

SECTION 13

Installation Instructions for SPEL Tankstor[®], Separators & Other Underground Tanks

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13.1 SPEL Underground Tanks

Introduction to Installation

SPEL Separators (Stormceptor® by-pass separators, Puraceptor® class 1 separators and full retention class 2 separators) and SPEL Tankstor® underground tanks, septic/settlement tanks, cesspools and stormwater attenuation tanks, etc.) must be installed according to these instructions and the SPEL Tankstor® and Separator installation instructions TSII (supplied with every tank).

The local authority and the local region of the Environment Agency should also be consulted as to whether any particular code applies to installation. Failure to follow these installation instructions will make our warranty void and may result in tank failure.

Site access and conditions

It is the responsibility of the contractor to ensure suitable access to good hard ground that is safe and suitable for off-loading.

Wide/long loads

Where the tank is of such size that police/private escort is required delivery times given are estimates only. In the event of delays outside our control e.g. police re-routing or escort delays, the extra charges that result will be forwarded to the contractor.

Off-loading/handling

The contractor is responsible for off-loading. Tank handling during off-loading must be carried out with care to prevent rolling off the vehicle. Care must also be exercised to prevent accidental damage from impact or contact with sharp objects.

Do not drag tanks along the ground for any distance and avoid jarring or bumps. Tanks should be lifted using slings, not chains or wire ropes. For large tanks a spreader bar may be required. Use guidelines when craning long tanks. Do not lift with water in the tank (see page 2).

Note: Where transport height restrictions prevent the tank being loaded in the vertical position on the transport vehicle, the tank will be loaded at 45 degrees or as required to keep within the restrictions. In such cases it will be necessary for the tank to be off loaded onto a level area or well supported planks positioned adjacent to the 'lift' points and supporting at least four ribs. The area must allow room to enable the tank to be rolled into the vertical position before lifting the tank into the excavation.

Storage

Set the tank on smooth ground free of bricks and sharp objects. Chock/tie down to prevent rolling and movement especially in high winds. (See 13.2).

Tank dimensions

Dimensions given on drawings and literature shall be subject to manufacturing tolerances and should be physically checked prior to installation. This applies to overall length, connection positions, their size and invert dimensions. Also check the correct way the tank shall be installed and alignment with site drainage.

Installation procedures

The alternative methods of installation depend on the ground conditions, water table and the tank's location.

Installation should be carried out by a competent contractor in accordance with the above procedures, Health & Safety at Work legislation and good building practice.

It is recommended to cover the access shaft openings with polythene or plywood sheets to prevent concrete and debris entering the tank.

It is not possible to cover every condition in these instructions, therefore if in doubt contact us.

Tank specification

Check that you have received the correct specification tank. SPEL underground tanks are available in specifications to suit invert depths, concrete or pea gravel surround and ground water conditions, the specification options are Standard, Heavy, Extra Heavy and Special. (See pages 13.4 and 13.5). For most applications the standard or heavy specifications are adequate. If the tank invert depth and/or water table depth is outside the range specified we shall be pleased to advise accordingly.

Siting SPEL septic tanks

British Standard BS 6297: 1983 recommends that sewage treatment works should be as far from habitable buildings as is economically practicable. The direction of the prevailing wind should be considered in relation to any properties when siting the works.

In accordance with the Building Regulations 2000. H2 2002 edition SPEL septic tanks should be sited at least 7m from any habitable parts of buildings, and preferably downslope.

The tank should not be installed near a road or driveway, where it could be subjected to high external loads, unless the installation is designed to withstand such loadings, so they are not transferred to the tank shell.

Where the tank is to be emptied using a tanker, it should be sited within 30m of a vehicle access, provided that the invert level of the septic tank is no more than 3m below the level of the vehicle access. This distance may need to be reduced

where the depth to the invert of the tank is more than 3m. There should also be a clear route for the hose such that the tank can be emptied and cleaned without hazard to the building occupants and without the contents being taken through a dwelling or place of work.

Siting SPEL cesspools

SPEL cesspools should be sited at least 7m from any habitable building and preferably downslope. They should, however, be sited within 30m of a sludge removal tanker access and at such levels and position to operate without hazard to the building occupants.

Access openings

It is recommended that the access openings are covered prior to back filling to keep the internal shell and fittings clean.

Extension access shafts

Check if extension shafts are required.

These are available in 500mm high increments with socket joints or if required, flanged joints with neoprene gaskets.

Prior to surrounding in concrete, if required, ensure rectangular access shafts are shuttered internally to support the sides and prevent distortion. This is especially important when guide rails are installed for pumps or coalescer units.

With high water table ensure all joints are double sealed to prevent ingress of water.

Note: Where coalescer units or pumps are incorporated that require guide rails, or ladders are fitted, the height of the extension access shaft/s should be measured accurately before ordering.

Health and safety

Installation should be carried out by a competent contractor in accordance with the above procedures, Health & Safety at Work legislation and good building practice.

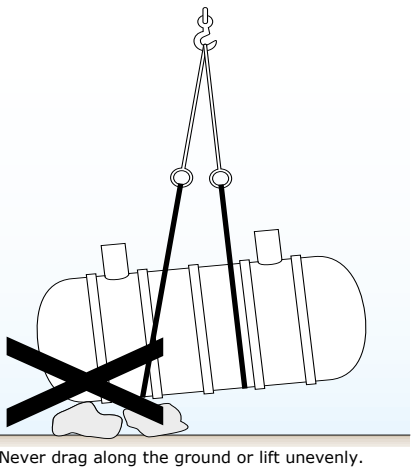
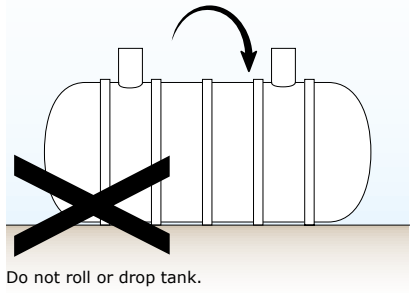
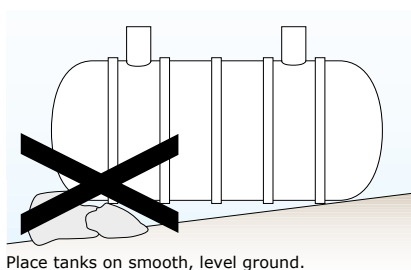
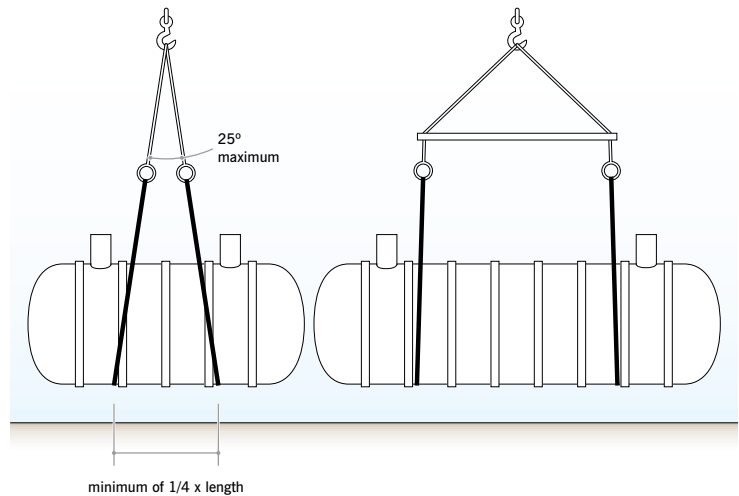
A warning notice should be visible at the top of each access shaft – 'danger, harmful fumes' and 'respirators must be worn in this tank'. Before entering persons must be qualified in accordance with 'confined space' requirements.



