AQUATOR® COMMERCIAL OIL WATER SEPARATOR

OPERATING, INSTALLATION & MAINTENANCE MANUAL

- WATER CORPORATION EDITION -

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TANK SOLUTIONS
FUEL · CHEMICALS · WATER

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TANK SOLUTIONS
FUEL · CHEMICALS · WATER

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INTRODUCTION

This Aquator® Commercial Oil Water Separator (OWS) Operating and Maintenance Manual gives instructions for single-wall OWS applications.

It is important to follow the procedures and instructions in this manual in order to safely and properly install a Tank Solutions Aquator® Oil Water Separator. Failure to follow these instructions will void the tank warranty and may cause tank failure, serious personal injury, or property damage.

The Tank Solutions warranty applies to a tank installed according to these instructions. Since Tank Solutions does not control the parameters of any installation, our sole responsibility in any installation is that presented in our warranty. Use the Tank Installation Checklist, a copy is in Appendex B, as the installation proceeds. Retain a copy of the checklist, along with any deviation – authorization letters, certification etc. in your files and return the original to Tank Solutions. For Warranty to be effective, the completed Installation Checklist must be returned to Tank Solutions within 30 days (refer to Installation Checklist for more details). Consult your Tank Solutions representative for any additional checklist forms. Comply with all applicable regulations standards and tank solutions guidelines such as:

- ✔ National, state and local construction, health, safety and environmental codes
- ✔ Industry standard practices (e.g. PEI/RP100, API RP1615 & EPA, AS4897, AS1692, AS1940)
- ✔ It is the responsibility of the owner and operator to always follow the operating guidelines set forth in our applicable limited warranty.
- ✔ It is the responsibility of the owner and operator to always follow the operating guidelines set forth in this Installation Manual.
- ✔ It is the responsibility of the owner to retain the limited warranty and Installation Manual provided with the tank for future reference. A copy of the current limited warranty is available on our website: **www.tanksolutions.com.au**
- ✔ Use the Tank Single Wall Installation Checklist - TD_IM_031 for all underground storage tanks throughout installation process.
- ✔ The commissioning contractor will use the Aquator® Commissioning Checklist - TD_IM_032 to sign off all items and provide a copy to Tank Solutions.
- ✔ Record the relevant information for each tank installed on the Tank Installation Checklist. Additional copies are available on our website: **www.tanksolutions.com.au**
- ✔ The tank installer must retain a copy of the completed Tank Installation Checklist and provide both the tank owner and Tank Solutions with a copy in order to facilitate any warranty claim.
- ✔ The tank installer is to supply a sieve analysis report of rock to be used as backfill. A copy of this report should be retained for warranty purposes and sent to Tank Solutions, along with the installation checklist.
- ✔ All Aquator® installations in the Water Corporation network **must** be installed with a Trade Waste Sampling Point (TWSP) on the Aquator® outlet pipework. See Water Corporation drawing number HX33-11-30 for details.

For additional information, contact your state and local government authorities, including health, fire or building departments, and environmental agencies. All work must be performed according to standard industry practices and OH&S regulations. A Tank Solutions requirement will never take precedence over a requirement imposed by any federal, state or local code or regulation. In all cases, any such requirement takes precedence over any provision of the Tank Solutions manual. Tank Solutions must authorize in writing any variation to, or deviation from, these instructions. This authorization must be made in writing, prior to tank installation. Tank Solutions recommends that all personnel carrying out works installing the tanks should have current accreditation.

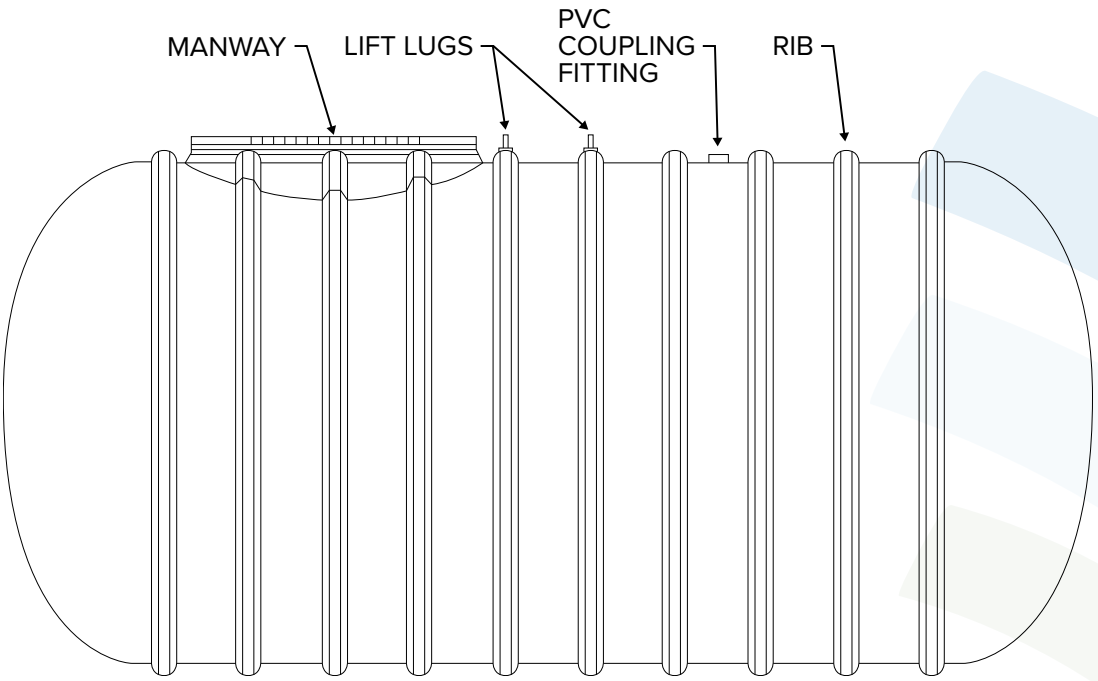


FIGURE 0-1

If you have any questions or encounter any situations not covered in these installation instructions, contact the Tank Solutions Technical Service Department on (02) 4964 8270 or local representative.

SAFETY

Before beginning the tank installation, read through the entire installation manual. It is the installer's responsibility to comply with all safety precautions, codes and regulations. No instructions or procedures presented in this manual should be interpreted as to put as risk any person's health or safety or to harm any property or the environment. Keep the Installation Manual available at the time of installation to refer back to safety procedures as needed.

The following definitions will serve as a guide when reading the Installation Manual:

WARNING: indicates hazards which, if not avoided, could cause death, serious personal injury or significant property damage.

CAUTION: indicates hazards which, if not avoided, may cause personal injury or property damage.

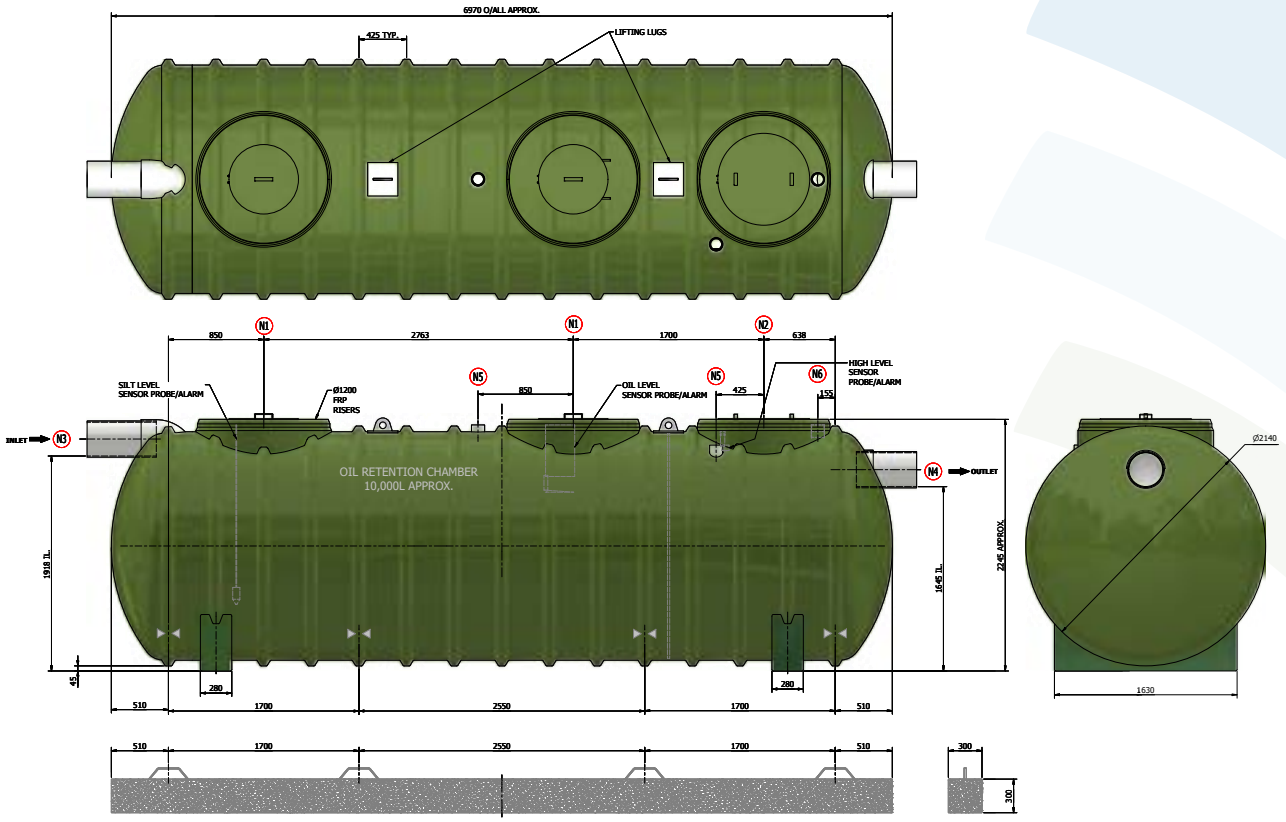
NOTE: indicates areas of importance during the installation.

