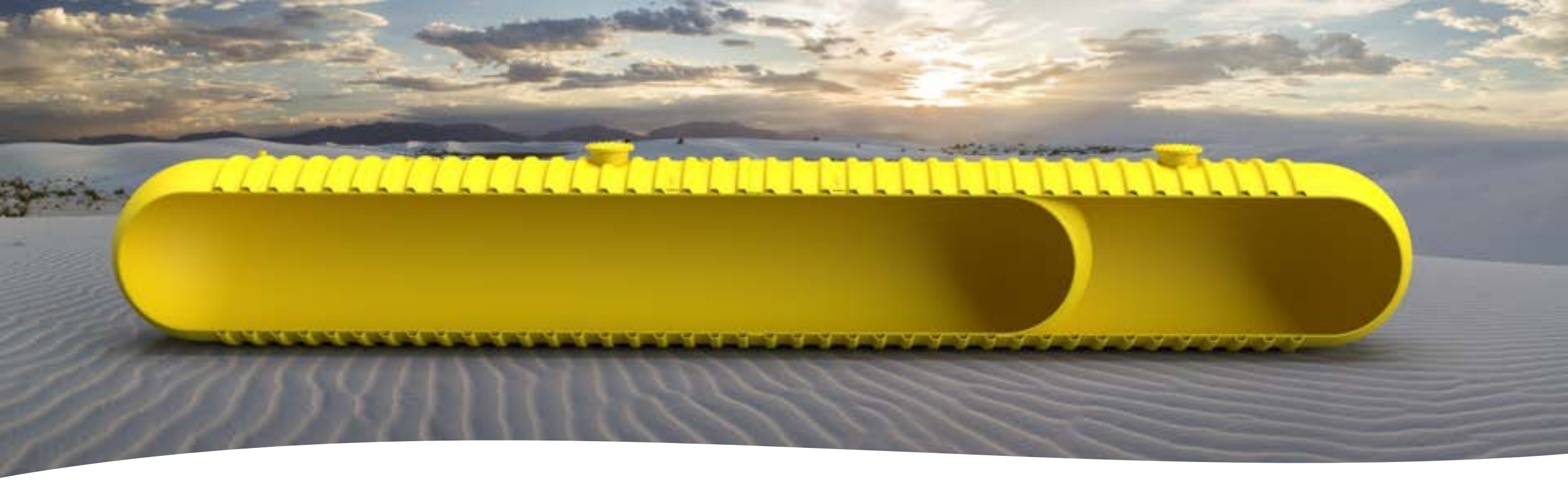
Testing Single Walled Tank(s)

- Comply with Requirements Set in Section 4.0 of IM.
- Connect “Tank Test Manifold” to a tank threaded coupling.
- Connect the pressure source to the “Tank Test Manifold”.
- Pressurize tank to 1 [psig].
- Close the air supply valve (see Figure 5).
- Remove air supply.
- Monitor the pressure reading for 30 minutes for any loss in pressure from the initial reading.
- While under pressure, cover tank outer surface, including fittings and manways, with soap solution and inspect for leakage.
- After completing air test, vent/release pressure.

Testing Double Walled Tank(s)
Dry Interstitial

Remove the manufacturer's supplied "Annular Space Gauge and Valve" and do all of the following:

- Release Vacuum Pressure; Install contractor fabricated interstice test manifold; refer to section 4.3.
- Slowly pressurize the primary to 5 [psig], hold for one hour.
- Bleed over to the interstice from the primary to 5 [psig]
- Soak and visually inspect tank exterior; and monitor the pressure reading for 60 minutes for any loss in pressure from the initial reading.
- While under pressure, cover the Tank outer surface, including fittings and manways, with soap solution and inspect for leakage.
- After completing the air test, vent/release pressure.



Multi-Compartment Tank(s) Testing

Each individual compartment, delineated by a common bulkhead, have a dedicated annular probe rib or monitoring reservoir for a brine tank. There is no shared communication, probe rib, etc. between each adjacent compartment.

- Each compartment shall be treated as an individual tank and inspected independently.
- Repeat Section 4.0 for all compartments until complete tank has passed the acceptance criteria.

Testing Double Wall Tank(s)
Wet Interstitial

- Pressurize primary to 5 psi.
- Monitor brine reservoir for active air bubbles when tank is pressurized.
- Monitor the pressure for one hour.
- Release air pressure.
- DO NOT transfer pressure to reservoir filled with monitoring fluid.
- If a tightness test is required after installation refer to the detailed Standing Pipe Test Procedure Test Form located in the back of Tank Installation Manual

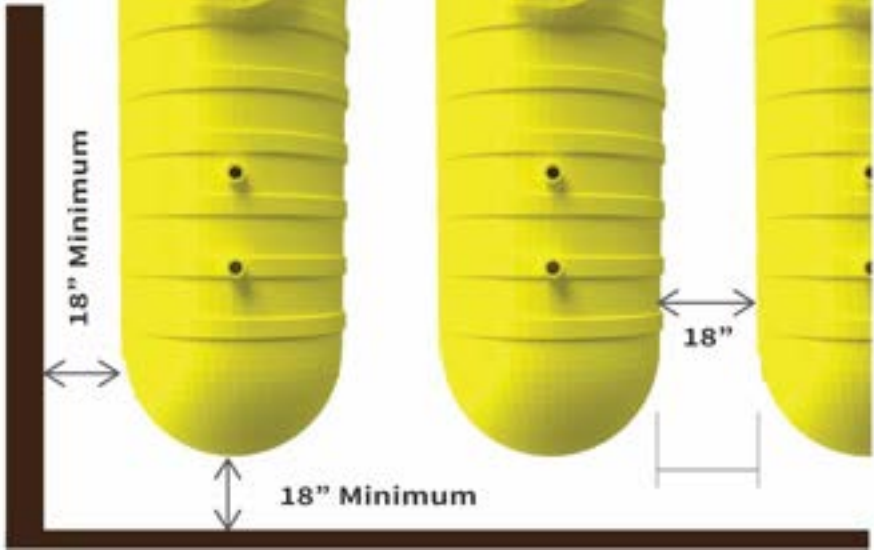
Tank Excavation & Clearance

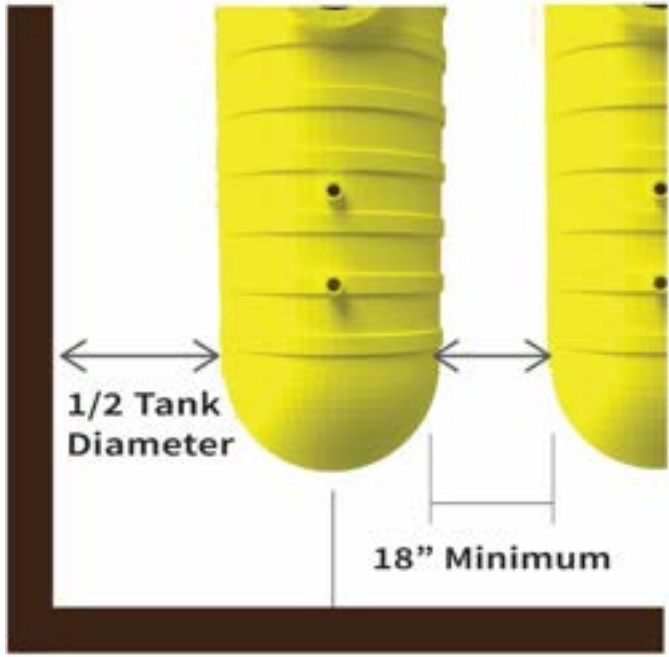
Backfill Requirements

- Always use approved pea gravel or crushed stone.
- Require sieve analysis from your backfill supplier.
- Alternative materials must be approved in writing by Technical Support prior to installation.

