

# TORNADO GPT

## INSTALLATION MANUAL

**MODEL ID**

.....

**LOCATION**

.....

**TGPT SERIAL ID**

.....

PROTECTOR



SAVING NATURE.

# TORNADO GPT

HIGH VOLUME VORTEX GPT FILTRATION SYSTEM



SAVING NATURE.

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**WARNING:** this manual applies exclusively to the Tornado GPT unit specified above. Do not use this manual as a guide to operate or maintain any device that is not the specified unit.

For further information visit our website at [protector.com.au](http://protector.com.au) or email [technician@protector.com.au](mailto:technician@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 Protector's 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.

# SYSTEM SPECIFICATIONS



## DESIGN AND CONSTRUCTION STANDARDS

AS1546 - Underground tank design

AS2634 - is used to formulae the manufacture standards and installation of the penetrations to the unit (TBC)

AS1170 - Loading code

## DESIGN METHODOLOGY

The underground tank Design Methodology is based on the use of the above standards as described, where applicable:

AS1546 is used to formulae the design load of soil/groundwater and use for the testing methods applied.

AS1170 is used to formulae the design loads from active loads that the stations are subject to, including the required roof slab design. This standard is also used to formulae the ballast requirements for ant floatation.

AS2634 is used to formulae the manufacture standards and installation of the Penetrations to the stations (TBC)

## MATERIALS OF CONSTRUCTION

### CORROSION

INTERNAL	EXTERNAL
Internal Corrosion Barrier, moulded with a resin rich C'veil and CSM layers	External layer will a resin rich CSM layer and C-Glass veil finished with ISO/NPG Flow coat layer for external finish to required colour
Resin rich Corrosion barrier constructed from Hetron 922 Vinyl Ester Resin	
C'veil will be Regina 80gsm Surface Tissue	
The Internal Corrosion Barrier is manufactured in accordance with AS2634	

### REINFORCEMENT

- Manufactured using Chop / Hoop Construction, on a computer-controlled Filament Winding machine.
- Shell Thickness are in accordance to the design requirements set out in the methodology.
- Structural layers are constructed from Polyplex Isophthalic Resin with CSM & Hoop in accordance with Ratio's as specified by the design.
- Fiberglass 'E' glass is used for both chopped and continuous strands.

### TANK

- The base is circumferentially benched to WSA04–2005
- FRP Flanged fittings are made in accordance with AS2634, and flanges are installed as per AS2634. Both the internal and external FRP attachment laminates are in accordance with AS2634



## 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 Tornado GPT is essential:

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

## GENERAL INFORMATION

**WARNING Tornado GPT are a confined space per OHS guidelines. Follow proper confined space safety procedures.**

Protector fibreglass units are designed for installation with concrete top pad and bottom slabs. The following instructions reflect the approved methods for installing Tornado GPT. Follow all OHS, Federal, State or Local, safety and environmental codes and regulations

## BEFORE YOU BEGIN

- Read, understand and follow these instructions.
- Barricade the work area.
- Review and prepare to complete the installation checklist as the installation progresses. If you have questions on their Tornado GPT installation details, call Technical Support at 02 8006 2627

# BEFORE INSTALLATION



Our products are suitable for almost all locations, from an industrial car park to residential catchment areas, from mining areas to airports, our large range of products will provide the solution you need. Our FRP designs will strive to keep our streams, waterways and our environment clean.

## DESIGN CONSIDERATIONS

Important considerations must be taken when deciding on which Protector product is suitable for your needs. With the assistance of our team of experienced staff we can offer endless assistance and advice in this matter. The most important aspects we consider helping solve your needs are:

- Physical Locale and rainfall conditions
- Catchment Size
- Contaminant types
- Flow Rate
- Risk Analysis

All our products ensure clean, treated water to flow back into the environment.

## LOCATION

Location is vital for design considerations for Protector to provide the best possible Tornado GPT for you site demands. Information shall need to be supplied to our team depicting all information necessary for us to select the perfect Tornado GPT for you. Rainfall data, flow rates, storm conditions and other aspects of the surrounding area are recommended to be provided or detailed.

For optimal installation and transport of the Tornado GPT, clear and safe access to the installation site must be considered to facilitate ease of installation, maintenance and servicing. The access manways built into our Tornado GPT must be accessible at all times and well-sealed to prevent foreign contaminants from entering the unit. Access roads must be available for delivery of the Tornado GPT, with no intrusion or obstacles that may cause damage to the unit upon delivery and installation.

# INSTALLATION PROCEDURE



## GENERAL

The construction method used in the manufacture of Tornado GPT devices utilises high strength Composite Laminar of Resin and Glass

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

## PRE-INSTALLATION CHECKS

1. After unloading inspect the tank skin for any damage during transportation and crane slinging. Should any minor 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 hold down bolts on pedestals and tighten if necessary.

## HANDLING AND PREPARATION

**WARNING** Do not stand on or under Tornado GPT while it is being lifted. This could result in personal injury or death.

- Do not drop or impact the Tornado GPT.
- Tornado GPT should be stored horizontally and chocked, using only appropriate materials such as sandbags, tires, or other soft or pliable materials.
- Upon Tornado GPT delivery and when lifting unit, visually inspect entire exterior surface of the Protector for shipping or handling damage.
- If the Tornado GPT 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 Tornado GPT on any pipe stub out, accessory or appurtenance installed on the unit.
- The contractor is responsible for rigging, unloading and securing the Tornado GPT.
- When lifting the Tornado GPT in the horizontal position, use two slings with a spreader bar.
- Use a minimum of two lift lugs when pivoting the Tornado GPT from horizontal to vertical.
- Utilize all lift lugs provided at the Tornado GPT top for vertical lifting.
- Only a pliable strap or rope should contact the Tornado GPT, do not use chains, steel cables or hard metallic slings.