Lifting, handling and storage

Lifting and handling - preferable methods

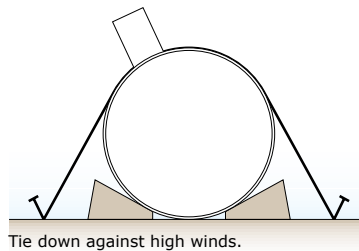
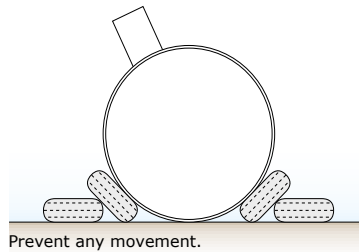
- Do not roll or drop tanks. Only move tanks by lifting. Rolling tanks could damage fittings
- Tanks can be lifted using slings/webbing straps as illustrated.
- Where necessary a spreader bar should be used.
- Guide the tank with guide lines.
- Never use chains or steel cables around tank shell.
- Do not drag tanks along ground for any distance.
- Avoid jarring or bumps.
- Do not lift with liquid in the tank.
- Set tanks on smooth ground, free of rocks or other sharp objects.



Storage

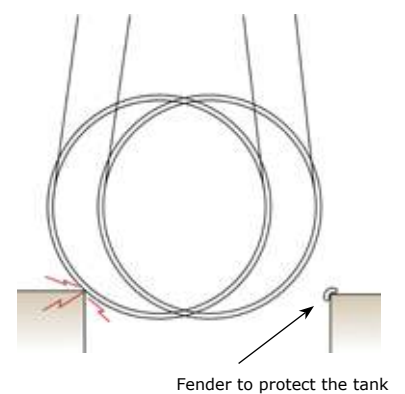
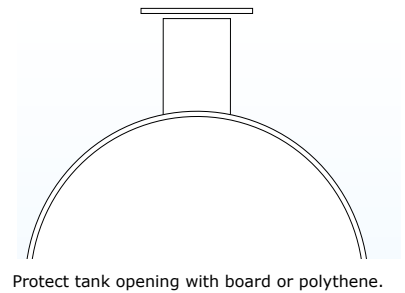
If tanks have to be stored temporarily prior to installation, they should be located:

- In an area where the chance of accidental damage or vandalism will be minimised.
- On a flat surface free from small or sharp objects.
- With efficient temporary anchorage to prevent high winds causing damage.



Protecting the tank internally during the installation

Use a board or polythene to cover the access shaft/s to prevent concrete / backfill falling into the tank (particularly where the internal fittings eg. Pump guide rails, Separator automatic closure device (ACD) are present).

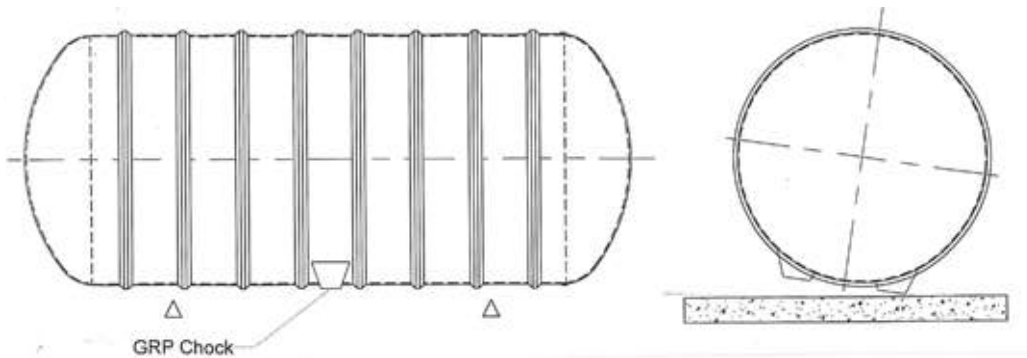


When lowering tanks into shored excavations ensure:

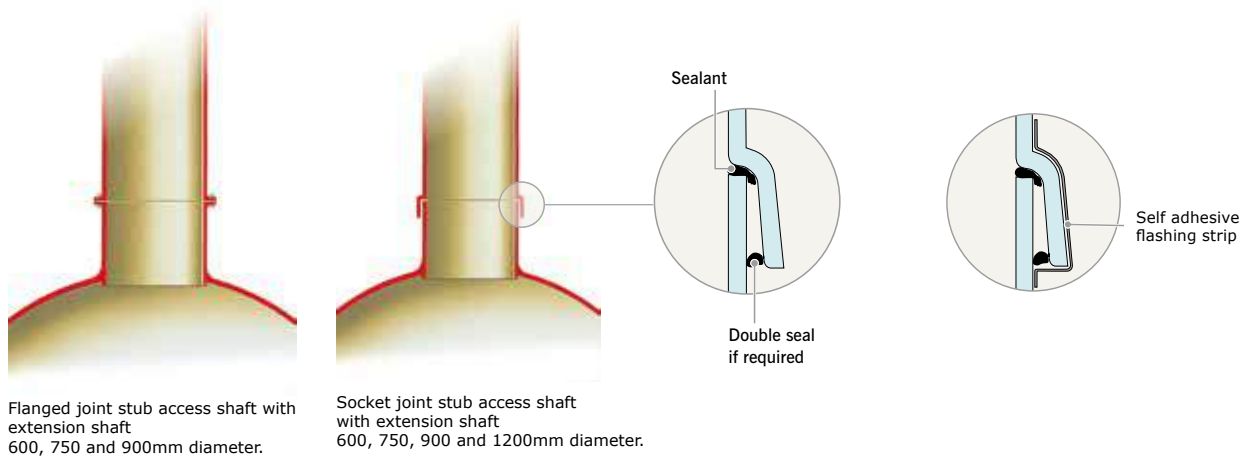
- Lower carefully using two guidelines, one each end, to avoid contact with piling sheets or projections.
- It is recommended that 'fenders' are placed over projecting shoring braces etc.

13.3 SPEL Underground Tanks

Stabilising Chocks

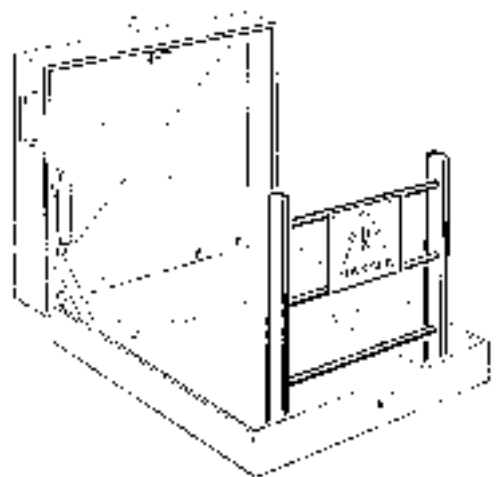


Chocks can be fitted to maintain the tank in a truly vertical position on a flat base slab. These chocks are not load-bearing. If fitted, the tank should be handled with care to ensure the tank is lowered squarely onto the flat base slab. Avoid lowering the tank at an angle with a chock impacting on the base slab and taking the full weight of the tank as this impact could damage both the shell and the chock.