Tank Location & Spacing

- It is recommended that the tank owner seeks the advice of a local foundation professional engineer to determine the proper location of a tank excavation near any existing buildings or structures.
- Unstable soil conditions require that the tank(s) be spaced a minimum of ½ of the tank diameter between the excavation wall and the tank sides and endcaps.
- Stable soil conditions require spacing of 18” between the excavation wall and the tank sides and endcaps.
- If two tanks are installed in the same hole, allow for 18” spacing between tanks. If deadmen are used, space the tanks twice the width of the deadmen.





Unstable Excavation Examples

- Any soil that is naturally unstable
- Bog
- Peat Muck
- Quicksand
- Flowing Water
- Landfill
- Swamp
- Soft or highly Expansive Clay
- Underground Stream

Geotextile Fabric

To preserve the integrity of backfill material, it is recommended to utilize geotextile fabric when installing tanks. This is a particularly important step for:

- Areas with a high-water table or fluctuating ground water conditions.
- Areas with unstable native.
- Soil with less than 250 [lbs/ft2] cohesion or ultimate bearing capacity of less than 500 [lbs/ft2].
- When the split backfill method is being used, a layer of geotextile fabric must be installed between the primary and secondary backfill.

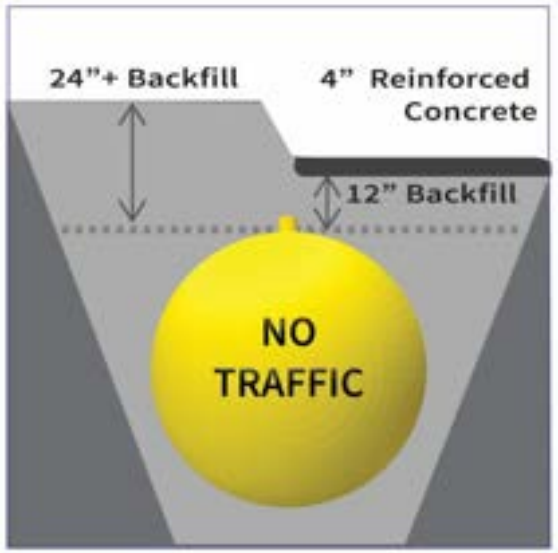
Burial Depth & Cover

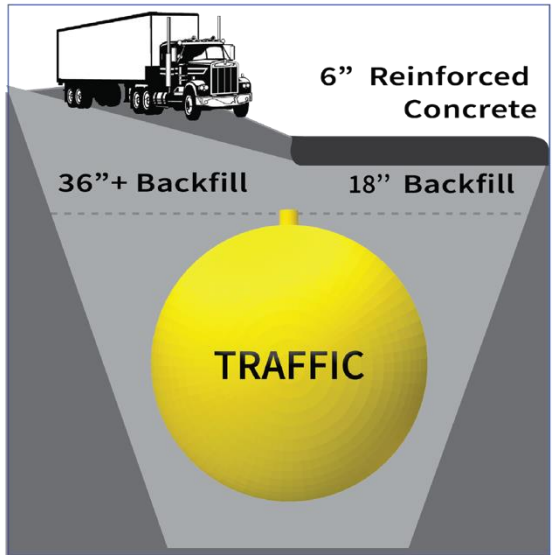
BURIAL DEPTH & COVER
8’ & 10’ Diameters

- The maximum burial depth for standard Tanks is 7’ from the Tank top to grade.
- Contact a representative to discuss available options. Local codes may have more stringent depth and type of cover requirements.
- If a traffic or surface pad is used, it must extend 12” beyond the Tank in all directions.
- Tanks with no traffic load must have a minimum of 24” backfill cover, or 12” backfill plus 4” Reinforced Concrete.
- Tanks with H20 traffic loads (32,000 lbs./axle) must have a minimum of 36” backfill cover, or 18” backfill plus 6” Reinforced Concrete, Reference Next Page.
- Inadequate depth and/or type of cover will void the Limited Warranty.

Depth and Type of Cover Minimum Requirements for Fuel Tanks	
NON-TRAFFIC OPTIONS	**TRAFFIC OPTIONS**
24” backfill	36” backfill
12” backfill + 4” reinforced concrete	18” backfill + 6” reinforced concrete
12” backfill + 6” asphalt	18” backfill + 8” asphalt

