

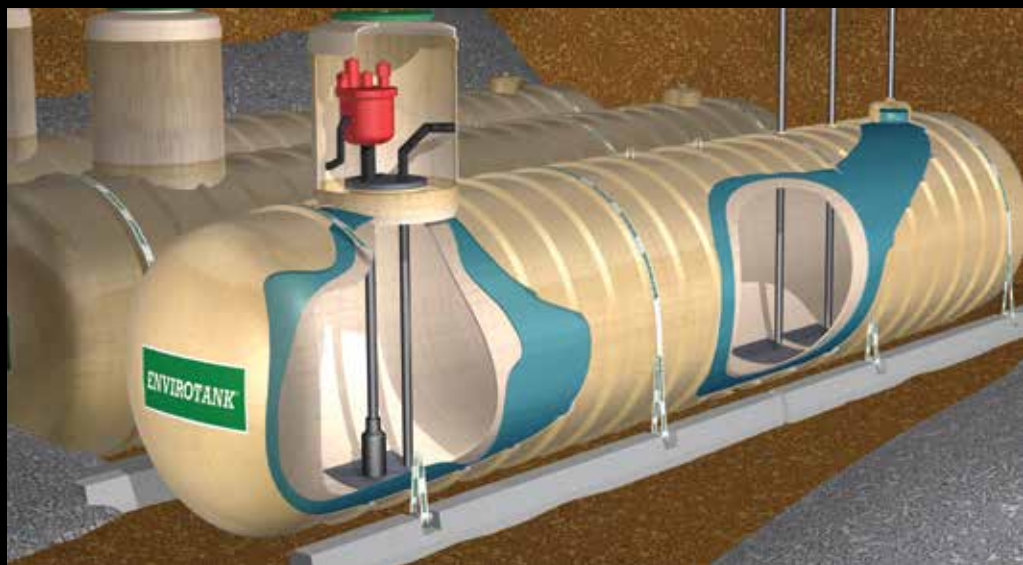
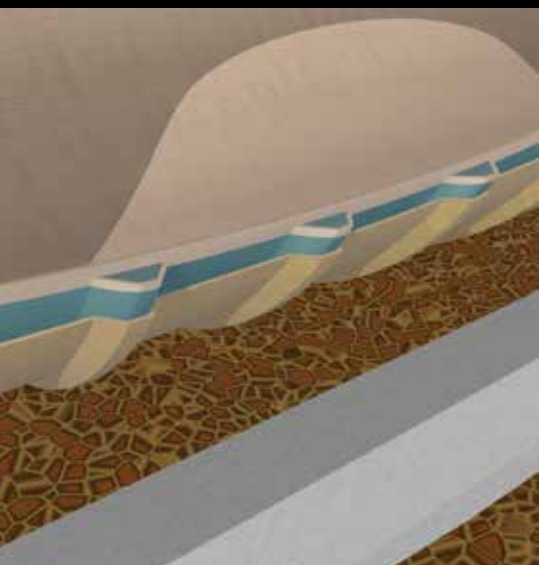
FIBREGLASS UNDERGROUND STORAGE TANKS



**ENVIROTANK**

# Installation Instructions For Petroleum Storage Tanks

PUBLICATION NO. INST INS 02

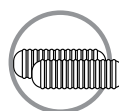


**Tank Technical Support**

Auckland, New Zealand  
(64) 9 573 0548

Melbourne, Australia  
1800 818 354 (61) 3 9550 0800

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**ENVIROTANK**



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## INTRODUCTION

The purpose of this manual is to provide consultants, fuel system designers, owners, installation contractors and their employees with detailed instructions for the proper installation of Single-Wall and Double-Wall Fibreglass Underground Storage Tanks and related accessories.

Tank installation is a very specialized business. If you do not have the proper experience and you have not completed and passed the Envirotank Approved Installer program in the last 24 months, please contact Envirotank for a list of approved contractors or further information.

Proper installation is required to assure the long-term performance of Envirotank Underground Storage Tanks.

These instructions must be followed.

## SAFETY

These Instructions must not be interpreted in anyway that could put any persons health at risk, or could harm property and/or the environment.

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

### WARNING

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

### 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.
- Prevent tank damage and/or failure, which could lead to product loss and environmental contamination.
- Validate the tank structural warranty.

## IMPORTANT REMINDERS

- In addition to these instructions the installation must comply with AS1940, AS1692 & AS4897 and relevant OH&S regulations and all applicable Federal, State and Local safety, construction and environmental laws, regulations, codes and/or guidelines.
- Any variances or deviations to these installation instructions must be approved by Envirotank in writing prior to the tank installation.
- These instructions provide the minimum requirements for the successful and safe installation of a fibreglass underground storage tank under normal conditions. Envirotank does not design or engineer the actual installation. The tank owner's UPSS designer/engineer of record for the installation can exceed these minimum requirements and is responsible for the design and installation of the UPSS.

- The presence of an Envirotank representative at the jobsite does not relieve the designer, owner or installation contractor of their responsibility to follow the published installation instructions.

### TANK WARRANTY ACTIVATION

- In order to activate the tank's structural warranty, the tank installation must be performed by an Approved Installation Contractor.
- These instructions must be followed.
- The Envirotank installation validation checklist (INST CK02) must be correctly completed by the approved installer and witnessed by the tank owner's representative.
- A copy of the installation validation checklist, these instructions and any other correspondence must be maintained by both the approved installation contractor and tank owner to validate any future warranty claim.

### BEFORE YOU BEGIN

- Check with the tank owner/UPSS Designer that all the supporting documentation and drawings are correct.
- If you have questions regarding tank modifications, such as adding fittings or manways or tank repair, contact Envirotank prior to purchasing the tanks.
- Check with the Local authorities for building codes, underground utilities locations\ dial before you dig and environmental conditions have been completed.
- Read, understand and follow these instructions.
- Be an Approved Envirotank Installer.
- If you have installation questions or need alternative installation methods, contact Envirotank before proceeding.


- Review and prepare to complete the installation validation checklist.
- Barricade the tank area to prevent unauthorised access and any vehicle travel over the tanks until installation is complete.

### IMPORTANT TELEPHONE NUMBERS


Envirotank Australia	1800 818 354 or (+61 3) 9550 0800
Envirotank New Zealand	(+64 9) 573 0548

### ADDITIONAL INFORMATION SOURCES

[www.envirotank.com.au](http://www.envirotank.com.au)  
[www.envirotank.co.nz](http://www.envirotank.co.nz)


**WARNING**


Do not enter tank or sumps unless all appropriate OH&S regulations and permits for confined space entry have been completed. Failure to follow OH&S requirements could result in death or serious injury.



**ASPHYXIATION**



**FIRE**



**EXPLOSION**



## A. HANDLING AND PREPARATION

### ⚠ WARNING

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

### ⚠ WARNING

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

- Ensure lifting equipment is rated to handle the load before lifting. Tank weight is noted on the tank.
- The tank owner or their representative is responsible for rigging, unloading and securing the tank on site.
- All tanks must be mechanically unloaded under the direction of a suitably qualified person.
- Complete the delivery checklist (DEL CK02) provided prior to unloading tanks.
- Upon tank delivery and when lifting the tank, visually inspect the entire surface of the tank for shipping or handling damage. If the tank has a wet annular (interstitial) space, inspect for monitoring fluid (Hydroguard®) on the exterior surface.
- The tank owner or their representative is responsible for making sure the tank is secured by a suitably qualified person before removing the shipping straps, so that the tank does not roll off the truck / trailer.

For temporary storage of tanks on site:

- Set on smooth ground (no protruding rocks, or hard objects) or on the shipping pads, orientated to allow for tank rotation that may be required.
- Chock tanks with sandbags to prevent rolling.
- 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.

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 the ground during rotation or placement.
- Do not drop tank.

### LIFTING TANKS

To lift the tank, always use all of the lifting lugs provided on the tank. Apply equal tension to all the lifting lugs simultaneously. There may be different orientations or numbers of lifting lugs on tanks, always identify the number of lifting lugs and use them all.

While lifting steady and guide the tank using the provided guidelines.

Only use appropriate lifting equipment to lift and move tanks. The capacity of lifting equipment must be checked before lifting and moving tanks. Only suitably qualified persons should supervise, connect and lift tanks.

Figure A-1

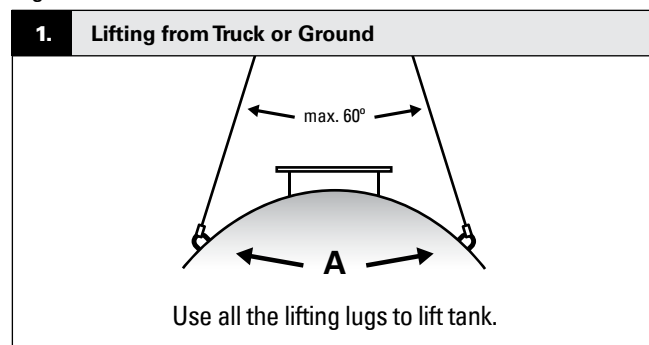
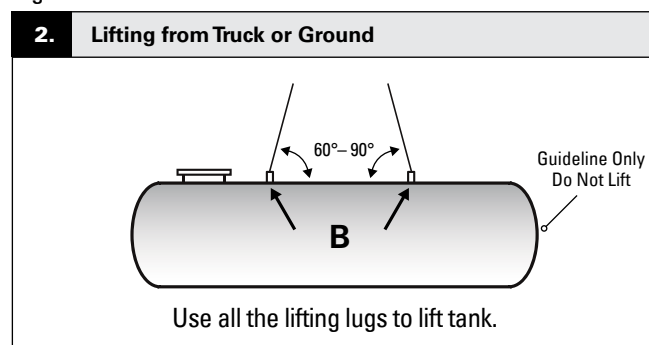


Figure A-2



## LIFTING ENVIROTANK DEADMAN ANCHORS

### ⚠ WARNING

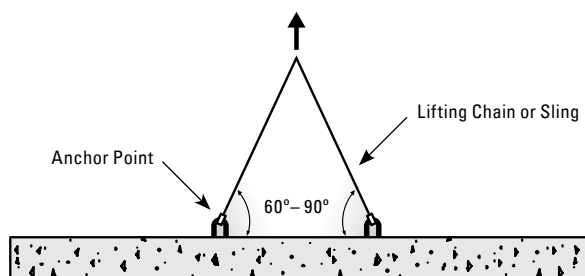
Use the anchor points only when lifting and positioning Envirotank deadman. Failure to do so could result in death or serious injury.

- Ensure lifting equipment is rated to handle the load before lifting. For deadman anchor weight estimates use the following table to work out individual deadman anchor weights.

Deadman Anchor Weight Approximations	
300 x 300 Blocks	450 x 300 Blocks
250 kgs per lineal metre	350 kgs per lineal metre

- The deadman anchor type, lengths and number of anchor points are dependant on the tank diameter, model and capacity.
- Lift deadman anchors using a minimum of two equally spaced anchors points.
- The angle from the deadman to the lifting equipment should always be between 60° and 90° (see Figure A-3).

