HYDROPROTECTOR

INSTALLATION MANUAL

MODEL ID

LOCATION

HYD SERIAL ID

PROTECTOR

HYDROPROTECTOR

THE ULTIMATE IN STORMWATER PROTECTION

SAVING NATURE.

WARNING: this manual applies exclusively to the hydroprotector unit specified above. Do not use this manual as a guide to install any device that is not the specified unit.

For further information visit our website at **protector.com.au** or email **engineering@protector.com.au**

PRODUCT OVERVIEW

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Protector Stormwater quality Improvement Devices, manufactured by the Australian-based manufacturer, Protector Australia, provide high quality solutions for stormwater treatment and management for fast and efficient installation and maintenance, needed for today's fast track building methods. Built to the highest specifications, the Protector Stormwater quality improvement device range of products designed within FRP tanks are designed and built to BS4994-1987 and ASME RPT1. Popular with councils, municipal, water authorities, civil and construction customers and incorporating state-of-the-art technology, our packaged Stormwater Quality Improvement Devices provide simple solutions to some of the most complex problems in the stormwater treatment industry.

Protector Stormwater quality Improvement Devices are designed to reduce operating costs and optimise operating and installation efficiency whilst providing the highest quality stormwater pollutant removal.

Protector's dynamic enterprise has roots in the industry that go back to over 40 years of engineering, design experience and product knowledge passed from generation to generation to where it is today. Protector Stormwater Quality Improvement Devices and treatment systems are renowned for their quality with painstaking attention to detail that has become the product and basis for the company's operation formed by years of experience and knowledge in the fibreglass and water industry. With all FRP parts being manufactured in Australia, you can be assured of the highest quality system.

Today Protectors plant, based in the picturesque Southern Highlands, comprises of modern 'state of the art' filament winding and computerised robots to ensure fast operations and precision from concept to completion. The basis for the company's operation, with continuous success, both yours and ours!

Fibreglass Reinforced Polymer are strengthened materials that shows higher resistance to the corrosion which makes them ideal to be implemented for the tanks. They can be exposed to the water for years without being corrupted. Light weight, being resistant to high temperature and easy on-site installation are some of the desirable features that FRP indicates. Furthermore, FRP plates have higher mechanical strength which enables them to carry higher loads compared to plastics.

Protector Australia has designed and manufactured SQID systems utilizing FRP in order to provide a quality product that is high in strength and have a long life with high corrosion resistance. Protector SQID systems have a better durability, and highly resistant to any impact and corrosion.

This document provides an in-depth and detailed collation of the technical information on the Protector Stormwater Quality Improvement Device range including its installation practices, suitable usage, advantages and limitations.

Information is also provided on the filtration system, its design and its maintenance.

CAUTIONS AND SAFETY INFORMATION

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ALL MAINTENANCE ACTIVITIES ARE TO BE PERFORMED BY QUALIFIED PERSONNEL AND FOLLOW S.W.M.S. DEVELOPED IN ACCORDANCE WITH THIS MANUAL.

- Personnel to have received confined space entry permit.
- Personnel to follow all Occupational Health and Safety guidelines.
- Personnel to take all precautions to prevent injury.
- Before opening manway accesses, personnel to ensure all signage and barriers are erected prior to work.
- At least two qualified personnel to be present during maintenance.
- All access equipment to be checked and tagged prior to use.
- All electrical equipment to be checked and tagged prior to use.
- Isolate all electrical currents prior to works.
- Where applicable, divert foot and vehicle traffic away from works zone.
- Wiring of any equipment should be performed by a qualified electrician.

SAFETY

These instructions should not be interpreted in any way to put one's health at risk, or to harm property and/or the environment. The following definitions will serve as a guide when reading this manual:

WARNING

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

CAUTION

Indicates a potentially hazardous situation, which if not avoided may result in minor or moderate injury. A caution without the safety alert symbol indicates a potentially hazardous situation, which if not avoided may result in property damage.

IMPORTANT INFORMATION

Proper installation of each Hydroprotector Class 1 separator is essential:

- To ensure the safety of all the individuals involved in the installation.
- To prevent Hydroprotector Class 1 separator damage and/or failure, which could lead to product loss and environmental contamination.
- To validate the Hydroprotector Class 1 separator warranty.