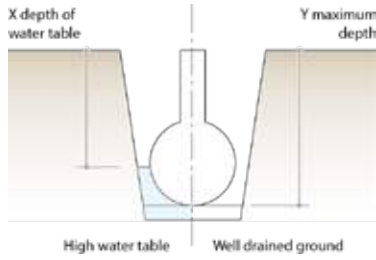
Manhole Covers and Frames

Where access to a tank or package pumping station is required for routine maintenance a fall protection and security locking is recommended. The double skinned covers are predominantly used for the protection of potable water and single skin covers for most other applications, including waste water pumping stations.

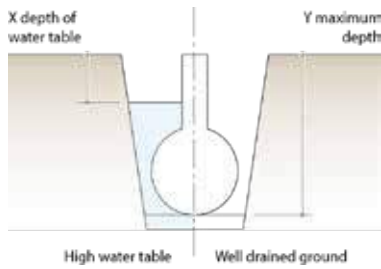


Specifications to suit invert depths and ground water conditions - pea gravel and concrete surrounds

Standard tanks

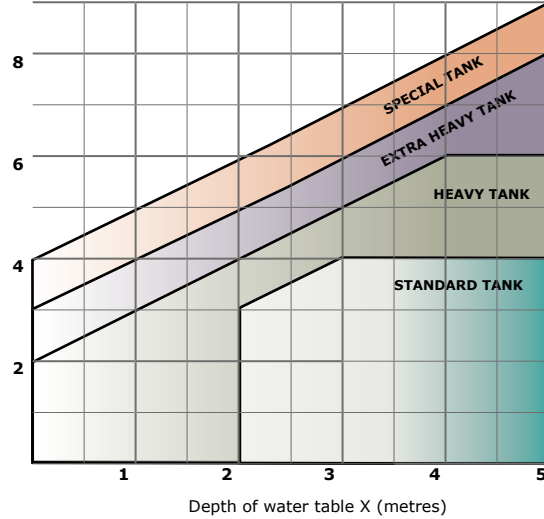


Heavy, Extra Heavy & Special tanks



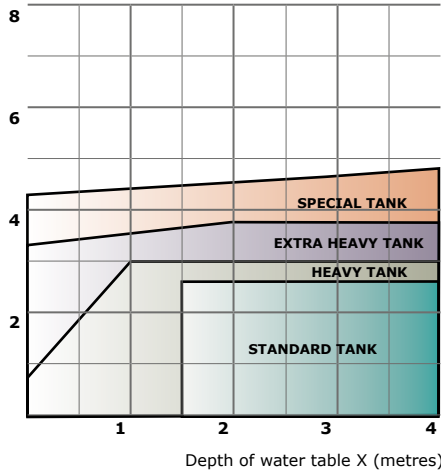
100 & 200 Series with concrete surround

Maximum depth Y (metres)



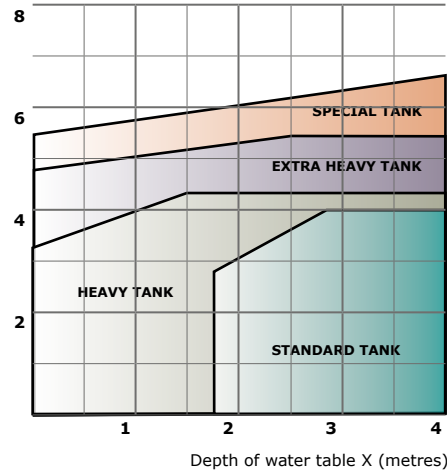
300 Series with pea gravel surround

Maximum depth Y (metres)



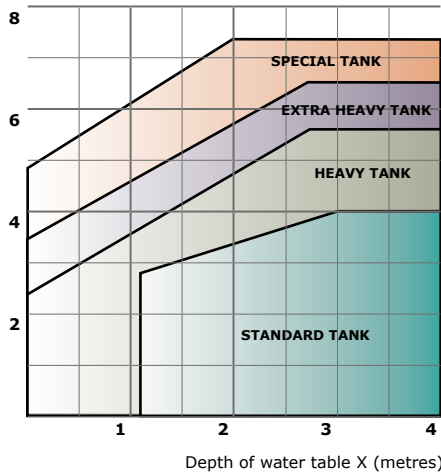
400 Series with pea gravel surround

Maximum depth Y (metres)



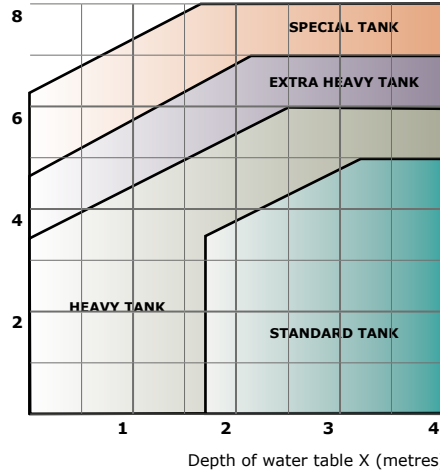
300 Series with concrete surround

Maximum depth Y (metres)



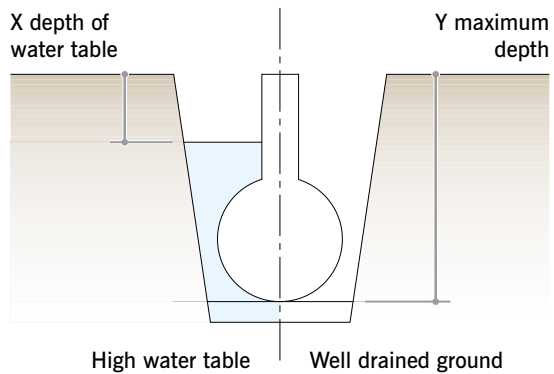
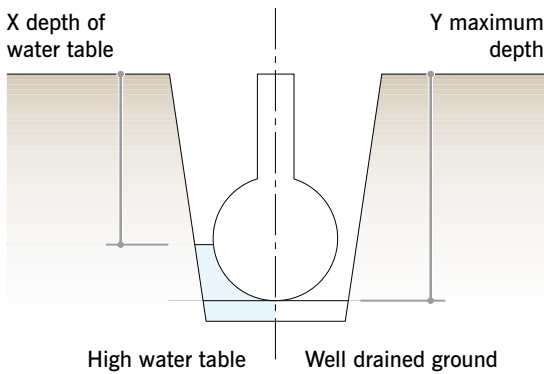
400 Series with concrete surround

Maximum depth Y (metres)



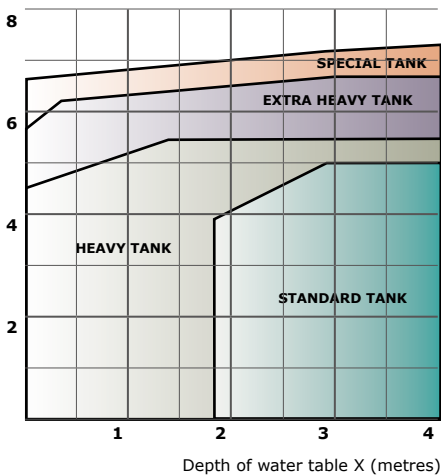
13.5 SPEL Underground Tanks - 500 & 600 Series

Specifications to suit invert depths and ground water conditions - pea gravel and concrete surrounds



