UTG 9502	
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Technical Data Sheet UTG 9502

Installation Guidance Notes

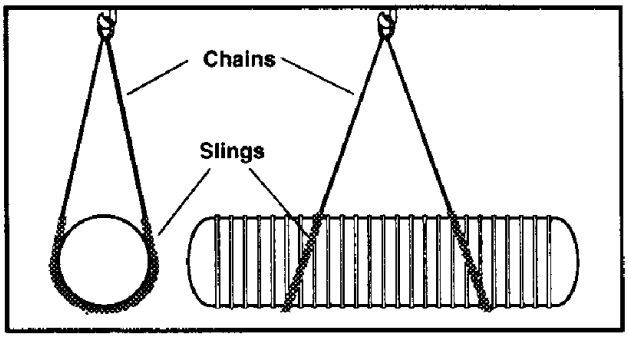
Concrete Surround – Underground Tanks

General

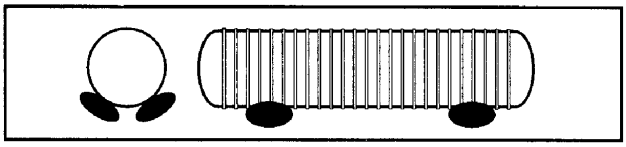
1. These guidance notes refer only to the installation of Conder Environmental Solutions underground GRP tanks suitable for concrete surround.
2. These guidance notes do not provide specific, site-related installation instructions.
3. If in any doubt about any aspect of the installation please contact Conder Environmental Solutions on 0870 264 0004.
4. Generally the depth from finished ground level to the top crown of the main tank shell should be no more than 2m meters.

Transportation, unloading and storage of tanks

1. Tanks must be held down during transportation using nylon straps, do not use chains, cables or wire ropes to hold tanks.
2. Do not over tighten straps, causing deformation of the tank shell.
3. Tanks are best lifted by a crane utilising webbing lifting straps – do not use chains, cables or wire ropes in contact with the tank.
4. It is recommended that a lifting beam is used for tanks longer than 8 meters.
5. Smaller tanks may be lifted with other suitable site equipment, but greater care is needed to control the lift and to ensure the tank is not damaged.
6. Not all tanks will have their centre of gravity at the centre of the tank. Therefore, the lifting straps need to be arranged to ensure the tank is stable during lifting.
7. Move tanks only by lifting and setting, do not drag or roll.
8. Do not drop or roll tanks from the delivery vehicle.
9. Place tanks carefully onto a smooth level even surface, free from rocks, large stones or other debris that could cause point loads on the tank shell.
10. Chock tanks using tyres, sandbags or similar to prevent rolling.
11. In high wind conditions, consideration should be given to strapping down the tanks to prevent damage.



Tank Lifting



Tank Chocking

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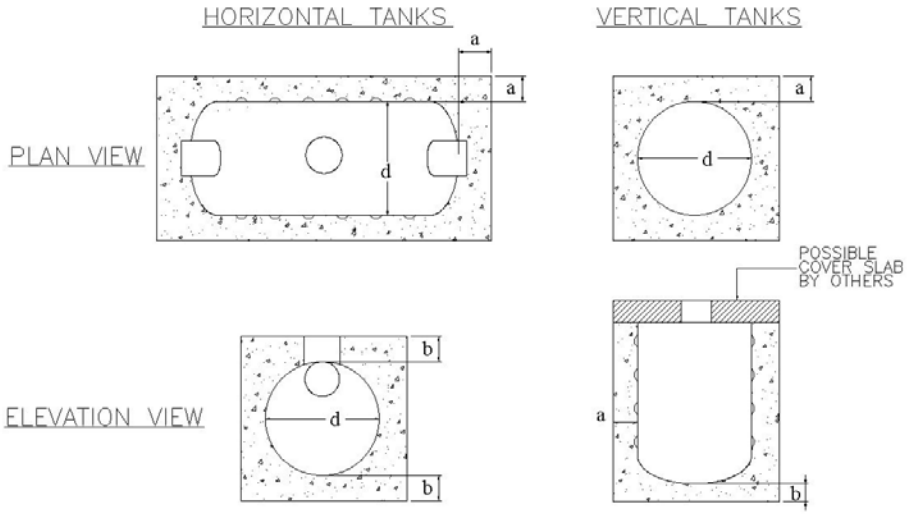
Pre-Installation Inspection

1. Tanks should be subject to a visual inspection prior to installation. Special consideration should be given to strap positions. Check for: fractures to the shell or ribs; delaminations; scratches or abrasions deeper than 1.5mm; stress cracks or star crazing.
2. Any damage should be notified to the delivery driver and to Conder Environmental Solutions.
3. Do not undertake any unauthorised repairs, as this will invalidate the tank warranty.
4. Check the invert depth is correct, the tank is correct grade for granular surround and that the inlet and outlet pipe orientations are correct

Excavation

1. Excavations should be planned with due regard to Health and Safety requirements, and should be either shored or battered back to a “safe” angle.
2. The excavation should allow for the minimum concrete surround thickness (tank sides /ends and base) as shown in the table below, while taking into account any shoring used.
3. Ground instability at formation level e.g. running sand, may necessitate over-excavation and stabilisation with hardcore or blinding concrete.