GENERAL INFORMATION

Protector fiberglass Hydroprotector Class 1 separators are designed for installation with concrete top pad and bottom slabs. The following instructions reflect the approved methods for installing Hydroprotector Class 1 separators. Follow all OHS, Federal, State or Local safety and environmental codes and regulations.

CAUTIONS AND SAFETY INFORMATION

SAVING NATURE.

CLASS 1 SEPARATOR HYDROPROTECTOR MUST BE INSTALLED TO THESE INSTRUCTIONS.

The local authority and 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 void our warranty and may result in tank failure.

SITE ACCESS AND CONDITIONS

It is the responsibility of the contractor to ensure 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 offloading must be carried out with care to prevent accidental damage from impact or contact with sharp objects.

Tanks should be lifted using slings, not chains or wire ropes. Do not drag tanks along the ground for any distance and avoid jarring or bumps. Do not lift with water in the tank.

Note: Where transport height restriction 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 loaded onto a level area or well supported planks positioned adjacent to the ‘lift’ points and to support at least four ribs. The area must allow room too enable the tank to be rolled into the vertical position before lifting the tank into the excavation.

STORAGE

Set tank on smooth ground free of rocks and sharp objects. Chock/tie down to prevent movement in high winds.

TAKE DIMENSIONS

Dimensions given on drawing and literature shall be subject to manufacturing tolerances and should be checked physically prior to installation.

INSTALLATION PROCEDURES

The alternative methods of installation depends on the ground conditions, water table, the tanks locations and whether the tank is fitted with feet or not.

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

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

CAUTIONS AND SAFETY INFORMATION

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TANK SPECIFICATION

Check that you have received the correct specification tank.

Protector underground tanks are available in specification to suit invert depths, concrete or pea gravel surround and water conditions; standard, heavy, extra heavy and special.

For most applications, the standard or heavy specifications we shall be pleased to advise. If the tank invert depth and/or water table depth is outside the range we shall be pleased to advise accordingly.

EXTENSION ACCESS SHAFTS

Check if extension shafts are required.

These are available in 500 mm and 1000 mm high increments.

Note: where coalescer filter 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 procedure, Health and 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 the tank'. Before entering persons must be qualified in accordance with 'confined space' requirements.

Information contained in this data sheet is approximate and for general guidance only. In accordance with the company's policy of constant improvement and development of protector products, reserves the right to change the specification without prior notice.

PRE-INSTALLATION

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GENERAL

The construction method used in the manufacture of FRP Hydroprotector Class 1 separator system uses high strength composite laminar of resin and fibreglass.

These materials are extremely strong as well as corrosion resistant. But, like all engineered products, care must be taken during installation to ensure long, trouble free operation.

PRE-INSTALLATION CHECKS

1. After unloading inspect the tank outer layer for any damage during transportation and crane slinging. Should any surface damage be evident, this must be reported to your supplier and inspected before proceeding with the installation.
2. Check walls, floor, and roof for any surface damage. If minor repairs are required, report as outlined in above.
3. Check all pipe penetrations through wall, ensure that no damage has occurred and that the surfaces are clean for later joining to incoming and outgoing pipes and vents.
4. Check holds down bolts on pedestals and tighten if necessary.

HANDLING AND PREPARATION

WARNING Do not stand on or under Hydroprotector Class 1 separator while it is being lifted. This could result in personal injury or death.

- Do not drop or impact the Hydroprotector Class 1 separator.
- Hydroprotector Class 1 separators should be stored horizontally and chocked, using only appropriate materials such as sandbags, tires, or other soft or pliable materials.
- Upon Hydroprotector Class 1 separator delivery and when lifting Hydroprotector Class 1 separator, visually inspect entire exterior surface of the Hydroprotector Class 1 separator for shipping or handling damage.
- If the Hydroprotector Class 1 separator must be moved by rolling, ensure that ground to be traversed is smooth and free of rocks, debris, or other hard objects.
- Do not roll or set the Hydroprotector Class 1 separator on any pipe stub out, accessory or appurtenance installed on the Hydroprotector Class 1 separator.
- The contractor is responsible for rigging, unloading, and securing the Hydroprotector Class 1 separator.
- When lifting the Hydroprotector Class 1 separator in the horizontal position, use two slings with a spreader bar.
- Use a minimum of two lifting slings when pivoting the Hydroprotector Class 1 separator from horizontal to vertical.
- Only a pliable strap or rope should contact the Hydroprotector Class 1 separator, do not use chains, steel cables or hard metallic slings.