Traffic vs
No Traffic Burial
8’ & 10’ Diameters



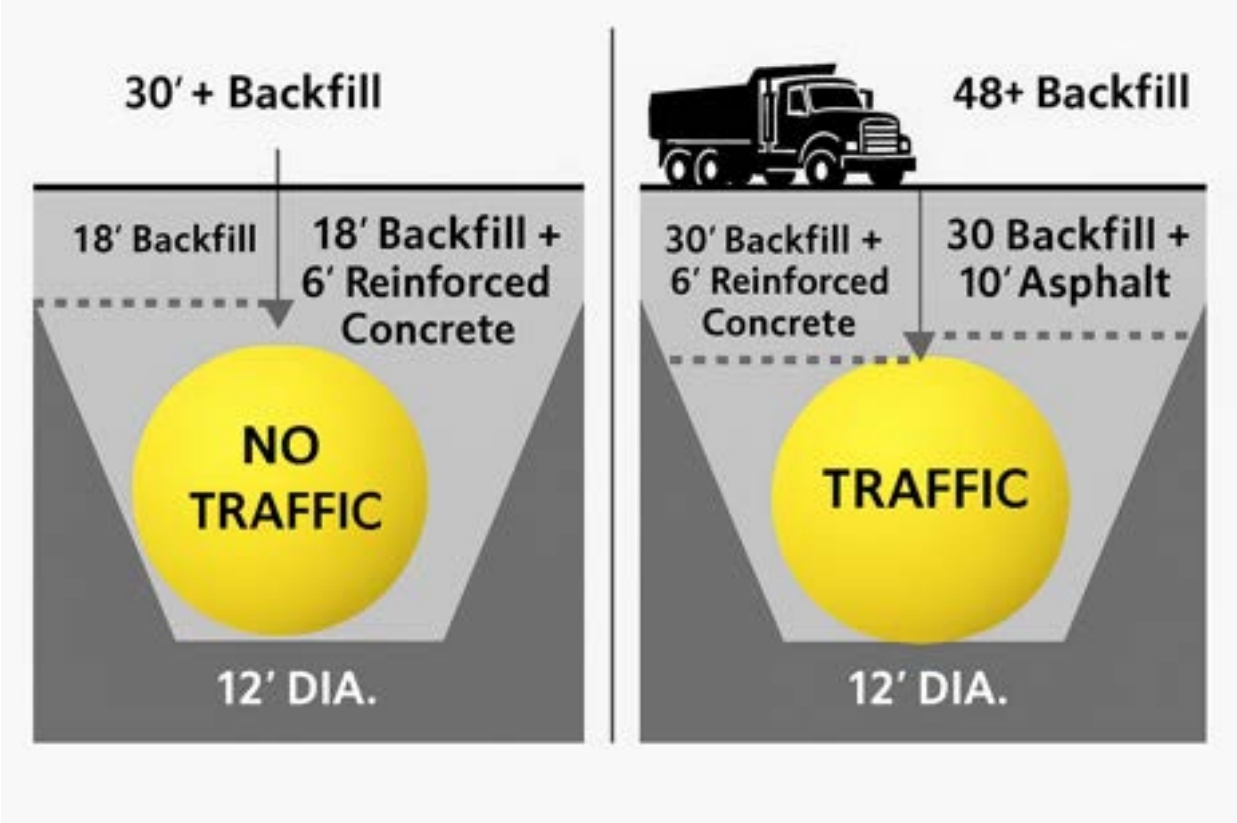


BURIAL DEPTH & COVER
12’ Diameter up to 60K Gal

- The maximum burial depth for standard Tanks is 7’ from the Tank top to grade.
- Contact a representative to discuss available options. Local codes may have more stringent depth and type of cover requirements.
- If a traffic or surface pad is used, it must extend 12” beyond the Tank in all directions.
- Tanks with no traffic load must have a minimum of 30” backfill cover, or 18” backfill plus 6” Reinforced Concrete.
- Tanks with H20 traffic loads (32,000 lbs./axle) must have a minimum of 48” backfill cover, or 18” backfill plus 6” Reinforced Concrete, Reference Next Page.
- Inadequate depth and/or type of cover will void the Limited Warranty.
- Burial requirements increase with tank size to address higher buoyant force and structural demands. See Appendix A in installation manual for anchoring guidelines.

Burial Depth Requirements – 12’ Diameter 60K Gallon Tank [Max]	
NON-TRAFFIC OPTIONS	**TRAFFIC OPTIONS**
30” Backfill	48” Backfill
18” Backfill + 6” Reinforced Concrete	30” Backfill + 6” Reinforced Concrete
18” Backfill + 8” Asphalt	30” Backfill + 10” Asphalt

Traffic vs
No Traffic Burial
12’ Diameter



Ballasting

Dry Hole: A Tank is not adequately protected against flotation until the Tank is fully backfilled to the final grade elevation with approved backfill material. See Appendix A (Anchor Charts) for minimum burial depths.

- Use caution to ensure the Tank does not completely fill during ballasting. Keep the Tank vented to prevent any pressurization of the tank when filling.
- Ensure the ballast will not contaminate the product being stored or clean the tank before product is added to the Tank. This is
- especially important for diesel exhaust fluid (DEF) Tanks.
- Dry Hole – Add ballast only after backfilling is placed at least 75% of the way up the Tank.
- Only under wet-hole conditions should the ballast be added before the backfill is 75% of the way up the Tank. For wet-hole
- conditions refer to Section 7.4.

Wet Hole: Follow all steps in the Dry Hole Installation section while taking caution to keep the water level in the excavation at the lowest level
possible by using submersible pumps. Ballast the Tank if ground water cannot be lowered.
The ballast level inside the Tank and in all compartments must be equal and not more than 12” above the ground water level outside of the Tank, see Figure 12.

