Installation Guidelines for spherical tanks (Septic tanks and Cesspools)

These guidelines represent best practice for the installation of Anua spherical tanks. Many years of specialist experience have led to the successful installation of thousands of units. It must be noted, however, that these guidelines are necessarily of a general nature. It is the responsibility of others to verify that they are appropriate for the specific ground conditions and in-service loads of each installation. Similarly, a qualified specialist (e.g. civil engineering consultant or certified installer) must verify any information or advice given by employees or agents of Anua regarding the design of an installation.

BEFORE INSTALLING YOUR TANK

- Ensure Building Regulation approval.
- Ensure ground porosity is suitable.
- Inspect tank for damage before installation. Our tanks have been fully tested before despatch from our factory. Once the tank has been installed, we cannot accept claims for damage.
- Check that you have the correct invert drain depth (neck height) of tank. A label indicates the maximum permissible depth.
- Ensure access for desludging tanker. (Building regulations suggest 30m max)
- Check orientation and heights of inlet and outlets.
- Check that the tank is suitable for its application. Septic tanks and cesspools should not be used for silage effluent, chemical toilet waste or any other chemicals. Consult Anua if in doubt.

DO:

- Use the correct backfill material.
- Site tank at furthest practical location from habitable dwellings. Most building regulations recommend a minimum of 15m.
- Fit the correct cover & frame (pedestrian duty) LOCKABLE.
- Consider drainage falls, generally 1 in 60/70 between house and tank and max. 1 in 200 for irrigation system.
- Lift the tank using adequate ropes or slings through both of the lugs fitted either side of the neck.

DO NOT:

- Subject the tank to impact or contact with sharp edges.
- Add neck extensions to the tank, nor, build a brick manhole above the tank neck (as this increases burial depth of the tank). We do not recommend extending the neck of the tank under any circumstances.
- Install tank deeper than the depth that the fitted neck will allow.
- Install in trafficked areas without a suitable load bearing slab.
- Site the tank so that it is subjected to excess ground pressure (e.g. sloping sites) or applied loads such as may be generated by the proximity of vehicular traffic.
- Lift using only one of the lugs.
- Fill an unsupported tank.

INSTALLATION OF SEPTIC TANKS INTO WET GROUND AND INSTALLATION OF CESSPOOLS INTO ALL GROUND CONDITIONS

Wet ground is where ground water lies above the base of tank at any time or in slow draining clay soils.

1) Excavate a hole to appropriate depth allowing at least 300mm for concrete and hard-core base. Allow for tank width plus at least 400mm with additional allowance for any necessary shuttering. De-water the excavation using suitable pumping equipment.

   Ensure that the pump discharge does not saturate the ground in the immediate vicinity. De-watering is to continue until you are satisfied that the concrete has cured.

2) Lay at least 150mm of hard-core in the base of the excavation. Line the complete excavation with polythene sheeting.

3) Lay a bed of concrete (minimum 200mm thick) on top of the polythene at the base of the excavation.

4) Lower the tank onto the concrete bed, ensuring that the inlet and outlet (septic tank only) are in the correct position.

5) Ensure the tank is upright, then ballast it with water to a maximum of 500mm deep.

6) Haunch up the concrete bed at least 450mm all round the base, ensuring that all voids in the concrete are eliminated and at least 200mm of concrete is left below the tank base.

7) Backfill to the invert depth with concrete. Ensure that the water level inside the tank is maintained no more than approx. 250-300mm above concrete backfill level. Backfill evenly all round the tank, consolidating in layers. The backfilling should start before the base has hardened and be a single continuous operation so that the tank has a full concrete jacket without joins.

8) DO NOT use vibrating pokers to consolidate concrete. DO NOT discharge concrete directly onto the tank.

9) Align and connect pipework. The septic tank inlet pipe should be at least 25mm above the outlet pipe.

10) Build up a shell of concrete around neck of tank to 150-200mm thickness before completing the backfill with a suitable material. Care must be taken to avoid distortion of the neck whilst concreting this area. Support the neck with a temporary internal brace or frame.