PRE-INSTALLATION

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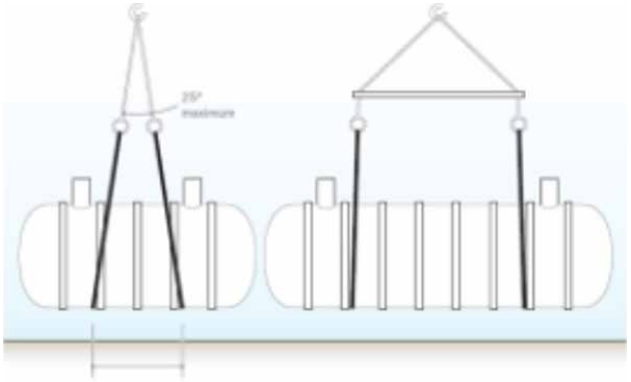
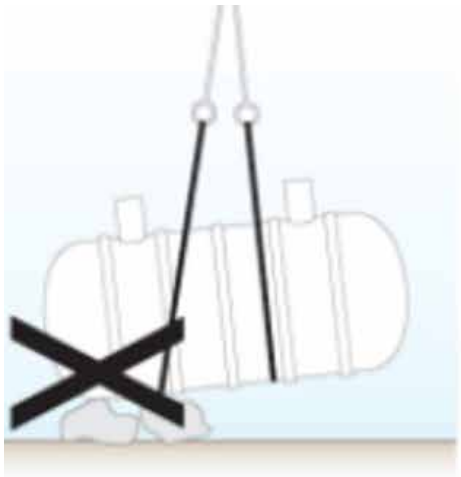
LIFTING AND HANDLING – PREFERABLE METHODS

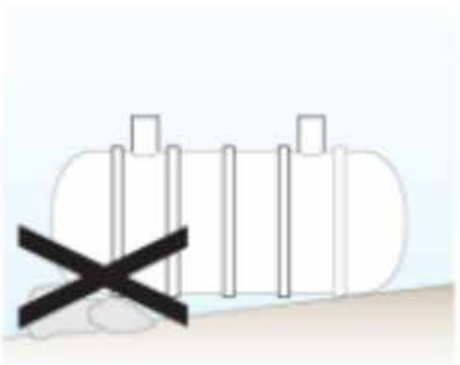
- Do not roll or drop tanks, Only move tanks by lifting. Rolling tanks could damage fittings.
- Tanks can be lifted using slings / webbings as illustrated.
- Where necessary a spreader bar should be used.
- Guide the tank with guide lines.
- Never use chains or steel cables around tank shell.
- Do not 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.



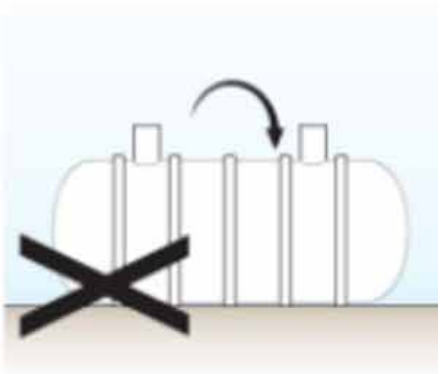
Minimum of 1/4 x length Preferred methods of lifting



Never drag along the ground or lift unevenly



Place tanks on smooth level ground



Do not roll or drop tank

LIFTING AND TANK HANDLING FROM TRUCK:

1. Place Soft Slings around the body of the tank.
2. Slings to be ¼ length of tank from each end.
3. Connect two leg chains to slings unless using a spreader bar.
4. Ensure that angle of lifting is no less than 60 degrees.
5. Lift and Place on Ground.
6. Ensure that the tank is resting on supports. Ensure that the flanges do not come in to contact with the ground.
7. Ensure that the base of the tank is on soft ground (I.E, smooth bed of gravel).