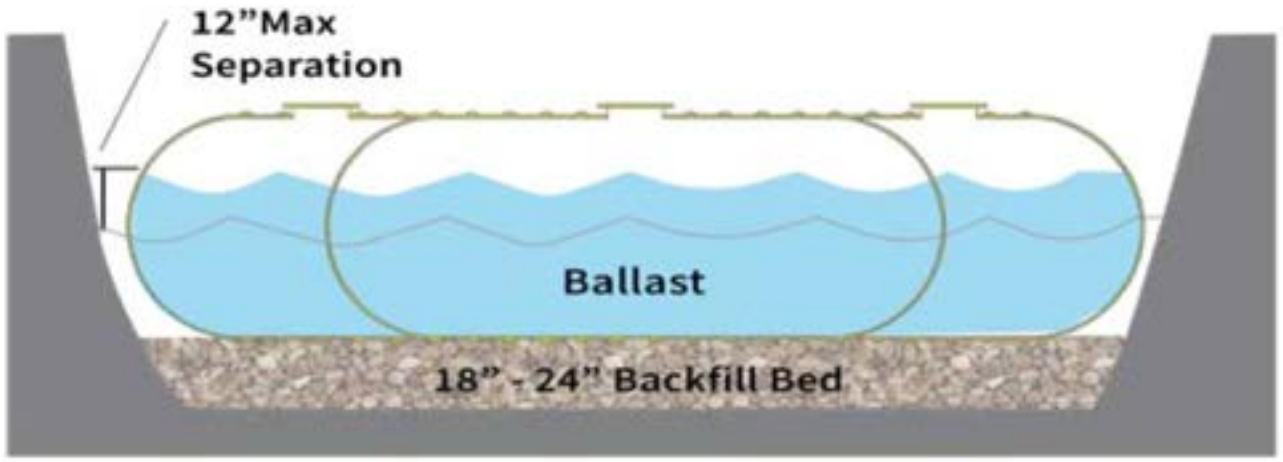


Figure 12: Ballast v. Ground Water Level

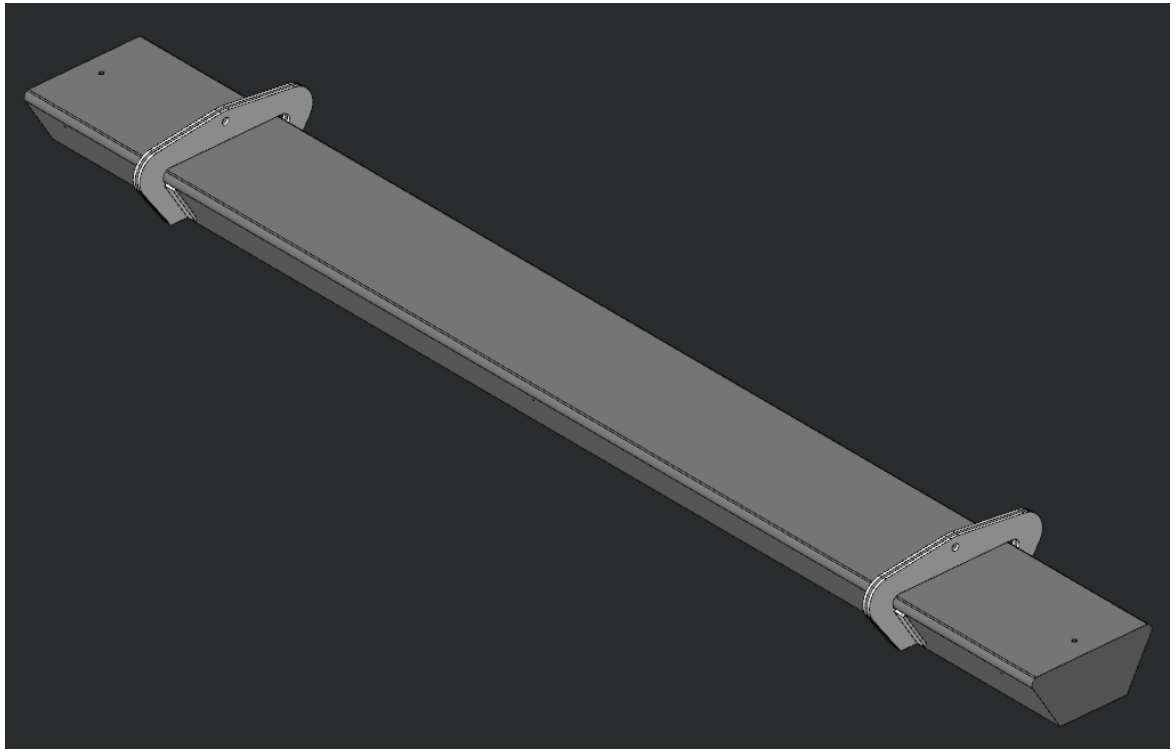
New Deadman Installation Instructions

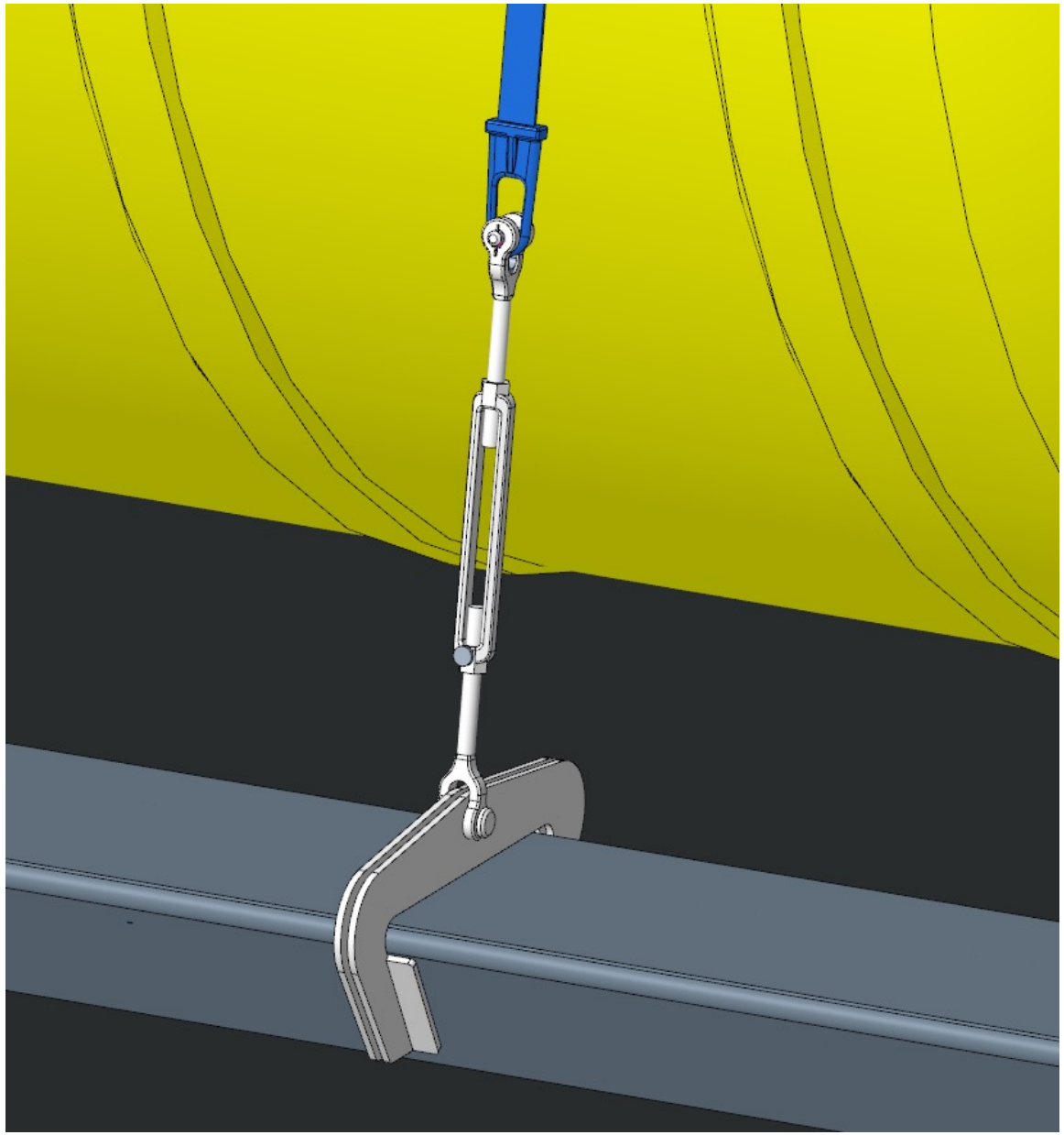
June 1, 2026

NATIONWIDE TANKS by HESS SERVICES, INC.

Innovative Adjustable Design for Ease of Installation

- Full-length adjustability for anchor/strap placement
- Turnbuckles connect directly to galvanized anchor
- No shackles needed
- Plasma cut, welded, & hot dip galvanized anchoring fixtures, PE Certified