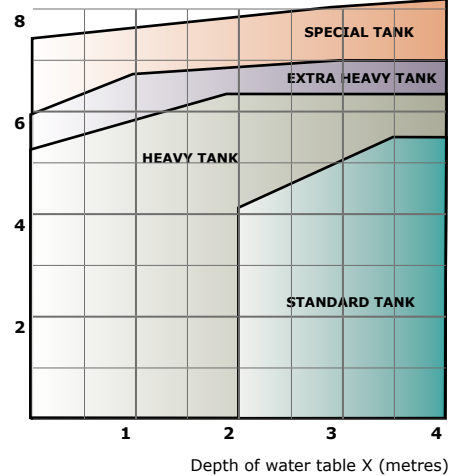
500 Series with pea gravel surround

Maximum depth Y (metres)



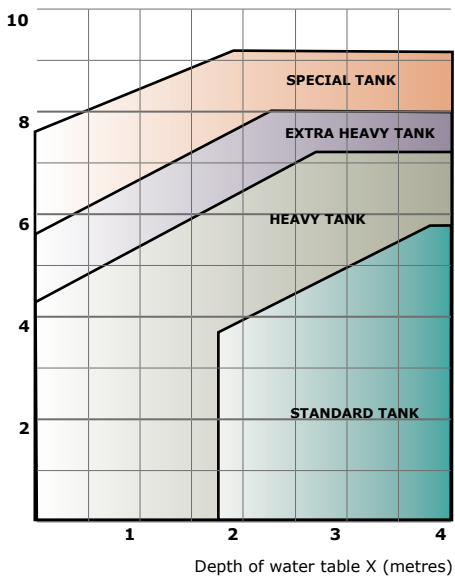
600 Series with pea gravel surround

Maximum depth Y (metres)



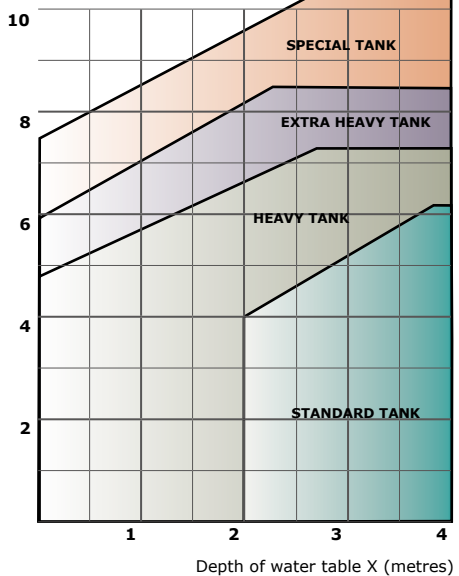
500 Series with concrete surround

Maximum depth Y (metres)



600 Series with concrete surround

Maximum depth Y (metres)

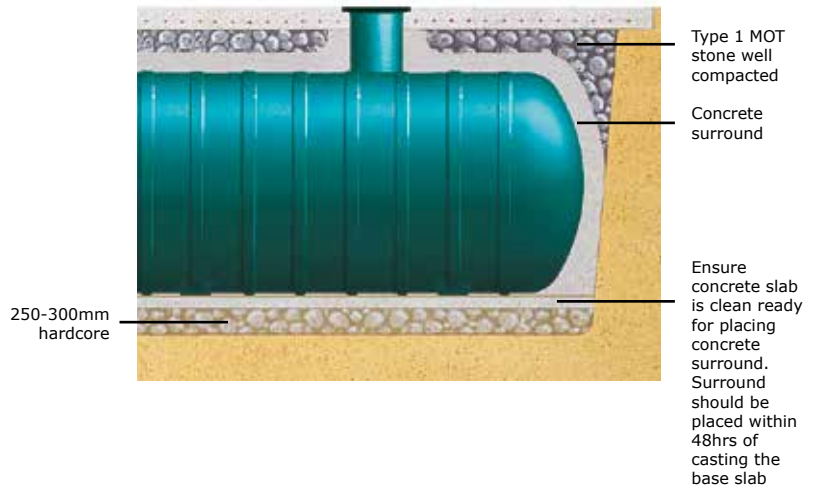


Typical installation of a SPEL tank



Installation with feet/chocks

Installation of SPEL Tankstor® tank with chocks and load bearing cover slab.



Excavation details for concrete surround			Series 100/200	Series 300	Series 400	Series 500	Series 600
Max. burial depths (m) <small>For your specific requirements refer to burial depth and water table depth charts on pages 13.4 and 13.5</small>	Standard	dry excavation	4.0	4.0	5.0	5.7	6.2
	Heavy	dry excavation	6.0	5.6	6.00	7.25	7.3
		high water table	-	3.0	3.75	5.0	5.2
	Extra heavy	dry excavation	-	6.5	7.0	8.0	8.4
	Special	dry excavation	-	7.3	8.0	9.2	10.2
Minimum hardcore (mm), dependent on ground conditions			150	200	250	300	300
Concrete base slab (mm)	Slab thickness		100-150*	150*	220-240	240-300	250-300
Concrete surround (mm), dependent on ground conditions			100-150	150	200-250	250-300	250-300
Maximum initial water fill depths, prior to backfilling (mm)			200	300	400	500	500
Tank internal diameter (mm)			1250/1200	1800	2600	3500	4000
Tank external diameter (mm)			1300/1225	1875	2700	3650	4150

*If using SPEL mechanical anchoring straps, a 220mm concrete base slab is required.

Preliminary

Dimensions given on the drawings and literature are subject to manufacturing tolerances and should be physically checked prior to installation. This applies to overall length, connection positions, their size and invert dimensions. Also check the correct way the tank shall be installed and alignment with site drainage.

Determine the size of the excavation from the dimensions of the tank and the incoming drain invert depth allowing for a minimum of 200-250mm (250-300mm for 500/600 Series tanks) of concrete all round the tank. Where difficult ground conditions or the possibility of external loading exist, the concrete surround should be designed accordingly, ie. extra thickness and/or the use of reinforcing.

Wet hole procedure

Where there is water entering the excavation, the water level should be maintained below the foundation level by pumping with or without the aid of a pump well in one corner of the excavation.

Excavation

Excavate allowing for easy placing of the tank and concrete and for consolidating concrete around the bottom half of the tank when backfilling. Allowance should be made for any timbering or sheeting that may be required. If the base of the excavation consists of unstable ground – loose gravel, running sand, landfill type areas, peat, swamp or in clay areas subject to swelling/shrinking etc., excavate to allow for 250-300mm of hardcore and cover with a polythene membrane prior to placing concrete.

Procedure

Where the level of the tank is important, chocks can be fitted during manufacture to enable the tank to be placed on a flat concrete base and levelled up prior to surrounding with concrete.

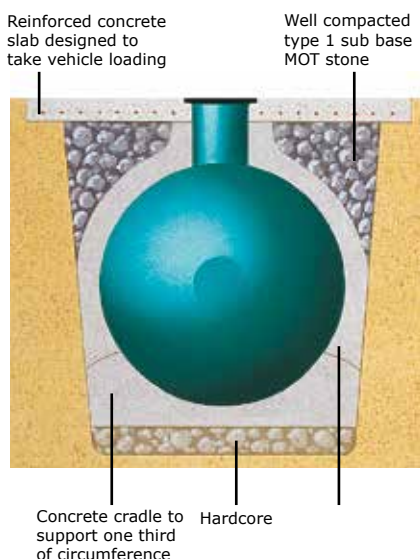
Note: It is recommended to cover the access shaft openings with polythene or plywood sheets to prevent concrete and debris entering the tank.