11) Trim the tank neck to ground level using a fine toothed saw. 450mm is the recommended minimum invert depth for frost protection of pipes. Do not cut the neck to less than 350mm above the inlet invert.

12) Fit cover and frame into concrete.

13) Do not empty tank until the concrete backfill has cured. Septic tanks should be left filled with water, this will be displaced as sewage enters.

Cesspools may be emptied once the concrete has cured.
INSTALLATION OF SEPTIC TANKS INTO DRY GROUND

Where ground water lies below base of tank at all times and ground is free draining. **Important** - Cesspools must be installed using the wet ground method.

1. Excavate a hole at least 300mm wider and 150mm deeper than the tank, with additional allowance for any necessary shuttering.
2. The tank must be bedded on concrete. Lay a bed of concrete (minimum 150mm thick) at the base of the excavation.
3. Lower the tank onto the concrete bed, ensuring that the inlet and outlet are in the correct position.
4. Ensure the tank is upright, then ballast it with water, to a maximum of 500mm deep.
5. Haunch up the concrete bed at least 450mm all round the base, ensuring that all voids in the concrete are eliminated and at least 150mm of concrete is left below the tank base.
6. Backfill to invert depth with pea-shingle or similar non angular, non cohesive and non compressible, rounded, free-flowing material. Ensure that the water level inside the tank is maintained approx. 250-500mm above the backfill level. Backfill evenly all round the tank. **DO NOT USE SAND OR SITE SPOIL AS A BACKFILL MATERIAL.**
7. Align and connect pipework. The septic tank inlet pipe should be kept 25mm above the outlet pipe.
8. Continue backfilling to ground level. Care must be taken to avoid distortion of the neck when backfilling this area. Use either a temporary brace to support neck from inside or use a suitable frame.
9. Trim the tank neck to ground level using a fine toothed saw. Do not cut the neck to less than 350mm above the inlet invert. 450mm is the recommended minimum invert depth for frost protection of pipes.
10. Fit access cover and frame (pedestrian duty only). Apply surface finish e.g. turf.
11. Leave septic tank filled with water, this will be displaced as sewage enters.

**MATERIAL SPECIFICATIONS**

**Concrete**

All references to concrete are for 20 N/mm² - 20mm aggregate - 25mm slump mix. BS5328 Parts 1, 2, 3 and 4.

**Pea Shingle**

6mm-10mm rounded pea-shingle offering low point loading characteristics is the most suitable material for backfilling tanks.

**Polythene Sheet**

Building Quality 500 gauge.

**CONNECTING PIPEWORK / TRENCHING / INSPECTION CHAMBERS / VENTILATION ARRANGEMENTS**

Building regulations provide guidance as to the specification of materials used and fitted. It is important that these are consulted and complied with as the operation of the septic tank/cesspool can be adversely affected. No surface water should be allowed to enter a septic tank system as this impairs its performance and affects the size of unit selected. Surface water should also be excluded from cesspools as it can seriously affect emptying frequency.

**Notes for Septic Tank and Cesspool Users**

The septic tank is part of a foul water system and toxic wastes should not be permitted to enter. All household chemicals may be used in moderation but the user should be aware that excess use may affect the performance and lead to odour problems and increased desludging requirements. Do not use septic tanks or cesspools to dispose of Motor Oils, Grease, Paint, Thinners, Chemical Toilet Waste, Photographic Developers or similar chemicals.

Desludge septic tanks at least annually. Empty cesspools as required. Owners have a responsibility to use licensed waste contractors.

**SELECTION AND SITING**

Before specifying or installing an Anua tank you should consider the following points:

A Septic Tank System comprises a Septic Tank, a suitable Cover & Frame and a Subsurface Irrigation/Distribution System (soakaway system).

If there is insufficient area or the ground is not suitable for the construction of an effective sub-surface irrigation system, a septic tank will not function and some other means of sewage disposal must be used. Please consult professional advice for detailed guidance on assessing ground conditions and soakaway design.

Cesspools are storage vessels with no outlet. They must be emptied when full. Septic tanks and Cesspools are not suitable for chemical toilet waste or silage effluent.