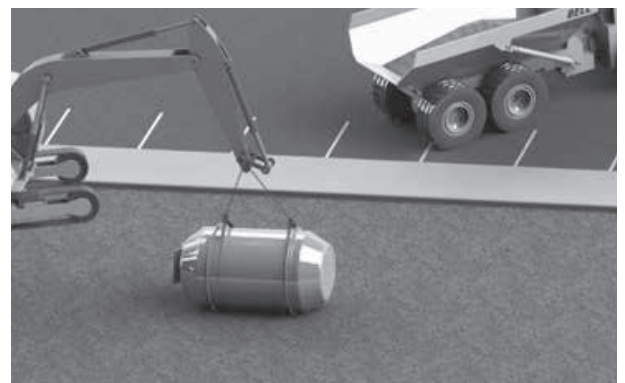
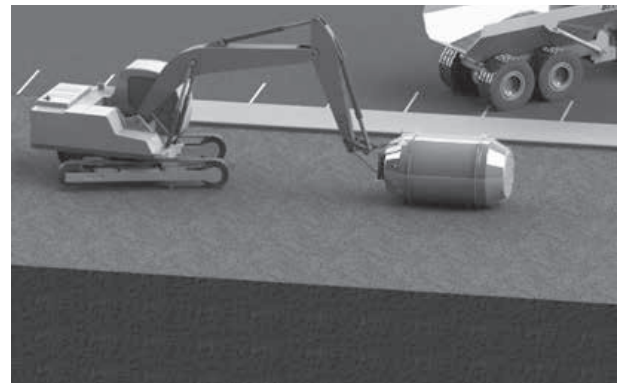
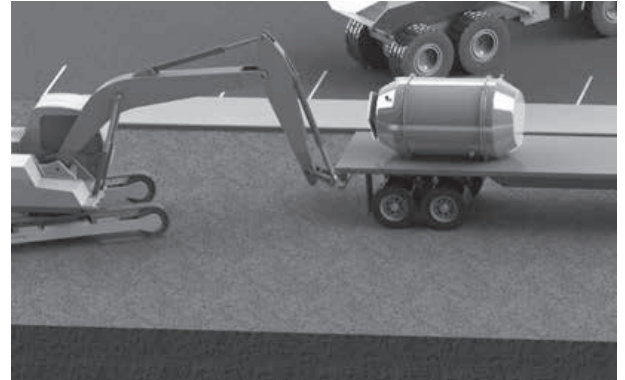
# INSTALLATION PROCEDURE

## LIFTING AND TANK HANDLING FROM TRUCK

Once the truck arrives check condition of tank to ensure no damage has incurred in transport. All issues must be photographed and sent to Tornado GPT for verification.

### VERTICAL LIFTING PROCEDURE:

1. Place soft slings around the body of the unit
2. Slings to be  $\frac{1}{4}$  from each end
3. Connect two leg chains to slings
4. Lift and place on ground
5. Place unit on ground as the same position of the truck
6. Ensure that the unit is resting on supports. Ensure that the flanges do not come in contact with the ground
7. Ensure that the base of the Tornado GPT unit is on soft ground (I.E. grass)
8. Place 3 x short soft slings around the unit
9. With a 3 toe chain set or 3 (1 redundant) ensure that the 3 ties are the same length
10. Reduce angle of chains to ensure safe lift
11. Slowly draw tension
12. Once the unit is vertical with all 3 chains tight, the unit is ready to be moved to the excavation for installation

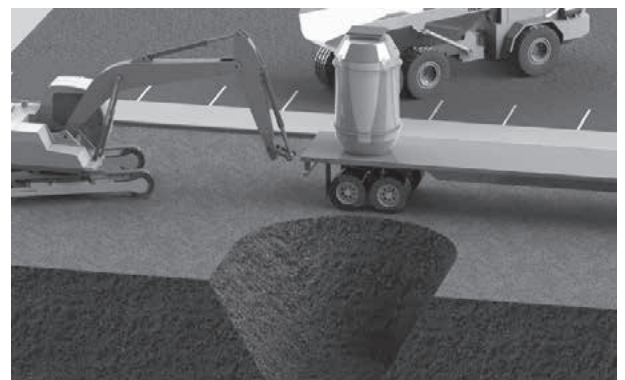


## SITE PREPARATION

Dimensions of the excavation should be wide enough to provide sufficient working room around the Tornado GPT.

Minimum anti floatation ring and ballast dimensions are specified in (Table 1, page 7)

Anti-floatation ring and ballast designs in (Table 1, page 7) meet Australian Standard Code S3600A.