1. Pour concrete base to correct depth and level off. Base should be reinforced as necessary.
2. When the concrete is set sufficiently, place the tank in position and check for level. Place the initial fill of water to a depth of 300mm – 500mm depending on the tank diameter to provide ballast for the first concrete pour.

Continued overleaf

13.7 Installation of Tanks Surrounded in Concrete

- Place the initial water fill depth in accordance with chart above.
- Place back-fill concrete up to the depth of the water in the tank ensuring the concrete is properly consolidated under the tank to prevent voids. Consolidate by hand – do not use vibrating poker.
- Connect up pipework, fix extension access shaft with waterproof mastic/adhesive or bolt to the stub access shaft as appropriate. (see below).
- Fit extension shafts if required:
Extension access shafts are available in 500mm increments with socket joints or if required, flanged joints with neoprene gaskets. Prior to surrounding in concrete if



For smaller tanks e.g. cesspools, with concrete cradle

- Place concrete along the centre of the excavation base and lower the tank into position 'puddling' it into the concrete to form a cradle. Consolidate under the tank to prevent voids. Consolidate by hand – do not use vibrating poker.
- Check the tank is truly vertical and level.
- After the concrete has reached its initial set, fill with water to approximately 500mm deep.

Venting SPEL Separators

SPEL Separators should be vented in accordance with BS EN 752 (BS8301:1985 Building Drainage) or Health and Safety Guidance Notice HS (G) 41 for filling stations, subject to local authority requirements. In multiple chamber separators, vent pipework must not be combined into a common stack below a point where pollutants contained could be transferred to other chambers.

SPEL Separator automatic alarm/monitoring systems

The SPEL automatic alarm/monitoring system provides

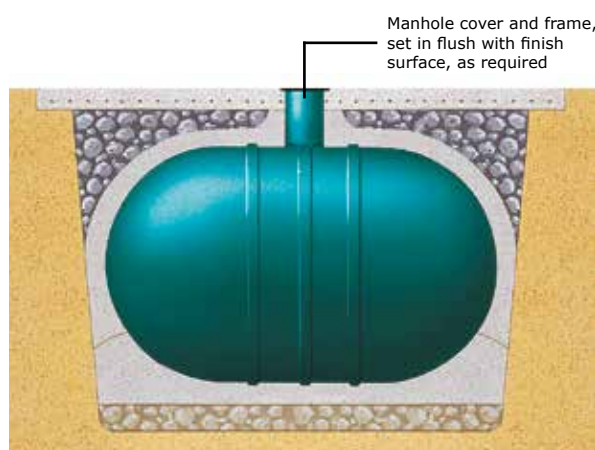
required, ensure rectangular access shafts are shuttered internally to support the sides and prevent distortion. This is especially important when guide rails are installed for pumps or coalescer units. With a high water table ensure all joints are double sealed to prevent ingress of water.

7. Top up the tank with water to invert level and place remainder of concrete.

8. Where the concrete slab over the tank is to take vehicle loading it should be reinforced in accordance with good practice to take the maximum load and should be extended onto unexcavated ground. It is important that vehicle loading is not transferred to the tank itself.

9. Incorporate inspection cover frames in the normal manner.

Installation with feet/chocks



Cesspool tanks/silage tanks etc.

When the concrete surround has fully cured, cesspools should be completely emptied ready for use.

4. As per instructions 4-9 on page 13.6, or if suitable, the tank can be surrounded in pea gravel or approved free flowing crushed rock. (See under tanks installed with granular backfill) When the concrete surround has fully cured, cesspools should be completely emptied ready for use.

Venting SPEL septic tanks and cesspools

Adequate ventilation of the septic tank and the inlet pipework shall be provided to prevent the accumulation of fermentation gases.

continuous monitoring of the separator contents by sensing when the light liquid within the separator has filled to a predetermined level (with design safety margins), and provides a simple audio-visual warning to alert the operator that the separator needs to be emptied.

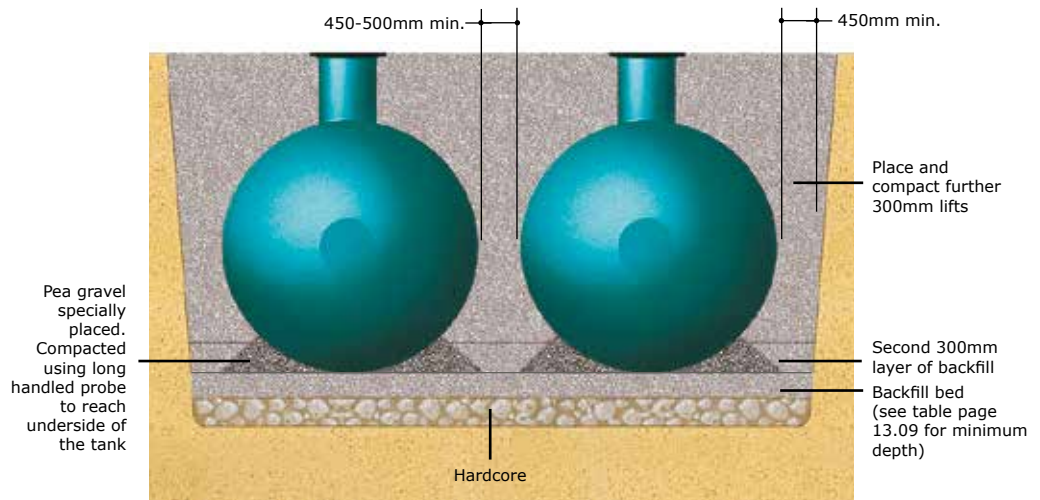
The system comprises 2 parts: a compact control unit and a probe unit. The control unit is installed in a non-hazardous area remote from the probe. It is self-contained and requires only a normal 240v AC electrical supply. The control incorporates an ATEX approved intrinsically safe circuit, which enables the probe unit to be used in Zone Zero Environments. For technical and installation details see Section 13.

Tank dimensions

Dimensions given on the drawings and literature are subject to manufacturing tolerances and should be physically checked prior to installation. This applies to overall length, connection positions, their size and invert dimensions. Also check the correct way the tank shall be installed and alignment with site drainage

If you have an installation situation that is not covered by this Data Manual please contact our technical services department.

It is important that only properly trained and experienced contractors perform this method of installation.



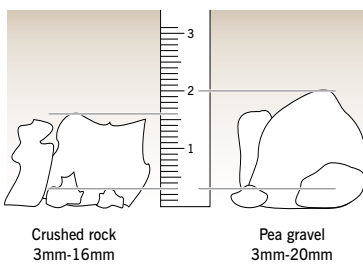
Backfill material

Pea gravel or crushed rock is preferred as backfill material.

Requirements for backfill material are:

- Clean and washed.
- Non-cohesive, inert material.
- Pea gravel or crushed rock.
- Particle not larger than 20mm.
- Material free from rocks, ice, snow or organic material.

Approved backfill material for tanks and pipes



Excavation size - unstable ground conditions

Where the ground is unstable, eg. landfill type areas, peat, swamp or in clay areas subject to swelling/shrinking, the width of the backfill must be increased to a minimum of half the tank diameter between the tank sides and the ends of excavation.

If the base of the excavation is also of unstable ground, allow for 250-300mm of hardcore. After placing the hardcore, consolidate to ensure a firm base for the backfill.