PEA GRAVEL BACKFILL INSTALLATIONS

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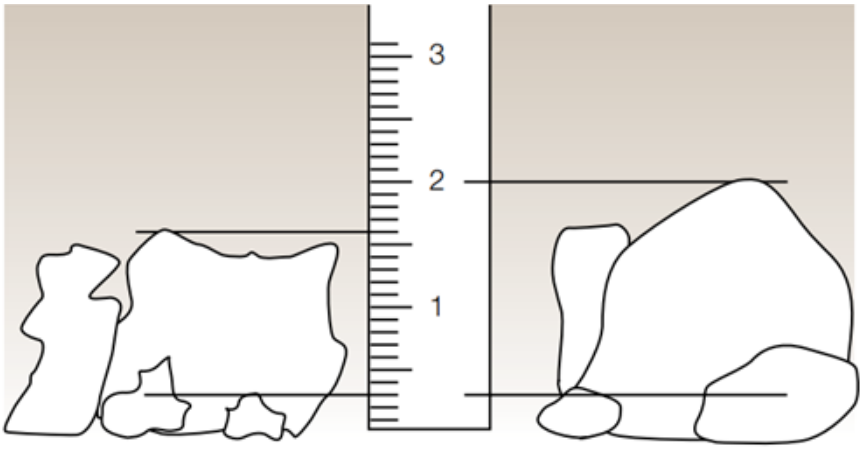
NB: ENSURE ONLY TRAINED AND EXPERIENCED CONTRACTORS PERFORM THIS METHOD OF INSTALLATION.

BACKFILL MATERIAL

Pea gravel or crushed rock is preferred as backfill material. Clean washed sand may be used, but it must be compact in 300mm lifts to above tank top. Requirements of the backfill material include:

- Clean and washed.
- Non-cohesive, inert materials.
- Pea gravel or crushed rock.
- Particle from 4.74mm and no greater than 19mm.
- Material free from rocks, ice, snow, or organic materials.

APPROVED BACKFILL MATERIAL FOR TANKS AND PIPES



Crushed rock 4.75mm - 19mm

Pea Gravel 4.75mm - 19mm

EXCAVATION

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

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.

UNSTABLE GROUND CONDITIONS

Where the ground is unstable, for instance landfill areas, peat, swamp or in clay areas subject to swelling or 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 to ensure a firm base for the backfill.

PEA GRAVEL BACKFILL INSTALLATIONS

SAVING NATURE.

FILTER FABRIC

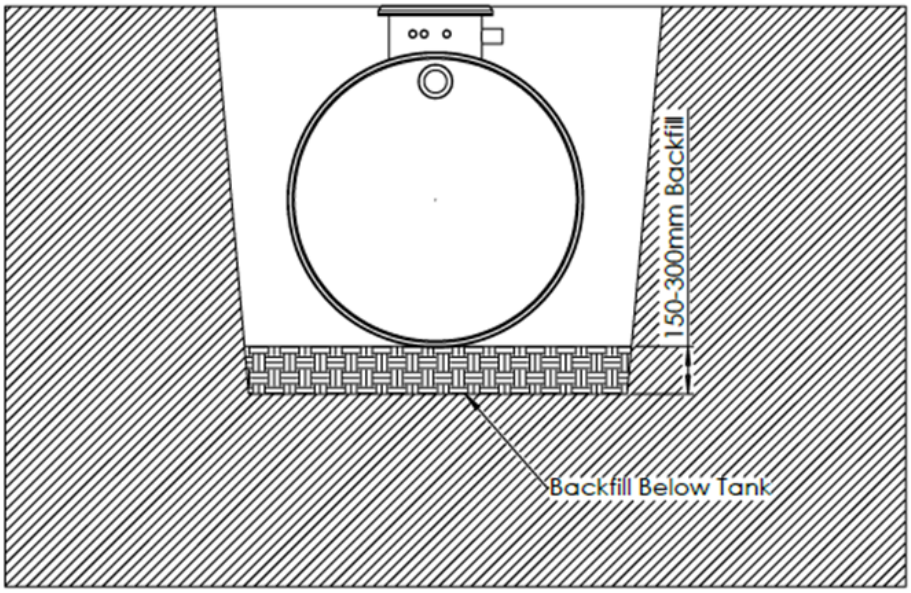
Where there is a risk of the migration of pea gravel with the native soil, an approved filter fabric/geotextile is recommended.

FILLING TANKS

Do not fill tanks until backfill is to the top of the tank. Where the tank is divided into chambers, ensure all chambers are filed evenly and surround in gravel.

DRY HOLE PROCEDURE

1. Place a minimum of 150mm-300mm of approved backfill over the excavation bottom.



2. Position the tank carefully onto backfill bed and check for levels including inlet/outlet inverts. Check that the tank is truly horizontal and level and that the inlet and outlet levels are correct.
3. Place first 300mm lift of backfill evenly around the tank by shoveling and pushing beneath the tank bottom, between ribs and end domes to ensure complete support and to eliminate voids.