DEFINITIONS

For terms related to the Tank Solutions Aquator®, see Figure 0-1, the drawing is for purposes of terminology only.

Each separator will be allocated a nominal size (NS) according to the maximum flow that can be treated to give, under the test conditions, an oil concentration of up to 5 mg/L (Class 1) in the discharge. Emergency spill capacity is defined as the maximum amount of oil the Tank Solutions Aquator® can store (capture) in an emergency spill situation. A full retention separator is fitted with a device that will prevent flow passing through the separator when the quantity of oil in the separator exceeds the oil storage volume (V).

A standard drawing of the T20 Aquator model is below for reference.



OIL STOP VALVE

A valve comprising a water buoyant element that is sensitive to any change in the water density. In the event of light liquids accumulation, the valve automatically activates and isolates the retention chamber such that pollutants are prevented from discharging from the outlet and into the surrounding environment.

FULL RETENTION

All liquid entering the Aquator® is treated. There is no by-pass possible.

RETENTION CHAMBER

The first chamber that the liquids enter where phase separation occurs. Silt falls to the Silt Retention Chamber which reduces the Total Suspended Solids (TSS) content in the outlet. Oils (light liquids) float to the surface. Water flows to and through the Oil Stop Valve.

Designed to promote non-turbulent flow through the Retention Chamber, the Aquator® utilises the density separation to retain light liquids and suspended solids in all flow conditions.

SECONDARY SEPARATION CHAMBER

The chamber that the water enters following the Retention Chamber.

COALESCING FILTER

Provides a coalescing process for the separation of emulsified hydrocarbons to reduce the light liquid content in the outlet to less than 5 mg/L.

INLET

The inlet pipe is arranged to minimise incoming turbulence and to act as a flame trap to prevent flammable and inflammable vapours passing into the drainage system.

1. PREPARATION FOR INSTALLATION

WARNING: Working in excavations is dangerous and is regulated by safety codes. Careless activity or operation of equipment can cause death or serious personal injury.

Although the corrosion-resistant Tank Solutions Aquators® are rugged, care must be taken that they are not dropped or damaged during delivery, unloading and handling on the job site. In addition, remove the manway cover and inspect baffles, coalescing filter and internal piping for damage.

WARNING: The tanks are heavy and have a large surface area. The tanks will roll on sloped surfaces and can be blown about by the wind. Uncontrolled movement of the tanks can cause death, serious personal injury and property damage.

Before the tanks are unloaded or relocated on the job site:

- Be sure that all equipment used to lift the tanks is rated to handle the load.
- Prepare the unloading and/or storage site by removing all rocks and debris.
- Arrange for sandbags or tyres to be used as chocks or use foam cradles provided.

Use the lifting lug(s) when hoisting the tank.

Do NOT wrap chain or cable around the tank. Use all of the lugs to move the tank. (See Fig. 1-1). **Use guy ropes to guide the tank when needed. Do not move the tank by rolling.**

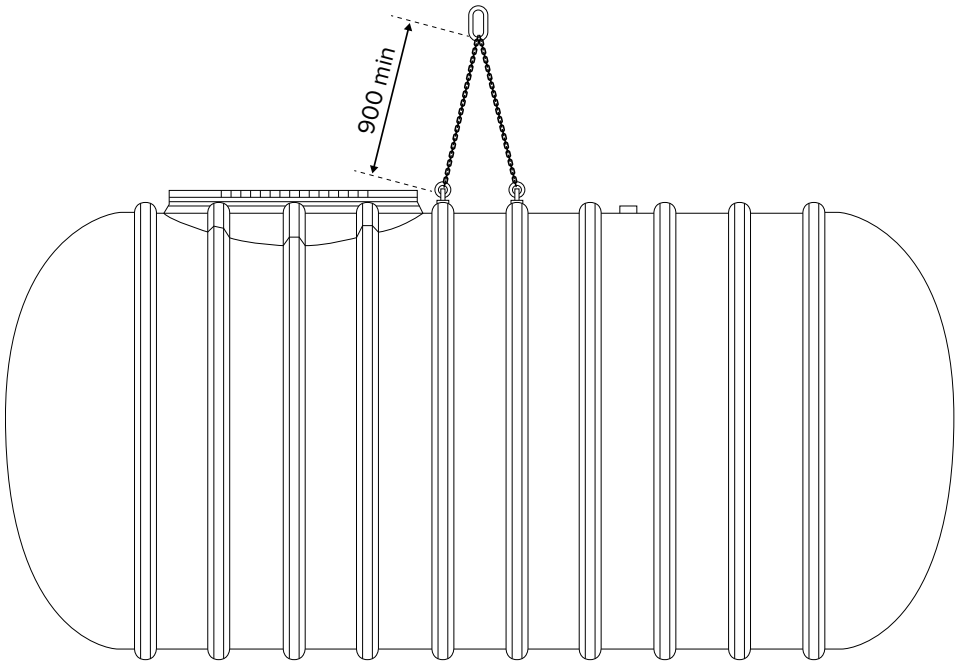


FIGURE 1-1

Whenever the tanks are stored at the site, chock them in place to prevent rolling. Tie them down if high winds are expected. Lifting lug position may vary depending on tank size but regardless of the location of lug location, the angle on lifting chains must not exceed 60 degree from the horizontal.

2. PREINSTALLATION TEST

GENERAL

Tank Solutions tanks are tested prior to shipment, but the tank must be checked at the site prior to installation in order to verify the absence of shipping and handling damage.

Visually inspect the tank exterior and interior of the tank for damage. Any damage should be documented and Tank Solutions contacted immediately. If no damage is found, complete the appropriate section on the Installation Checklist.

WARNING: **Always secure the tank before moving or lifting it. This is commonly done by connecting a crane to the lifting lugs or slings if provided. Failure to do so could result in death or serious injury. Always use guide ropes attached.**

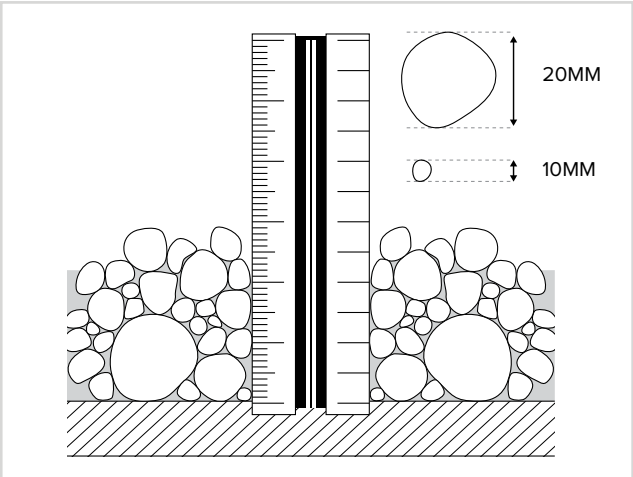
WARNING: **While moving or lifting the tank, do not position any part of your body underneath the tank. This could result in death or serious injury.**

If damage is detected, do not attempt repairs. Contact Tank Solutions on (02) 4964 8270 or your local representative.