Excavating - general

Excavate allowing for easy placing of the tank and backfill around the bottom half of the tank. Allowance should be made for any timbering or sheeting that may be required.

Filter fabric

Where there is a risk of the migration of pea gravel with the native soil, an approved filter fabric/geotextile is recommended.

Filling tanks

Do not fill tanks until backfill is to the top of the tank. (Exception; Wet Hole see page 13.9).

Where the tank is divided into chambers ensure all chambers are filled equally.

Note: Where the chambers may require to be separated by load bearing partitions to accommodate different liquid levels the tank must be surrounded in concrete.

Depth of cover for standard and heavy specification tanks

No vehicle loads

100/200/300/400 series tanks are designed for a minimum cover of 600mm of backfill or 300mm plus 100mm reinforced concrete slab.

500/600 series 1100mm backfill or 900mm backfill plus 100-150mm reinforced concrete slab.

Vehicle loads

100/200/300/400 series tanks subjected to vehicle loading must have a minimum cover of 600mm of backfill plus a minimum 150mm reinforced concrete slab designed to take the maximum load without such loadings being transferred to the tank itself.

500/600 series as above but 1000mm backfill plus a minimum 150mm reinforced concrete slab as above.

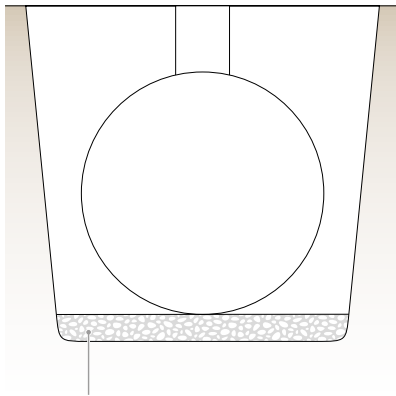
The maximum depth of the cover is governed by the maximum drain invert depth and periodic high water table when encountered.

For the depth of cover for Extra Heavy and special specification tanks, contact our technical services department.

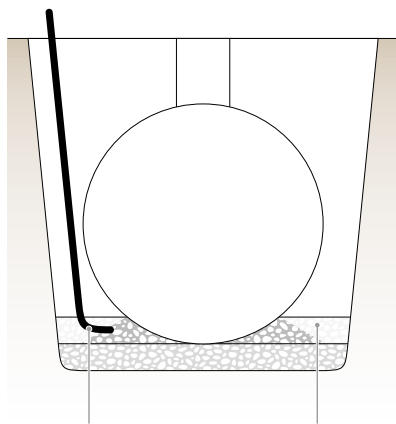
SPEL Mechanical Anchoring System

If you are using this system and a concrete base slab, the tank must be bedded on pea gravel - see 13.11.

13.9 Installation of Tanks Surrounded with Pea Gravel Backfill

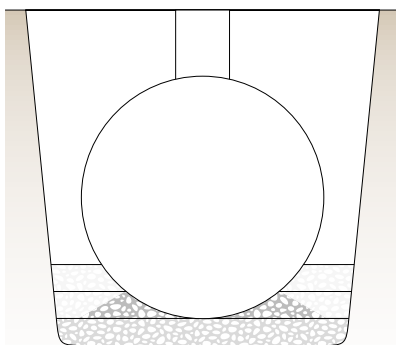


300mm bed



Curved, long handled probe to reach underside of the tank

Second 300mm layer of backfill



Installation - Dry hole

1. Place a minimum of 150-300mm of approved backfill over the excavation bottom. Refer to table below.
2. Position the tank carefully onto backfill bed and check for levels including inlet/outlet inverts.
3. It is recommended to cover access shafts with polythene or plywood to prevent backfill entering the tank.
4. Place first 300mm lift of backfill evenly around the tank by shovelling and pushing beneath the tank bottom, between ribs and end domes to ensure complete support and to eliminate voids. (Where access is confined, long handled probes, curved to enable reaching the underside of the tank, can be used). Place and compact further 300mm lifts, as above, to a minimum depth of 1/3rd of the tank diameter. The remainder of the backfill can be poured without consolidation except where required to support a cover slab.

5. Connect up inlet, outlet and vent pipework, seat access shaft into socket and apply waterproof mastic/adhesive or as applicable.

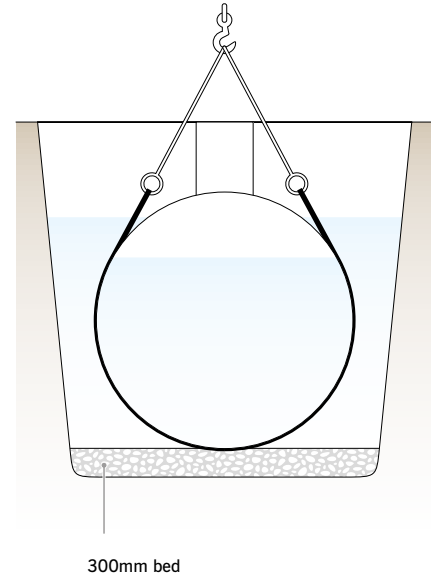
6. Where a concrete slab is to be constructed over the tank to take vehicle loading, it should be reinforced in accordance with good practice to take the maximum load and should be extended onto unexcavated ground. It is important that vehicle loading or any superimposed loads are not transferred to the tank itself.

Important: Before surrounding circular or rectangular shafts with backfill, shutter internally to support the sides and safeguard against distortion.

7. Incorporate inspection cover frames in the normal manner.

Wet hole procedure

Where there is water entering the excavation, the water level should be maintained below the foundation level by pumping with or without the aid of a pump well in one corner of the excavation.



300mm bed

If the water level cannot be lowered you will need to ballast the tank very carefully. Place the tank in the excavation adding only enough water ballast to sink it. The water level in the tank must never exceed the water level in the excavation. While adding then ballast use only a lifting strap to keep the tank in position.

It is essential the backfill is distributed evenly round the base of the tank and thoroughly consolidated with the aid of long handled probes to eliminate any voids as set out in point 4 'Dry hole procedure'.

To prevent flotation, mechanical anchoring may be required. See page 13.12.

Backfill bed

Please refer to this table for the minimum amount of approved backfill to be used over the excavation bottom for your series tank.

Tank	min backfill bed
100 Series	150mm
200 Series	150mm
300 Series	200mm
400 Series	250mm
500 Series	300mm
600 Series	300mm

This method of installation combines the economy of pea gravel backfill and the safety of a concrete cradle. For the less experienced contractor this is a safer option than bedding on pea gravel.

Excavation size – stable ground conditions

Determine the size of the excavation from the dimensions of the tank and the incoming drain invert depth, allowing for a minimum of 450mm of backfill between the tank sides and the ends of the excavation.

Excavation size – unstable ground conditions

Where the ground is unstable, eg. landfill type areas, peat, swamp or in clay areas subject to swelling/shrinking, the width of the backfill must be increased to a minimum of half the tank diameter between the tank sides and the ends of the excavation.

If the base of the excavation is also of unstable ground, allow for 250-300mm of hardcore. After placing the hardcore, consolidate and cover with a polythene membrane prior to placing concrete.

Note: If mechanical anchoring is required, sinkers will need to be cast into the concrete cradle. See mechanical anchoring on page 13.11 and 13.12.

1. Place concrete along the centre of the excavation base and lower the tank into position 'puddling' it into the concrete to form a cradle. Consolidate under the tank to prevent voids. Consolidate by hand – do not use vibrating pokers.