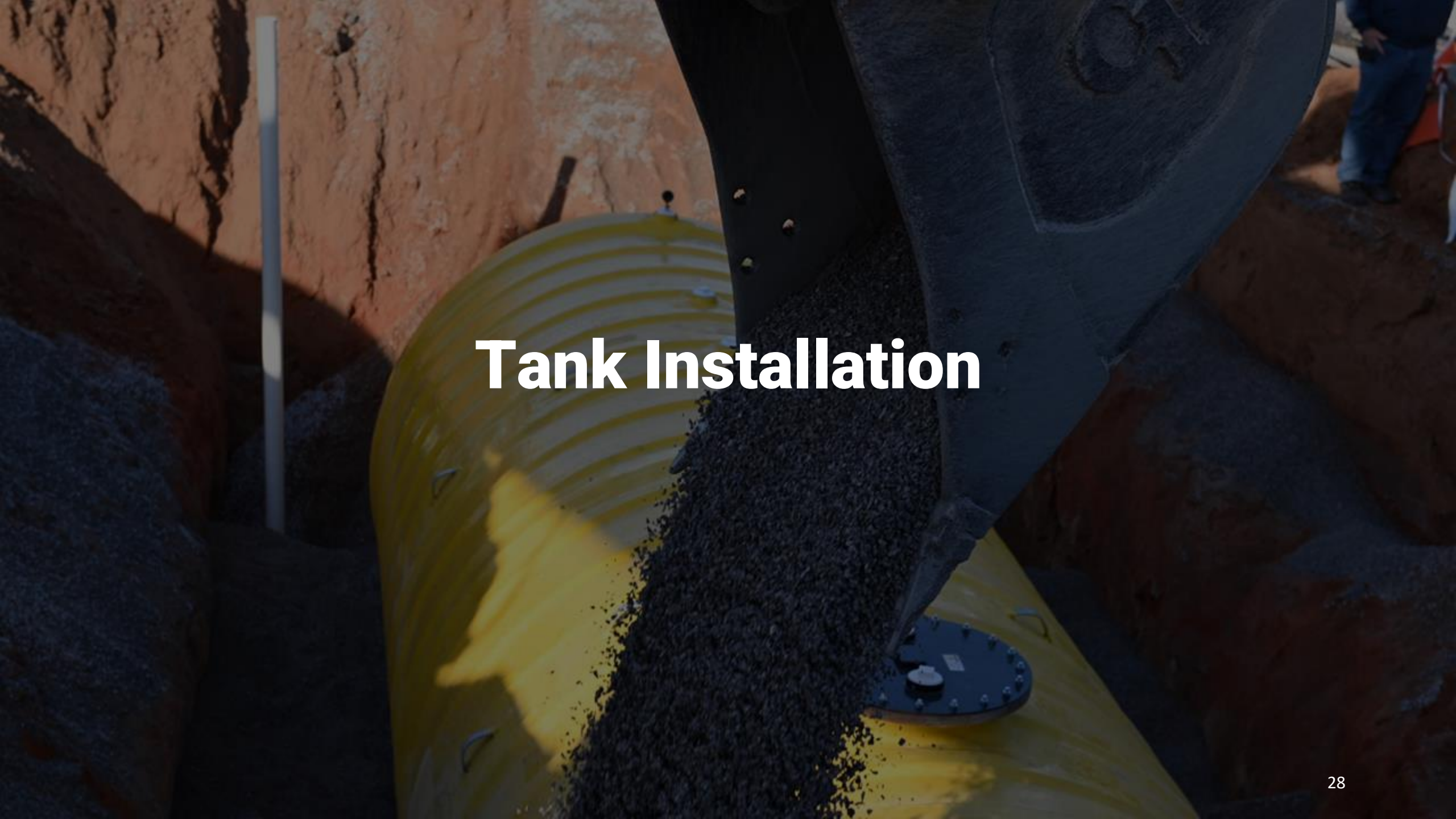


Deadman Lifting Guidelines

- Slide two anchoring fixtures onto the deadman.
- Attach 3/4” screw pin shackles (Ø7/8” pin) or equivalent (not provided by Nationwide)
- Center fixtures lengthwise 5’ apart. Use a two-leg sling with 10’ reach. Sling angle approximately 75°.
- Fixtures may be placed further apart if a longer sling is used to maintain at least a 60° sling angle. Keep fixtures centered and at least 3’ from each end of the deadman.
- A spreader beam may be used with slings oriented vertically. Keep fixtures centered and at least 3’ from each end of the deadman.
- Do not lift with fixtures uncentered or less than 5’ apart.
- A forklift may also be used. Spread forks as wide as possible and lift in the center of the deadman.

Benefits to Installers

- Vertically integrated: precast concrete deadmen & steel anchoring fixtures manufactured in our Hays, KS facility.
- Eliminates supply chain issues and ensures quality.
- Deadman are easily lifted with sliding anchoring fixtures via two evenly spaced pick points.
- Once deadman positioned in the hole, the anchors are easily moved to appropriate strap position.
- Deadman design aligns with industry standard turnbuckles and fiberglass straps.



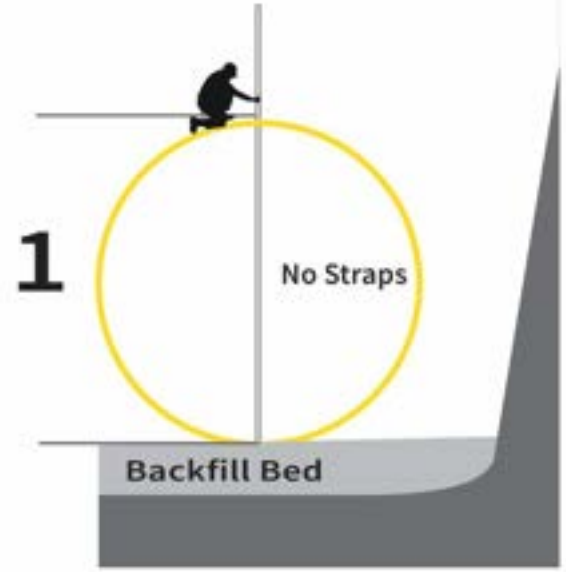
Tank Installation

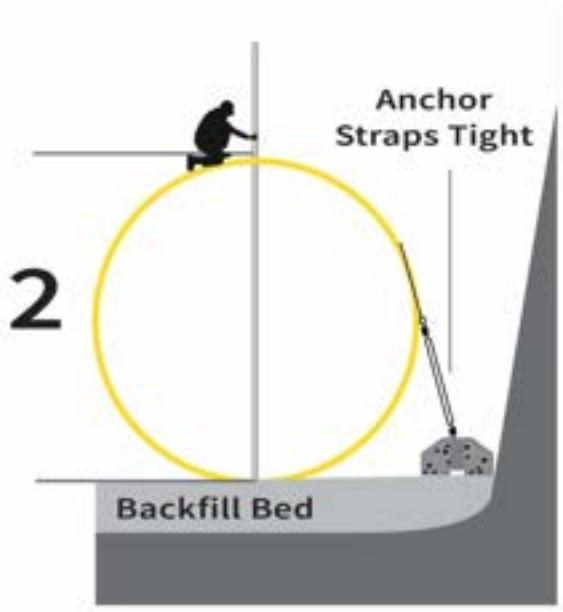
Tank Vertical Diameter Measurements Pt1

Over-Deflection of the tank may result in damage to the tank. Vertical diameter measurements are taken to determine the tank's deflection. The maximum tolerances are as follows:

- 8' tank – 1.25"
- 10' tank – 1.5"
- 12' tank – 1.625"

If at any point the deflection measurements exceed the tolerance, this indicates an improper installation. Stop the installation, and contact Nationwide Technical Support when taking corrective action is needed.

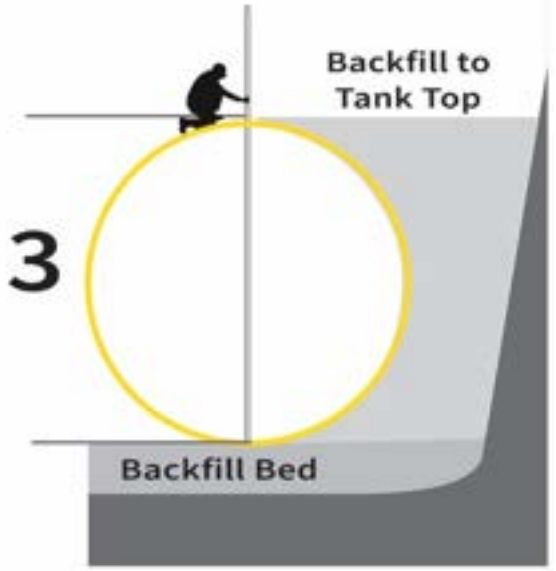


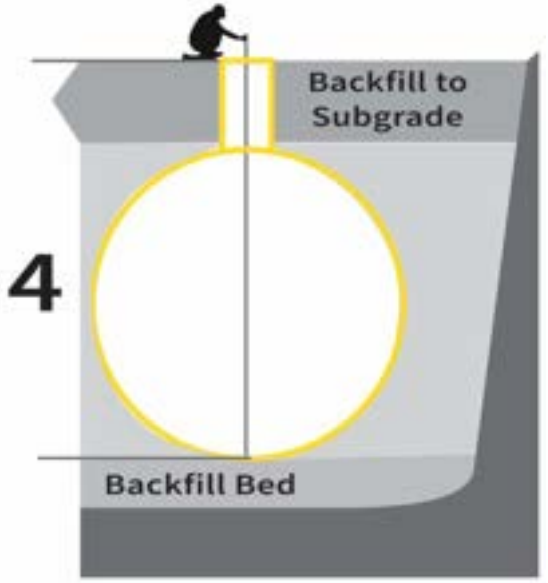


Tank Vertical Diameter Measurements Pt2

Vertical diameter measurements must be taken and recorded on the Tank Installation Checklist after each of the following steps:

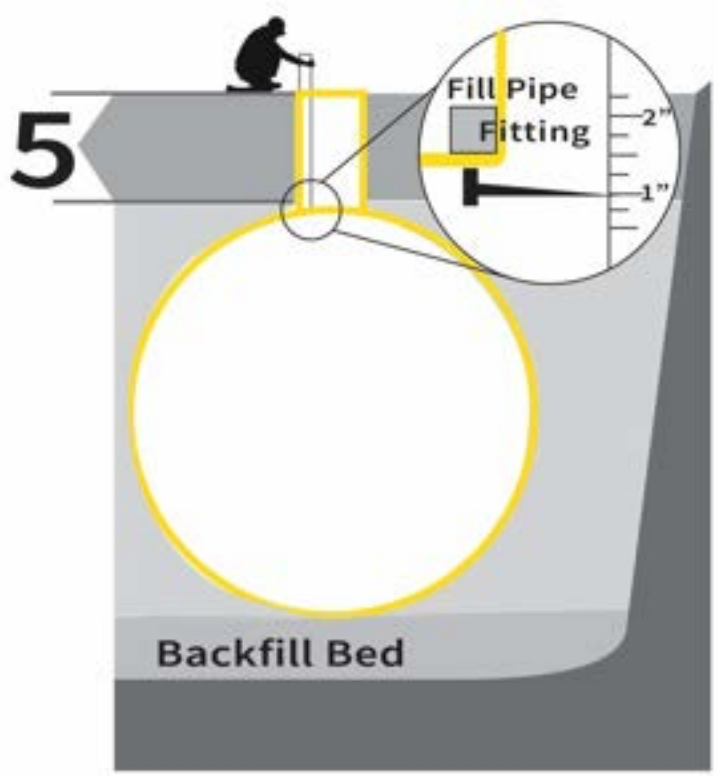
- Take diameter measurement at the centermost location of the tank or compartment.
- First Vertical Diameter Measurement – Placement of tank on backfill bed.
- Second Vertical Diameter Measurement – Anchoring completed (if applicable).
- Third Vertical Diameter Measurement – Backfill to tank top.
- Fourth and Fifth Vertical Diameter Measurements – Backfill to subgrade, before the concrete pad.
- Vertical diameter measurements must be recorded for each tank compartment.





Tank Vertical Diameter Measurements Pt3

- The inner diameter deflection is calculated using the “Fourth Vertical Diameter Measurement” and “Fifth Vertical Diameter Measurement”. Refer to Figure.
- This measurement is taken by driving a nail into the 1” point at a right angle to the gauge stick.
- Lower the gauge stick down the fill pipe far enough to extend below the bottom of the fitting.
- Lift the gauge stick until the nail catches on the lip of the fitting.
- Read the measurement at the top of the fill pipe.
- Subtract 1” to allow for the point where the nail is in the gauge stick.

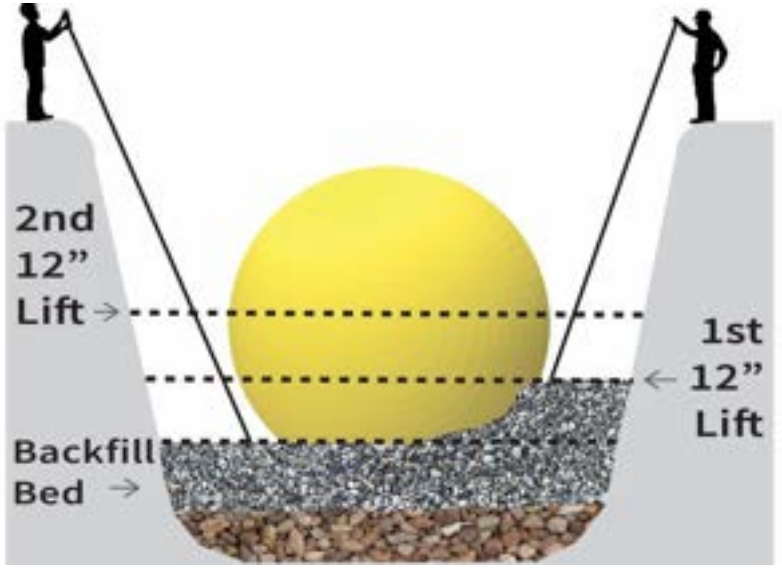


Dry Hole Installation

- Place tank in the excavation with lifting cables attached to lifting lugs provided on the tank. Maintain control of the tank with guide ropes.
- Set tank directly on backfill bed and take the First Vertical Diameter Measurement and record on the Tank Installation Checklist, see Figure 14.
- If mechanical anchoring is used, after anchoring is completed, take the Second Vertical Diameter Measurement, see Figure 14.
- If this measurement is not equal tolerances listed in 7.2, loosen the anchor straps and re-measure.

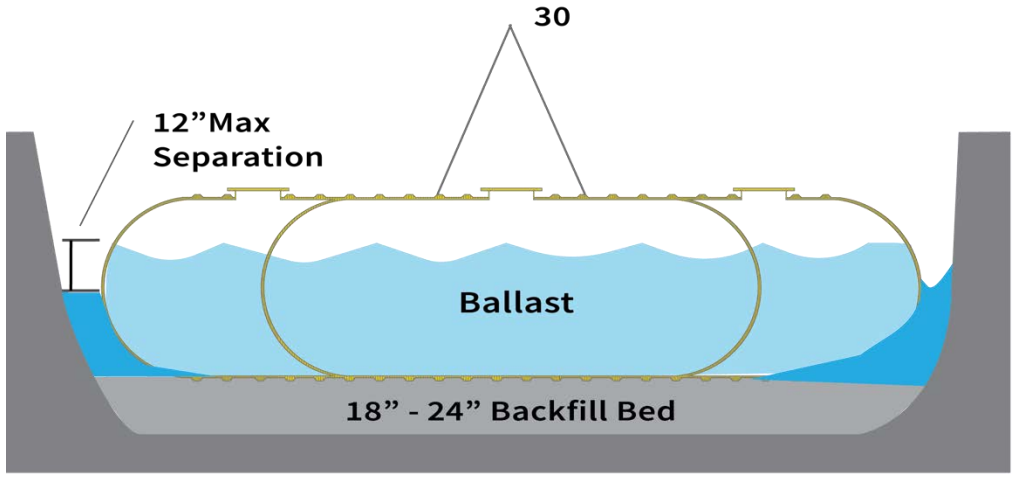
Dry Hole Installation Pt2

- Place the first 12” of approved backfill evenly around the tank. Push the backfill in place by using a non-metal tamping rod that is long enough to reach beneath the tank bottom.
- Work the backfill under the entire length of the tank, dome ends, and ribs eliminating all voids so that the tank is fully supported. Take care to not strike the tank with the probe or tank damage may occur.
- Repeat this process with a second lift of 12” backfill.
- After the second lift of backfill has been worked under the tank, between the 5 – 7 O’clock position, backfill can be brought to top with no additional handwork.



Wet Hole Installation

- Follow all steps in the Dry Hole Installation section while taking caution to keep the water level in the excavation at the lowest level possible by using submersible pumps. Ballast the tank if ground water cannot be lowered.
- Ballast level inside the tank and in all compartments should be equal and not more thank 12” above the ground water level outside the tank, see Figure 13.



Additional Information

Internal & External Piping

Internal piping must terminate at least 4” from the Tank bottom to allow for Tank deflection. External piping must be isolated from the concrete pad.

Venting Tanks

Tanks are designed to operate at atmospheric pressure, except for use with a vapor recovery system. The venting system must be designed so that pressure or vacuum at the Tank top will not exceed 1 psig. during normal operation, filling, and emptying.