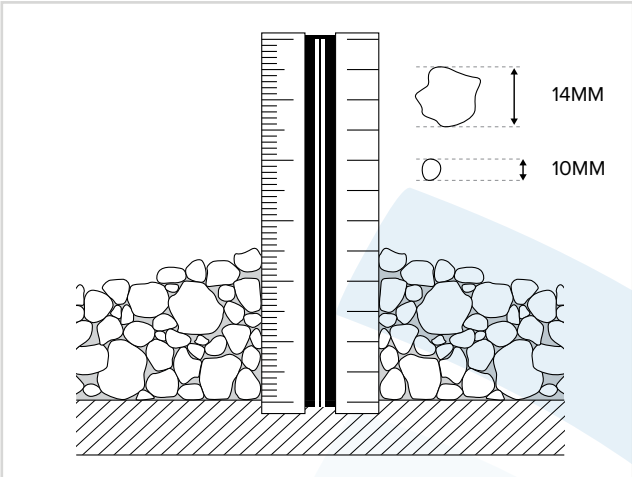
After installation and before backfilling to grade, conduct another visual inspection to verify that no damage has occurred during installation.

3. BACKFILL AND BEDDING

Tank Solutions recommends tanks be installed using either pea gravel or crushed stone which meets the following specifications.



PEA GRAVEL
Mix of rounded particles
Sizes between 10mm and 20mm



CRUSHED STONE
Mix of angular particles
Sizes between 10mm and 14mm

GENERAL

The material is washed and free flowing and confirms to the specification of AS2758 and AS1141. No more than 5% (by weight) of the material may pass through a 2.36mm sieve - See Backfill Guidelines - TD_IM_014.

Use of automated backfill delivery method i.e. rock slingers are permitted for use, however care must be taken not to direct rock at FRP tanks as this may cause damage to outer shell and void warranty. Wherever possible, sling rocks in line with or parallel with tanks. Prior to using the Rockslinger, cover the tank with Geofabric to help protect the surface. Whilst the use of a Rockslinger is permitted, Tank Solutions' preferred method of backfilling is a rock conveyor with chute or the use of a kibble bucket.

It is recommended that the supplier certify that the material conforms to AS2758 and any other applicable specifications. For additional information, refer to the Tank Solutions pamphlet Fibreglass Tank Backfill Guidelines - TD_IM_014. Please ensure a copy of the sieve analysis is sent with checklist to Tank Solutions as this will also be required to validate warranty.

Dry density of Backfill must reach 1500kg per m^3.

NOTE: If material which meets these specifications is not available, contact the Tank Solutions Technical Service Department for information on approved alternate materials and installation instructions.

NOTE: Using other than approved bedding and backfill materials without Tank Solutions prior written approval will void the tank warranty and may result in tank failure – See Backfill Guidelines - TD_IM_014.

NOTE: Do not exceed 50°C temperature in the Aquator® or its contents. Excessive heat in the Aquator® may result in minor or moderate injury or in failure of or damage to the Aquator®.

4. EXCAVATION PARAMETERS

The installing contractor must take all precautions necessary to protect employees working in or near a tank excavation. These precautions should include, but are not limited to:

- Location and protection of any utilities near the excavation before breaking ground;
- Means of securing the walls of the excavation;
- Appropriate benching of the excavation.
- Means of preventing exposure of employees to hazardous fumes from the excavation;
- Protection of employees from hazards associated with water accumulation in the excavation;
- Barricades, etc. to prevent unauthorized vehicle or pedestrian traffic;
- Inspection of the excavation and surrounding area at least daily.

The minimum depth of the excavation is normally determined by the presence or absence of groundwater and the presence or absence of traffic at the site. These dimensions are critical to the successful installation of a tank.

TANK SOLUTIONS MINIMUM BURIAL DEPTHS

Aquator® Oil Water Separator (excludes Fuel Tanks)

NO TRAFFIC		TRAFFIC	
Dry Hole	300 mm Backfill	Dry Hole	910m Backfill or 460mm Backfill + 150mm Reinforced Concrete
Wet Hole	1000 mm Backfill	Wet Hole	760 mm Backfill + 150 mm Reinforced Concrete

The tank owner or the owner's technical representative is responsible for determining sufficient overburden and/or appropriate anchoring system to that specific site.

In installations where it is not possible to pump the ground water to below the anchor depth during the excavation, contact Tank Solutions for guidance on installation process if required.

In these cases, buoyancy calculations may need to be conducted in consultation with the appropriate engineer, prior to installation.

It is the responsibility of the tank owner / designer to establish the needs and requirements for burial depth.

WARNING: **In a non-traffic installation, ensure that the areas above the tanks will never be subject to traffic load, which could cause tank damage and result in death or serious injury.**

NOTE: These depths of cover are Minimum's in all cases.

NOTE: Maximum burial depth is 2.1m of cover over top of tank.

NOTE: Any Manway/Turret Riser (if present) must not transmit load from the slab to the tank.

NOTE: Traffic loads are considered to be loadings for highway vehicles up to H-20 or HS-20 as defined in the AASHTO Standard specifications for Highway Bridges.

NOTE: Traffic loads from the top slab must not be transmitted to the riser. A minimum space of 75mm is required between the riser and the slab.

5. TANK SPACING

STABLE SOIL CONDITIONS

Where shoring is not required to maintain a vertical wall from top to bottom of the excavation, the minimum spacing between the sidewall and endcap of the tank/s must be at least 450 mm. If more than one tank is to be installed in the same hole, there must be at least 2 x Deadman between the tanks. Standard excavation batter requirements apply to all excavation to meet local and national safety standards.

UNSTABLE SOIL CONDITIONS

If the soil has less than 36 kPa/m^2 cohesion as calculated from an unconfined compression test; or soils having an ultimate bearing capacity of less than 168 kPa/m^2 or where soil will not maintain a vertical wall, the excavation must allow a minimum space equal to ½ the diameter of the tank between the side and endcap of the tank and the excavation wall. The spacing between adjacent tanks, remains the same as 2 x deadman anchor width.

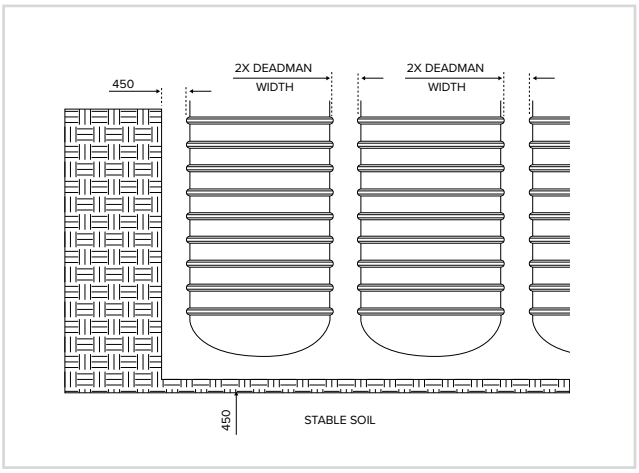


FIGURE 5-0

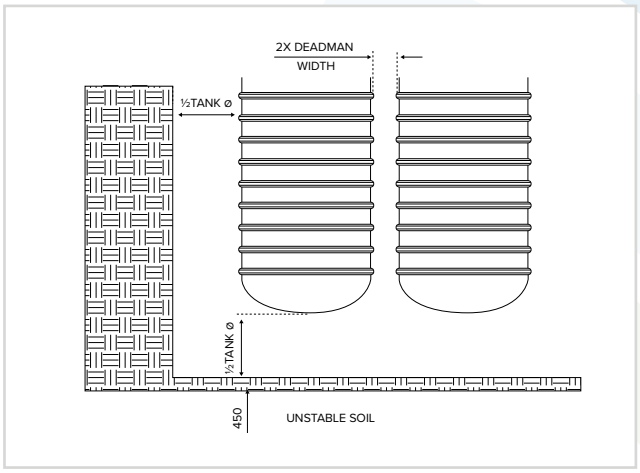


FIGURE 5-1

NOTE: These are minimum spacing's and must be increased as needed to accommodate deadmen or anchor slabs refer to Section 6 on tank anchoring. Always allow sufficient clearance to allow the deadmen to be set outside of the tank shadow.

We recommend that the tank owner seek the advice of a local foundation professional engineer if the in-situ soil is soft or inherently unstable (for example, peat, quick-sand, muck, landfill, soft or highly expansive clay, underground stream, etc.),

Stabilizing materials, such as a reinforced concrete slab, may be required under the tank as a foundation in addition to the required 300mm of bedding in an excavation where the bottom is unstable.