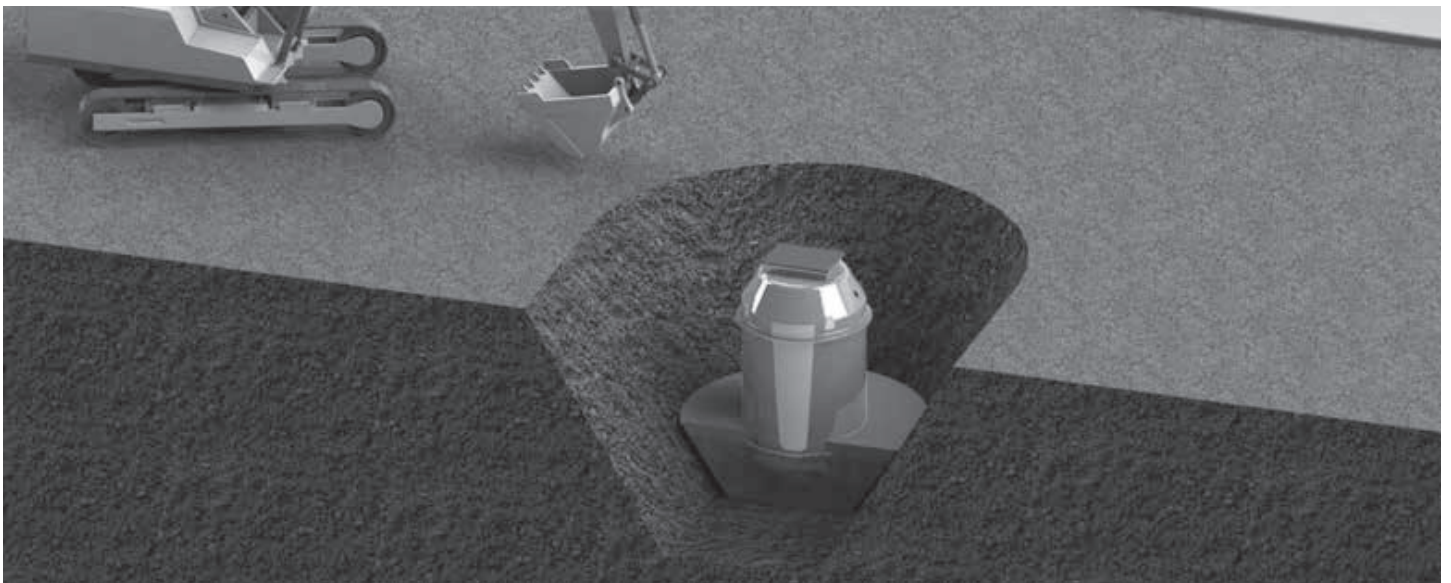




# BALLAST INSTALLATION

## ANTI-FLOATATION BALLASTS FOR TORNADO GPT

The Tornado GPT walls are designed to resist the crushing effects of underground pressures to the full depth of the wall without the need to be surrounded by concrete. However, in conditions of high water table, external ballast will be required to resist upward buoyancy forces. It is important to note that, as Tornado GPT units do not require outer concrete walls for strength, the ballast concrete may be placed in the most economical position, which is at the base of the excavation normally to the base locking ring. Concrete must be poured in accordance with 'best practice' as set out by the industry Standard. Please refer to the Concrete Manufacturers' Association Handbook. The calculation of the volume of concrete ballast is not covered in this document. This calculation should be carried out by a certified civil engineer.



**WARNING** Collapsing excavation walls can cause injury or death. Do not enter the Tornado GPT excavation unless necessary and in compliance with OHS regulations. Follow OHS guidelines for excavations.

Lower Tornado GPT onto compacted base then place wet concrete around the Unit, until it covers the lock-in rib plus meets the ballast quantity in (Table 1 and figure 1, page 7.)

Cold concrete joints are not allowed. Fibreglass solid bottom Tornado GPT with external reinforcing ribs must be installed in a continuous and monolithic concrete pour. Concrete must extend 100mm above the lock-in rib from the Tornado GPT bottom, and around the entire circumference of the unit. (Refer to illustration above)

- Concrete slab must fill all gaps and voids in and around the external tank lock-in ribs.
- It may be necessary to add ballast (water) inside the Tornado GPT to counteract buoyancy until the concrete is cured.

**ANTI FLOATATION RING CONCRETE SLAB** Use minimum 20 MPa concrete for anti-floatation and ballast Final concrete depth, size, thickness and reinforcements shall meet the minimum requirements in these instructions and applicable tables. Anti-floatation ring should extend a minimum of (refer to table 1, page 7) in all directions from the Protector outer diameter.

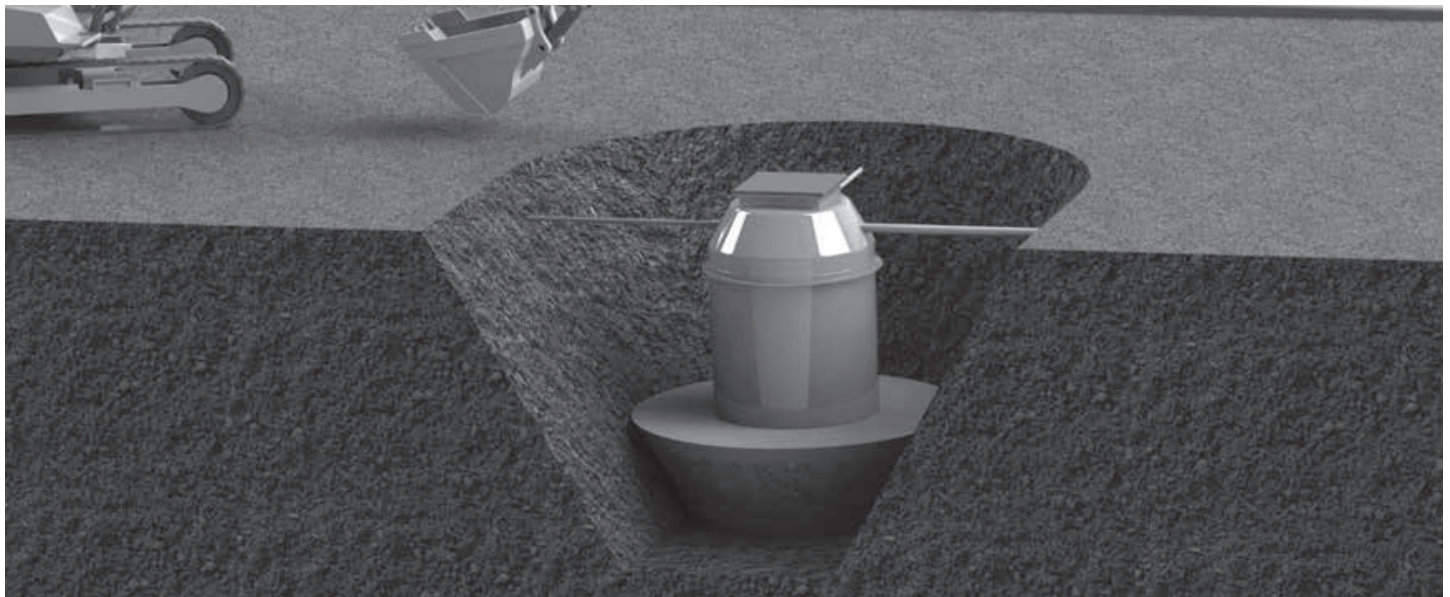
**CAUTION** Voids in the concrete slab around external structural anchors will result in product damage and environmental contamination.