PEA GRAVEL BACKFILL INSTALLATIONS

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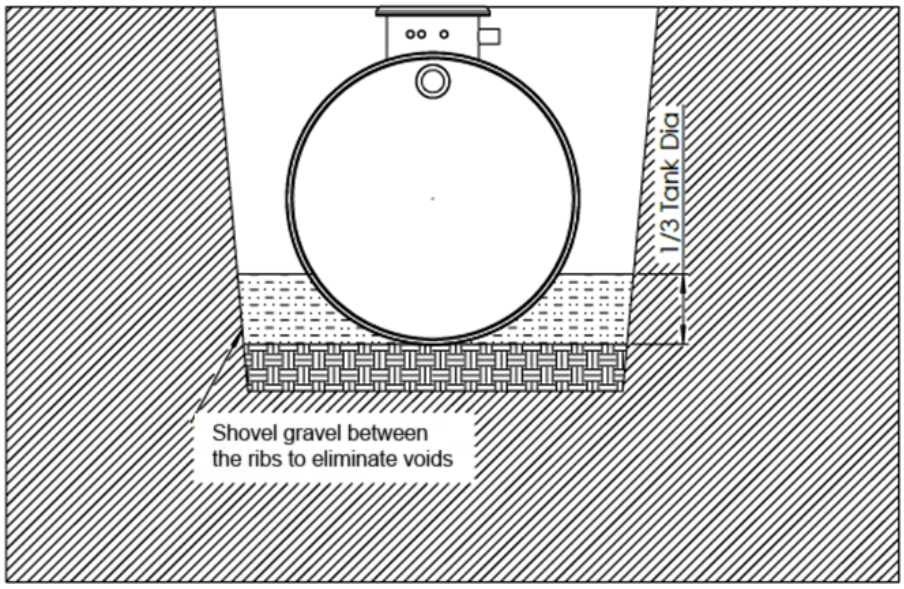
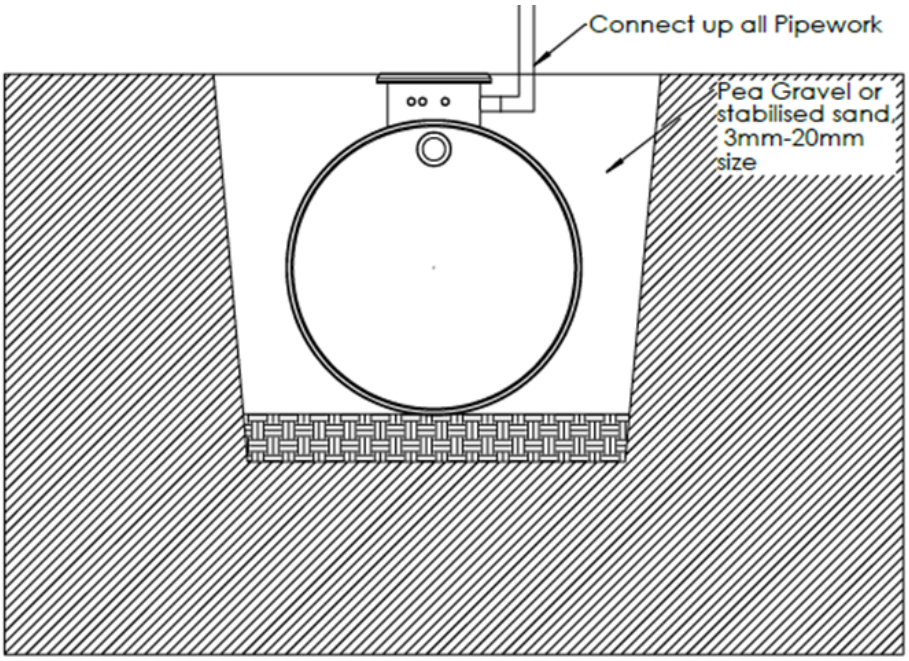
4. Place and compact further to a minimum depth of 1/3rd tank diameter.



5. The remainder of the backfill can be poured without consolidation except where required to support a cover slab.
6. Connect the inlet, outlet and vent pipework, seat access shaft into the socket and apply waterproof mastic or adhesive.