SHORING

In order to reduce the ½ diameter standoff to the standard minimum of 450mm, sacrificial shoring can be used if engineered to last the intended lifecycle of the tank.

Tank Solutions will require a copy of a Geotechnical Engineering Report that states the shoring will remain in place and effective for the life of the tank.

The location of the tank can be affected by the location of nearby structures. When selecting a tank position, care must be taken to avoid undermining the foundations of existing structures or new buildings and boundaries.

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.

Typically the way to check the placement of the tank in relation to a nearby structure is to do the following:

- Determine the depth of burial needed for the tank.
- Locate the footing of the structure to be considered.
- Determine the line that would fall into the ground from a 45 degree angle drawn downward from the corner(s) of the footing of the foundation that is closest to the tank.

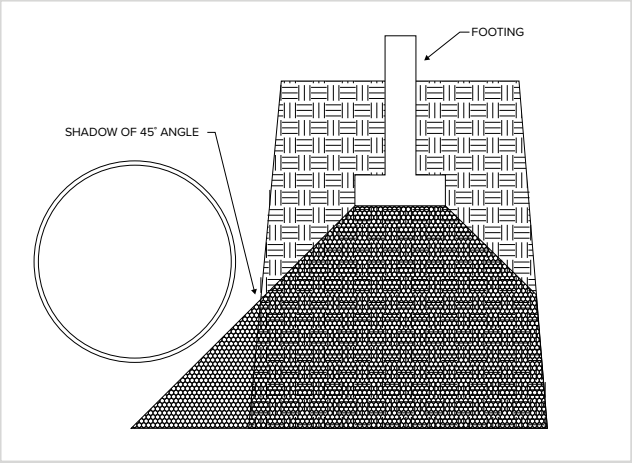


FIGURE 5-2

The tank must not fall within the “shadow” of the 45 degree angle line drawn from the foundations footing (see figure 5-2).

If the tank would fall within this “shadow” do one of the following to ensure that the tank does not fall within the “shadow”:

- Move the tank away from the existing building.
- Move the foundation of the building to be constructed away from the tank.
- Deepen the footing of the planned building’s foundation.

It is recommended that the tank owner seek the advice of a local foundation professional engineer to determine the proper placement of a tank excavation near any existing structure(s).

FILTER FABRIC

The tank owner or his technical representative is responsible for determining whether filter fabric is appropriate for a specific installation. If used, filter fabric must conform to AS3706-6-212.

Filter fabric allows the passage of water but prevents the migration and mixing of native soil and backfill material. It preserves the integrity of the backfill envelope which supports the tank. Polyethylene film is not considered an effective material to prevent migration of pea gravel and native soil; it may tear or degrade while in service.

Tank Solutions requires that filter fabric be used when the tank may be installed in.

- Areas with frequently changing ground water conditions or areas subject to tidal fluctuations,
- Unstable soils such as bog, swamp, landfill or mud,
- Wet conditions with silty soil.
- Split Backfill Method.

For further information concerning fabric specifications and installation procedures, consult the filter fabric supplier's installation guides or instructions.

To install filter fabric: Typically filter fabric manufacturers recommend that the installer line the excavation sides and bottom with the fabric, overlapping adjoining panels by at least 300 mm. Place backfill materials on the panels around the edge of the hole to anchor them in place.

In wet-hole conditions, use backfill material to sink and hold the fabric in place on the bottom of the hole.

6. ANCHORING TANK HOLD DOWN STRAPS

CAUTION: Tank Solutions recommends that every site be thoroughly evaluated for the potential to trap water or otherwise subject the tank to a rise in the local water table. Tank Solutions recommends that all tanks be anchored in installations in which water may enter the hole. Failure to anchor may damage the tank or surrounding property.

WARNING: Only use the anchor points when lifting and positioning the deadmen. A spreader bar may be required to lift longer sections of deadmen. Use guy ropes to guide the deadmen when lifting. Failure to do so could result in death or serious injury.

DEADMAN ANCHOR

A deadmen is a reinforced concrete beam with a total length that is typically equal to the overall tank length. A deadmen may be fabricated in multiple sections as long and each section contains at least two anchor points. The width of the anchor depends on the tank diameter.

NOTE: Approximate weight of the deadmen anchors per lineal metre is as follows:

150mm x 150mm	65kg per metre
300mm x 300mm	250kg per metre
300mm x 450mm	375kg per metre

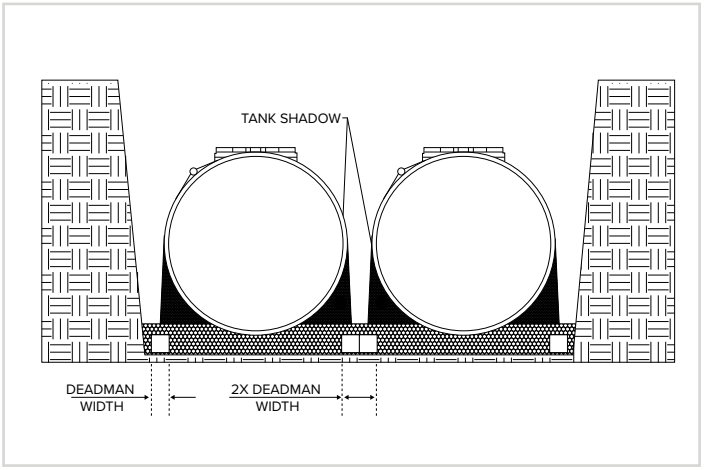


FIGURE 6-1

Lay the deadmen in the excavation parallel to the tank and outside of the tank “shadow” (see Figure 6-1). In multiple tank installations, each tank will require its own deadmen.

The minimum spacing between tanks must be equal to twice the width of a single Deadman.

Deadmen are to be butted together where multiple sections are used. Place A to A and AA to AA (Marked on Deadmen).

ANCHOR SLAB

An anchor slab is a reinforced concrete base. The total length of the slab is 460mm greater than the overall length of the tank. The minimum slab thickness is 200 mm. The width of the slab depends on the tank diameter. Provide a separate anchor point for each hold down strap. When using a concrete base slab, allow sufficient depth in the excavation for 300mm of bedding material below the tank.

NOTE: The tank owner is responsible for the design of anchor slabs.

HOLD DOWN STRAPS

Tank Solutions Hold down Straps should be used when a tank is to be anchored. The locations of the straps are marked on the tank by the ⧓ symbols. An installation guide can be provided as a separate document.

CAUTION: **Place the straps only in the locations designated by the arrow symbols ⧓.**

A measurement must be taken of the tank diameter before the straps are tightened (Measurement "1" on the Installation Checklist - Refer to Section 14 for methodology). To evenly distribute buoyancy loads tighten all hold down straps uniformly but cause no deflection of the tank. A second measurement should be taken of the tank diameter after the straps have been tightened (measurement 2). This should be compared with measurement 1 to ensure tank is inside the deflection allowance (see Deflection Allowance table on Installation Checklist and Section 14 for methodology)

NOTE: Installation check list must be filled in completely during installation – See the Single Wall Tank Installation Checklist - TD_IM_031.

7. DRY HOLE INSTALLATION

CAUTION: Tank Solutions recommends that every site excavation be thoroughly evaluated for the potential to trap water and/or a rise in the local water table. Tank Solutions recommends that all tanks be anchored and ballasted in installations in which water could rise in the hole. Failure to anchor and ballast the tank in a wet hole or one that can hold water may damage the tank or surrounding property.

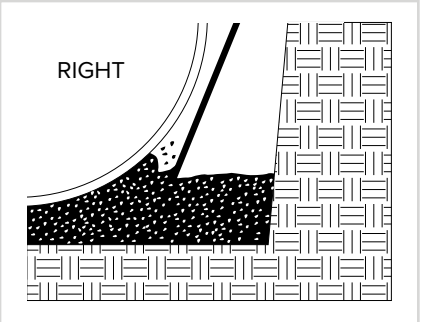
Following installation of anchors, prepare a smooth level bed, to the top of anchors (usually 300 mm), of approved backfill material. Place the tank or tanks onto the bed. Do not set Tank Solutions tanks directly onto a concrete slab or on timbers, cradles or directly onto the excavation base. Use the tops of the ribs to establish longitudinal level. Establish lateral level by placing the level across the top of a fitting, a manway or a collar. When the tank is placed, take the first internal diameter reading (Deflection reading “1” on the checklist). See Section 14 for instructions on taking deflection readings. Before backfilling, do a visual inspection on the tank, if no damage is found, note this on the Installation Checklist and continue to follow these instructions. If damage is found, contact Tank Solutions.

