



Tricel Pump Station[®]

Technical & Installation Manual

Engineering a green future



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It is important to read the full technical and installation guide prior to installation. This document should be retained for the lifetime of the product and in the event of change of ownership be transferred to the new owner.

1. Health and Safety precautions

1.1. General:

- Ensure that all the information contained in this manual is adhered to at all times.
- It's important that locks are fitted to the lid to prevent accidental access.
- Never enter a tank, unless qualified to do so.
- Naked flames shall not be used in the vicinity of the tank due to the danger of combustion.
- The manhole covers shall never be left off an unattended tank. Always lock the cover of the system when work is completed.
- Sewage and sewage effluent can carry micro-organisms and gases harmful to human health. Any person carrying out work on the system must be appropriately trained. Suitable protective clothing; including gloves, goggles should be worn at all times. Always remove contaminated clothing and protective equipment after working with sewage treatment plants. Wash hands and face prior to eating, drinking or smoking.

1.2. Installation:

- Excavation works should be planned with due regard to health and safety requirements.
- Excavation shall either be shored or battered back to a "safe" working angle.
- All electrical works shall comply with all health and safety guidelines and national regulations.
- The unit is not suitable for vehicular traffic.

1.3. Electrical/Maintenance:

- All electrical work to be carried out by competent and certified persons using suitable materials for the application.
- Electrical work must be carried out strictly to the manufacturer's instructions and to the relevant national rules for electrical installations.

- When working with machinery/electrical equipment, proximity of water shall be noted. Electrical equipment shall not be wet when working with it.
- There is potential danger when de-sludging and therefore this shall never be done alone

2. Transportation, unloading and storage of Pump Stations

- Pump Station(s) must be held down during transportation using nylon straps, do not use cables or chains to secure tanks. Do not over tighten straps to cause deformation of the Pump Station(s). Do not drop or roll Pump Station(s) from truck/trailer.
- Move Pump Stations only by lifting and setting, do not drag.
- Always set the Pump Station(s) on flat smooth ground, free from debris.

3. Introduction.

This Tricel Pump Station is suitable for domestic applications where it is necessary to pump primary treated waste water to a higher discharge point. It is not suitable for raw sewage. The pump supplied is controlled by a float and can handle suspended solids of up to 10mm. On each pump cycle 40litres approx. is pumped. The pump station can handle up to 3m³ daily flow. There is a high level float provided, which will activate the alarm, to alert the homeowner to issues with the pump when an abnormal water level is detected. The pump station is available with or without a riser and there is an option of two pumps, Standard pump and Pro pump. The Standard pump will cover the majority of applications, but where a higher pump rate and/or a longer pumping distance is required, the Pro pump can be used, see Table 1, Table 2, Table 3, Standard Pump Chart and Pro Pump chart. Maximum inlet invert to ground level with riser is 1365mm. Inlet invert to ground level when pump station is purchased without the riser is 400mm. Maximum excavation depth for pump station is 2440mm including max riser and backfill material.