# CONNECTION AND FITTINGS

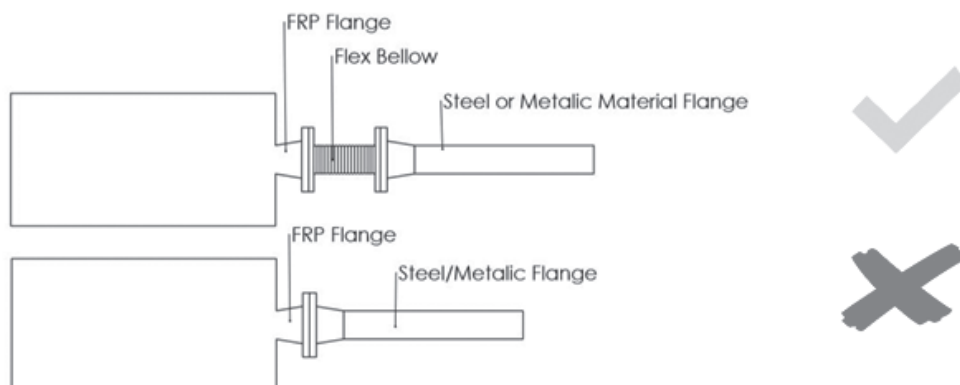
## PIPING PENETRATIONS/FITTINGS

**CAUTION** Always wear safety glasses and protective clothing when cutting on the Tornado GPT, failure to do so can result in personal injury.

- Pipe penetration cut-outs should be round holes and should be no larger than the pipe diameter plus 25mm.
- Make cuts using a saw with a masonry or diamond grit blade.
- Do not use an axe or other impact type tools.
- Accessories must be installed and used in strict accordance with the manufacturer's instructions.
- All piping must have a flexible connector installed directly on the fitting or accessory to allow for a minimum 15mm differential settlement between the Tornado GPT and the pipe. If more than 15mm differential settlement is expected, choose a flexible connector designed for the expected settlement. Do not backfill around the Tornado GPT until the concrete slab has hardened. Add backfill in maximum 900mm lifts evenly around the Tornado GPT to avoid uneven backfill loads.



**WARNING:** When connecting an FRP flange to a metallic flange connection, you **MUST** connect the flange to the metallic flange through the use on an appropriately sized flex bellow.



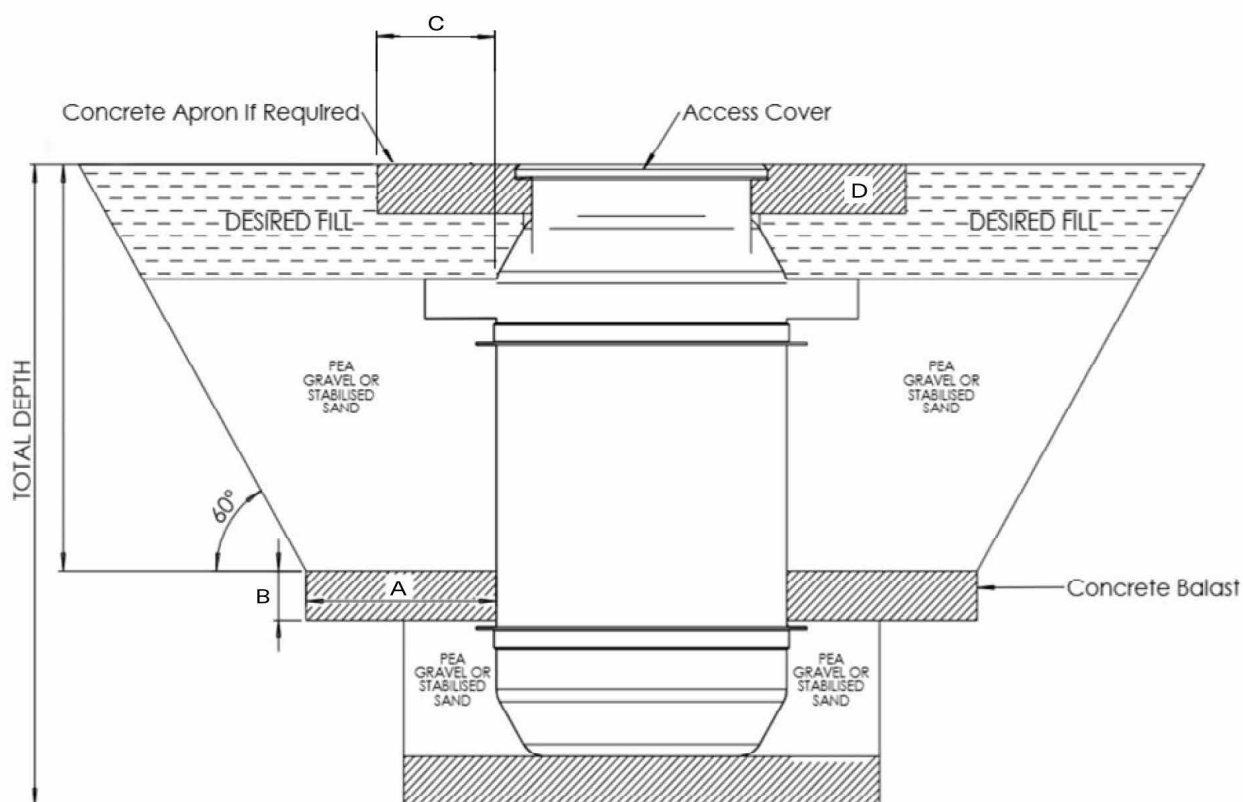
# REINFORCEMENT AND BACKFILL



SAVING NATURE.