Figure A-3



- Refer to Section G of these instructions for additional information.

## LIFTING ENVIROTANK TANK CONTAINMENT SUMPS AND COMPONENTS

- Visually inspect the sumps and components for shipping damage. If damage found, contact Envirotank.
- When handling sumps always wear gloves.
- Do not roll, drop or bounce.
- Set on smooth level surface.
- The sumps must be stored / secured to prevent damage from high winds.
- Refer to Section N of these instructions for additional information on tank containment sumps.

B. BED AND BACKFILL

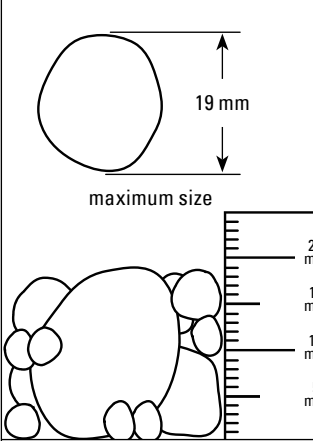
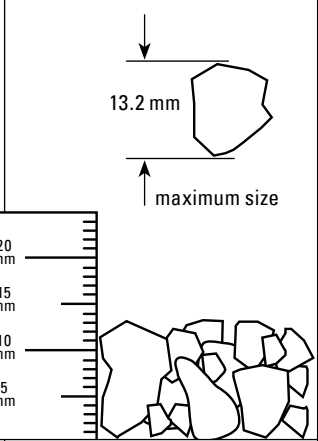
CAUTION

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 NATIVE SOIL.*
- *DO NOT BACKFILL TANK WITH NATIVE SOIL ALWAYS USE APPROVED BACKFILL.*
- Replace all excavated native soil with approved backfill of proper size and grading.
- Only use backfill that meets (Australia) AS2758 and AS1141.11 or equivalent standards requirements for quality and soundness for the material detailed in Figure B-1.
- Require your backfill supplier to certify, with a sieve analysis document, that the backfill meets this specification.
- Sieve analysis documents must be attached to the tank installation checklist.
- Use only approved naturally rounded gravel or crushed stone for the tank bed and backfill (see Figure B-1).

Figure B-1

NATURALLY ROUNDED GRAVEL	CRUSHED STONE
	
<p><b>Naturally Rounded Gravel:</b></p> <p>Clean naturally-rounded aggregate with particle sizes no larger than 19mm with a minimum size of 4.75mm and no more than 3% passing a 2.36mm sieve.</p> <p>Dry density must not be less than 1500 kg/cubic metre.</p>	<p><b>Crushed Stone or Gravel:</b></p> <p>Washed, with angular particle sizes no larger than 13.2mm with with a minimum size of 4.75mm with no more than 3% passing a 2.36mm sieve. Dry density must not be less than 1500 kg/cubic metre.</p>

Note: If backfill material which meets these specifications is not available, contact Envirotank for further information. The use of non-specified backfill material without Envirotanks prior written approval will void the tank warranty and may result in tank failure.



## C. PRE-INSTALLATION TESTING

### ⚠ WARNING

Do not exceed the recommended test pressure of 35 kPa.  
Tank damage and physical injury may result.

### ⚠ WARNING

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

### ⚠ WARNING

Do not connect the air supply directly to the annular space monitoring fitting.  
Tank damage or physical injury may result.

### VISUAL AIR SOAP TEST

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

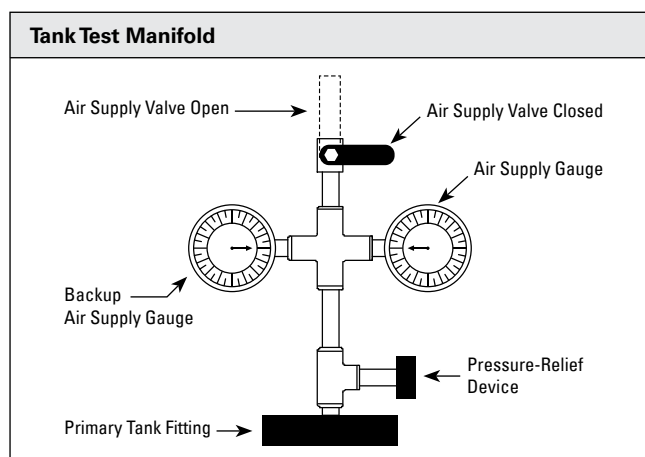
- Envirotanks must be tested on site prior to installation in order to verify the absence of shipping or handling damage.
- Tanks must be vented at all times except as defined during testing.

Note: Tanks shipped with hydrostatic monitoring fluid pre-installed in the interstitial space still require a pre-installation air/soap test to the primary tank, unless otherwise authorised by Envirotank in writing.

### FOR ALL AIR SOAP TESTS

- Use a contractor supplied "Tank Test Manifold" connected only to a tank primary fitting (see Figure C-1).

Figure C-1



Prepare for air testing.

- Replace all fitting bungs with plugs suitable for the product to be stored in the tank.
- Clean factory grease from tank fittings.
- Apply appropriate amount of Teflon tape to plugs.
- Install and tighten fitting plugs.
- Assemble the "Tank Test Manifold" as shown in Figure C-1.
- Gauges must have a maximum full-scale reading of approx. 80 kPa with 5 kPa increments.
- Pressure-relief device **must** be appropriately sized and set to prevent the tank from being pressurized in excess of the maximum allowed test pressure of 35 kPa maximum.

**DO NOT EXCEED 35 kPa WHEN PRESSURE TESTING ANY TANK.**

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 using 20 litres of water and 250ml of household dish washing detergent.
- Cover the tank shell fittings and manway covers with the soapy water solution and visually inspect them for leaks, which will be evident 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 Envirotank for further guidance

## D1. TESTING DOUBLE WALLED TANKS WITH LIQUID FILLED ANNULAR SPACE (Hydrostatic Monitored Tanks)

### CAUTION

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

### CAUTION

The reservoir must remain vented at all times during testing, the installation and service life of the tank or tank damage will result.

This tank includes a hydrostatic monitoring system. This system includes a non toxic coloured monitoring fluid between the tank walls.

The coloured monitoring fluid may be tap water with food dye or a brine solution (30% calcium chloride) depending on your geographical area (MSDS's available on request).

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

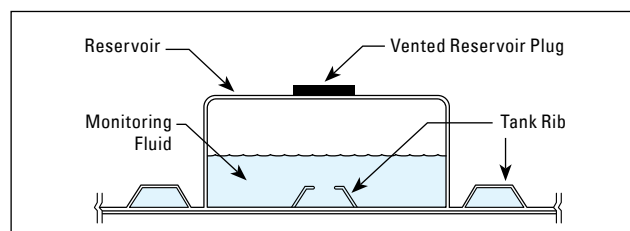
If the monitoring fluid is found on the tank inner or outer surface during any test, discontinue the installation and immediately contact Envirotank.

Monitor the hydrostatic fluid level daily during the installation to confirm tank tightness.

### Perform the following in the order listed.

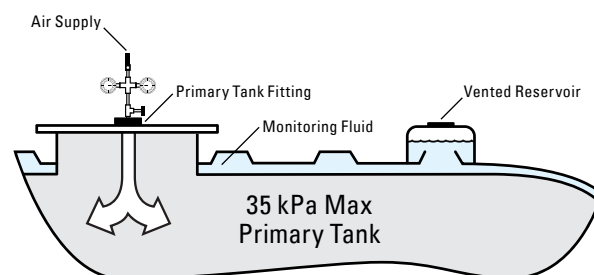
1. Comply with the requirements of Section C.
2. Closely inspect outer wall for any trace of monitoring fluid.
3. With tank in upright position, **remove the 100mm vented plug** from the reservoir fitting. The fluid should be clearly evident and the reservoir should be approx. 150mm – 200mm or half full of monitoring fluid. If the reservoir is empty, contact Envirotank for further guidance.
4. Add water or remove liquid to adjust the level of the monitoring fluid inside the reservoir. Do not overfill the reservoir (see Figure D1-1). Final monitoring fluid levels will be set later in the installation process.

Figure D1-1



5. Reinstall vented reservoir plug and ensure the annular space is vented at all times.
6. Remove enough plastic fitting covers to see inside the primary tank.
7. With a light, look inside for any signs of monitoring fluid.
8. 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. Slowly and carefully pressurize primary tank to 35 kPa maximum (See Figure D1-2).

Figure D1-2



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 tank fittings and manway(s), with soap solution and inspect.
15. After completing air test, slowly and carefully release pressure from the tank.
16. Remove all gauges, valves, and hose assemblies.
17. Closely inspect the outer wall for any trace of monitoring fluid. If the fluid is present, contact Envirotank immediately.
18. Look inside the tank for any accumulation of monitoring fluid at the bottom of the tank. If monitoring fluid is present, contact Envirotank immediately.
19. Check the monitoring fluid level in the reservoir.
20. Replace the plastic fitting covers in the open fittings.
21. **Reinstall vented reservoir plug and ensure the annular space is vented at all times.**

## D2. TESTING A DOUBLE WALL HYDROSTATICALLY MONITORED COMPARTMENT TANK WITH DOUBLE-WALL BULKHEADS

This tank includes a hydrostatic monitoring system. This system includes a non toxic coloured monitoring fluid between the tank walls.

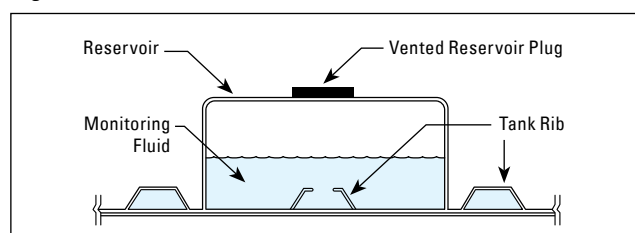
The coloured monitoring fluid may be tap water with food dye or a brine solution (30% calcium chloride) depending on your geographical area (MSDS's available on request).

In the unlikely event of a tank leak, this coloured monitoring fluid will leave a trace on the tank. If the monitoring fluid is found on the tank inner or outer surface during any test, discontinue the installation and immediately contact Envirotank.

### Perform in the following the order listed.

1. Comply with the requirements of Section C.
2. Closely inspect outer wall for any trace of monitoring fluid.
3. With tank in upright position, **remove the 100mm vented plug** from the reservoir fitting. The fluid should be clearly evident and the reservoir should be approx. 150mm – 200mm or half full of monitoring fluid. If the reservoir is empty, contact Envirotank for further guidance.
4. Add water or remove liquid to adjust the level of the monitoring fluid inside the reservoir. Do not overfill the reservoir (see Figure D2-1). Final monitoring fluid levels will be set later in the installation process.