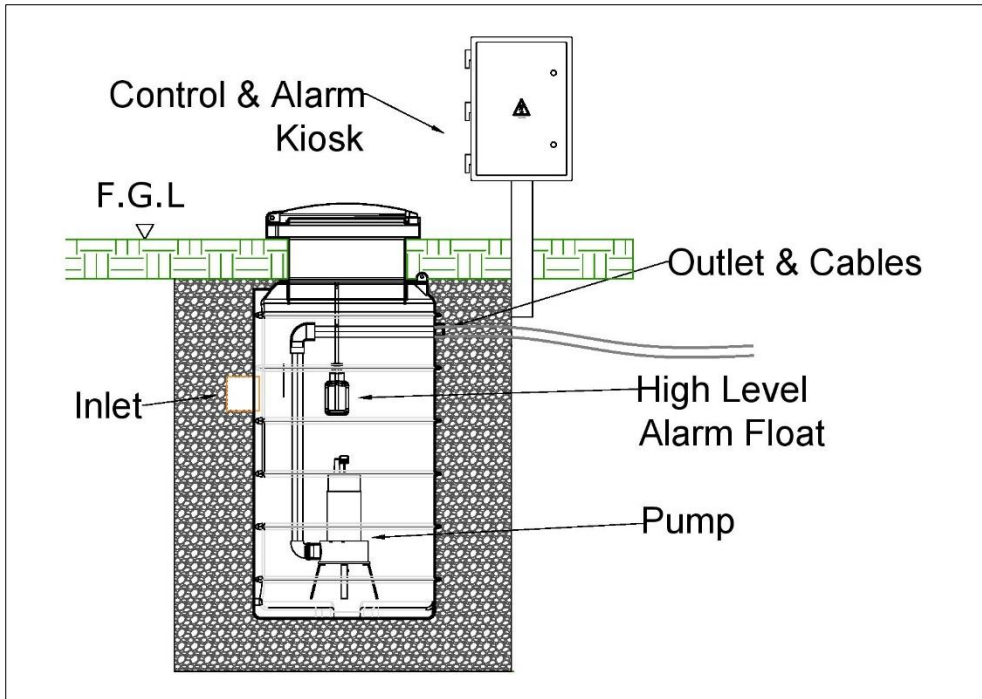


Figure 1 Typical installation. F.G.L.=Finished Ground Level

Table 1 Product List

Riser	Pump Type	Pump Power rating (kW)	Max Inlet invert to ground level (mm)
Yes	Standard	0.25	1365
Yes	Pro	1.1	1365
No	Standard	0.25	400
No	Pro	1.1	400

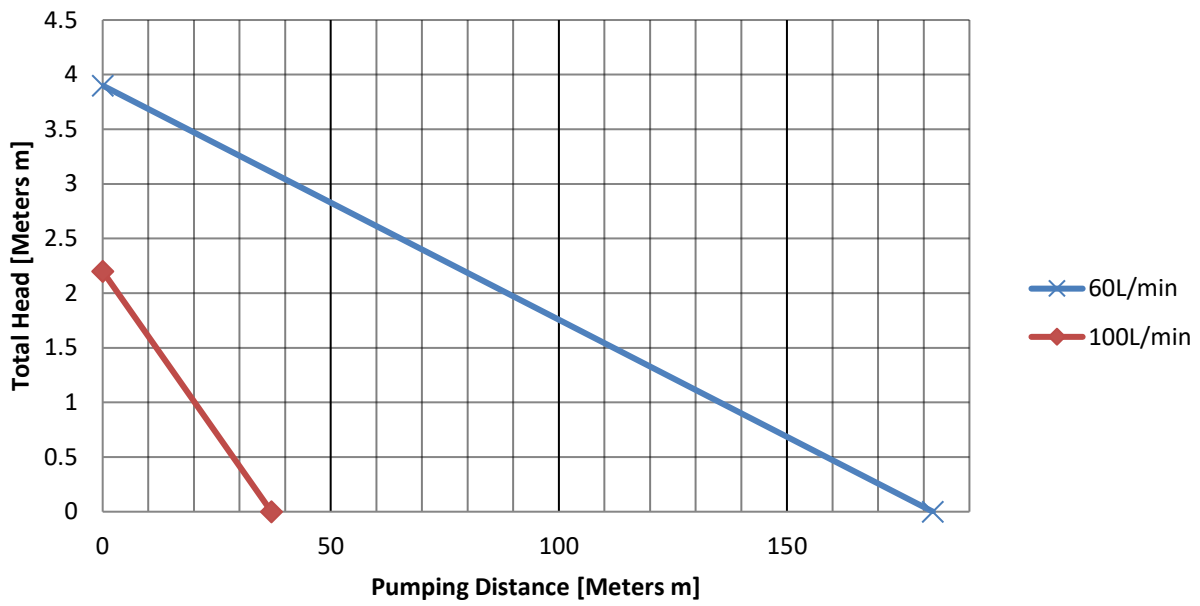
Table 2 Standard Pump

Pump	kW	HP				
Standard	0.25	0.33	l/min:			
			0	60	100	140
			Total Head (m):			
			9	7.05	5.4	3.45