TORNADO GPT DIA (MM)	REINFORCEMENT REO - BAR (IN CENTRE OF SLAB, REF-FIGURE 1.)	A - REQUIRED BALLAST EXTENSION AROUND WET WELL (MM)	B - BALLAST HEIGHT (MM)	C - REQUIRED SLAB EXTENSION AROUND PROTECTOR (MM)	D - SLAB THICKNESS (MM)
1200	1 @ 1800mm Dia. N12	300	400	400	200
1520	1 @ 1920mm Dia. N12	350	200	500	200
1850	1 @ 2250mm Dia. N12 & 1 @ 2650mm Dia. N1	400	600	550	200
2200	1 @ 2600mm Dia. N12 & 1 @ 3000mm Dia. FN12	500	700	700	200
2500	1 @ 2900mm Dia. N16 & 1 @ 3300mm Dia. N16	500	800	800	250
3000	1 @ 3400mm Dia. N16 & 1 @ 3800mm Dia. N16	700	1000	900	300

## TYPICAL INSTALLATION



# BED AND BACKFILL



Proper backfill selection and compaction are required for a proper installation. The allowed backfills are shown in Table D-1 along with the degree of compaction required.

## BED AND BACKFILL COMPACTION

Soil type-pipe bedding material (Unified Soil Classification System See Table D-2)	Minimum Degree of Compaction Required*
Fine - grained soils (Liquid Limit < 50) with medium to no plasticity with less than 25% coarse grained particles. CL, ML, ML - CL,	High
Fine grained soils (Liquid Limit < 50) with medium to no plasticity with more than 25% coarse grained particles. CL, ML, ML - CL	Moderate
Coarse grained soils containing more than 12% fines. GM, GC, SM, SC	Moderate
Coarse grained soils with less than 12% fines. GW, GP, SW, SP	Slight
Coarse grained soils with less than 12% fines. GW, GP, SW, SP	Dumped

## TORNADO GPT INSTALLATION WITH A HYDROVAULT OR EQUIVALENT UNIT

**CAUTION** Not using approved backfill material may result in tank failure and environmental contamination.

If the Tornado GPT is installed in the same excavation as an Hydrovault, the backfill around the Tornado GPT must also meet the Hydrovault backfill requirements to not compromise the Hydrovault installation. Hydrovault backfill requirements are more restricted and strict conformance to the Hydrovault backfill requirements must be met for both the Tornado GPT and Hydrovault. See Hydrovault Installation Manual for backfill details.

## DEGREE OF COMPACTION:

- **Dumped** - No compaction effort.
- **Slight** - Some compactive effort. In-place density <85% standard compaction. Or < 40% modified compaction.
- **Moderate** - Intermediate level of compactive effort, In-place density  $\geq$ 85% and < 95% standard compaction, or  $\geq$ 40% and <70% modified compaction.
- **High** - Considerable compactive effort. In-place density  $\geq$  95% standard compaction, or  $\geq$  70% modified compaction

The difference in the "dumped" and "slight" degree of compaction values is significant and are based on the method of construction, not the measured densities. "Dumped" means that there is absolutely no compaction of the embedment soil. "Slight" means there was something done that increased the soil density, even if minor, such as water settling, jetting, flooding, equipment travel, and in some cases, foot traffic.

For stable soils (cohesion  $\geq$  36 kpa and / or a bearing capacity  $\geq$  170 kpa a minimum 300mm of backfill must be placed around the Tornado GPT.

For unstable soils (cohesion  $\leq$  36kpa and ultimate bearing capacity  $\leq$  170 kpa). - Tornado GPT units 1200mm diameter or smaller require a minimum 600mm of backfill around the entire circumference of the Tornado GPT. Units larger than 1200mm diameter require a minimum backfill of  $\frac{1}{2}$  the Tornado GPT diameter around the entire circumference of the unit.

If muck, bog or peat are present, consult with a Geotechnical Engineer for backfill and excavation requirements.

For permafrost conditions, consult with a Geotechnical Engineer for backfill and excavation requirements. Keep backfill dry and free of ice in freezing conditions. Ensure that no foreign objects such as large stones, concrete clumps, tree roots/limbs, or debris is in the backfill surrounding the Tornado GPT. Prevent large surges of backfill from displacing the Tornado GPT.



TABLE D-2

LETTER AND DEFINITION	SECOND LETTER AND DEFINITION
G = Gravel	P = Poorly Graded (uniform particle sizes)
S = Sand	W = Well Graded (diversified particle sizes)
M = Silt	H = High Plasticity
C = Clay	L = Low Plasticity
O = Organic	