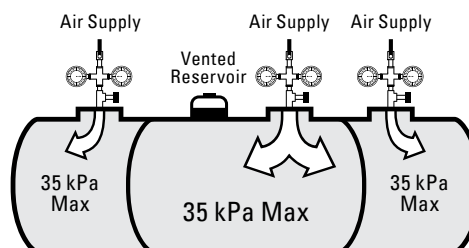
Figure D2-1



5. Remove enough tank fitting plugs to see inside each compartment.
6. With a light, look inside for monitoring fluid.
7. Replace and tighten fitting plug(s).
8. Connect "Tank Test Manifold(s)" to each compartment.
9. Connect the pressure source to the "Tank Test Manifold" on each compartment.

10. Slowly and carefully pressurize all compartments to 35 kPa (see Figure D2-2).

Figure D2-2



11. Close valve on each "Tank Test Manifold."
12. 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 tank outer surface, including fittings and manway(s), with soap solution and inspect.
15. After completing air test, slowly and carefully release pressure from all compartments.
16. Remove all gauges, valves, and hose assemblies.
17. Closely inspect the outer wall for any trace of monitoring fluid. If the fluid is present, contact Envirotank immediately.
18. Look inside all compartments for any accumulation of monitoring fluid at the bottom of the tank. If monitoring fluid is present, contact Envirotank immediately.
19. Check the monitoring fluid level in the reservoir.
20. Replace the plastic fitting covers in the open fittings.
21. **Reinstall vented reservoir plug and ensure the annular space is vented at all times.**

## E. EXCAVATION AND TANK CLEARANCE

### ⚠ WARNING

Do not enter the tank excavation unless in compliance with OH&S regulations. Follow OH&S guidelines for the tank excavation.

Collapsing excavation walls can cause injury or death.

### STABLE EXCAVATIONS

- When your excavation is in stable undisturbed soil; Use the minimum spacing's as detailed in Figure E-1 and Table E-2.

Figure E-1, Stable Excavations

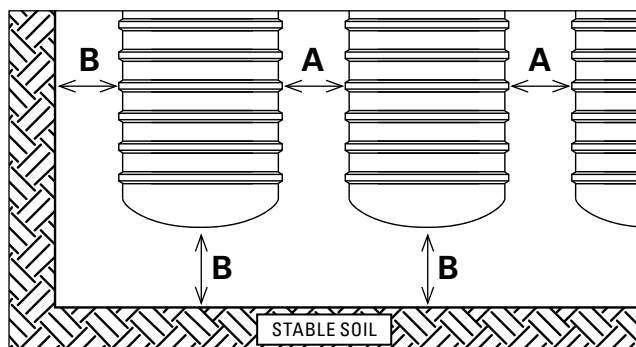


TABLE E-2, Stable Excavations

1.2m, 1.5m, 2.0m & 2.5m Diameter Tanks		
	Minimum Clearance / No Deadman Anchors	c\w 300 x 300 mm Envirotank Deadman
<b>A</b>	450mm	600mm
<b>B</b>	450mm \ 600mm Pref.	450mm \ 600mm Pref.
3.0m Diameter Tanks		
	Minimum Clearance / No Deadman Anchors	c\w 450 x 300 mm Envirotank Deadman
<b>A</b>	450mm	900mm
<b>B</b>	450mm \ 600mm Pref.	600mm

### UNSTABLE EXCAVATIONS

An unstable excavation is any of the following:

- Muck, bog, peat, swamp, quick sand, flowing water, landfill type areas or where the soil is soft or in areas with expansive clay soils or any other situations where the soil is inherently unstable.
- Soil less than 36 kPa (750 lbs./sq. ft.) cohesion, or have an ultimate bearing capacity less than 170 kPa (3500 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 min. 200mm concrete slab is needed under the tank.
- When a concrete slab is used, it should extend to the excavation walls.
- Unstable excavations also require filter fabric.
- When the soil is unstable, with or without shoring, use the minimum spacing's as detailed in Figure E-3 and Table E-4.

Figure E-3, Unstable Excavations

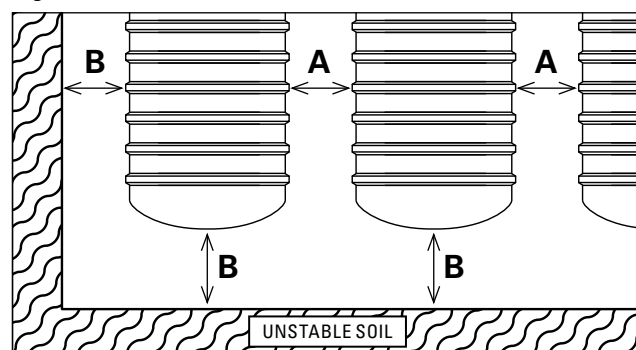


TABLE E-4, Unstable Excavations

1.2m, 1.5m, 2.0m & 2.5m Diameter Tanks		
	Minimum Clearance / No Deadman Anchors	c\w 300 x 300 mm Envirotank Deadman
<b>A</b>	450mm	600mm
<b>B</b>	1/2 Tank Diameter	1/2 Tank Diameter
3.0m Diameter Tanks		
	Minimum Clearance / No Deadman Anchors	c\w 450 x 300 mm Envirotank Deadman
<b>A</b>	450mm	900mm
<b>B</b>	1500mm	1500mm

### SHORING REMOVAL

After the backfill is properly placed completely around the tank(s):

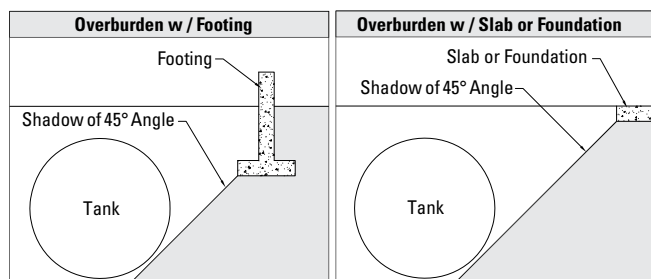
- Carefully remove shoring and pull slowly to top of backfill.
- Fill any voids created by the pulled shoring with approved backfill.

- 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 and the min. separation distances are used, the shoring must not degrade over the life of the tank.

## TANK LOCATION - NEARBY STRUCTURES

- The tank owner and the tank owner's representative's are responsible for determining the proper location of the 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.

Figure E-5



## FILTER FABRIC SPECIFICATION

	AUSTRALIA & NEW ZEALAND
Product	Geo Textile Filter Fabric to Conform to AS3706 and AS2001 2.3 Method B-88

Filter Fabric allows the passage of water and prevents the migration of approved backfill into native soil and native soil into the approved backfill.

Migration may compromise the backfill support of the tank.

**Polyethylene or plastic is not considered an effective material to prevent migration of approved backfill** and/or native soil; prevents water migration, tears easily and over time may degrade in a wet environment.

## FILTER FABRIC INSTALLATION

1. Line the excavation base and walls with filter fabric.
2. Overlap adjoining fabric panels 300mm minimum.
3. Place backfill on top of fabric and around base of excavation perimeter to hold fabric in place.

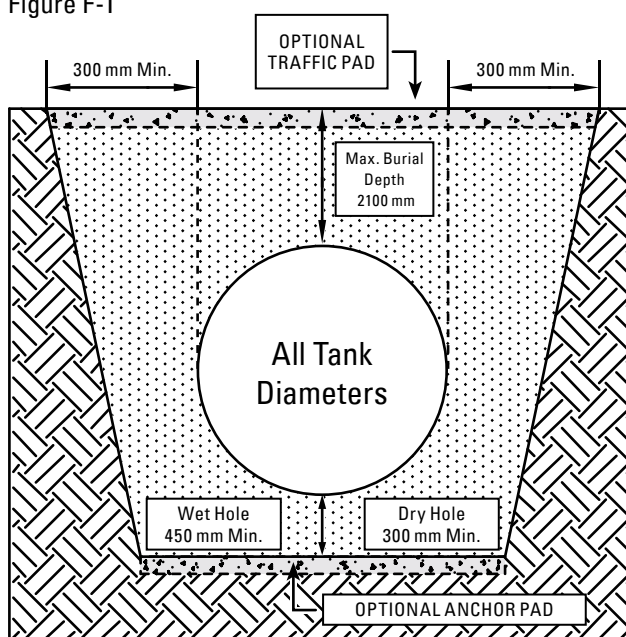
## F. BURIAL DEPTH AND COVER

Always adhere to the minimum and maximum dimensions in this section.

If at anytime wet conditions can occur, including excavations likely to fill with water over the life of the tank, sufficient overburden and/or an appropriate anchoring system must be used to offset the buoyancy of the tank.

**REFER TO THE "TANK BURIAL DEPTH RECOMMENDATIONS" (APPENDIX A) FOR MINIMUM BURIAL DEPTH IN BUOYANT CONDITIONS.**

Figure F-1



## IMPORTANT TANK BURIAL FACTORS

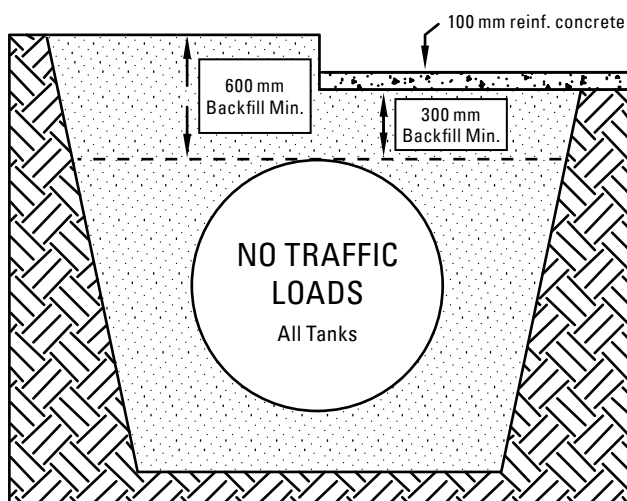
- Any covering pavement must extend by 300mm minimum beyond the tank perimeter in all directions.
- The maximum allowable burial depth is 2.1m from the tank top to finished level including pavement.
- Tanks can be designed for burial depths greater than 2.1m, contact Envirotank prior to tank purchase.
- Dry hole and/or stable excavations must have a bed of 300mm minimum of approved backfill between the bottom of the tank and the base of the excavation.
- Wet hole and/or unstable excavations must have a bed of 450mm minimum of approved backfill between the bottom of the tank and the base of the excavation or a bed of 300mm minimum of approved backfill on top of the concrete anchor pad.
- Should fill be required in an excavation to raise the base level, only approved backfill must be used.

## MINIMUM BURIAL DEPTH WITH NO TRAFFIC LOADS FOR DRY INSTALLATIONS

Local site conditions and or codes may require deeper minimum burial depth, check with the tank owner/UPSS Designer.