Table 3 Pro Pump

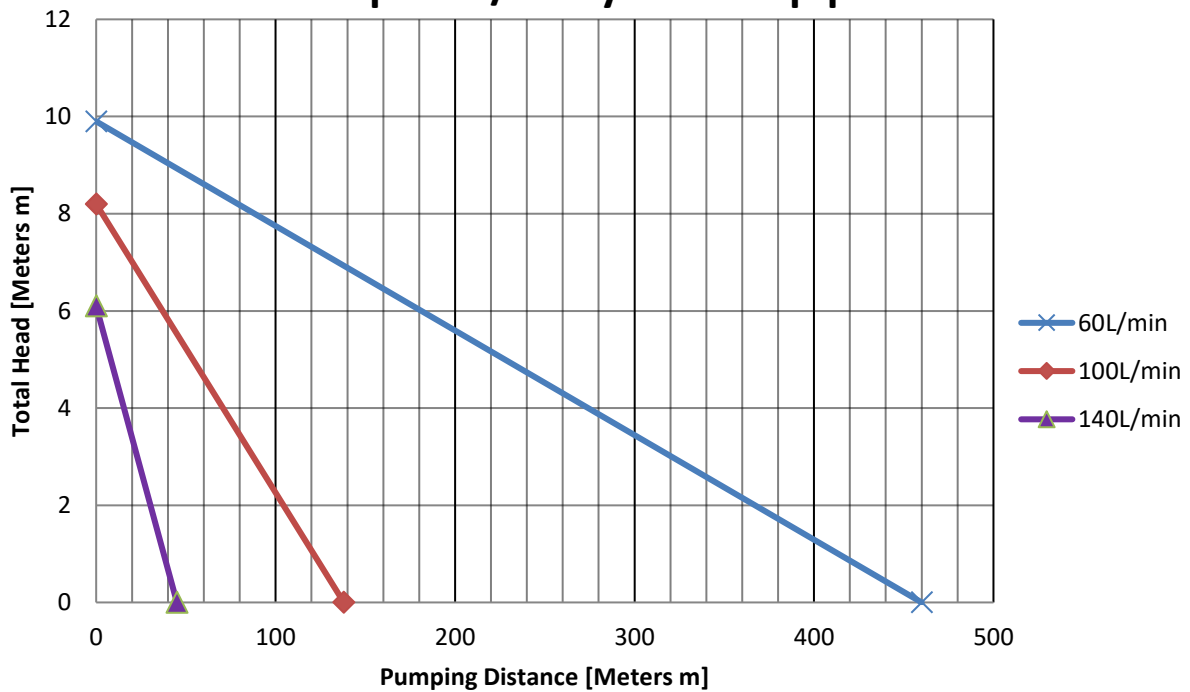
Pump	kW	HP				
Pro	1.1	1.5	l/min:			
			0	60	100	140
			Total Head (m):			
			18	15.8	14.2	12.5

Standard Pump - 1 1/2" Hydrodare pipework



Note: Flow rate should never be less than 60Litres/minute.

Pro Pump - 1 1/2" Hydrodare pipework



4. Pump Station dimensions

Table 4 Pump Station Dimensions

Product:	Unit	Pump Station with Standard Pump Kit.	Pump Station with Pro Pump Kit.	Pump Station with Riser and Standard Pump Kit.	Pump Station with Riser and Pro Pump Kit.
Capacity	Litre	300	300	430max	430max
Inlet pipe diameter	mm	110	110	110	110
Outlet Fitting*	Inch	1 ½" Philmac	1 ½" Philmac	1 ½" Philmac	1 ½" Philmac
Overall height	mm	1215	1215	2210**	2210**
Overall width	mm	640	640	640	640
Inlet invert to ground level	mm	400	400	1365max***	1365max***
Outlet invert to ground level	mm	185	185	445max***	445max***
Standard volume pumped per cycle	Litres	40	40	40	40
Approx. volume remaining after alarm activated	Litres	90	50	220max	180max
Weight empty	kg	16.5	16.5	26.5	26.5
Pump	-	Standard	Pro	Standard	Pro

*Suitable for 1 ½" Hydrodare NG pipe or equivalent

**Max height, can be cut down to suit other applications. See Figure 3 Pump Chamber with riser. Showing max height.

***See Section 7.1 Riser Cutting.

4.1 Pump Station Drawings

Pump Station with no riser

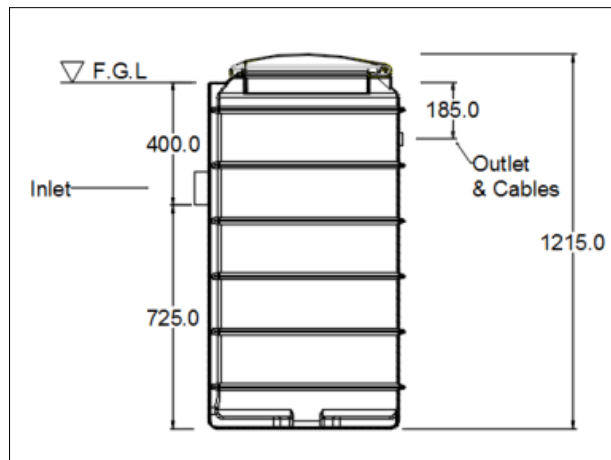


Figure 2 Pump Chamber without Riser.