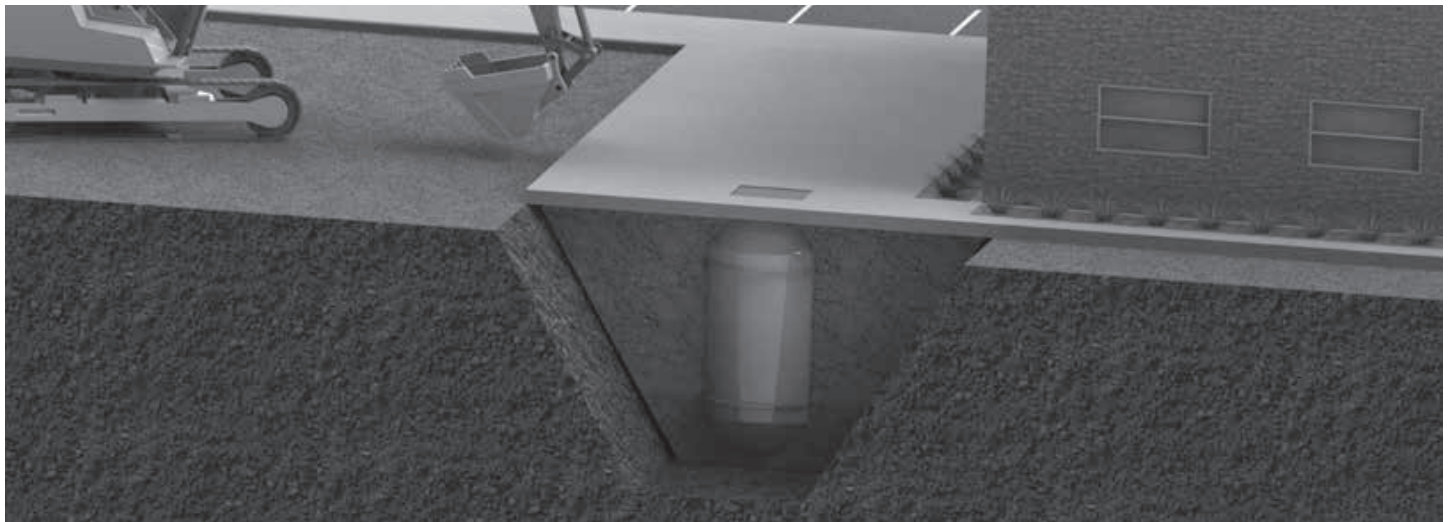
# LEVELS AND TRAFFIC LOADS

## INVERT

Invert specified by Certified Engineer. The invert may be at any angle and may project up the Tornado GPT any distance.

## TOP PAD

- The Tornado GPT is designed to support the dead weight of an 200mm thick square pad 600mm larger than the diameter of the Tornado GPT (centered on the unit) along with a dynamic T-44 traffic load as long as the pad is designed to distribute the loads on the Tornado GPT perimeter and not on the interior of the lid.
- If the static load will exceed the 200mm pad weight or the traffic load will exceed T-44, the pad must be 1200mm larger than the Tornado GPT diameter (centered on the unit) and all of the pad and / or traffic loads must be supported by the soil around the Tornado GPT and not by the unit itself.
- Fibreglass flat tops 1000mm through 2500mm diameter are designed to support 200mm concrete pads without internal supports while the concrete cures.
- The concrete pad must be designed to be self-supporting after cured.
- The pad shall be specified by the Certified Engineer.



## FIBREGLASS FLAT TOPS WITHOUT TRAFFIC LOAD

- The pad must be larger than the Tornado GPT a minimum of 300mm in all directions.
- Maximum 200mm concrete pad thickness.

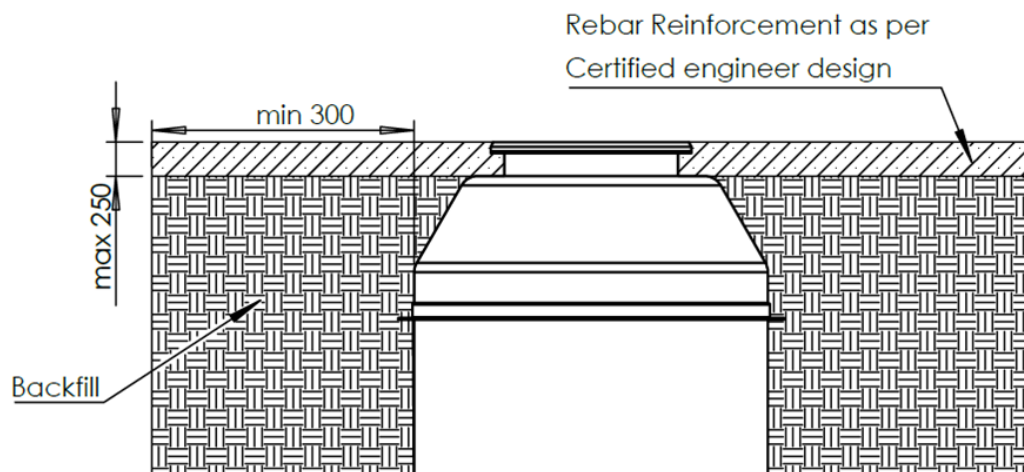
## FIBREGLASS FLAT TOPS WITH TRAFFIC LOAD

- The pad must be larger than the Tornado GPT 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 Tornado GPT centered on the unit) along with a dynamic T-44 traffic load must be distributed on the Tornado GPT perimeter and not on the interior of the lid.
- If either the static pad load or the dynamic traffic load is exceeded, all of the pad and / or traffic loads must be supported by the soil around the Tornado GPT and not by the unit itself.