PEA GRAVEL BACKFILL INSTALLATIONS

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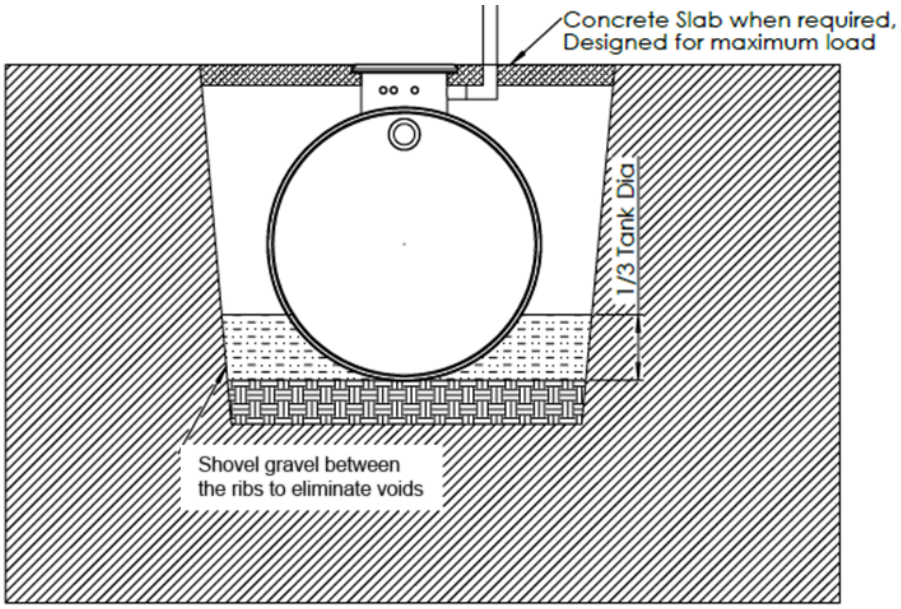
7. Where a concrete slab is to be constructed over the tank to take vehicle loading, it should be reinforced according to good practice to take the maximum load and should be extended onto unexcavated ground. It is important that the vehicle loadings are not transferred to the tank itself. Ensure the sides have been shored to prevent colapse.



WET HOLE PROCEDURE

Where there is water entering the excavation, the water level should be maintained below the foundation level by pumping. 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 ballast use only lifting straps to keep the tank in position.

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

BACKFILL BED

This table describes the minimum amount of approved backfill required to be used over the excavation bottom.

TANK	MIN BACKFILL BED (MM)
1000, 1200, 1500 diameter	200
1850 and 2200 diameter	250
2500 and 3000 diameter	300

VENTING

Adequate ventilation of the HydroProtector fuel separator and the inlet pipework shall be provided to prevent the accumulation of gases. All Protector products should be vented to Australian Standards, subject to local authority requirements. In multiple chamber separators, vent pipework must not be combined into a common stack below a point where the pollutants contained could be transferred into other tanks. Vent stack by law should be 3.8m high and away from hazardous zones.