Pump Station with Riser

Drawing showing max height with riser. See Section 6.1 Riser Cutting for alternative heights.

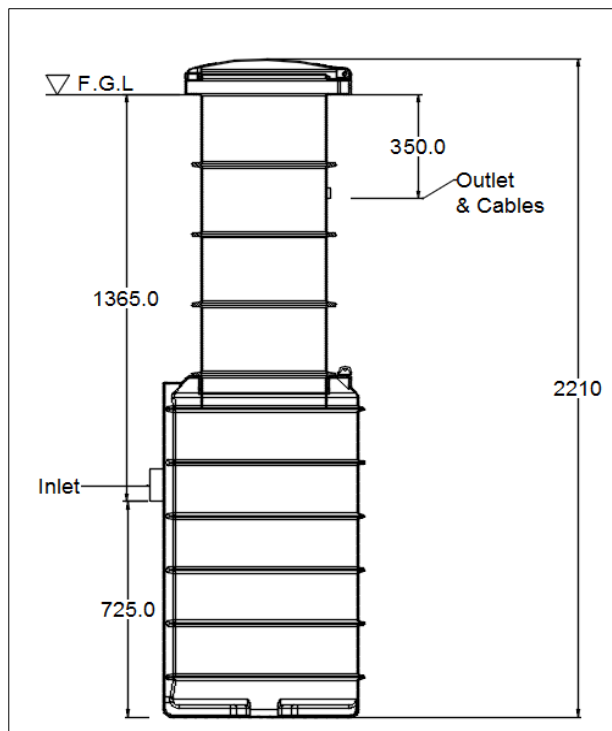


Figure 3 Pump Chamber with riser. Showing max height.

5. Installation Requirements

Prior to installation, please consider finished ground level before purchasing a Pump Station. It is important to determine if you require a pump station with or without a riser. Always ensure that the manhole lid remains above finished ground level. The pump station with a riser can be cut down as per Section 7.1 Riser Cutting.

5.1 Lid Locking point

All manholes should be locked for safety. Manholes are for pedestrian use only. The Pump Station is supplied with one locking point. It should be locked with a suitable locking device to prevent unauthorised access. Locking devices are not supplied.



Figure 4 Lid Locking point

5.2 Control of Groundwater

During installation tanks must not be subjected to buoyant forces. Incorrectly installed tanks that are subject to movement, rotation or floatation and may become damaged, for which Tricel cannot accept liability. Contact a qualified engineer if there are difficulties on site due to adverse water logging.

6. Installation

All installations must be fit for purpose to suit the on-site conditions, which will vary from site to site. This is the responsibility of the onsite contractor.

A dry site is one where the water table never rises higher than the base of the pump station.

A wet site is one where the water table may rise higher than the base of the pump station. If there is any doubt whether it should be a wet or dry site installation a wet site installation must take place.