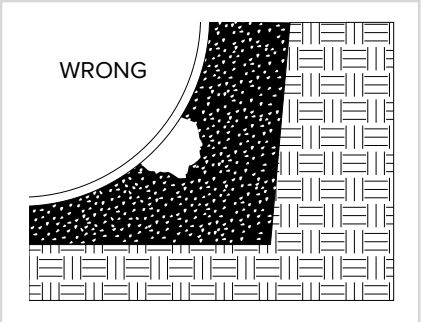
BACKFILLING

Use only approved backfill material (See Section 3). Do not mix approved material with sand or native soil. Do not use native soil as backfill material. All excavated native soil must be replaced with approved material. Place one 300mm lift of material evenly around the tank. From the side of the excavation or the top of an adjacent tank, work the material by hand completely beneath the tank body and domes to provide full support. Use a probe long enough to reach beneath the tank and push the backfill in place. Repeat this setup with a second 300mm lift. After the second lift of material has been placed and probed, the backfill can be brought to the top of the tank without further hand work.

CAUTION: Do not strike the tank with the tamping bar. The tank may be damage and require repair.

CAUTION: Do not use a mechanical compaction machine with 2m of the tank side wall or 45 degrees from finished surface and tank base.





When the tank is backfilled to the tank top:

- Take a third deflection reading (deflection reading “3” on the Checklist) and compare to the original measurement “1” to ensure the tank does not lie outside the maximum deflection range outlined on the Installation Checklist.
- DO NOT proceed to grade if the deflection is excessive.

(For installations within Water Corporation of Western Australia, please refer to Appendix A)

In addition, install the Aquator® in one of the following positions:

a) in a level and plumb position, or

b) with the outlet side 35-140mm or typically 0.5-2% fall to be lower than the inlet side.

The Aquator® is designed to be gravity-fed. If an installation requires a lift station, the lift station should be located downstream of the Aquator®.

SUMMARY

1. Prepare the tank bed
2. Set and level the tanks
3. Measure the tank internal diameter - deflection reading 1
4. Install hold down hardware (refer to Section 6)
5. Conduct a visual inspection of the tank
6. Measure the tank internal diameter - deflection reading 2
7. Place and probe the first two lifts of backfill material
8. Add backfill to the top of the tank
9. Measure the tank internal diameter - deflection reading 3
10. If concreting, backfill to sub grade (prior to concreting)
11. Measure the tank internal diameter - deflection reading 4

It is not recommended that the tank be left empty if backfilling is not to be carried out immediately.

If there is a possibility of water being present the tank should be ballasted until final backfilling to grade is completed. When filling the tank make sure that the tank is adequately vented. The vent must be large enough to allow the displaced air to escape.

NOTE: Do not ballast the tank until the backfill is even with the top of the tank, unless in a wet hole installation.

8. WET HOLE INSTALLATION

DEFINITION

A “wet hole”, is an excavation that has the potential to trap water and/or experience a rise in the local water table either in the excavation during installation or in the excavation following backfilling.

CAUTION: **Tank Solutions recommends that every site excavation be thoroughly evaluated for the potential to trap water and/or a rise in the local water table. Tank Solutions recommends that all tanks be anchored and ballasted in installations in which water could rise in the hole. Failure to anchor and ballast the tank in a wet hole or one that can hold water may damage the tank or surrounding property.**

CAUTION: **Never allow an empty tank to remain in a wet hole, or a dry hole that may become wet unless anchoring and backfilling have been completed. Failure to anchor and backfill may damage the tank or surrounding property.**

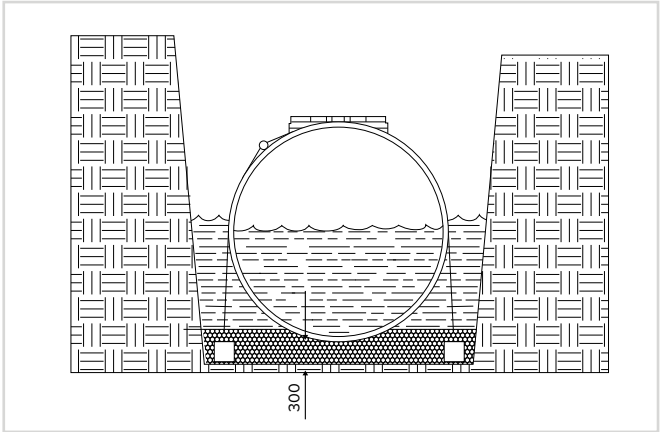
Pump the water from the hole to maintain minimum water level. Position anchors, refer to Section 6. Add a minimum of 300mm of well-placed backfill material to the hole and level the bed to assure uniform bottom support for the tank. Position the tank in the hole. Partially ballast tank until it settles firmly on the prepared bed. Ballast level in a tank must never exceed water level in hole during installation. Use only enough ballast to sink the tank until backfill material is even with the top of the tank.

WARNING: **If product is used as ballast, exercise special care in handling. Safeguard against sparks, fire or product spills. Improper handling of product can cause a fire or explosion, and death, severe personal injury or property damage.**

After levelling tanks, the anchoring procedures in Section 6 must be followed. Backfill must be added evenly after anchoring, and remaining dry hole backfilling procedures should be followed.

NOTE: Cover depth must exceed minimum depth specified in these installation instructions.

NOTE: It is recommended that the tank be completely ballasted once backfill is even with the top of the tank.



9. POST INSTALLATION TESTING

SECOND INTERMEDIATE DEFLECTION MEASUREMENT

After backfill is brought to the top of the tank, make an intermediate measurement of vertical deflection (deflection reading “3” on the Checklist) according to the instructions in the Section 14 (see Installation Checklist for deflection allowance).

10. BALLASTING

Only under wet-hole conditions as described in Section 8, should ballast be added before the backfill is even with the top of the tank. When filling the tank, make sure the tank is properly vented. The vent must be large enough to allow the displaced air to escape. In general a tank is not adequately protected against floatation until the tank is fully backfilled and the top slab is in place. Therefore, during the installation process, the tank should only be fully ballasted after the backfill is level with the top of the tank.

IMPORTANT NOTE: Please refer to section 17 (filling the Aquator) prior to ballasting. Both the inlet and outlet valves, if present need to be open before filling commences.

11. PIPING AND VENTING

WARNING: All underground tanks/compartments shall be adequately vented to prevent the development of vacuum or pressure when filling or emptying the tank. Failure to properly vent a tank could cause tank failure and result in death or serious injury and may void the warranty.

WARNING: If owner/operator allows pump or pressure-filling of the tank, owner/operator must ensure that the tank is not equipped with overfill protection, such as an automatic shut off device or ball float valve. Owner/operator must notify whoever will fill the tank that automatic shut-off equipment is required on the delivery truck to prevent an overfill and that over filling the tank while under pressure could cause tank failure even if the tank vent is unrestricted. Failure to follow these instructions each time the tank is filled could cause an overfill, over pressurization or tank failure, and could result in death or serious injury.

The tanks venting system must be adequately to ensure that atmospheric pressure is maintained at all times, including when filling & emptying the tank.

NOTE: All piping must conform to all applicable codes and standards. See INTRODUCTION.

All piping must be properly sized and influent piping must be gravity-fed.

Turbulence caused by improperly sized piping or pumping influent into the Aquator® may damage the Aquator®, reduce its efficiency or require flow conditioners to augment the system.

Make sure the diameters of the connecting pipework are no larger than the diameters of the inlet nozzle and the outlet nozzle.

Install expansion joints on any inlet or outlet tee/elbow connections.

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

Slope the inlet pipework downward to the Aquator® to establish a proper gravity flow.
Slope the outlet pipework downward away from the Aquator® according to job specifications (typically between 0.5–2.0 %) to establish a proper gravity flow.

Tank Solutions recommends installing a gross pollutant trap (GPT) large enough to collect debris (such as leaves, gravel, sand, rags, etc.) upstream of the Aquator®.

A valve can be installed upstream of the inlet tee / elbow connection.
A valve can be installed downstream of the outlet tee / elbow connection.
Make sure inlet valves have no valve seat or reductions and are the same size as the piping.

To prevent debris from entering the Aquator®, plug the inlet piping and outlet piping until the drainage site is paved and the GPT (if present) is installed.

If valves are installed, keep the valves completely open during normal operation.