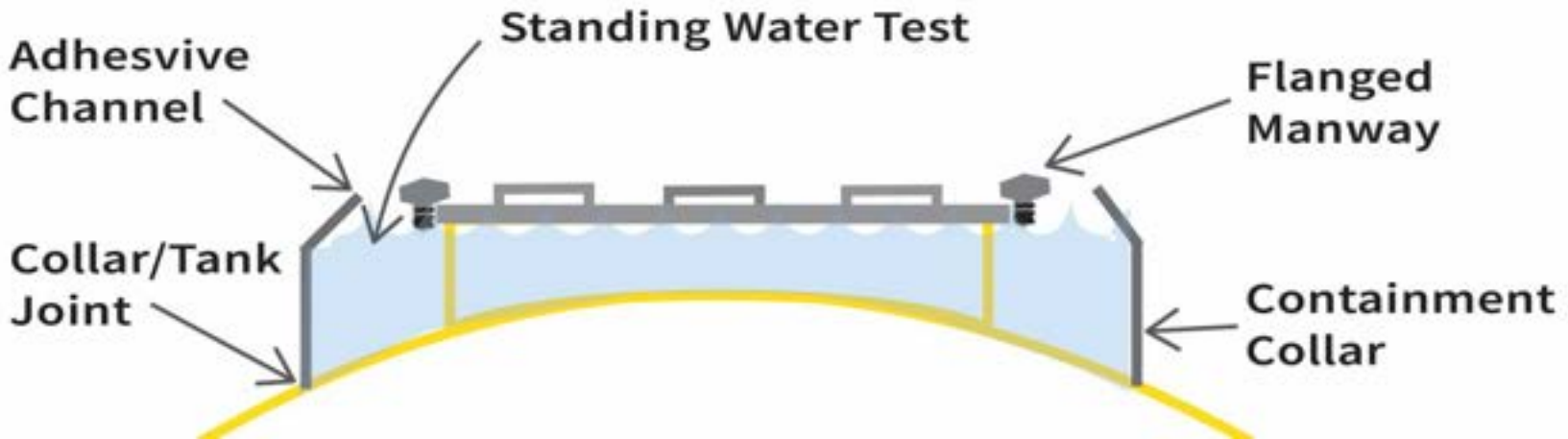
Installing Containment Sumps, Collars & Risers

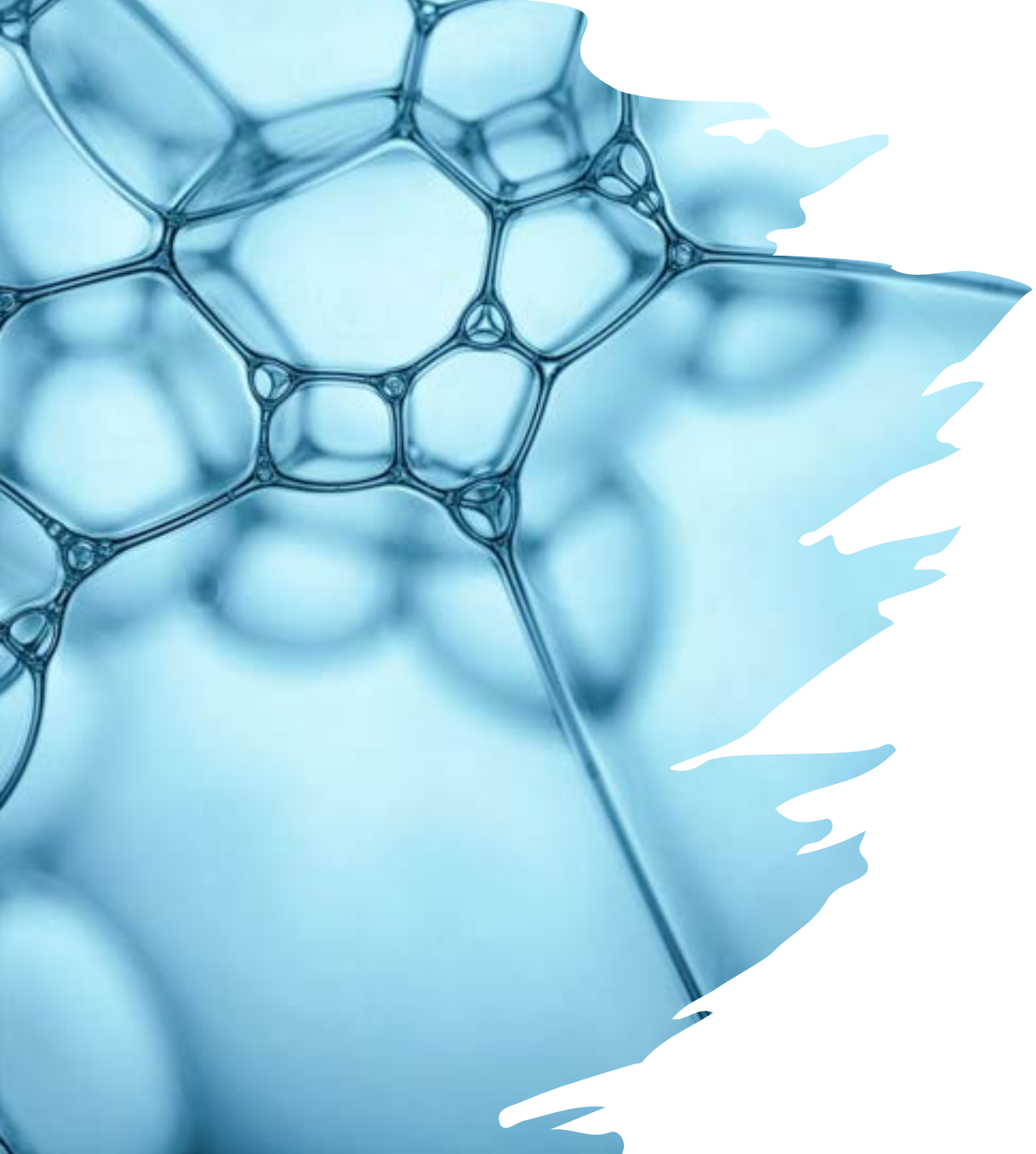
NWT offers sump kits in a variety of models and sizes that are designed for field installation. Instructions for the various models can be found in supplemental materials.

Collar Test Instructions

Before sump assembly, the containment collars must be leak tested.

- ✓ Place and secure measuring stick with 1/16” (0.0626”) increments in the sump to measure any changes in the liquid level.
- ✓ Fill collar with water to the highest point and wait 20 minutes.
- ✓ Record the liquid level.
- ✓ Wait a minimum of one hour.
- ✓ Re-measure the liquid level. A liquid change of more than 1/8” (0.125”) indicates a possible leak.
- ✓ Visually inspect the collar connection to the Tank wall and adhesive channel joint for leaks.
- ✓ Test liquids must be disposed of properly.





Interstitial Space Monitoring

MONITORING TANKS WITH A DRY INTERSTITIAL

Always consult with the monitoring equipment manufacturer regarding proper sensor installation, servicing and use instructions. Consult with all applicable governmental authorities regarding required inspections and other sensor-related requirements.

- ✓ The maximum vacuum for continuous monitoring is -1 psig. Utilize an approved vacuum monitoring system with a vacuum make-up pump.
- ✓ The maximum pressure for continuous monitoring is +1 psig. Utilize an approved pressure monitoring system with a pressure make-up pump. Ensure the system is designed to prevent pressure from exceeding +1 psig or Tank damage may occur.

Brine System Installation

Hydrostatic Pressure

Purpose

This section provides technical guidance for installers, inspectors, trainers, and engineers regarding hydrostatic pressure in brine-filled interstitial spaces for double-wall tanks.

Brine fill height must be controlled. Installers must not add pipe extensions, standpipes, risers, funnels, or elevated fill columns to check the top collar unless specifically authorized by the tank manufacturer.

Training takeaway

Brine height equals pressure. Every added foot matters.

Key Design Parameters

System limits

- Maximum allowable interstitial pressure: 5.25 psi
- Brine specific gravity: 1.10 SG
- Maximum allowable brine column height: 11 ft

These values are directly related. At 1.10 SG, an 11 ft brine column produces approximately 5.24 psi of hydrostatic pressure, which is essentially equal to the 5.25 psi maximum tank interstitial pressure rating.