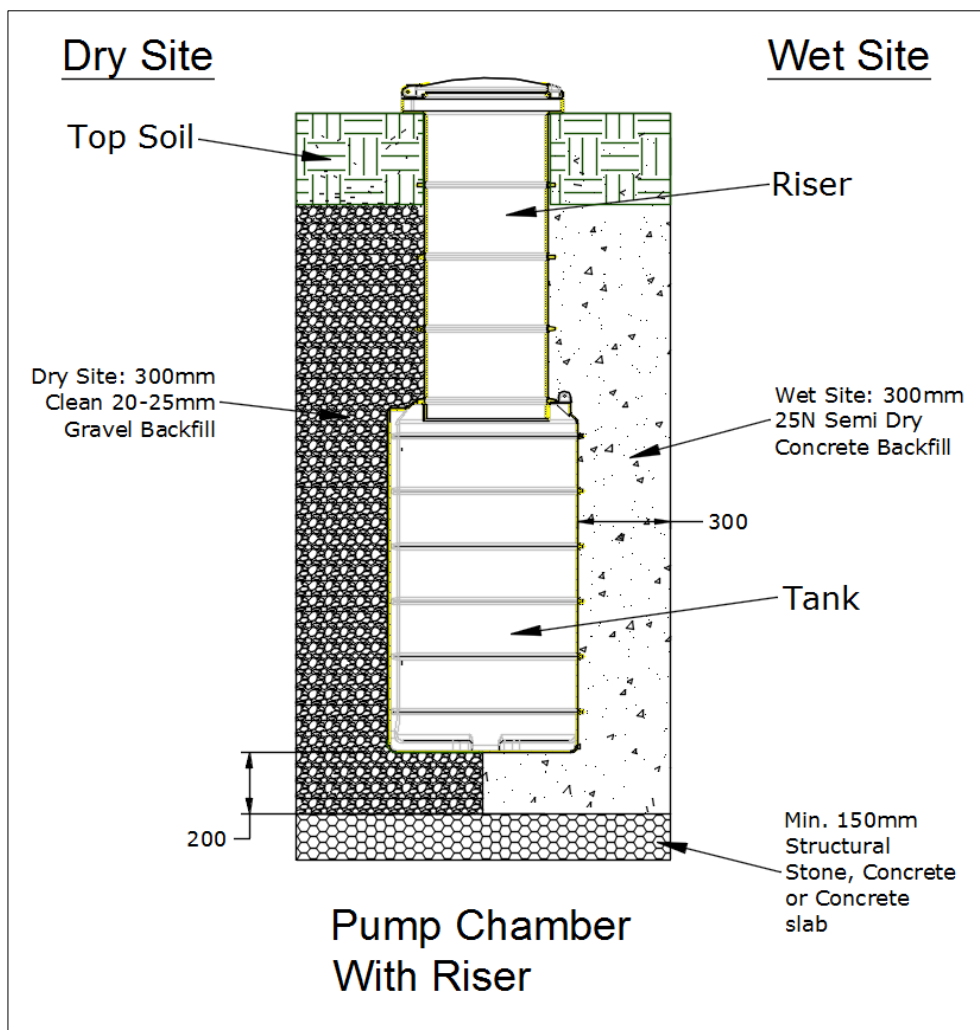


Figure 5 Dry Site and Wet Site Installations

6.1 Riser cutting

If using a riser, inlet invert to ground level heights of 1365mm, 1130mm, 895mm and 660mm can be achieved. This is done by cutting the riser to one of 3 lengths onsite and fitting to the pump station before it is installed in the ground. See Figure 6 Cutting points on Riser. For the lowest riser height suitably, sized holes must be bored into the tank for the outlet connection and cables. Hole sizes: 20mm diameter for the M20 cable glands and 48mm diameter for the 1 1/2" Philmac Tank connector. See Figure 7. Use tech screws and sealant supplied when fitting the riser. See Figure 8 Location of Sealant and Tech Screws.

		Pump Station Without Riser.	Pump Station With Riser.
Description	Name	QTY	QTY
	<u>Pump Station with riser</u>		
	Pump Station 300L Tank for riser	0	1
	PS300 Riser Assembly	0	1
	Tec Screw - 4.8 x 25 A2 S/S	0	8
	Bituminous Sealant OS111	0	1
	Pump Kit	0	1
	<u>Pump Station without Riser</u>		
	Pump Station 300L Tank, with lid	1	0
	Pump Kit	1	0

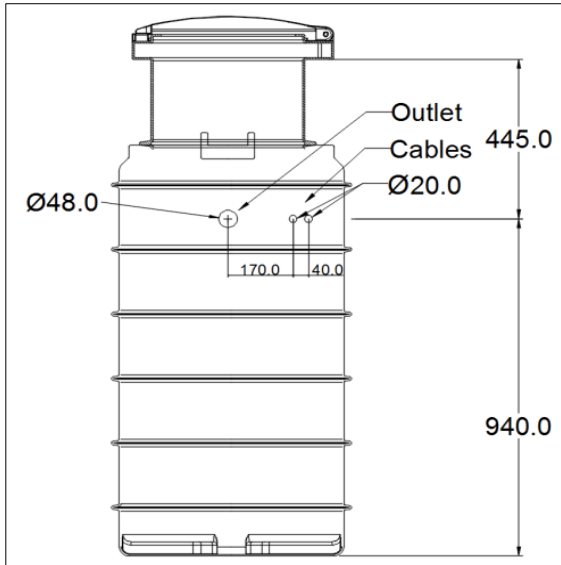


Figure 7 Outlet and Cable hole positions when using lowest Riser height.