# LEVELS AND TRAFFIC LOADS

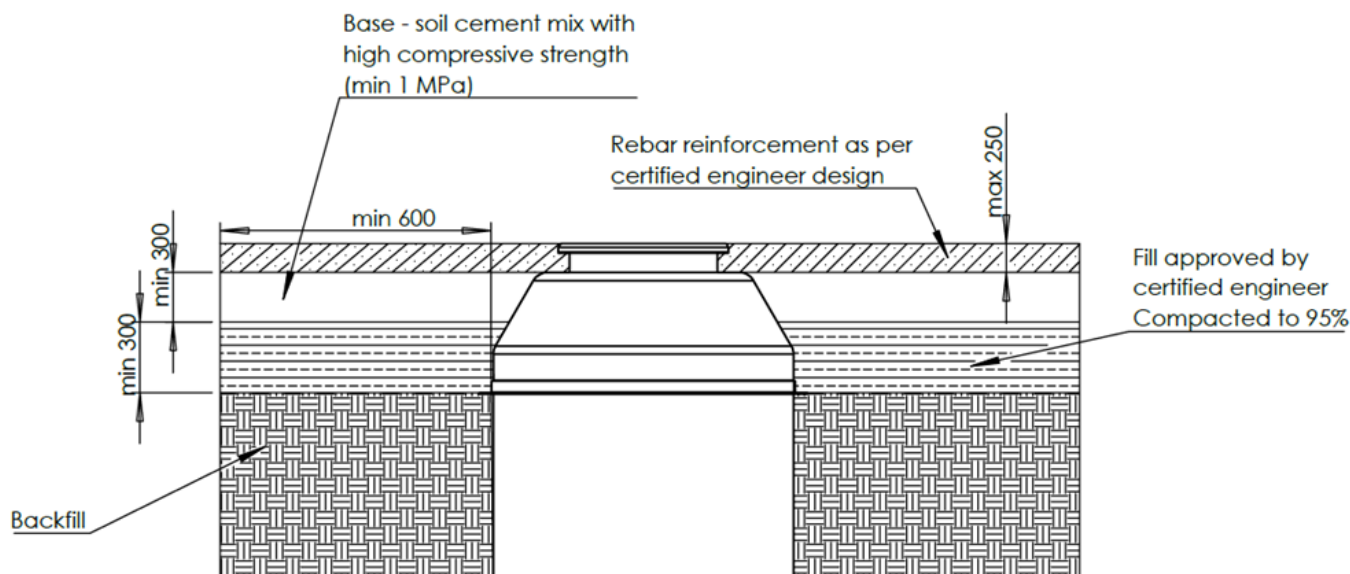
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- If either the static pad load or the dynamic traffic load is exceeded, all of the pad and / or traffic loads must be supported by the soil around the Tornado GPT and not by the unit itself.



# INSTALLATION SUMMARY

Dimensions of the excavation should be wide enough to provide sufficient working room around the Tornado GPT.

Minimum anti floatation ring and ballast dimensions are specified in anti-floatation ring and ballast designs in meet Australian Standard Code S3600A.

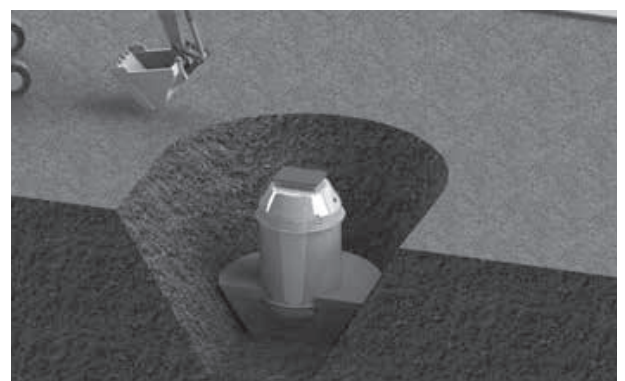
(Dead load resisting floatation have a factor of safety of 1.2 applied.)

The tank walls are designed to resist the crushing effects of underground pressures to the full depth of the wall without the need to be surrounded by concrete. However, in conditions of high-water table, external ballast will be required to resist upward buoyancy forces. It is important to note that, as Tornado GPT systems do not require outer concrete walls for strength, the ballast concrete may be placed in the most economical position, which is at the base of the excavation normally to the base locking ring. Concrete must be poured in accordance with 'best practice' as set out by the industry Standard. Please refer to the Concrete Manufacturers' Association Handbook.

**WARNING** To prevent fire or explosion hazard, Protector recommends air driven tools whenever possible. DO NOT use power tools where flammable vapours or liquids exist. Also, when electric hand tools are used, be aware of potential shock hazards. Wear protective clothing and eye protection. Protector units maybe a confined space. Follow proper safety procedures.

## INSTALLATION INSTRUCTIONS

1. Form excavation at depth 300mm below depth of Tornado GPT. Place 200mm of firm compacted sub base
2. Place 100mm of bedding sand to required level.
3. Lower the Tornado GPT into the excavation ensuring no sharp objects that may cause penetration of the unit are present. All lifting apparatus is to be supplied by the contractor for installation. Ensure the level of the Tornado GPT matches the installation requirements.
4. Fill Tornado GPT to 20% of total volume.
5. Backfill around the Tornado GPT with pea gravel surround up to height of unit flange
6. If installation is in high water table area - Insert the concrete Ballast, thickness and radius of which is to suitably match that of the supplied series drawing. This ensures no movement when the Tornado GPT is empty and to maintain contact with the gravel backfill. NOTE: If the Volume of concrete of the top slab is equal to the volume of the unit, a concrete slab is not required. See below table for more details