Vent the Aquator® to atmospheric pressure to ensure proper operation.

Vent the Aquator® inlet and outlet pipework to atmospheric pressure to ensure proper operation.

Provide flame arrestors when required by regulations and standards and when appropriate for safety reasons.

12. BACKFILLING TO GRADE

When the tank has been set, tested and backfilled, and all piping and venting has been completed, the balance of the backfill material may be added.

When the tank has been backfilled to Sub Grade (before concrete), take the final diameter reading (Deflection reading “4” on the checklist).

The same material as specified in Section 3 must be used to completely fill excavation. The backfill must be free of debris. Any blocks or bricks used as support material during piping must be removed prior to completion of backfilling. Safety measures, such as placing barricades until installation is complete, should be used around the excavation site.

Be sure that the installation meets all of the requirements of minimum cover as specific in Section 4. Be sure that the checklist is properly completed.

13. DEFLECTION MEASUREMENT

Four deflection measurements should be taken:

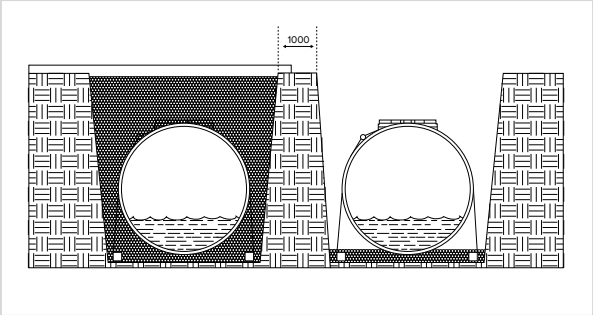
1. Initial measurement on placement of the tank in the hole (measurement “1” on the Installation Checklist) – See Installation Checklist - TD_IM_001.
2. An intermediate measurement when straps are tightened to ensure uniform tightening (Measurement “2” on the checklist)
3. When backfill to top of tank is completed (Measurement “3” on the checklist)
4. At Sub Grade - before Concrete topping (Measurement “4” on the checklist) – See the Single Wall Tank Installation Checklist - TD_IM_031.

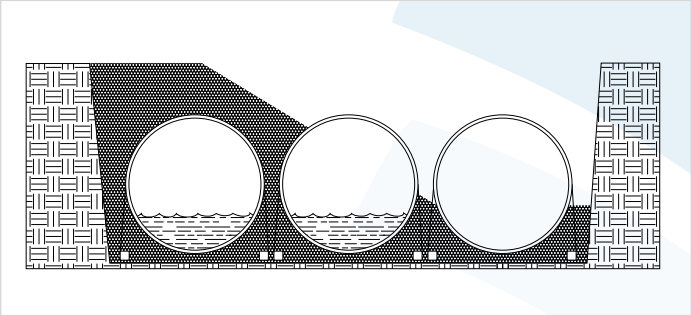
14. ADDING TANKS AT EXISTING LOCATIONS

Additional Tank Solutions tanks can be installed at existing locations if proper foundation support exists. The method of installation is the responsibility of the owner / fuel system designer. It is required, however, that one of the following methods be used.

The preferred method is to install a new tank in a separate hole at least 1 Meter from the original hole.

Caution must be exercised in keeping unusual surface loads off existing tanks. The natural barrier of undisturbed soil between tanks must be maintained.





If this method is not practical, additional tanks may be buried in the same installation hole. After emptying existing tanks to less than one-quarter capacity, remove the surface pad. Enlarge the excavation for the new tank, leaving as much backfill as possible around existing tanks.

It may be necessary to install shoring to make sure that existing tanks do not move and that sufficient backfill remains. The new tanks must be installed by following the procedures in this guide.

CAUTION: **If any existing tank(s) should move during the installation of new tanks, they must be removed and reinstall according to the tank manufacturer's instructions. Failure to follow this Caution could result in minor or moderate injury.**

Remember to leave minimum of 2 x Deadman width as spacing between tanks. The backfill material must be the same as that specified in Section 3.

15. INSTALLATION OF FRP RISER / TURRETS

Tanks are often supplied with 1200mm collar / riser assemblies - For detail on the installation of the riser, See Riser Installation - TD_IM_005.

16. INSTALLATION NOTES FOLLOWING EN 858-2:2003 (E);

- The light liquid shall not be able to escape from separator or the extension shafts.
- Separator systems shall be installed in such way that the level of the manhole cover (ground level) is higher than the water level on the surface being drained. This will prevent the possible escape of light liquid from the system
- Separator system shall be only installed on drainage systems where light liquids need to be separated from water and retained within the separator. They shall not be installed on drain and sewer systems containing domestic wastewater.
- The drainage of areas where light liquids are unlikely to occur, such as roofs and grassed areas should not discharge through separators.
- The connection of the separator system to the drainage system shall be done in accordance with the local regulations.
- Sampling access is integral, immediately downstream of the separator.
- To avoid turbulence within the separator, pumping and lifting plants should be installed downstream of the separator.
- The provision of traps on drains depends on local regulations. The drains as well as the connected pipelines shall be installed to fall to the separator system.

If for technical reasons long pipe runs are required for large collecting areas, e.g. tank farms, army barracks, refineries, full pipelines may be necessary for special protection of the drainage installations.

17. FILLING THE AQUATOR®

Open the Aquator® inlet and outlet valves if present.

Fill the Aquator® through the manway or inlet pipework.

Place the fill hose through the fitting and secure it so it does not spray directly on the coalescing filter. Both chambers of the Aquator® should be filled with clean water up to the invert level of the outlet pipe. It is now ready for use.

If probes are present, Tank Solutions recommends that the Aquator® be filled completely to check probe operation during a start-up.

The Aquator® shall be adequately vented to prevent the development of vacuum or pressure when filling or emptying the tank. Failure to properly vent the Aquator® could cause tank failure.

18. CONNECTING AQUATOR® TO SENSORS

See Installation Manual for alarm instructions. (Darcy Spillcare Manufacture)

It is recommended that the sensors and alarm unit be fitted, tested and commissioned by a licensed electrician. This is to ensure that the excessive oil probe is calibrated correctly, raising an alarm when 90% of the oil storage volume is reached. Should the oil level alarm fail to provide an early warning, excessive oil could overflow from the separator, thus polluting the environment.

19. OPERATING THE AQUATOR®

Operating the Aquator® as specified in this manual increases the efficiency and effectiveness of the Aquator®. Take ordinary fire prevention measures around separated oil to ensure that all flames, sparks and other ignition devices and materials are kept away from the Aquator®.

Safeguard against sparks or fire in the vicinity of the Aquator®. Vapours and liquid oil may be flammable and cause a fire or explosion.

Check oil level after every rainstorm or in accordance with local codes. Dispose of oil from the Aquator® as required by federal, state and local regulations and codes.

Do not collect "waste" oils in the Aquator® as they may contain chemicals that may damage the Aquator® tank, pipework and internal components.

Remove oil only during non-flow conditions so that only oil is drawn off.

20. MAINTAINING THE AQUATOR®

The Aquator® requires regular maintenance, including the following cleaning and inspection procedures, to operate most efficiently and effectively.

Never enter the Aquator®, the riser, the manway extension or any other enclosed space without proper training and WHS-approved equipment. Aquator® internal surfaces are slippery.

Ventilate all enclosed spaces according to methods described in applicable regulations and codes before entering an Aquator® to avoid asphyxiation or ignition of vapours or liquid oil, which are flammable.

Perform maintenance at three, six- or twelve-monthly intervals depending upon the site conditions.

Under the following conditions, maintenance is required more frequently:

- If the Aquator® bottom sludge accumulation is more than 30 cm deep;
- When the effluent water quality does not meet levels mandated by applicable federal, state and local codes and regulations;
- After a major oil spill has occurred.

20.1 BEGIN MAINTENANCE BY CLEANING THE AQUATOR®, USING THE FOLLOWING PROCEDURE:

- Remove the coalescing filter for cleaning.
- Use normal water pressure, ensuring the dirty water runs back into the drainage system leading to the Aquator®.
- **Do not stand on the coalescing filter support grating. This grating is not designed to accept loads and is slippery.**
- **Sludge and debris should be removed from the Aquator® using a vacuum truck.**
- **Do not use picks, axes, hammers or other heavy tools or objects when breaking apart sludge in the Aquator®. Such tools may damage the Aquator®.**
- **Do not use soaps or detergents when cleaning the coalescing filter. Soaps or detergents may damage the coalescing filter and/or reduce the efficiency of the Aquator®.**

20.2 CHECK THE OIL/WATER SENSOR (IF INSTALLED) FOR MOVEMENT

- Remove and clean the sensor as per manufacturer's instructions if the sensors are fouled. This is usually simply a matter of wiping and reinstalling.
- Visually inspect the Aquator® interior (walls, components and inlet piping) for damage. If you observe any damage, contact the Tank Solutions.
- If entry to the Aquator® is required, remove all liquid from the Aquator® and isolate all inlet and outlet pipework and valves.