11 ft = 5.24 psi

Hydrostatic Pressure Formula

Hydrostatic pressure is caused by the weight of liquid above a given point. The pressure at the bottom of the liquid column depends on the height of the liquid column and the density of the liquid.

$$P = 0.433 \times SG \times H$$

Where:

- P = hydrostatic pressure, in psi
- 0.433 = pressure produced by 1 ft of water, in psi/ft
- SG = specific gravity of the brine
- H = vertical height of liquid column, in ft

Pressure Per Foot 1.10 SG Brine

Calculation

Pressure per foot = 0.433 x 1.10

Pressure per foot = 0.4763 psi/ft

Rounded for field use, 1.10 SG brine adds approximately 0.476 psi for every 1 ft of vertical head.

Every additional foot of brine height increases interstitial pressure by nearly one-half psi.

Every added foot matters.

Maximum 11 ft Head Calculation

Formula

$$P = 0.433 \times SG \times H$$

Substitute values

$$P = 0.433 \times 1.10 \times 11$$

Step 1

$$0.433 \times 1.10 = 0.4763 \text{ psi/ft}$$

Step 2

$$0.4763 \times 11 = 5.2393 \text{ psi}$$

Rounded result

$P = 5.24$ psi

Because the maximum allowable pressure is 5.25 psi,
the 11 ft maximum head is already at the allowable limit.

Pressure at Common Heights

Brine Column Height	Calculation	Approx. Pressure
1 ft	0.476 x 1	0.48 psi
2 ft	0.476 x 2	0.95 psi
3 ft	0.476 x 3	1.43 psi
4 ft	0.476 x 4	1.90 psi
5 ft	0.476 x 5	2.38 psi
6 ft	0.476 x 6	2.86 psi
7 ft	0.476 x 7	3.33 psi
8 ft	0.476 x 8	3.81 psi
9 ft	0.476 x 9	4.29 psi
10 ft	0.476 x 10	4.76 psi
10.5 ft	0.476 x 10.5	5.00 psi
11 ft	0.476 x 11	5.24 psi
12 ft	0.476 x 12	5.72 psi
13 ft	0.476 x 13	6.19 psi
14 ft	0.476 x 14	6.67 psi
15 ft	0.476 x 15	7.14 psi

4 ft Pipe Extension Not Allowed

A common field mistake is adding a temporary or permanent pipe extension to the brine fill point to raise the liquid level and verify flow, fill, or brine presence at the top collar.

This must not be done because the added pipe increases the vertical liquid column height and therefore increases pressure inside the interstitial space.

Example: Existing 11 ft head plus 4 ft extension

11 ft + 4 ft = 15 ft total brine column height

P = 0.433 x 1.10 x 15 = 7.14 psi

This exceeds the 5.25 psi maximum allowable pressure.

Percent Overpressure

Maximum allowable interstitial pressure

5.25 psi

Pressure with 15 ft total head

7.14 psi

Amount over rating

7.14 psi - 5.25 psi = 1.89 psi

Percent over rating

1.89 / 5.25 = 0.36 = 36%

A 4 ft extension can create pressure approximately 36% above the tank rating.

Why This Matters

The interstitial space is designed for leak detection and secondary containment under controlled hydrostatic conditions. It is not intended to be used as a high-pressure vessel.

Exceeding the interstitial pressure rating can:

- overstress the tank wall or interstitial structure
- affect the bond between tank components
- distort or damage monitoring components
- create false monitoring conditions
- reduce long-term reliability
- compromise manufacturer installation requirements
- void warranty coverage or result in nonconforming installation

Installer Requirements

Required

Use only manufacturer-approved brine fill procedures.

Use only the approved brine specific gravity.

Maintain brine column height at or below 11 ft.

Verify vertical elevation difference before filling.

Confirm maximum brine fill height from drawings or manufacturer instructions.

Prohibited

- Do not add temporary or permanent pipe extensions.
- Do not install standpipes or risers that increase brine column height.
- Do not use funnels, elevated fill containers, or temporary columns to force brine into the interstice.
- Do not overfill to check the top collar.
- Do not pressurize above the manufacturer rating.

WARNING

Interstitial Overpressurization Hazard

The interstitial space is pressure-limited. Do not add pipe extensions, standpipes, risers, funnels, or elevated fill columns to the brine fill point.

For 1.10 SG brine, each additional foot of brine height adds approximately 0.476 psi to the interstitial space.

At the maximum approved brine column height of 11 ft, the interstitial pressure is approximately 5.24 psi. This is essentially equal to the maximum allowable pressure of 5.25 psi.

Adding a 4 ft pipe extension increases total brine column height to 15 ft and creates approximately 7.14 psi. This exceeds the maximum allowable pressure by approximately 1.89 psi, or 36%.

Do not use added pipe height to check the top collar or force brine into the interstitial space.

Recommended Training Message

Brine height equals pressure.

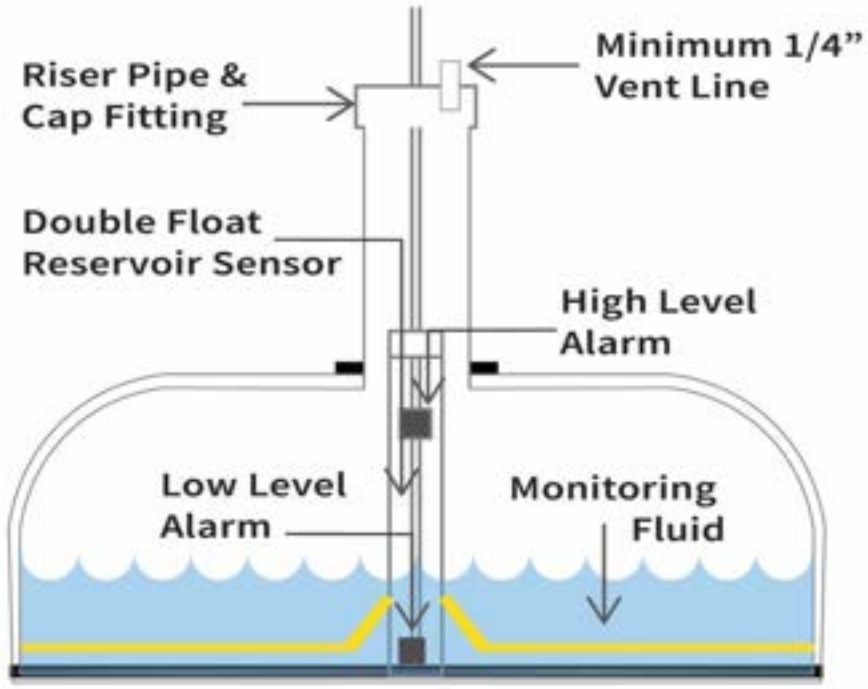
Every added foot matters.

- 1 extra ft adds about 0.48 psi
- 2 extra ft adds about 0.95 psi
- 3 extra ft adds about 1.43 psi
- 4 extra ft adds about 1.90 psi

Because the approved 11 ft head already produces approximately 5.24 psi, installers must treat 11 ft as the maximum allowable height. Adding a 4 ft pipe extension is not a harmless check.

Strict control of brine fill height is required.

Interstitial Space Monitoring Pt. 2



HYDROSTATIC MONITORING

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.
- ✓ Vent the annular space with a minimum ¼" hole at the riser top.
- ✓ When installing a double float sensor, the bottom of the sensor must be in contact with the Tank top.
- ✓ 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 Tank has been placed in the excavation and backfilled to the Tank top.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