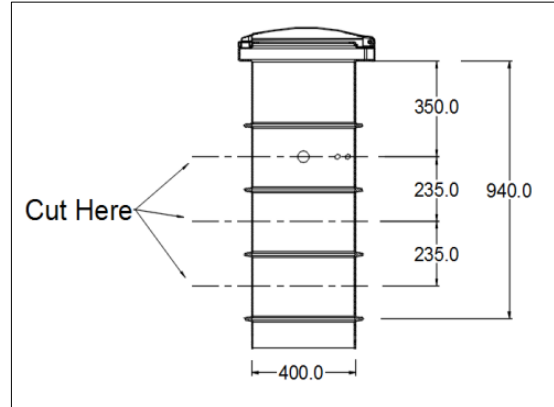


Figure 6 Cutting points on Riser

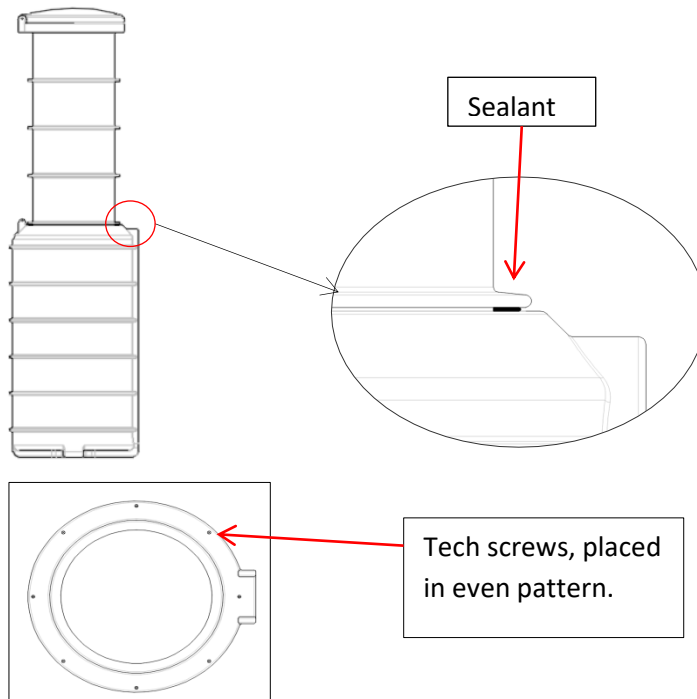


Figure 8 Location of Sealant and Tech Screws.