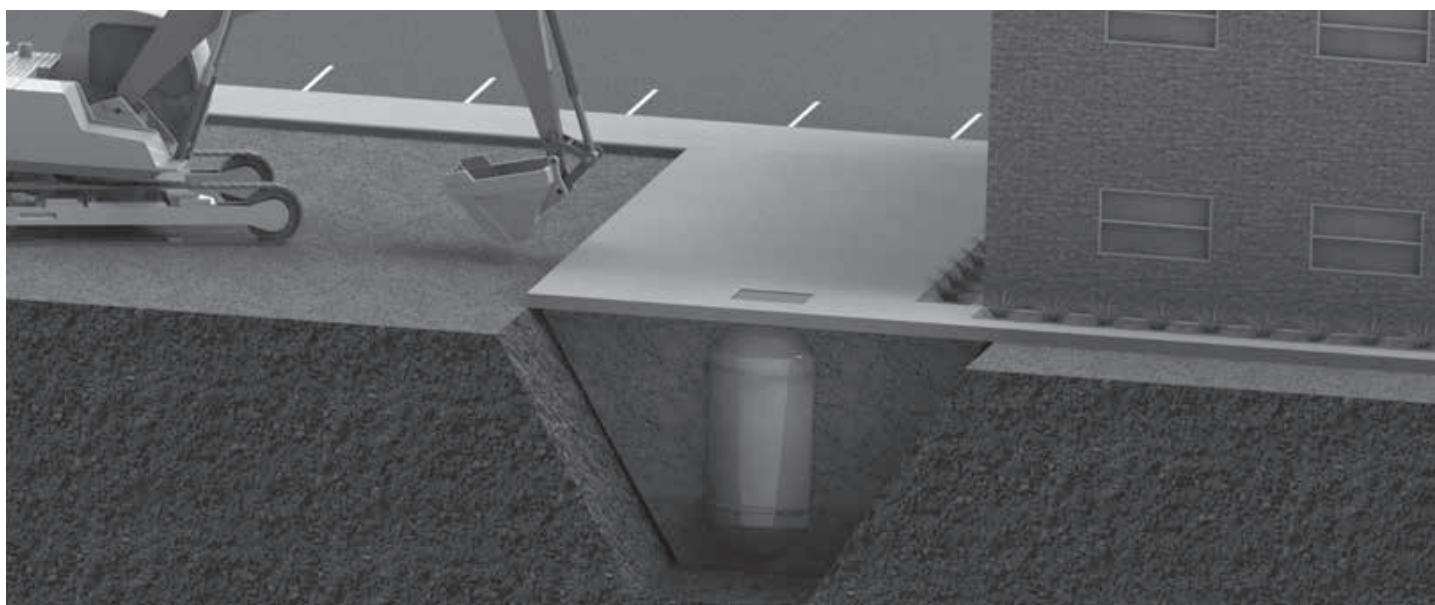
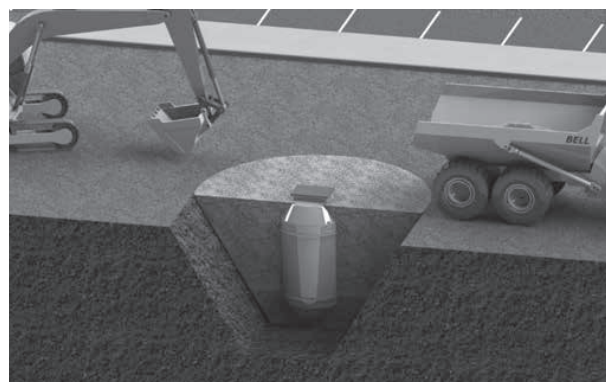


# INSTALLATION SUMMARY



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1. Fill the area above the ballast with pea gravel up to a maximum height of 100mm below the top of the lid for room for concrete slab.
2. Site conditions will be used to determine the size of the concrete slab, determined by a civil engineer. Use of reo bars only when necessary and instructed by the civil engineer.
3. Seal all pipe connections to ensure no leakage and install access cover.



**WARNING** To prevent fire or explosion hazard, Protector recommends air driven tools whenever possible. DO NOT use power tools where flammable vapours or liquids exist. Also, when electric hand tools are used, be aware of potential shock hazards. Wear protective clothing and eye protection. Protectors may be a confined space. Follow proper safety procedures.

# AFTER INSTALLATION



After the installation procedure has been followed and the Tornado GPT system is secured in place, a few final steps must be adhered to, in order to maximise the lifespan of the FRP Underground tank.

It must be ensured that the Tornado GPT 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 animals that walk or drive upon the lid. Hence the surroundings must be carefully cordoned off and the lid designed for the sites demands.

## LIGHT SURFACE LOADS

Light duty Fibreglass or aluminium access covers are not suitable for vehicular traffic. If a Tornado GPT 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 frill 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.

# STARTUP



SAVING NATURE.

After correct installation of the Tornado GPT and assurance that the system is safe from accidental contact, as well as all connections have been completed, the system can begin operation.

NB: when beginning the Tornado GPT devices operation, especially in the case of flow of hazardous liquids, thorough cleaning of vents and pipework must be carried out in accordance to OH and S procedures.

## THE START UP PROCESS IS OUTLINED BELOW.

1. The Tornado GPT is to be cleaned from sludge, silt and any other foreign particles that have entered the system during transportation or installation.
2. All pipework secured and tight
3. Once each section of the system is checked and ensured in efficient use, begin the flow of the system.
4. Ensure all manways are secured and locked.

# WARRANTY AND MAINTENANCE



SAVING NATURE.

The quality assurance of our FRP products ensures that the Protector range of FRP underground packaged Tornado GPT has an expected lifespan of 50 years. There is also a guarantee of our Protector products to be free of defects in material and workmanship for one (1) year from the date of shipment from our manufacturing factory. The obligation of this warranty, statutory or otherwise, is limited to replacement or repair at factory or at a point designated by Protector, of such part as shall appear to us, upon inspection at such point, to have been defective in material or workmanship. This warranty does not obligate Protector to bear the cost of labour or transportation charges in connection with replacement or repair of defective part; nor shall it apply to a unit upon which repairs or alterations have been made unless authorised by Protector in writing. No Warranty is made in respect to electrical control panels, pumps, motors or trade accessories, such being subject to warranties of their respective manufacturers. No express, limited or statutory warranty, other than herein set forth is made or authorised to be made by Protector. In no event shall Protector be liable for consequential damages or contingent liabilities arising out of failure of any Tornado GPT or parts thereof to operate properly. Packaged Stormwater quality improvement devices must be installed by licensed tradesmen. Failure to do so voids all Warranty.

## MAINTENANCE

For all maintenance instructions and details, please see each systems product specific maintenance manuals by contacting Protector on (02) 8006 2627 or by going to our website:

[www.protector.com.au](http://www.protector.com.au)



This information is correct at the time of publishing 08/08/2023 but the manufacturer reserves the right to carry out modification aimed at product improvement without notice. © Protector Australia 2023.

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 **PROTECTOR**  
SAVING NATURE.