- **Properly dispose of oil removed from the Aquator® as required by federal, state and local laws, codes and regulations.**
- **Failure to close inlet and outlet piping valves or plug the piping before entering the Aquator® could result in death or serious injury.**

20.3 MINIMUM MAINTENANCE PROCEDURES

The maintenance shall be carried by experience personnel and in accordance with the manufacturer's instructions and should include the following as a minimum;

a) Sludge trap
   - Determination of sludge volume

b) Separator
   - Measure the thickness of light liquids
   - Check the operation of the automatic closure device
   - Check the coalescing devices for permeability, if the water levels in front and behind the coalescing device show significant difference
   - Check the function of the warning device

c) Sampling port
   - Clean the drain channel
   - Light liquid and sludge shall be removed as required.
   - Before putting in service the Aquator® shall be filled with fresh water.

NOTE: Emptying is recommended when one half of sludge volume or 80% of the storage capacity of the separator is reached. In exceptional circumstances, when personnel need to enter the separator, it shall be fully drained and thoroughly ventilated.

The regulations / decrees for avoiding accidents and the handling of dangerous materials shall be followed.

20.4 GENERAL INSPECTION REQUIREMENTS

Every five years the separator shall be emptied and then submitted to general inspection covering the following items;

- Tightness of the system
- Structural condition
- Internal coating, if present
- State of inbuilt parts
- State of electrical devices and installations
- Checking of adjustment of automatic closure device.

The cleaning and maintenance records shall be kept and made available to relevant authorities upon request (such as, but not limited to, the local water utility) and shall contain remarks on specific events (e.g. servicing, repairs, accidents).

- Re-install the cleaned coalescing filter unit, support grating and retaining pieces.
- If the coalescing filter unit is not properly installed, the Aquator® will not work properly or efficiently.

- Check to see that the coalescing filter unit is reinstalled properly. Improper installation may result in damage to the Aquator® and/or reduce its efficiency.
- Attach the manway lid.
- Refill the Aquator® to at least half way by using clean water. (See SECTION 18 for instructions.)

21. OPTIONAL PROCESS FOR CLEANING THE AQUATOR®

If it has been less than 12 months since last cleaning the Aquator® and if only the bottom sludge has built up and the effluent water is contaminant-free, the following procedure may be sufficient for proper maintenance:

1. Vacuum out the sludge from silt chamber.
2. Recharge the Aquator® by filling it to the invert level of the outlet pipe with clean water.
   (See SECTION 18 in this manual.)

22. INSPECTING THE AQUATOR®

Continue maintenance by performing the following inspections as usage and the site conditions require.

- Inspect and clean the GPT.
- Inspect the inside of the Aquator® looking for sand, trash, sludge and oil build-up.
- Inspect effluent water for oils or other contaminants during or immediately after a heavy rainfall.

23. REMOVING AND CLEANING THE COALESCER

Keep spare coalescing filters covered or out of contact with ultraviolet light. Ultraviolet light from sunshine may damage the coalescing filter if left exposed for extended periods of time and may reduce the efficiency of the Aquator® when installed.

Never enter the Aquator®, the riser, the manway extension or any other enclosed space without proper training and WHS-approved equipment. Failure to follow this warning could result in death or serious injury.

Remove the sludge from under the coalescing filter support grating in the coalescing chamber.

Remove the coalescing filter. Use normal water pressure, ensuring the dirty water runs back into the drainage system leading to the Aquator®.

24. HANDLING A MAJOR OIL SPILL

When the oil exceeds the nominal oil storage capacity of the Aquator® because of a spill, it may be considered a major oil spill. Take the following actions:

1. Notify the authorities required by applicable federal, state and local regulations and codes.
2. Pump out the oil in the Aquator® by following instructions in SECTION 13.
3. Charge the Aquator® with clean water.
4. Wait one hour for possible oil-level build-up that may release from the coalescing filter
5. Check oil level again.
6. Repeat if necessary, to make sure all oil is removed from the Aquator®.

25. LIMITED WARRANTIES

Each product is covered by a product-specific limited warranty, which contain operating guidelines and parameters that should be reviewed as applicable. Copies of the limited warranties are found in Tank Solutions product brochures and are available upon request.

26. RETAINING THE AQUATOR MANUAL

After installation, tank installer must give Aquator® Installation Manual to Aquator® owner and operator.

After installation, tank owner must retain Aquator® Installation Manual for future reference to operating and maintenance guidelines.

27. SERVICE REPORTS

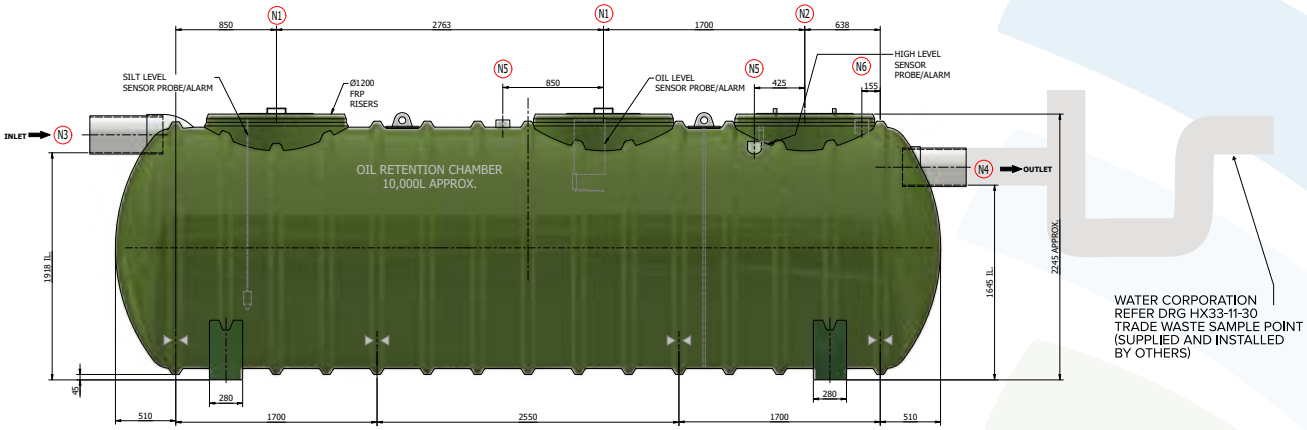
In line with the servicing requirements for the Aquator set out in this manual, Water Corporation requires the owner to ensure that service reports are generated as required and that a copy is retained at the premises where the product is installed.