INSTALLATION OF EXTRAS

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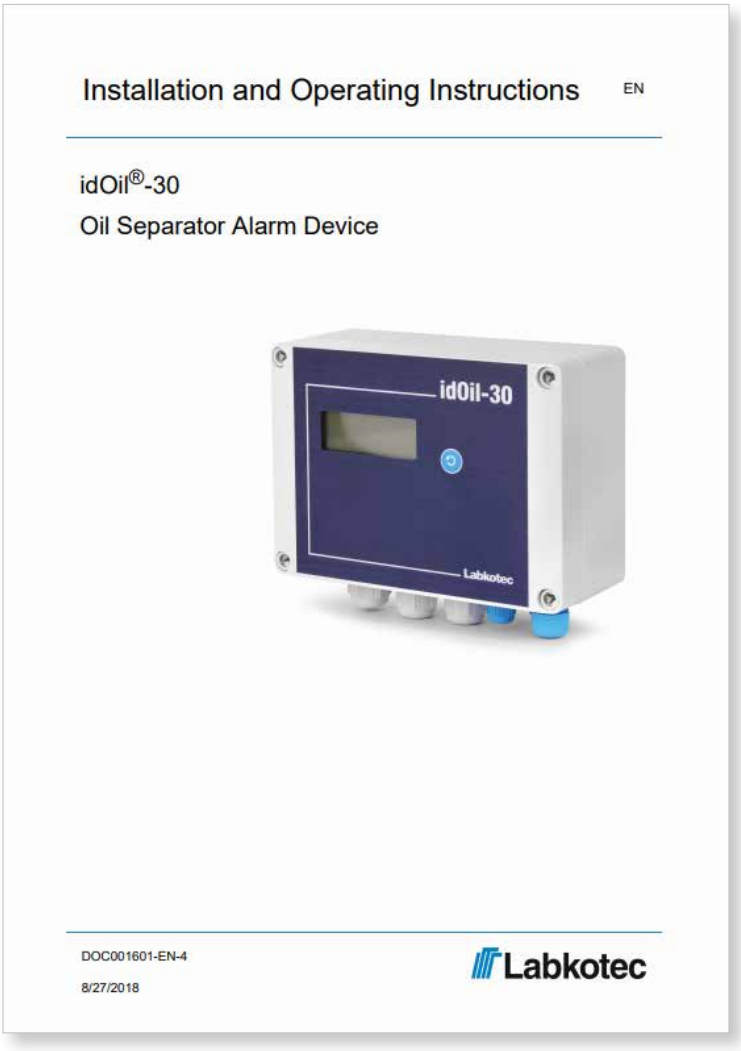
REFER TO SUPPLIED LABKOTEC "INSTALLATION AND OPERATING INSTRUCTIONS."



Control panel can be mounted on external or internal walls or on a freestanding post. The control panel can also be installed in a freestanding Solar powered unit, making it independent of mains electricity. If the control panel is mounted externally, a sun shade must be installed to prevent UV degradation. Ideally if installed outside it should be in a vandal proof enclosure with additional strobe light fitted on top.

Control panel for Protector automatic alarm and monitoring system can be placed up to 300m from the probe. Please use round 2 core wire to ensure proper seal with provided Y-seal.

UNDERGROUND TANKS

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WELLPOINT DEWATERING

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

Without well point dewatering the contractor would be trying to work or dig in ground that is quicksand. The sides of the excavated hole would keep collapsing and any sand removed would be replaced by more sand running in, filling the hole. This can result in unnecessary danger to workers, other site locations, infrastructure nearby etc. Once the well points have been installed and the system has been running for some time, the contract can the excavate in stable conditions. The system must be operational 24 hours a day.

LONG EXCAVATION

Where excavations exceed 4m and extend to up to 22m, a proprietary bracing system, where little or no cross bracing internally is required, should be used. Systems available compromise 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 is required to be arranged to provide cross bracing support at the central point. This arrangement enables the Protector tank to be passed under and into the excavation.

To allow for the central goal post, the Protector tank must be slung sufficiently off centre to ensure clearance when finally positioning. Just sufficient angle of repose of the suspended tank can be achieved by using careful calculated length slings. Care must be exercised when the lower suspended end of the Protector tank reaches the concrete base slab. It is recommended the first point of contact is protected. A vehicle type is effective in cushioning a load point.