A septic tank discharge requires permission from the Environment Agency (England and Wales), the Scottish Environmental Protection Agency or Local Authority Public Health Department (Ireland).

Planning permission and Building Regulation approval may be required. Building Regulations require the tank/system to be sited to avoid contamination of water supplies. We suggest that septic tanks and cesspools should be sited at the maximum practical distance from the property(ies). Where possible they should be sited a minimum of 15 metres from any dwelling as suggested in the regulations.

If your sewage results from a commercial source, i.e. from a pub or restaurant, then you may require a grease trap, installed on a separate drain, prior to the septic tank. Please contact us for guidance.

Roof and surface water drains must not be connected to any tank system, but should be connected to a separate soakaway.

**SEPTIC TANK SELECTION - Size and invert depth**

The number of people using the facility, and the level at which it is to be installed governs the tank model selected. We supply 1.0 metre invert depth - 1.5 metre invert depth available to order. The figures given are for domestic households. For advice on other situations such as office developments please contact us.

**SITING CONSIDERATIONS**

Where possible, take advantage of site gradients to minimise the invert depth at the tank inlet, as this will reduce excavation. The tank neck can be trimmed to suit, subject to retaining a minimum of 350mm provide suction tanker access. The vertical distance from the base of the tank to the ground level of the hard standing area should be less than 5 metres. Avoid siting tanks in sloping ground, as this can cause excessive ground pressure on the tank.

Anua tanks are not designed to accept any traffic loads. A minimum traffic clearance must be provided. If this is not possible the tank must be protected from superimposed loads, e.g. by a reinforced concrete surround and provided with an appropriate cover, which must not bear on the structure of the tank. Please contact a consultant civil engineer.

Anua pumping systems are available, (details on request) to raise the discharge from a septic tank to a soakaway system at a higher level.

Building Regulations require the system to be adequately ventilated.

For frost protection a minimum invert depth of 450mm is recommended.

Septic tanks require desludging at least annually, possibly more frequently for tanks serving multiple properties. Cesspools must be emptied when full. Tanks should be sited within 30 metres of a hard standing area to allow ventilation via the soil stack at the head of the drains. [If there is no open soil stack (e.g. drainage systems with air admittance valves only), then the septic tank must be independently vented.] The direction of the prevailing wind in relation to the property(ies) should be considered when selecting the tank site.

We recommend the installation of inspection chambers down stream of the Septic Tank so that the effluent quality and soakaway system can be checked.
Venting

All septic tanks should be vented in accordance with building regulations. If air admittance valves are fitted to the property, use the vent fitted to the turret. (Blanking plug supplied if conventional soil stack is fitted to the property).

Effluent disposal

If conditions are suitable, the cheapest and one of the most efficient means of disposal is by means of a subsurface irrigation system. It is simple to install but requires careful design and installation to work efficiently. To determine the most suitable siting and area of land required for a subsurface irrigation system, a percolation test, in accordance with the Building Regulations and British Standard BS 6297:1983, will be necessary. However, we recommend seeking advice from the local Authority Officers whose experience and knowledge of local conditions can be invaluable.

If you wish to carry out a percolation test, the procedure is as follows:

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Dia</th>
<th>Outlet</th>
<th>Overall</th>
<th>No. of p’sons to be served</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lts</td>
<td>&quot;A&quot; invert &quot;B&quot;</td>
<td>height &quot;C&quot;</td>
<td>180L/psi/ton/day</td>
<td></td>
</tr>
<tr>
<td>2800</td>
<td>1850</td>
<td>1620</td>
<td>2665</td>
<td>4</td>
</tr>
<tr>
<td>3800</td>
<td>1985</td>
<td>1785</td>
<td>2766</td>
<td>10</td>
</tr>
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<td>4500</td>
<td>2204</td>
<td>1955</td>
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<td>6000</td>
<td>2300</td>
<td>2375</td>
<td>3400</td>
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</tr>
<tr>
<td>9000</td>
<td>2680</td>
<td>2635</td>
<td>3560</td>
<td>39</td>
</tr>
</tbody>
</table>

Cover installation

Cut turret to required height. Position frame and secure with 3 screws provided. Cover screws down to frame.