2. Check the tank is truly vertical, level and inlet/outlet invert levels are correct.

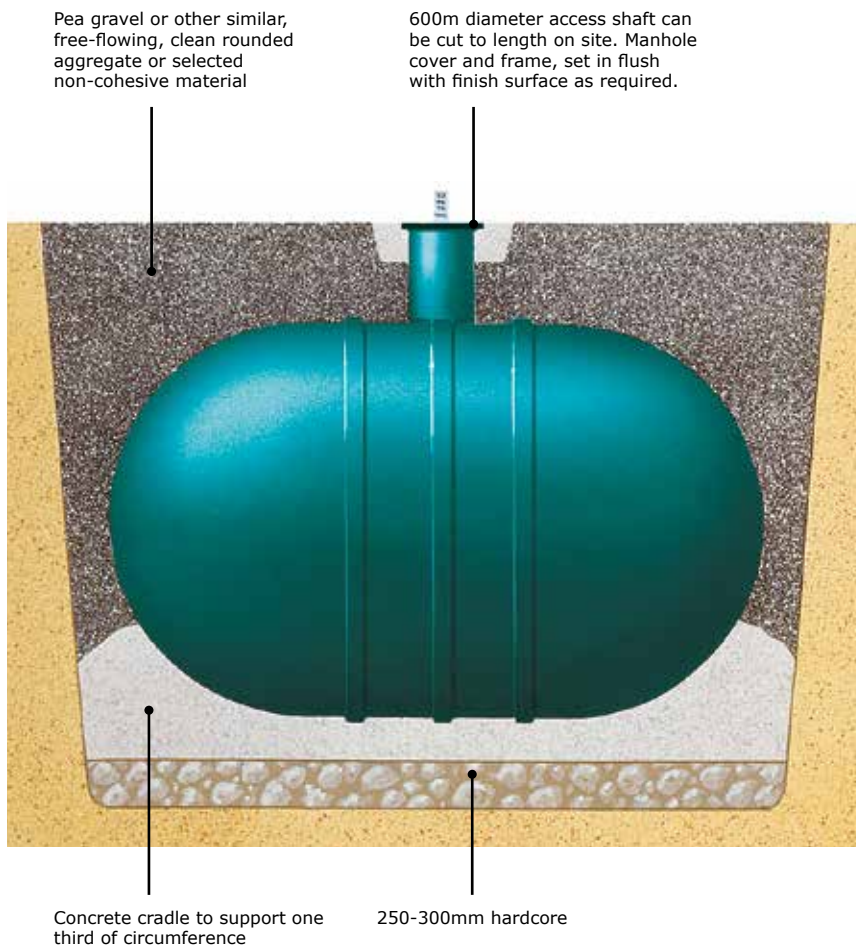
3. Place first 300mm lift of backfill evenly around the tank by shovelling and pushing around the tank sides, between ribs and end domes to ensure complete support and to eliminate voids. (Where access is confined long handled probes, curved to enable reaching the underside of the tank, can be used). After placing first lift of backfill the remainder of the backfill can be poured without further consolidation by hand.

4. Connect up inlet, outlet and vent pipework, seat access shaft into socket and apply waterproof mastic/adhesive or as applicable. (see page 2.13).

5. Where the concrete slab is to be constructed over the tank to take vehicle loading it should be reinforced in accordance with good practice to take the maximum load and should be extended onto unexcavated ground. It is important that vehicle loading is not transferred to the tank itself.

6. Incorporate inspection cover frames in the normal manner.

Note: Where the tank is divided into chambers ensure all chambers are filled equally. Where the chambers may require to be separated by load bearing partitions to accommodate different liquid levels the tank must be surrounded in concrete.



13.11 SPEL Underground Tanks Mechanical Anchoring

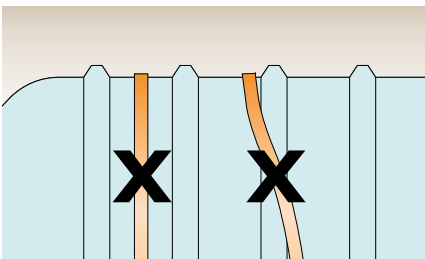


Minimum burial depth

The following table shows minimum burial depths when mechanical anchoring is not required.

Tank Series	Dia. (mm)	No cover slab (mm)	150mm cover slab (mm)
300	1800	1200	1100
400	2600	1500	1400
500	3500	1800	1700
600	4000	2100	2000

Do not strap here



Straps must not be placed between the ribs or passed over from one side to the other as stress will be transferred to the weakest part of the tank wall. Unless the SPEL system is used and positioned correctly the 25 year warranty will be nullified.

The 'holding down' ribs are indicated on the tank by a 'strap' label



SPEL mechanical anchoring system

Mechanical anchoring is required where the tank is to be surrounded in pea gravel and where water could enter into the excavation (underground water table, rainwater run-off etc.) or where the tank is to be surrounded in concrete and it is imperative the tank does not shift during the placement of this concrete.

SPEL mechanical anchoring straps are available for all tanks. These are located over the designated ribs and held in position by locators positioned over the said ribs. Cables or straps should not be used between the ribs on the tank.

It is the responsibility of the tank owner or their technical representative to determine if mechanical anchoring is required for a specific installation.

If water could enter the excavation (underground water table, rainwater run-off etc.) we recommend the tank is mechanically anchored unless the minimum depth from tank top is, as in table on left.

The weight of over burden on top of the concrete anchor pad provides the anchoring force.

The pad is to prevent buoyancy but should be designed taking into account soil conditions eg. thickness and reinforcement.

Anchor points should be spaced equal to the tank diameter plus 300mm on each side of the tank regardless of tank diameter. The anchor points must be aligned in accordance with the designated ribs plus or minus 25mm.

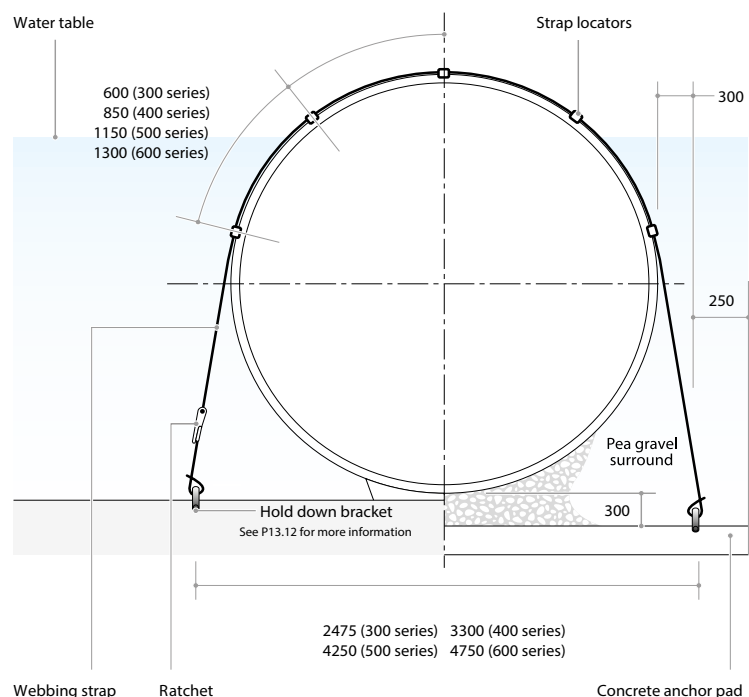
All anchor straps must be uniformly tightened with the ratchets. Straps should be a tight, snug fit to the ribs but must not cause the tank to deflect. It is recommended that the ratchets are positioned on alternate sides of the tank to ensure the tank remains vertical during tensioning.