TRAFFIC AND NON-TRAFFIC LOAD COVERS

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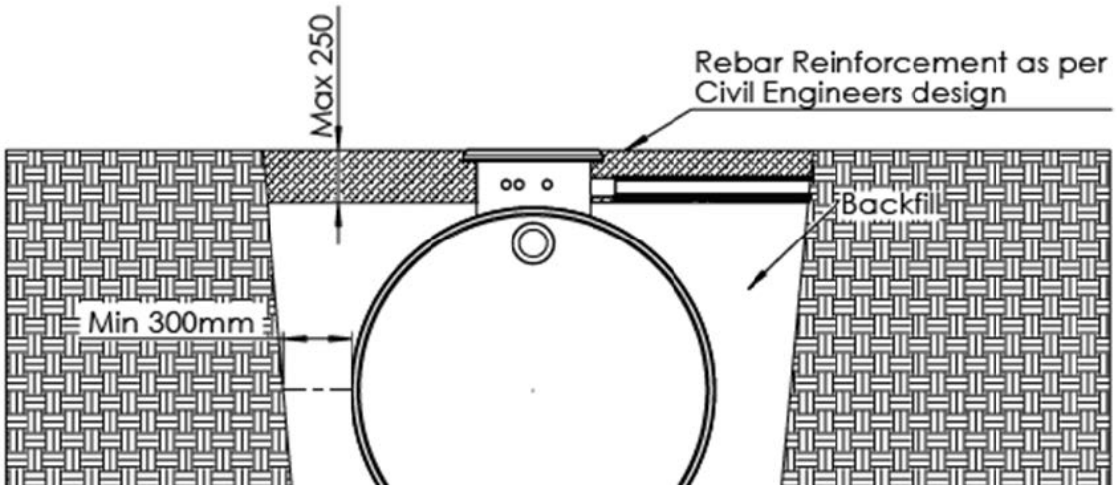
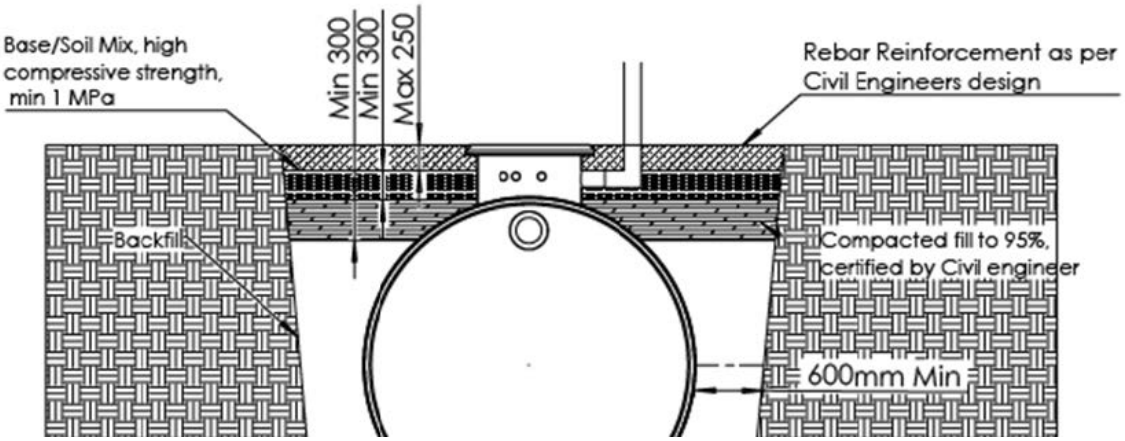
FIBERGLASS FLAT TOPS WITHOUT TRAFFIC LOADS

- The pad must be larger than the HYDROPROTECTOR CLASS 1 SEPARATOR - a minimum of 300mm in all directions.
- Maximum 200mm concrete pad thickness.



FIBERGLASS FLAT TOPS WITH TRAFFIC LOAD

- The pad must be larger than the Hydroprotector Class 1 separator a minimum of 600mm in all directions.
- The Certified Engineer shall specify the pad strength and reinforcement so that the static weight of an 200mm thick square pad (no more than 600mm larger than the diameter of the Hydroprotector Class 1 separator centered on the Hydroprotector Class 1 separator along with a dynamic T-44 traffic load must be distributed on the Hydroprotector Class 1 separator perimeter and not on the interior of the lid.
- If either the static pad load or the dynamic traffic load is exceeded, all the pad and / or traffic loads must be supported by the soil around the Hydroprotector Class 1 separator and not by the Hydroprotector Class 1 separator itself.



AFTER INSTALLATION

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After the installation procedure has been followed and the Hydroprotector Class 1 separator system is secured in place, a few final steps must be followed, to maximize the lifespan of the FRP Underground tank.

It must be ensured that the tank will have no contact from outside environmental conditions and protection from contact with moving factors. These include motor vehicles, farm equipment, construction, and any animal interference. If not installed completely underground, fencing must be included on site to ensure no contact by environmental conditions from high wind, and existing fauna interactions. The lids must be designed to be able to take the impact of any contact from motor vehicles or animals, and alternatively must not cause damage to any vehicles or and animals that walk or drive upon the lid. Hence the surroundings must be carefully cordoned off and the lid designed for the sites demands.

LIVE SURFACE LOADS

Light duty Fiberglass are not suitable for vehicular traffic. If a package system is to be positioned in a location subject to vehicular traffic, then a certified cast iron cover must be used. Either Class B or Class D covers may be selected to suit the appropriate wheel loading. Special design consideration must be given to the surface slab, which must provide a full re-enforced bridge support to transmit slab loads to virgin ground. In this case, the services of a qualified civil engineer should be engaged to provide adequate slab designs.

INSTALLATION NOTES

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PROTECTOR