- All tanks need a 600mm minimum cover of approved backfill or a 300mm minimum cover of approved backfill plus 100mm of reinforced concrete. (see Figure F-2)

Figure F-2



## MINIMUM BURIAL DEPTH WITH TRAFFICABLE LOADS FOR DRY INSTALLATIONS

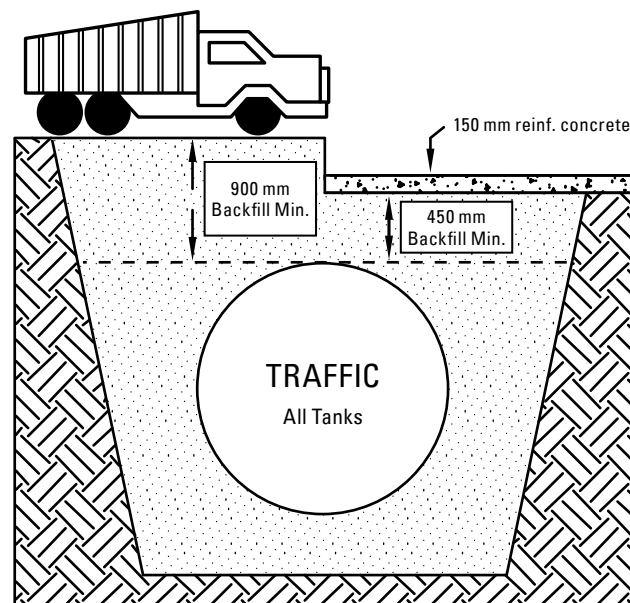
- The burial depths are detailed in Figure F-3 are suitable for a H20 traffic loads.
- The concrete pavement, thickness and reinforcement, must be designed for job specific conditions and applicable traffic loads to assure concrete traffic pad integrity. It is the responsibility of the tank owner/UPSS Designer to design the traffic pad for all loads.
- It is essential that no traffic loads are transmitted to the tank by the Containment Sumps or any risers or piping. (see Section N).

### CAUTION

Failure to provide sufficient approved backfill cover or allowing point loading to the tank by transmitting trafficable loads may damage the tank or cause tank failure.

- All tanks located in trafficable areas, need a 900mm minimum cover of approved backfill or a 450mm minimum cover of approved backfill plus 150mm of reinforced concrete. (see Figure F-3).

Figure F-3



## MINIMUM BURIAL DEPTH FOR WET OR FLOODED INSTALLATIONS

It is the responsibility of the tank owner/UPSS Designer to establish the needs and requirements for burial depth and/or anchoring to suit their specific site conditions.

**REFER TO THE "BURIAL DEPTH RECOMMENDATIONS" (APPENDIX A) FOR MINIMUM BURIAL DEPTH IN BUOYANT CONDITIONS.**

In most cases anchoring may be necessary because the tank excavation is likely to fill with water during the life of the installation and flooding to ground level may occur in seasonal events or water and drainage system may fail. We recommend tank owners/UPSS Designers evaluate the risk involved for each specific site.

### CAUTION

Every site is unique and 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



## G. ANCHORING

It is the responsibility of the tank owner/UPSS Designer to determine the appropriate anchoring method and to design the anchoring system.

Envirotank has provided an "Anchor Chart" in (Appendix A) that covers the minimum burial depths for the three common methods of anchoring tanks.

The three common methods are:

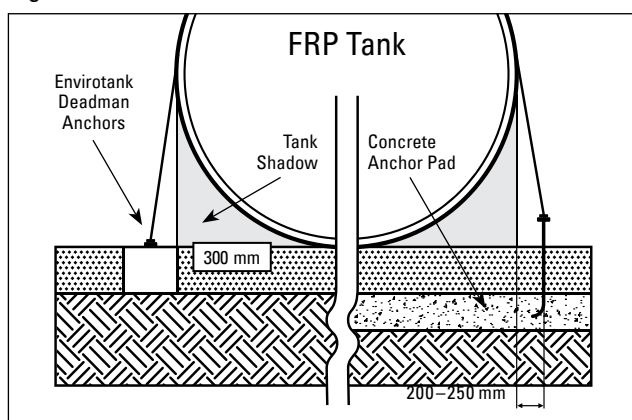
1. Deadman Anchors
2. Concrete Anchor Pad
3. Overburden Only (no mechanical anchoring)

Envirotank offers an engineered mechanical anchoring system designed for each size tank consisting of deadman anchors and hold down straps.

Burial depth, straps, deadman anchors and anchor pads can be combined to provide anchoring using the information provided in this section.

The mechanical anchoring methods are shown in Figure G-1

Figure G-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 Envirotank supplied anchor straps only.
- Anchor points must be aligned with designated anchor ribs marked on the tank (▶◀). Do not use straps between ribs.
- For deadman anchors, place the inside edge of the deadman outside the tank shadow. (Outside of ribs)
- For bottom anchor pad, position anchor points 200mm min. outside the tank shadow.

- All anchor straps must be uniformly tightened. Straps should only be snug tight, and not be over tightened so to cause tank deflection.

### ANCHORING POINT LOADS

The Envirotank deadman anchoring and/or strapping system is designed for the maximum working loads the system will experience over the life of the tank. Contact Envirotank for deadman anchor design details if Envirotank deadman anchors are not be used.

The weight of the overburden (approved backfill) acting on the deadman anchor or pad and the tank provides the majority of the anchoring force (not the weight of the concrete deadman anchor or pad alone).

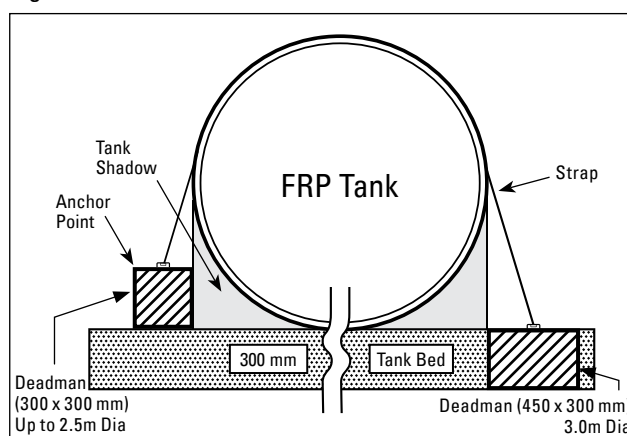
### DEADMAN ANCHORS

Deadman anchors are made of reinforced concrete and are designed and suitable for the life of the installation and must be placed end to end and combined be equal to tank length, with the anchor points aligned with designated anchor ribs marked on the tank (▶◀).

The weight of the overburden (approved backfill) to finished grade acting on both the deadman anchors and the tank provides the total anchoring force (not the weight of the deadman anchors alone).

- Refer back to Section A. Handling and Preparation for deadman weight approximations.
- Each tank requires its own set of deadman anchors on both sides of the tank.
- A separate anchor point must be provided for each strap.
- Envirotank deadman anchors are engineered and sized to the tank ordered.
- Deadman anchors must be placed parallel to the tank and outside of the tank shadow.
- The deadman anchors should be placed on the excavation base for 3.0m diameter tanks and optionally can be placed on the tank bed for tanks up to 2.5m diameter.(see Figure G-2).

Figure G-2



- Envirotank deadman anchors are supplied with 25mm diameter galvanized anchor points.
- Anchor points must match the designated anchor ribs marked on the tank (►◄).
- Place multiple deadman anchor blocks, in contact with each other, end to end.
- Use one anchor point per strap.
- Should acid sulphate soils or similarly aggressive environment be likely, the concrete deadman anchors should be coated with bitumen and all galvanized steel components be adequately protected.

**CONCRETE ANCHOR PADS FOR USE IN UNSTABLE CONDITIONS**

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

- The anchor pad for unstable excavations must be a min. 200mm thick.
- For un stable conditions the pad must extend a minimum of 450mm beyond the tank shadow. The pad must also be as a minimum the same length as the tank.
- For unstable excavations, it is the responsibility of the tank owner/UPSS Designer to design the concrete anchor pad to suit the specific conditions being encountered.
- 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 as a minimum should be designed for the working loads in Table G-3.
- A separate anchor point must be provided for each strap.
- Anchor points must match the designated anchor ribs marked on the tank (►◄).
- Only use Envirotank supplied anchor straps and hold down stirrups.

Table G-3

Anchor Point Loads Allowed	
Tank Diameter	Maximum Load
1.2m & 1.5m	570kg
2.0m	2450kg
2.5m & 3.0m	3400kg

**OVERBURDEN (No Mechanical Anchoring)**

Overburden is burying the tanks deep enough so that the weight of the approved backfill is sufficient to overcome any buoyancy.

This typically requires the burial depth to be greater than 60% of the tank diameter as a minimum cover of approved backfill / pavement.

Envirotank has provided an “Anchor Chart” in (Appendix A) that covers the minimum burial depths for the three common methods of anchoring tanks as a guide only and for a fully flooded multiple tank installation.

The important criteria for buoyancy and burial depth is the selection of approved backfill, maximum expected flood water level, single or multiple tank installation, the use and numbers of containment turrets per tank, pavement type and thickness and the safety factor and/or risk evaluation acceptable.

Due to unique site conditions at all locations, variations in approved backfill weight and tank configurations, the tank owner/UPSS Designer must verify the particular circumstances when evaluating the need for an anchoring system and recognise that the information provided by Envirotank is based on theoretical assumptions and while accurate, Envirotank take no responsibility for the information provided.

**HOLD DOWN STRAPS**

The Envirotank Hold Down Strapping System comes complete with a single length of flexible polyester webbing that is used to secure the deadman anchors on both sides of the tank and with the tensioning device and clamp and is supplied standard unless requested otherwise.

The Envirotank strapping system uses high strength polyester webbing without any third party hardware such as turnbuckles and shackles.

The Envirotank System minimises and can eliminate the “time in the hole” and is generally quicker and simpler to use and can also be clamped on the upper side of the tank to avoid working on top of the tank.

**CAUTION**

Anchor straps must be uniformly tightened and should be snugged down and not over tightened to avoid tank deflection.

**HOLD DOWN STRAP INSTALLATION**

- Feed one end of the webbing through the anchor hold down point, over the top of the tank, through the anchor hold down point on the other side and back to the position on the tank to be clamped there to the other end of the webbing by the clamping device. Ensure the clamp is central on a designated rib (►◄) ensuring the webbing is on the rib (►◄) as well.

- Feed the two loose ends of the webbing through the clamp bars and close the bars, then rotate the bars in the sheet metal guide provided. One or two full turns to tighten using a spanner or equivalent to get maximum tension.
- While holding full tension assemble the side plates onto the clamping bars and bolt in place with the bolt and spacer provided. See (Appendix B) for detailed assembly instructions

## H. TANK INSTALLATION

### WARNING

Do not enter the tank excavation unless all OH&S requirements pertaining to excavations are followed. Collapsing excavation walls may cause death or serious injury.