Cover and frame installation into landscaped area

Cut and frame installation into light vehicular traffic area

Concrete base haunch up around base

Pea shingle back fill

Frame set into rebated structural concrete slab
**Percolation test** as detailed in Building Regulations approved document H (2000) (generally as described in BS6297)

To determine the area of land required, a percolation test is essential; the following method should be adopted:

Excavate a hole 300mm square to a depth 250mm below the proposed invert level of the land drain. Where deep drains are necessary, the hole should conform to this shape at the bottom but may be enlarged above the 300mm level to enable safe excavation to be carried out.

Fill the 300mm square section of the hole to a depth of at least 300mm with water and allow it to seep away overnight. Next day refill the test section with water to a depth of at least 300mm and observe the time, in seconds, for the water to seep away completely, between 75% and 25%, i.e. 150mm of water depth.

Divide this time by 15,000, in millimetres, of the water placed in the hole. The answer gives the average time required for the water to drop 1mm. Take care, when making the test, to avoid abnormal weather conditions such as heavy rain, severe frost or drought. Carry out the test at least three times, in 2 holes, and take the average figure.

Where deep excavations are necessary, a modified test procedure may be adopted using a 300mm earth auger. Bore the test hole vertically to the appropriate depth, taking care to remove all loose debris.

Make water level observations referring to a fixed datum using a dip stick or some suitable alternative water level indicator.

The value found in this way is called the ‘Percolation Value’ ($V_p$ in s) of the soil and can be used to determine the area of drainage trench floors required to disperse effluents.

The floor area of subsurface drainage trench ($A_t$ in m²) required to disperse effluents from septic tanks may be calculated from:

$$A_t = P \times V_p \times 0.25$$

Where

- $P$ is the number of persons served by the tank
- $V_p$ is the percolation value obtained as described.

$VP$ of between 12 and 100 are suitable for this discharge method. The area determined should be used to calculate either a length of land drain, or alternatively the floor area of one or more shallow soakaways.

Drainage trenches should be from 300mm to 900mm wide and areas of undisturbed ground 2m wide should be maintained between parallel trenches.

**A guide to the length of perforated land drain required**

<table>
<thead>
<tr>
<th>Time to fall 25m</th>
<th>Number of persons to be served</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mins</td>
<td>3-4</td>
</tr>
<tr>
<td>2 or less</td>
<td>11</td>
</tr>
<tr>
<td>3 or less</td>
<td>16</td>
</tr>
<tr>
<td>4 or less</td>
<td>21</td>
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<tr>
<td>5 or less</td>
<td>27</td>
</tr>
<tr>
<td>10 or less</td>
<td>53</td>
</tr>
<tr>
<td>15 or less</td>
<td>80</td>
</tr>
</tbody>
</table>

*This table is for your guidance only, it is based on a trench floor width of 450mm. You should consult your local authority for their recommendations.*

**Laying land drains**

To achieve even distribution, land drains should be laid in a herringbone or similar pattern depending on the site. Unglazed earthenware jointless pipes, rigid perforated plastic or vitrified clay pipes should be laid with a fall of 1 in 200 and at a minimum depth of 300mm. The pipes should be laid on a 150mm layer of cinder, clean gravel or broken stone 20mm to 50mm grade and trenched filled to a level 50mm above the pipe and covered with geotextile membrane laid to prevent the entry of silt. The remainder of the trench can be filled with normal soil.

**Alternative method for effluent disposal**

On steep sloping sites, providing the subsoil is porous, e.g. gravel, sand or chalk and there is no possibility of contaminating underground waters, soakaway pits can be excavated and filled with brickbats or large stones.

**Note:**

If the winter water table rises to within 1m of the invert of the irrigation system an alternative method of disposal will be necessary. This can sometimes be achieved by discharging into shallow trenches laid in the topsoil. (See Building Regulations for details of drainage mounds) Alternatively the effluent can be pumped to a suitable area.