APPENDIX A

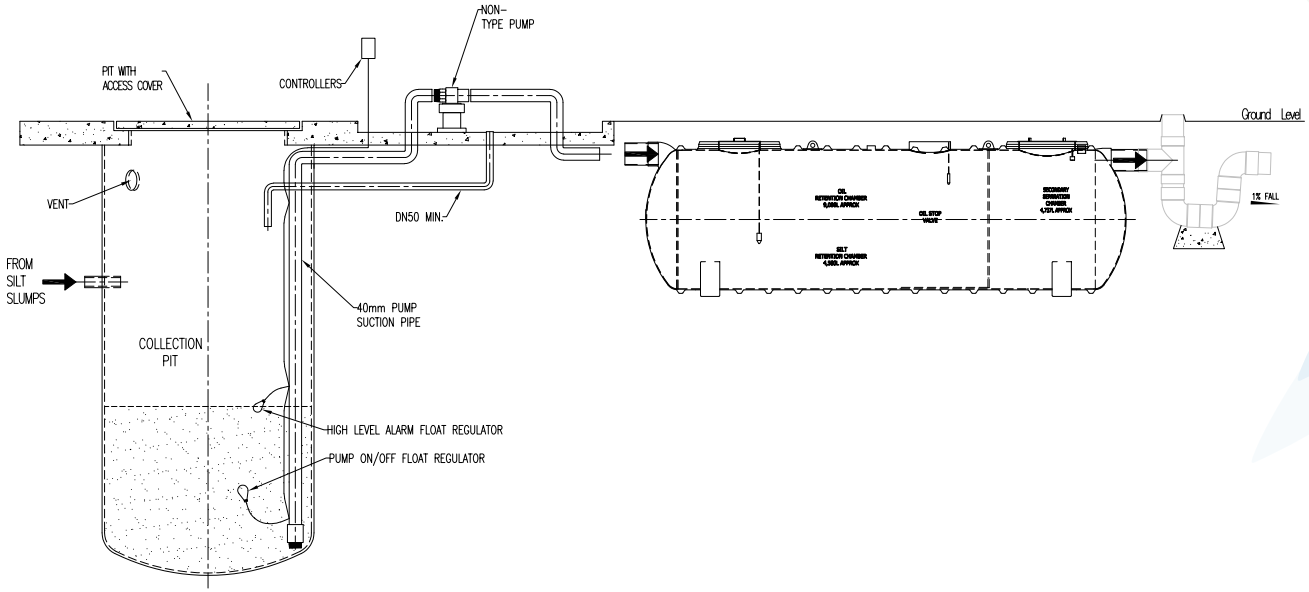
SPECIFIC INSTALLATION REQUIREMENTS FOR THE WESTERN AUSTRALIAN WATER CORPORATION

All Aquator® installations in the Water Corporation network **must** be installed with a Trade Waste Sampling Point (TWSP) on the Aquator® outlet pipework. See Water Corporation drawing number HX33-11-30 for details.

An example arrangement is shown below.



The below drawing shows a broader typical installation with a collection pit and TWSP on for reference.



INSTALLATION IN GARDEN BED OR GRASSED AREA

"If installed in garden bed, grassed area or the like then final finish of the entire length and width of the cover base must be of solid material (preferrably concrete) and finished to the top of the lid to allow safe opening of lid covers."

APPENDIX B

AQUATOR® INSTALLATION CHECKLIST

An electronic version of this form is available on www.tanksolutions.com.au

AQUATOR® OIL WATER SEPERATOR

The installing contractor must read the installation manual and complete and return this checklist within 30 days after the date of installation to validate the Tank Solutions warranty. The tank owner must retain a copy of this checklist and a copy of all deviation authorisations to substantiate any warranty claim.

Date of Installation:

Site Owner:

Site Address:

Street *City* *State* *Postcode*

Installing Contractor:

Installation On-Site Supervisor:

Supervisor Accreditation Number & Expiry Date:

Contractor Address:

Street *City* *State* *Postcode*

TANK INFORMATION	TANK #1	TANK #2	TANK #3	TANK #4
Tank Number				
Total Capacity				
Compartments: Single (SC), Dual (DC) or Triple (TC)				
Configuration (Compartment Volumes)				
Tank Diameter				

	SITE INFORMATION	TANK #1	TANK #2	TANK #3	TANK #4
0	Confirm that the installer has read the installation manual and that the installation will be carried out as per the steps advised in the installation manual. – Yes or No				
1	Primary backfill meets Backfill Guideline requirements (Form TD_IM_014) – Yes or No				
2	Secondary backfill material will be used – Yes or No				
3	Has Tank Solutions been advised that Split Backfill procedure will be used? (Must advise Tank Solutions prior to using Split Backfill procedure)				
4	If Secondary backfill material is used, does it meet manufacturer's requirements (Form TD_IM_020) – Yes or No				
5	Geotextile Fabric will be used – Yes or No				
6a)	Is the excavation shored – Yes or No				
6b)	Will the shoring be removed – Yes or No				
6c)	Has a suitably qualified Engineer confirmed the Shoring will remain effective for 30 years? – Yes or No				
7	Tanks in trafficable area – Yes or No				
8	Hole Condition – Wet or Dry Dry: Water not anticipated to reach tank. Area not subject to flooding or water table rising. Wet: Excavation may trap water. Area subject to flooding or water table rising.				
9	Additional Comments				

	PRE-INSTALLATION INSPECTION AND TESTING	TANK #1	TANK #2	TANK #3	TANK #4
10	Visual Inspection – Is there evidence of damage (holes, cracks, gouges) in the tank – Yes or No (If yes, document any damage found and send, with pictures to Tank Solutions prior to Installation)				
11	Has the valve been opened prior to filling – Yes or No				

	DURING INSTALLATION	TANK #1	TANK #2	TANK #3	TANK #4
12	Anchoring performed in accordance with Installation Instructions – Yes or No				
13	Backfill material bed is level and a minimum of 300mm deep, over native soil or slab before setting tank				
14	Record Internal Diameter Measurement #1 (before installation)				
15	Tank Spacing - Tanks are spaced correctly from each other and excavation walls as per the Installation Instructions – Yes or No				
16	Record final tank spacing between tanks				
17	Record final tank spacing between tanks and excavation walls				
18	Record Internal Diameter Measurement #2 (after straps are installed)				
19	Subtract diameter measurement #2 from #1 and record				
20	Deflection measurements are within acceptable limits (see Table 1 below) – Yes or No				
21	Voids under tank between ribs and domes filled with backfill and tamped – Yes or No				
22	Backfill placement meets requirements – Yes or No				
23	Has the TWSP been installed as per Appendix A and Water Corporation drawing HX33-11-30 – Yes or No A TWSP MUST be installed before proceeding any further.				
24	Record Internal Diameter Measurement #3 (after backfilling to top of tank is complete)				
25	Subtract diameter measurement #3 from #1 and record				
26	Deflection measurements are within acceptable limits (see Table 1 below) – Yes or No				
27	Tank was ballasted prior to bringing backfill to top of tank – Yes or No				

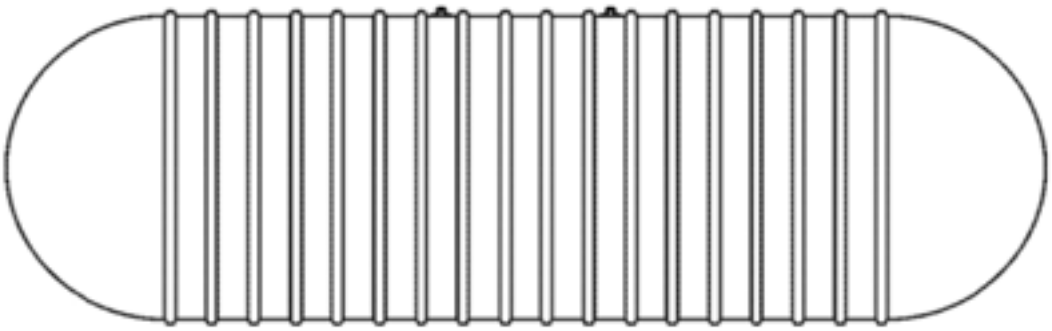
	AFTER BACKFILLING IS BOUGHT TO TOP OF TANK	TANK #1	TANK #2	TANK #3	TANK #4
28	Tank was ballasted after to bringing backfill to top of tank – Yes or No				
29	Record final depth of backfill over the tank				
30	Record Internal Diameter Measurement #4 (after backfilling is bought to sub-grade)				
31	Subtract diameter measurement #4 from #1 and record				
32	Final Deflection measurement are within acceptable limits (see Table 1 below) – Yes or No				
33	Thickness of concrete surface slab				

TABLE 1 – MAXIMUM ALLOWABLE DEFLECTIONS

NOTE: If Deflection is 75% of Maximum, notify Tank Solutions Technical Department immediately.

TANK DIAMETER	MAXIMUM DEFLECTION	NOMINAL INSIDE DIAMETER	DEFLECTION MEASUREMENT PROCESS	DEFLECTION MEASUREMENT READINGS							
				TANK 1		TANK 2		TANK 3		TANK 4	
mm	mm	mm	Position	P1	P2	P1	P2	P1	P2	P1	P2
1470	19	1500	ID Reading 1								
2140	24	2026	ID Reading 2								
			Deflection Check 1 Reading 1 - 2								
			ID Reading 3								
			Deflection Check 2 Reading 1 - 3								
			ID Reading 4								
			Deflection Check 3 Reading 1 - 4								

Deflection Measurements Verified by: _____



MARK LOCATION OF DEFLECTION READINGS

Measured at:
☐ End ☐ Centre

TANK WARRANTY

In order to validate Tank Warranty, please send the completed Installation Checklist along with the following documents back to Tank Solutions within 30 days of the Tank Installation:

- Backfill Sieve Analysis

Whilst not a condition of Warranty, for completeness of our records Tank Solutions would appreciate it if the following were also sent through if available:

- Site Tank and Pump Layout
- Pictures of Installation

TANK SOLUTIONS
FUEL · CHEMICALS · WATER

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