### BEFORE YOU BEGIN

It is important to review all instructions and documents to make sure you are compliant with the proper procedures to ensure proper installation and service life of the tank. This includes:

- Bed and Approved Backfill
- Hole Size and Burial Depth
- Pre-Installation Testing
- Anchoring
- Tank Orientation

### 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 H-1, stop the installation and contact Envirotank immediately

### CAUTION

Excessive tank deflection may result in tank failure.

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 Vertical Diameter Measurement" Backfill to sub grade, before the pavement is laid.

Note: 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 top of the tank shell fitting.
- All measurements should be made in millimetres using the dip stick for that tank\compartment, marking the back of the stick.
- All measurements should be made through the fitting closest to centre of tank or each compartment where possible.
- Refer to Table H-1 for maximum allowable vertical deflection values.

Table H-1

Tank Diameter	Maximum Deflection
1.2m & 1.5m	12mm
2.0m	20mm
2.5m	32mm
3.0m	38mm

### INSTALLATION PROCEDURE

- Determine if filter fabric is required for your installation (see Section E for details).
- All tank holes must have a minimum of 300mm and 600mm maximum of approved backfill bed between the bottom of the tank and the base of the excavation or concrete anchor pad.
- Place tank in excavation with lifting cables attached to all the lifting lugs provided on tank, while maintaining control of tank with guide ropes (see Figure A-1 or A-2).
- Set tanks directly on 300mm minimum of approved backfill bed for a stable excavation and 450mm minimum for an unstable and or wet excavation. (See figure F-1)

### CAUTION

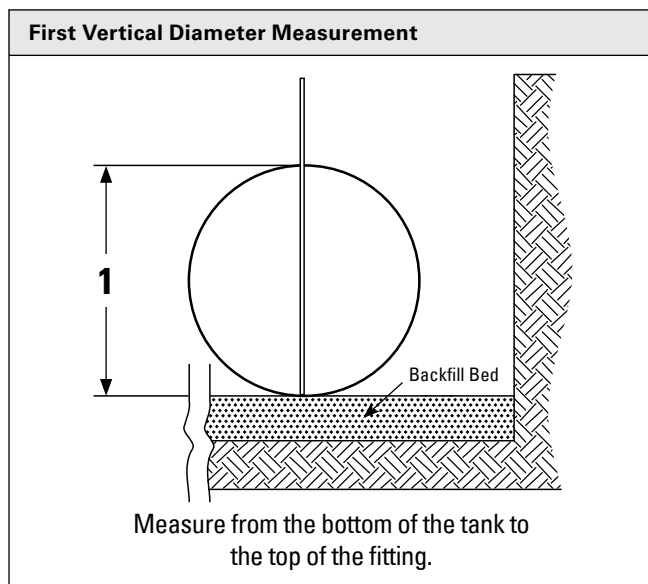
Do not place tanks directly on concrete slab, timbers, beams or cradles or tank damage can occur.

### CAUTION

Do not mix native soil with approved backfill material or tank damage can occur

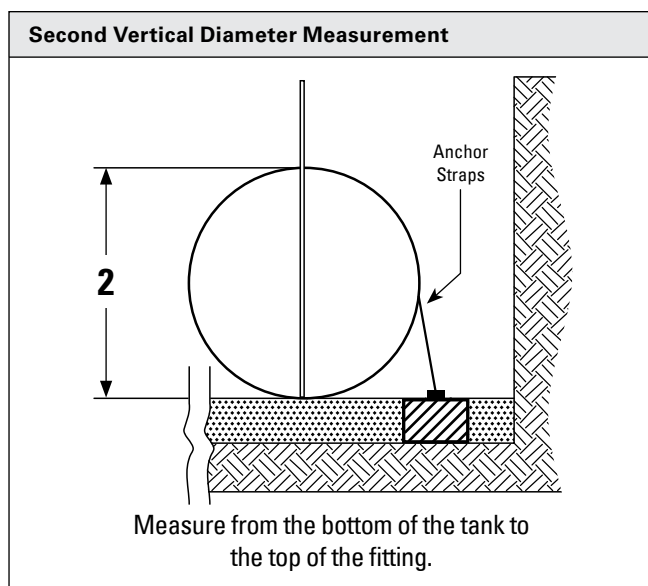
- Take the "First Vertical Diameter Measurement" and record the value on the Tank Installation Checklist (see Figure H-2).

Figure H-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 H-3).

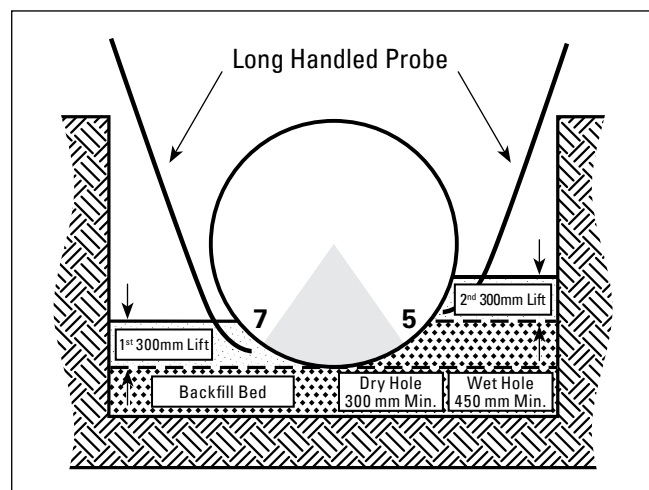
Figure H-3



- Proper backfilling is required to provide necessary support for the tank.
- Only use approved backfill. (See Figure B-1)

- Place the first 300mm lift of approved backfill material evenly around the tank. Push the backfill in to 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 end-caps, eliminating all voids, so the tank is fully supported (see Figure H-4).

Figure H-4

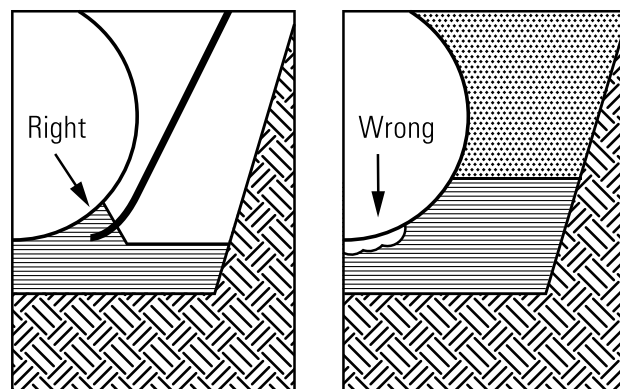


- Eliminate all voids by using a probe to push backfill:
  - Completely beneath tank bottom .
  - Completely between the 5 o'clock and 7 o'clock positions along the entire length of the tank between and around all ribs and end-caps. It is critical to tank performance that this area offers full support under the tank and end caps (see Figure H-5).
- Repeat this process with a second 300mm lift.

### CAUTION

Failure to adequately place and "tamp in" backfill may cause tank damage to occur.

Figure H-5



- After completion of second lift, backfill can be brought to tank top without additional handwork.

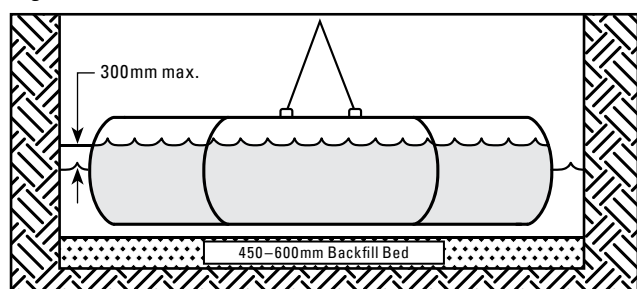
## WET HOLE INSTALLATION

### CAUTION

Keep tank vented to prevent pressurisation of tank when adding ballast. As the tank nears full, reduce the fill rate to prevent pressurisation or tank damage may occur.

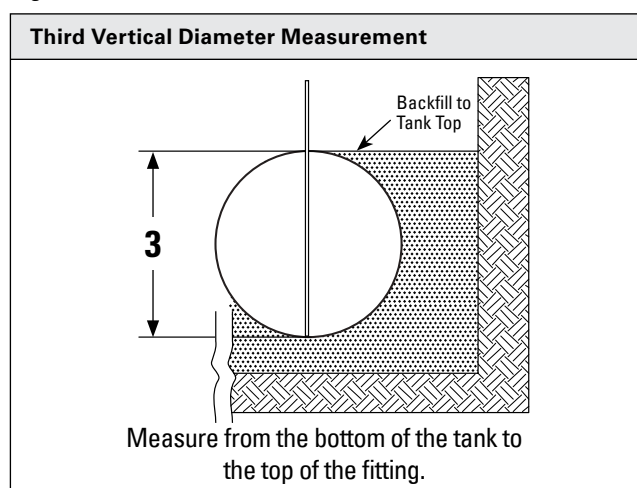
- Additional information on wet hole installations and alternate installation techniques are available. Contact Envirotank for further information.
- Special Instructions for a wet hole installation:
- Water level in the excavation should be maintained at lowest practical level by using pumps.
- Ballast 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 300mm above ground water level outside tank (see Figure H-6).

Figure H-6



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

Figure H-7



- After backfill is even with tank top, fill all tank compartments with water ballast to minimize chance of tank buoyancy.

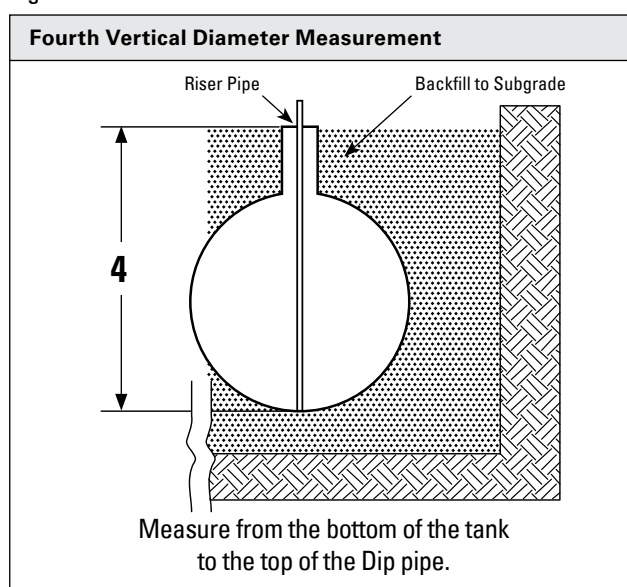
### CAUTION

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

## BACKFILL TO SUBGRADE

- When the tank has been correctly installed into the excavation and backfill to top of tank and all verified measurements have been taken and all pre-burial system testing has been completed and passed; add the remaining backfill material to sub-grade.
- Always use approved backfill material to replace all excavated (or loose) native soil regardless of the excavation size.
- If alternative smaller or finer backfill material is used above the tank top, filter fabric is required to separate the approved material from this material.
- Once the tank has been backfilled to sub-grade, before placement of concrete pad, take the fourth vertical diameter measurement.
- Record the Deflection Measurement on the Tank Installation Checklist (see Figure H-8).