Check the tanks internal diameter before and after tensioning the straps with a gauge rod to ensure against deflection.

Do not fill with product or water until backfill is level with top of tank except when backfilling with concrete.

When backfilling with concrete, we advise that the tank is filled with water to a corresponding level with the concrete to equalise pressure. Where the tank is divided into chambers, ensure all chambers are filled equally. See installation procedure for surrounding in concrete.

Figure 1



Procedure for 'anchoring' tanks down

1. Check contents of kit.
2. Hold-down Brackets:

a) Position brackets so they line up with the ribs of the tank as indicated by 'strap' label. Check position from side of tank and edge of slab as shown in Figure 1 on previous page.

b) Thread loop of short length through hold-down bracket (see Sketch 1).
Note: the arm of the ratchet should be facing outwards. (Do the same for long length on opposite side of the tank.)

c) Drill a 20mm dia x 150mm deep hole in concrete slab.

d) Clear the hole of dust and hammer in the anchor bolt.

e) Drill the second hole and hammer in the second anchor bolt.

f) Tighten the nuts to 200Nm.

NB. For strength the bolts must be at least 130mm deep into the slab and the concrete strength C25/30 or higher.

3. Then throw the remaining length of the long length of webbing over the tank, making sure that the webbing is not twisted.

4. Position the 'long' length of webbing over the designated rib and 'clip in' the strap locators underneath the webbing and position as shown in the drawing (see Figure 1 previous page).

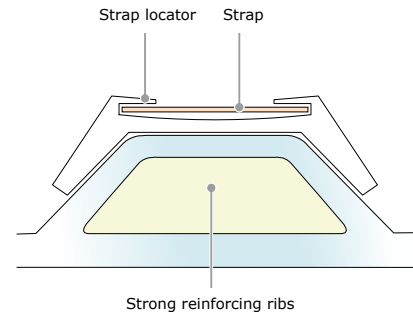
5. Taking the end of the 'long' length of webbing, thread it through the slot of the ratchet (see Sketch 1) and tighten up using the ratchet arm to give required tension.

6. On completion the ratchet tensioners should be well wrapped in 'DENSO' or similar tape for long-term protection if the tank is surrounded in pea gravel or similar backfill.

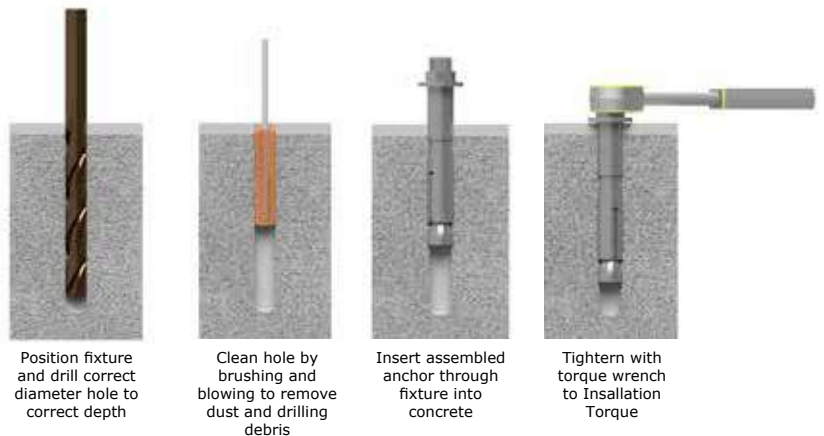
Sketch 1



Sketch 2

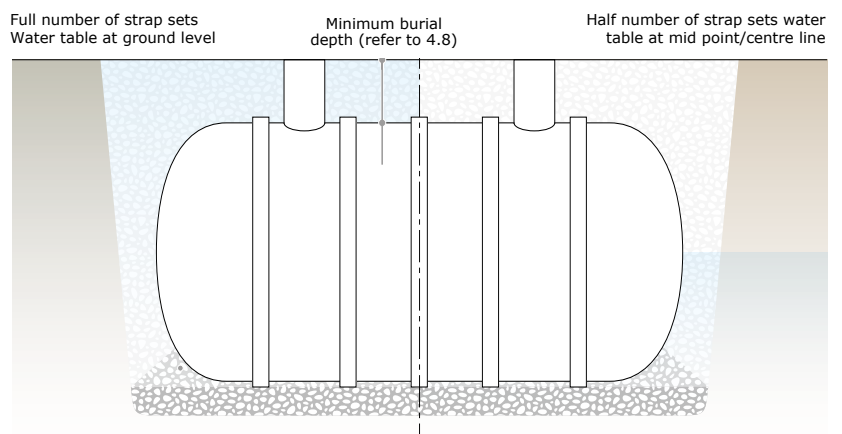
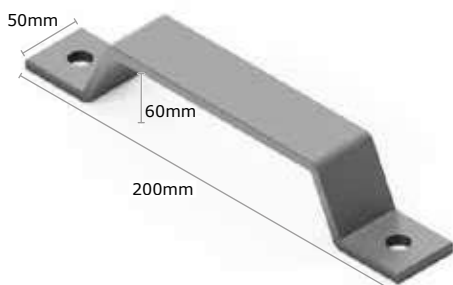


Anchoring kit contents for 300 series:	Anchoring kit contents for 400, 500 and 600 series:
Ratchet c/w short length of webbing x 1	Ratchet c/w short length of webbing x 1
Long length of webbing x 1	Long length of webbing x 1
Hold-down brackets x 2	Hold-down brackets x 2
GRP strap locators x 3	GRP strap locators x 5
Bolts x 4	Bolts x 4



Position fixture and drill correct diameter hole to correct depth
 Clean hole by brushing and blowing to remove dust and drilling debris
 Insert assembled anchor through fixture into concrete
 Tighten with torque wrench to Installation Torque

Hold-down Brackets



13.13 SPEL Underground Tanks Wellpoint Dewatering & Long Excavations

Wellpoint dewatering

Where sandy, permeable ground is saturated with water, wellpoint dewatering is a technique that lowers the ground water level over a defined area. This is achieved by simultaneously pumping from a number of wellpoints inserted into the water table.

Without wellpoint dewatering the contractor would be trying to work or dig in ground that is virtually quicksand. The sides of the excavated hole would keep collapsing and any sand removed would be replaced by more sand running in, thus, filling up the hole. This can result in danger to men, adjacent structures, roads, etc.

Once the wellpoints have been installed and the system has been running for some time, the contractor can then excavate in stable conditions.

As a general rule, any dewatering system must be kept running 24 hours a day because the water removed from the ground is replaced from the surrounding areas.

Modular bracing systems

Where excavations exceed 4m and extend to 22m or more, a propriety bracing system, where no internal cross bracing is required, should be used.

Systems available comprise telescopic, hydraulic and rough adjustment walling modules connected to fixed length extension beams designed to provide support to interlocking sheet piling.

Where excavations are 20m or more in length a goal post arrangement is normally required to provide cross bracing support at the central point. This arrangement enables the SPEL tank to be passed under and into the excavation.

For up to 20m long excavations, temporary bracing can be provided by Mabey Hire Ltd. to provide a clear opening for installing the SPEL Tankstor® or separator as illustrated.



Dewatering at
RAF Coningsby



SPEL Separator being installed at an RAF base.