Tank Diameter ‘d’ (mm)	‘a’ minimum (mm)	‘b’ minimum (mm)
1000	150	150
1200	150	150
1500	200	200
1800	250	250
2500	300	300
3000	300	300
4000	350	300

Buoyancy and Anchoring

1. The dimensions, in the above table, may need to be increased if there is a risk of high ground water level at the tank location. To avoid floatation we recommend a factor of safety of 1.5 against floatation. Mass concrete has a minimum density of 2,300 kg/m^3

Concrete Specification

1. The specification for the concrete mix to surround the tank should be selected by the tank installer taking into account the site conditions and application requirements.
2. For a typical non structural application in good ground conditions, with non aggressive soils, a concrete with a 28 day compressive strength of 20 to 30N/mm^2 with a 25 to 50mm slump, complying with the relevant BS EN, is generally suitable. For non typical applications, aggressive soils or structural applications specialist advice should be obtained.

Lift height (rate of rise)

1. Determine the lift height (m), or rate of rise (m/h) for the specific concrete type used, to ensure that a design pressure (*P max*) of 15kN/m^2 on the tank is not exceeded.

Vibration

1. The design of the tank assumes minimal compaction of the surrounding concrete. Where necessary, this may be extended to include light internal vibration. Do not use deep revibration which will substantially increase the pressure on the tank, possibly causing failure.

Impact of Concrete on Discharge

1. The effects of concrete discharge impact are considerable. These effects must be considered to enusre the maximum pressure of 15kN/m2 on the tank is not exceeded. Under no circumstances should concrete be discharged directly onto the tank.

Live Load

1. If the tank is installed in an area where traffic, or other superimposed loadings can be applied, a structural engineer should be consulted, to design a reinforced concrete slab spanning over the tank. This is to prevent the load being transmitted to the tank (or its concrete surround). If this slab is constructed immediately above the tank, it should be separated from the concrete surrounding the tank by compressible material.

Tank Burial Depth

1. This grade of tank is designed to be installed below ground and completely surrounded with concrete.
2. Generally, the depth from finished ground level to the top crown of the main shell should be no more than two metres. This may vary dependant upon ground water conditions. Deeper inverts may be accomodated on a standard shell providing the water table level does not exceed two metres above the top crown of the main shell. For deeper burial with high water table conditions heavy duty shells are available. If the tank is installed outside these parameters it may suffer irreparable damage. Should you be in any doubt regarding suitable shell application please contact Conder Environmental Solutions.

Control of Groundwater

1. Tanks must not be subjected to buoyant forces during installation, taking account of ground water levels and surface water run-off, and their accumulation in the tank excavation. This applies even if the tanks are mechanically anchored.

Installation Procedure

1. Maintain a completely dry excavation until the final pour of concrete has set. Failure to do this may result in voids beneath the tank and subsequent tank failure.
2. Place the concrete in the base of the excavation to form a level and smooth base onto which the tank can be placed. The base concrete thickness should be in accordance with the information provided above.
3. Place the tank onto the concrete base, while the concrete is still wet, and determine the correct orientation for the tank pipework. Connect the pipework to the tank, ensuring correct alignment.
4. Fill each chamber of the tank with clean water to a depth of 300mm and recheck the pipework levels and connections. Commence backfilling evenly around the tank with concrete ensuring there are no voids, particularly at the bottom of the tank shell. Continue filling the tank chamber(s) with water whilst evenly backfilling with concrete around the tank ensuring that the progressive water level is no more than 300mm above the concrete level.
5. Connect and seal turret extensions prior to completing the concrete encasement of the main tank (the height shown in the above table). Allow the concrete to cure.
6. Using appropriate formwork continue pouring concrete around the tank superstructure, i.e. access turrets, in lift heights not exceeding 500mm, allowing the concrete to set between each lift. The lift height, rate of concrete rise, or concrete compaction must not be to an extent which causes any part of the tank superstructure to distort, as this will damage the tank.
7. Complete the backfill to ground level using free flowing granular material. Trim all access turrets and prepare suitable footings for each manhole frame ensuring any loads on the covers are not transmitted to the tank access turrets or access extensions, if fitted.

Access Shaft Extensions

1. Access extensions should be surrounded with concrete poured in 500mm lifts, allowing an initial set between each lift. The pressure from concrete placed in higher lifts may cause access extensions to distort or collapse.
2. Loose shafts should be sealed using silicon sealant, sikaflex –291, or similar prior to installation to prevent ingress of groundwater under high water table conditions. It is the installation contractor’s responsibility to ensure a watertight seal.

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