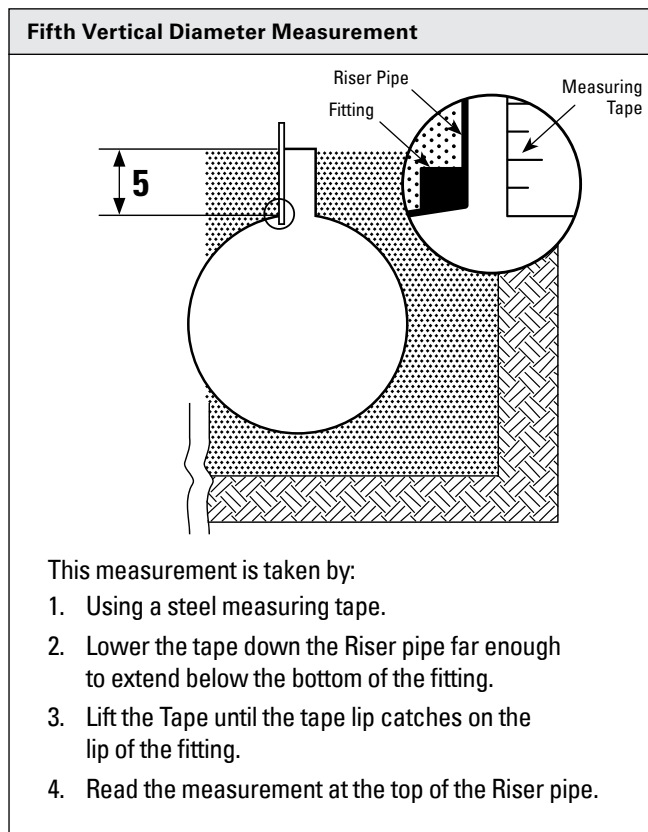
Figure H-8





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

Figure H-9



- 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 H-1 have not been exceeded.
- If the final deflection measurement exceeds the values in Table H-1 you should stop the installation, prior to set up and pouring the pavement, and immediately contact Envirotank for directions.

## I. ADDING TANKS AT EXISTING LOCATIONS

Additional tanks may be installed at existing locations using one of the following methods, however it is the tank owner/UPSS Designer that must verify the site conditions as they exist and that the information provided by Envirotank is based on theoretical assumptions and while accurate, Envirotank take no responsibility for the information provided.

## PREFERRED METHOD

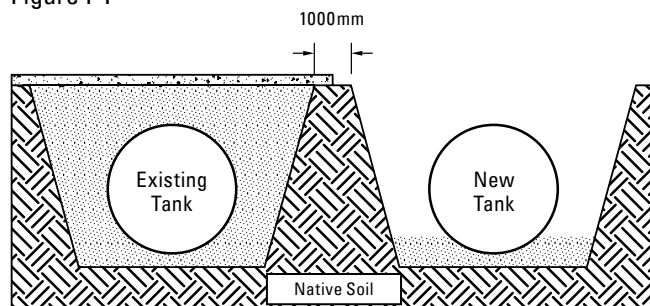
- Install a new tank in a separate hole at least 1.0m from the original excavation.
- Follow procedures outlined in this Installation Manual.

### CAUTION

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

- Maintain a minimum 1.0m at grade of native soil between existing and new installation (see Figure I-1).

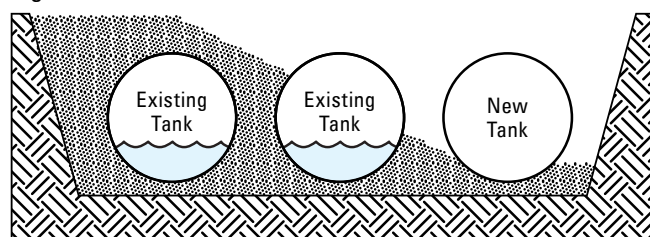
Figure I-1



## ALTERNATE METHOD FOR DRY HOLE EXCAVATION

- Lower ballast in existing tanks to less than 20% capacity.
- Remove the surface slab.
- Enlarge the excavation for the new tanks, leaving as much backfill as possible around the existing tanks (see Figure I-2).

Figure I-2



- Install shoring, if necessary, to make sure that existing tanks do not move or roll over 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.



## J. PIPING AND BOTTOM SUMP CLEARANCES

### TANKS WITH BOTTOM SUMPS

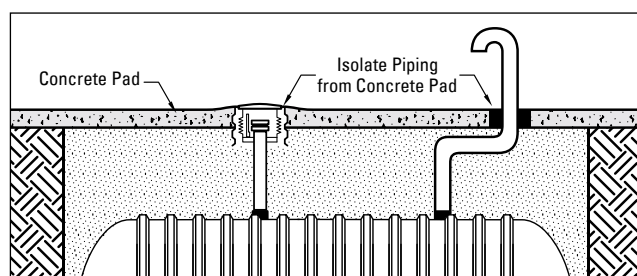
When installing a tank equipped with a bottom sump, excavation and backfill must be modified to provide:

- A hole centred at the sump location.
- Hole should be 300mm larger than the sump in all directions.
- Backfill by hand with approved tank backfill.
- The void around the sump must be hand tamped prior to adding the first 300mm lift of backfill around the tank.

### EXTERNAL AND INTERNAL PIPING

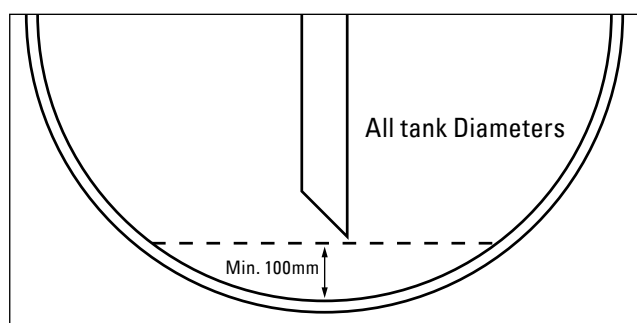
- Attached piping must be free to move with the tank.
- Isolate the piping from the pavement. (see Figure J-1).

Figure J-1



- Take precaution during construction to make sure no damage occurs to the exposed pipe(s).
- Internal piping must terminate a minimum of 100mm from tank bottom for tanks to allow for tank deflection (see Figure J-2).
- Internal piping should be installed in accordance with AS1692 Section 2.2.7 Liquid seal, Section 2.3.2 Dipsticks and Section 2.4.3 Pressure equalisation.

Figure J-2



### CAUTION

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

## K. TANK VENTING

### 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 vapour recovery systems provided the pressure or vacuum does not exceed 7 kPa).
- The tank's venting system must as a minimum comply with the requirements of AS1940 Section 5.4 and;
- 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.**

### CAUTION

Pressurisation from filling a non-vented tank will result in tank damage

## L. FILLING TANKS

### CAUTION

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

- Envirotank recommends only gravity-filling of tanks.
- Install positive shut-off equipment in the fill lines to prevent the tank from being overfilled.
- Pressurisation from over filling may damage the tank, even if the tank vent is unrestricted.
- Under no circumstances should vent restriction devices such as vent float valves or similar be used for overfill prevention devices.
- Do not fill or ballast tank until tank has been properly backfilled.
- Ullage must be maintained in the tank.

## M. MANWAYS

### ⚠ WARNING

Do not enter tank without a Confined Space Entry permit. Failure to follow OH&S guidelines for Confined Space may result in death or serious injury.



ASPHYXIATION



FIRE



EXPLOSION

The standard 600mm diameter manway has a total load bearing capacity of 550 kg. Heavy duty manways must be specified on tanks equipped with heavy helical heating coils, agitators or pumps with a total downward load greater than 550 kg.

## N. CONTAINMENT COLLARS AND SUMPS

Envirotank containment collars are factory installed to the tank top to provide a means of secondarily containing leaks and providing maintenance access to pumps and piping connections.

### ⚠ WARNING

Do not enter tank sump without consulting Confined Space Entry guidelines. Failure to follow OH&S guidelines for Confined Space may result in death or serious injury.



ASPHYXIATION



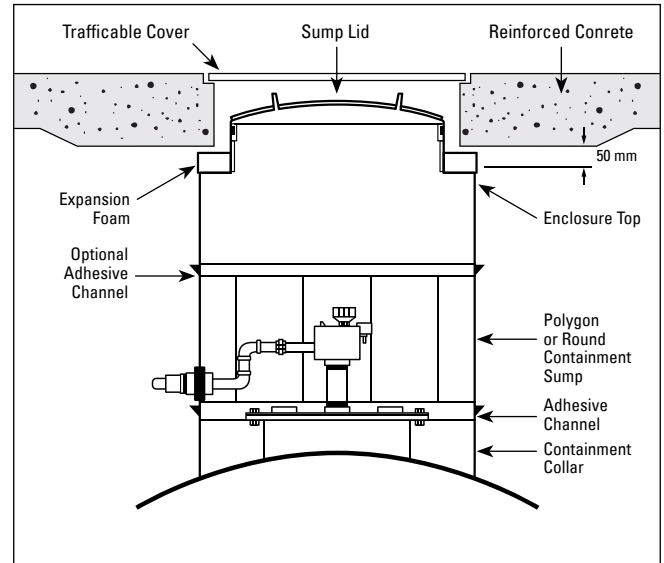
FIRE



EXPLOSION

- All Containment Collars and Sumps must be isolated from direct traffic loading (see Figure N-1).

Figure N-1



### CAUTION

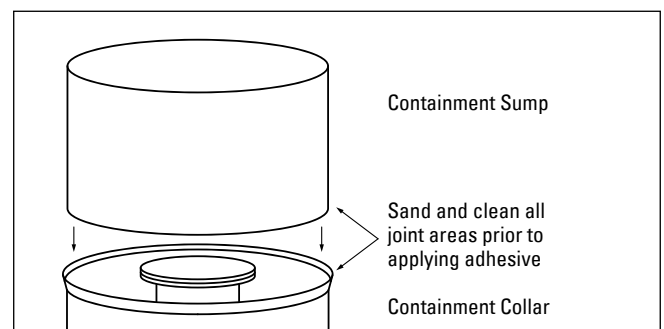
Failure to provide adequate clearance may cause damage to the tank and result in environmental contamination.

Envirotank tank sumps are designed to provide a watertight connection to the containment collar utilizing an adhesive joint or alternatively the joint may be fibreglassed.

### ASSEMBLY PROCEDURE

1. Lightly sand the bottom 25 mm of the containment sump (exterior) surface using supplied sandpaper.
2. Lightly sand inside surface of the containment collar. (see Figure N-2)
3. Wipe the collar and sump mating surfaces clean of all foreign material and dust.
4. Place sump in collar and check for proper alignment. (see Figure N-3)

Figure N-2



**Please Note:** All mating surfaces must be sanded until they appear "white" in colour and must be clean and dry and free from of foreign materials, oil grease and dust prior to applying adhesive.

## ADHESIVE APPLICATION GUIDELINES

The following guidelines are for the application of adhesives to be used outside in ambient temperatures only.

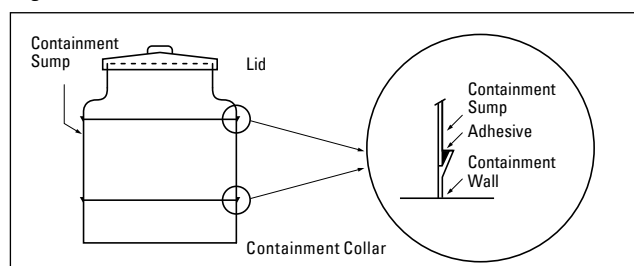
### ⚠ WARNING

Always wear Protective Clothing, Safety Glasses, Barrier Creams and Rubber Gloves and ensure adequate ventilation of the work area when using adhesives.

Refer to MSDS sheet for additional information.

- Minimum application temperature 5°C, maximum application temperature 40°C.
- For cold weather applications use warm water to preheat the adhesive to 10°C - 25°C to make the application easier.
- Break inner seal at extrusion end of cartridge.
- Affix nozzle to cartridge.
- Cut nozzle tip to size.
- Install cartridge in to caulking gun
- Prior to placing sump apply spots or short beads evenly spaced on the prepared surface of containment collar.
- Place the containment sump in the collar and press down until the mating surfaces are in intimate contact and adhesive is pushed out.
- Place a bead of adhesive a minimum of 7mm wide, bead must be completed within 30 minutes. (see Figure N-3)
- Surface skinning time approx. 45 to 75 minutes dependent on climate.
- Adhesive 70% cure rate min. 24 to 36 hours dependent on climate and bead thickness. Do not disturb mating parts until cured.

Figure N-3

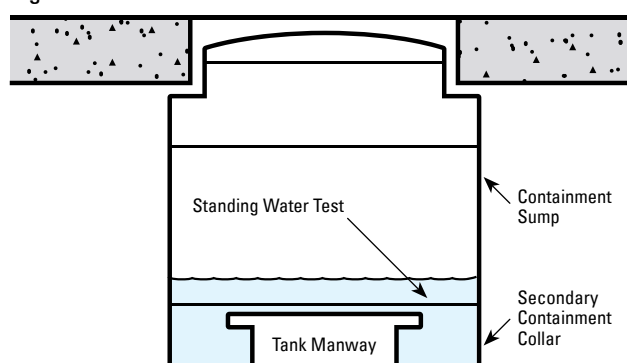


## COLLAR AND SUMP TESTING INSTRUCTIONS

### Initial Jobsite Testing

- The installation contractor must test the tank collar and containment sump joints before backfilling is completed around the collars and sumps.
- Test the joints by filling the sump with water 75mm above the tank sump to the secondary containment collar joints. Record the liquid level. After 24 hours, re-measure and record the liquid level.
- A liquid level change of more than 5mm indicates a possible leak (see Figure N-4).

Figure N-4



### VACUUM TESTING

Third parting vacuum testing systems can be used to test Envirotank sumps, however the maximum vacuum should not exceed 75mm of mercury.

### CAUTION

Excessive vacuum may result in containment sump failure.

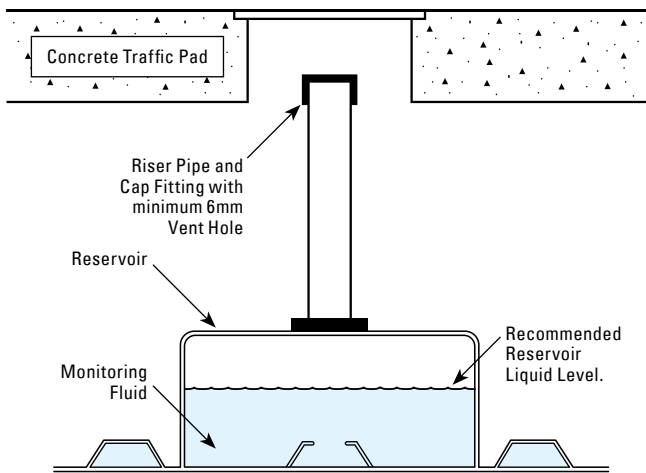
## O. ANNULAR SPACE MONITORING

### HYDROSTATIC MONITORING

Because of its superior leak detection capability, Envirotank recommends the Hydroguard® Hydrostatic Tank Monitoring System for continuous monitoring of the annular space.

- All Envirotanks with the hydrostatic monitoring system arrive on site with monitoring fluid installed in the annular space and some fluid in the reservoir.
- The coloured monitoring fluid may be tap water with food dye or a brine solution (30% calcium chloride) depending on your geographical area (MSDS's available on request).
- After installation and ballasting, the fluid level in the reservoir must be filled to the proper level. (see Figure O-1).
- Add water to adjust the fluid level.

Figure O-1

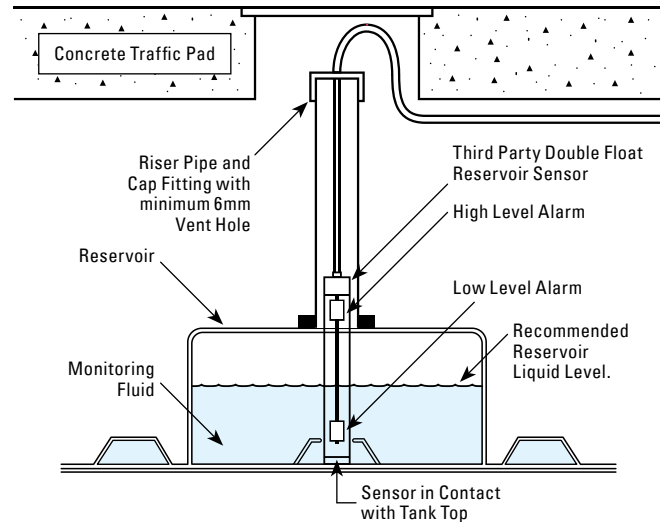


### CAUTION

Hydrostatic monitoring cavity (Interstitial Space) between the inner and outer tank must be vented to the atmosphere at all times. If unvented, the pressure build up may cause tank damage.

- Vent the annular space with a minimum 6mm hole in the Hydroguard® Reservoir Riser Cap. (see Figure O-1)
- When installing a third party double float sensor, the bottom of the sensor must be in contact with the tank top. (see Figure O-2).

Figure O-2



### 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.

## P. TANK PIT OBSERVATION WELLS

Tank Pit Observation Wells should be set at least 300 mm outside of tank outer diameter and must be backfilled around with same approved tank backfill material

**TANK BURIAL DEPTH RECOMMENDATIONS****APPENDIX A**

The minimum burial depths from tank top to grade as detailed in Table AA-1 are recommended to achieve a 1.2 safety factor against flotation assuming worst case conditions of water to grade and the tank completely empty with a multiple tank installation.

- When calculating the minimal burial depths required, table AA-2 details the additional depth required for the addition of containment turrets to each tank and the removal of trafficable pavement.
- **MAXIMUM ALLOWABLE BURIAL DEPTH 2.1M.**

Table AA-1

Tank Diameter	1.2m	1.5m	2.0m	2.5m	3.0m
Concrete Slab Anchor	600	600	600	725	925
Deadman Anchors	600	600	700	950	1125
No Anchoring (Backfill Only)	800	900	1200	1500	1800

Table AA-2

Tank Diameter	1.2m	1.5m	2.0m	2.5m	3.0m
<b>Each 1200 Diameter Containment Turret Per Tank Requires an Additional Burial Depth of;</b>					
With Deadman Anchors Add	+ 50	+ 50	+ 75	+100	+100
No Anchoring (Backfill Only) Add	+ 300	+ 300	+200	+ 150	+ 125
<b>Each 1500 Diameter Containment Turret Per Tank Requires an Additional Burial Depth of;</b>					
With Deadman Anchors Add	+ 60	+ 60	+ 90	+120	+120
No Anchoring (Backfill Only) Add	+ 360	+ 360	+240	+ 180	+ 150
<b>Burial Depth Adjustment Required When;</b>					
No Trafficable Pavement	+ 75	+ 75	+ 75	+ 75	+ 75
Anchor Place on Tank Bed	+ 50	+ 50	+ 50	+ 50	+ 50

**Calculation Examples:**

2.5m diameter DWT55 with one (1) 1200 diameter containment turret using deadman anchors placed on the tank bed and a trafficable pavement is  $950 + 100 + 50 = 1100\text{mm}$  from tank top to finished level.

3.0m diameter DWT110 with two (2) 1500 diameter containment turrets using deadman anchors with no trafficable pavement is  $1125 + 120 + 120 + 75 = 1440\text{mm}$  from tank top to finished level.

## HOLD DOWN STRAP INSTALLATION

## APPENDIX B

- The hold-down straps can only be used on the top of all designated ribs as indicated by the (▶◀) markings on the tank.
- Anchor points on the deadman anchors must be aligned with designated (▶◀) ribs  $\pm 25$  mm.
- Feed one end of the strap through the anchor bar, over the top of the tank, through the anchor bar on the other side and back over the top of the tank to be clamped to the other end of the strap by the clamping device.
- Ensure the clamp is central on top of a designated (▶◀) rib and guide the strap onto the rib as well.
- Straps can be assembled and buckled on the side of the tank to prevent working at heights or on top of the tank to reduce in excavation time.



1. Feed each end of strap through the clamp plates.



2. Close clamp plates with a hammer protecting the tank with a block of wood.



3. Locate sheet metal channel assy guide under both runs of straps.



4. Insert gal. Bolt Spacer and rotate clamp to take up slack strap. Place guides x (2) on strap.



5. Fit spanners over the ends of the clamp and rotate to snug straps down.



6. After each crank hold position with one spanner and reposition one at a time.



7. Continue rotational tightening until strap is snugged down.



8. Assemble side holding plates over clamp ends, use spanner on the outside to locate & align assy



9. Bolt can be passed through holding plates and spacer and tightened.



10. Bolt fully tightened and clamp complete.

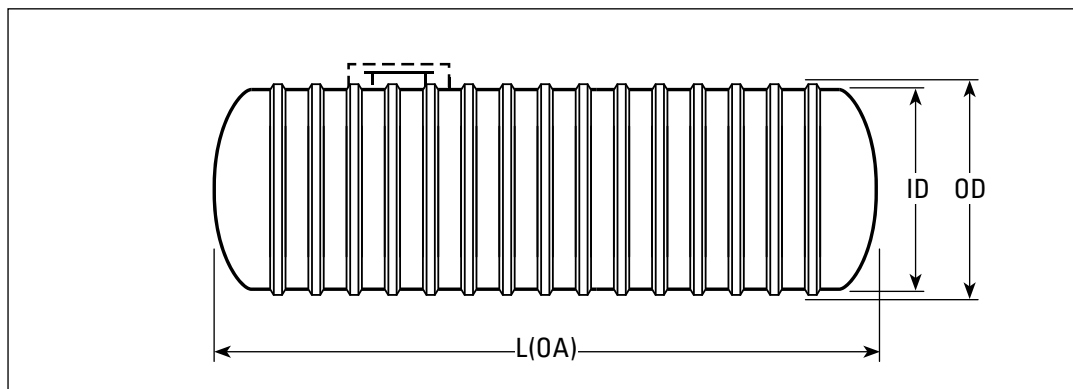
### CAUTION

Anchor straps must be uniformly tightened and should be snugged down to avoid tank deflection.



## TANK DIMENSION CHART

## APPENDIX C



Nom.Capacity (Litres x 1000)	Length L(OA)	ID-Inside Diameter	OD-Out.Dia. (Including Ribs)	Approx. Weight (Single Wall Tank)	Approx. Weight (Double Wall Tank)
5	4800	1200	1290	350	750
10	3950	2000	2090	600	1050
20	4700	2500	2590	1000	1550
30	6750	2500	2590	1350	2200
40	8750	2500	2590	1700	2850
45	9750	2500	2590	1850	3150
50	10800	2500	2590	2000	3450
55	11800	2500	2590	2200	3750
60 (2.5m)	12800	2500	2590	2400	4200
60 (3.0m)	9050	3000	3140	2400	4200
70	10600	3000	3140	2600	4900
80	11950	3000	3140	2900	5500
90	13500	3000	3140	3200	6200
100	14850	3000	3140	3500	6800
110	16400	3000	3140	3850	7500

### NOTE:

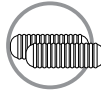
The provided Tank Dimension Chart is for standard tank models and should only be used as a guide.

Contact Envirotank for confirmation of tank dimensions and weights.

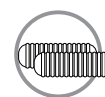
Actual tank weight is stenciled on tanks.



Handwriting practice lines consisting of horizontal dotted lines on a white background.



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## Tank Installation Validation Checklist

### For Fibreglass Underground Petroleum Storage Tanks

This checklist must be completed and retained for the lifetime of the tank installation with any copies of any written authorizations for variations and/or deviations received from Envirotank.

Tank Owner \_\_\_\_\_ Date of Installation \_\_\_\_\_

Site Address \_\_\_\_\_

Installation Contractor \_\_\_\_\_

Tank Owner's Representative \_\_\_\_\_

### General Site Procedures

	Completed	N/A
<b>1. Backfill material meets Envirotank specification (Quarry sieve analysis is attached).</b>	_____	_____
Indicate which material you used:		
<input type="checkbox"/> Naturally Rounded Gravel	_____	_____
<input type="checkbox"/> Crushed Stone	_____	_____
<input type="checkbox"/> Other (Envirotank approval letter attached)	_____	_____
<b>2. Backfill above tank top.</b>		
Indicate which material you used:		
<input type="checkbox"/> Same backfill material used as above	_____	_____
<input type="checkbox"/> Other (Envirotank approval letter attached)	_____	_____
<b>3. Excavation and tank clearance meet Section E.</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
<b>4. Filter fabric used to line excavation</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
<b>5. Indicate excavation condition:</b>		
<input type="checkbox"/> Dry hole (Water is not anticipated to reach tank – area is not subject to flooding)	_____	_____
<input type="checkbox"/> Wet hole (Excavation may trap water – area may be subject to flooding)	_____	_____
<b>6. Anchoring performed in accordance with installation instructions:</b>		
Indicate which method you used		
<input type="checkbox"/> Deadman Anchors		
<input type="checkbox"/> Anchor Pad		
<input type="checkbox"/> No mechanical anchoring		
<b>7. Depth of approved backfill under tank _____ millimetres</b>	_____	_____
<b>8. All deflection measurements are recorded on reverse side.</b>	_____	_____
<b>9. Approved backfill placed in 300mm lifts &amp; probed as described in Section H.</b>	_____	_____
<b>10. Tanks ballasted after backfilling in accordance with Section H.</b>	_____	_____
<b>11. Tank burial depth complies with the requirements of Section F.</b>	_____	_____
<b>12. Piping and bottom sump clearances according to Section J.</b>	_____	_____

### Tank Specific Information

TANK NUMBER	1	2	3	4	5
<b>13. Tank serial number.</b>	_____	_____	_____	_____	_____
<b>14. Tank type.*</b> (Indicate SWT, DWT, SWT-OWS, or DWT-OWS for each tank)	_____	_____	_____	_____	_____
<b>15. Interstitial Monitor type.**</b> (Indicate HYDRO or DRY for each tank)	_____	_____	_____	_____	_____
<b>16. Tank capacity.</b> (Indicate unit of measurement and record the capacities for each tank)	_____	_____	_____	_____	_____
<b>17. Tank free of visual damage.</b> (Delivery Document attached to this form)	_____	_____	_____	_____	_____
<b>18. Monitoring fluid visible on inner or outer tank wall.</b> (Indicate Yes or No for each tank)	_____	_____	_____	_____	_____
<b>19. Pre-Installation air/soap test performed without leaks.</b> Indicate which test in Section D you used per tank:	_____	_____	_____	_____	_____
<b>20. Hydrostatically monitored tanks:</b> Indicate Yes or N/A for each step completed per tank:					
• Check monitoring-fluid level in reservoir	_____	_____	_____	_____	_____
• Record monitoring-fluid level in reservoir	_____	_____	_____	_____	_____
• Annular space vented	_____	_____	_____	_____	_____

### Tank Specific Information

TANK NUMBER	1	2	3	4	5
1. First Vertical Diameter Measurement (Section H, Figure H-2)	—	—	—	—	—
2. Second Vertical Diameter Measurement (Section H, Figure H-3)	—	—	—	—	—
3. Third Vertical Diameter Measurement (Section H, Figure H-7) <b>Measurement A</b> - Tank deflection with backfill at tank top (subtract Measurement 3 from Measurement 1 above) <i>Refer to Table I-1 for max. deflection values.</i>	—	—	—	—	—
4. Fourth Vertical Diameter Measurement (Section H, Figure H-8)	—	—	—	—	—
5. Fifth Vertical Diameter Measurement (Section H, Figure H-9)	—	—	—	—	—
6. Calculate the final vertical diameter measurement (subtract Measurement 5 from Measurement 4 above) <b>Measurement B</b> - Tank deflection at sub-grade (subtract Calculated Value (6) from Measurement 1 above) <i>Refer to Table I-1 for max. deflection values.</i>	—	—	—	—	—

### CAUTION

If any of the measurements taken exceed the values shown in Table I-1, immediately contact Envirotank prior to proceeding with the installation.

Table I-1

Tank Diameter	Maximum Allowable Vertical Deflection
1.2m & 1.5m	12mm
2.0m	20mm
2.5m	32mm
3.0m	38mm

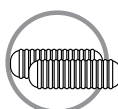
### Certification that Tank Installation was in accordance with Tank Installation Instructions (INST INS 02).

Tank Owner Representative (Print Name)	Date	Contractor Representative (Print Name & AEI Number)	Date
Tank Owner Representative (Signature)	Date	Contractor Representative (Signature)	Date

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Envirotank New Zealand 9-573-0548

www.envirotank.com.au  
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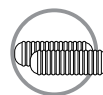


**ENVIROTANK**



**AUSTRALIA**  
541 Blackburn Road  
Mt.Waverley VIC 3149  
MELBOURNE  
(03) 9550 0800

**NEW ZEALAND**  
PO BOX 11, 185  
Ellerslie  
AUCKLAND  
(9) 573 0548



**ENVIROTANK**

Quality  
ISO 9001

## Tank Delivery Inspection Checklist

For Fibreglass Underground Storage Tanks

Customer name (tank owner): \_\_\_\_\_ Location: \_\_\_\_\_

Tank size: \_\_\_\_\_ Date & Time unloaded: \_\_\_\_\_

Method of unloading: ☐ Crane ☐ Other (specify): \_\_\_\_\_

Tank inspection after unloading: Are tanks free of damage? ☐ Yes ☐ No

Describe damage if any: (Notify your despatcher and Envirotank plant if there is any damage) \_\_\_\_\_

\_\_\_\_\_

Describe any problems in making this delivery and/or in unloading: \_\_\_\_\_

\_\_\_\_\_

**Items Delivered:** ☐ Number of tanks / ☐ Number of sumps / ☐ Number of dipsticks / ☐ Number of lids  
☐ Number of straps / ☐ Number of other accessories / ☐ Total pieces delivered including tanks

**Reservoir readings:** (for Double Wall Tanks only) Tank 1: \_\_\_\_\_ Tank 2: \_\_\_\_\_ Tank 3: \_\_\_\_\_ Tank 4: \_\_\_\_\_ Tank 5: \_\_\_\_\_ Tank 6: \_\_\_\_\_

**Chocking Used:** ☐ Foam ☐ Other (describe): \_\_\_\_\_

If customer or representative is at delivery site, obtain signature on delivery receipt: ☐ Yes ☐ No Signature: \_\_\_\_\_

**Customer Note:** You or your representative must be at the job site at the time of delivery to inspect your tank(s) prior to off loading and report any shortage or damage directly to Envirotank.

**Customer:** Please inspect your tank thoroughly for noticeable damage and complete this section.

1. Agree with driver's report above?

☐ Yes ☐ No

2. Ribs crushed or broken?

☐ Yes ☐ No

3. Are stones or other hard debris at unloading spot in contact with tank shell wall?

☐ Yes ☐ No

4. End caps inspected for apparent damage?

☐ Yes ☐ No

5. Acceptance of tank(s)?

A. in apparent good condition ☐ Yes

or B. with definition of damage ☐ Yes

Please sign below:

Customer's Representative: \_\_\_\_\_

Customer's Representative: \_\_\_\_\_

Title: \_\_\_\_\_

Company: \_\_\_\_\_

**If damaged:**

**Indicate position of damage:**

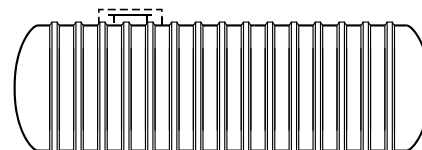
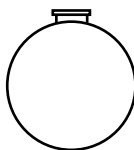
Tank No. \_\_\_\_\_

Tank Size: \_\_\_\_\_

If damaged between ribs, which ribs? \_\_\_\_\_

\_\_\_\_\_

(e.g. between 2nd and 3rd ribs near manhole end of tank.)



Driver's signature: \_\_\_\_\_ Driver's name (please print): \_\_\_\_\_ Date: \_\_\_\_\_

Carrier: \_\_\_\_\_