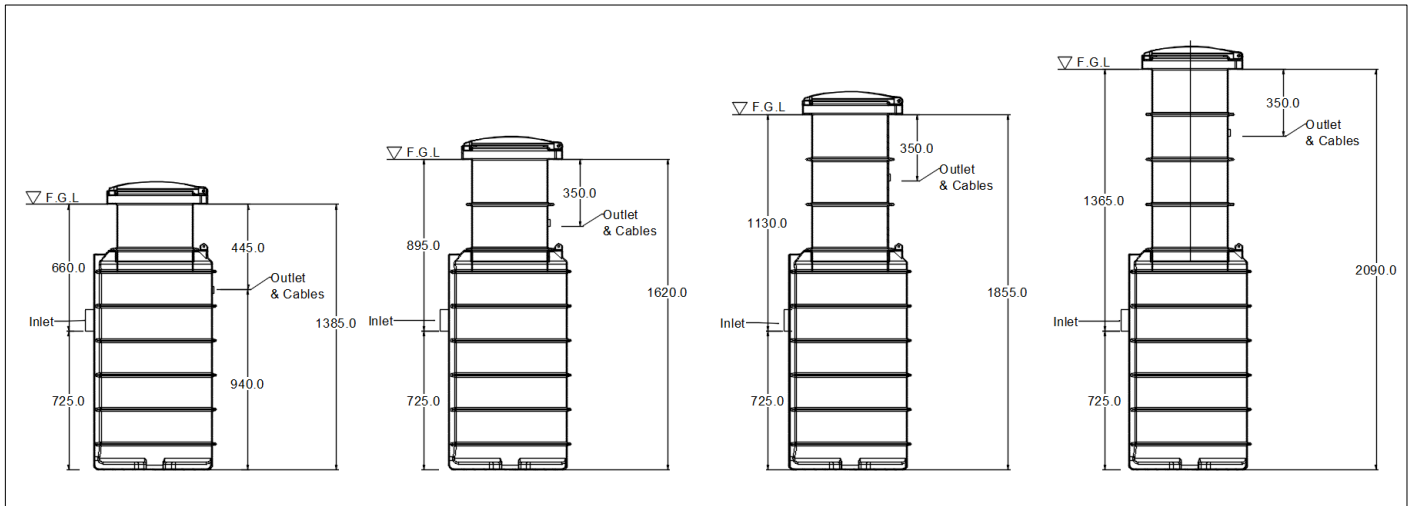


Figure 9 Pump Chamber Invert and overall heights with Riser. F.G.L=Finished Ground Level

6.2 Installation steps

1. A 1200x1200mm excavation is to be provided for the Pump Station. To work out the depth of excavation, add 350mm to the overall pump station base to Finished Ground Level height. See Figure 9. Also see Figure 5.
2. Form a base for the pump station in the excavation using a minimum of 150mm Structural Stone, Concrete or a Concrete slab.
3. Over the base install 200mm of backfill material (ensure correct backfill, see section 6.3) and level to +/-10mm.
4. Lift Pump Station into position.
5. Ensure connecting pipework is at the correct level.
6. Connect inlet pipe.
7. Fill Tank to 300mm depth with water.
8. Install backfill material up to the level of the outlet.
9. Fit the pump kit, outlet connection and cable connections. See section 7 Pump Kit Assembly.
10. Connect pipework and check levels.
11. Run a duct from the pump station to the alarm kiosk for electrical connections.
12. Continue backfilling up to 300mm below Ground level.
13. Finishing backfilling with 300mm of clean topsoil.

6.3 Backfill specifications

6.3.1 Gravel Backfill [Dry Site]:

Gravel shall be clean and free flowing, free from large rocks, dirt, sand, roots, organic material or debris. 20-25mm size.

6.3.2 25N Semi Dry Concrete Backfill [Wet Site]:

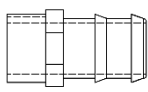
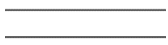


Semi dry concrete 25N grade with a ratio of 4.5 aggregate to 1 cement. Under no circumstances should concrete be discharged directly onto the pump station.



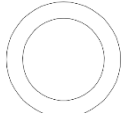
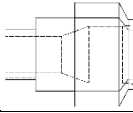







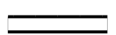
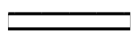
6.3.3 Top Soil:





Clean native top soil shall not contain rocks larger than 36mm on largest dimension.

7. Pump Kit Assembly

The pump kit supplied will fit the highest riser outlet. The plumbing to and from the plant should be completed by a competent person in accordance with best practices. The outlet will be a 1 ½" Inch connector (compression fitting) suited for 1 ½" NG Hydrodare pipe or equivalent. The submersible pump is supplied with its float switch set to 100mm length approx.

			Standard Pump Kit, Without Riser	Standard Pump Kit, With Riser	Pro Pump Kit, Without Riser	Pro Pump Kit, With Riser
	Description	Name	QTY	QTY	QTY	QTY
1		Hosetail - 1 1/2" Male Tapered (PP)	1	1	1	1
2		Hose - 1 1/2" Reinforced PVC Braided (200mm length)	1	1	1	1
3		Hose Nozzle - 50 x 38 CH PVC	1	1	1	1
4		Elbow - 40mm 90deg PVC	1	1	1	1

5		Reducing Bush - 50-40mm (U-PVC) with Solvent Socket	1	1	1	1
6		Connector - Female Thread 50mm x 1 1/2" (U-PVC)	1	1	1	1
7		Gasket - EPDM Seal Ring 70x50x5mm	1	1	1	1
8		Philmac - Tank Connector 1 1/2" M	1	1	1	1
9		Hose Clip - Worm Drive 25 x 45mm S/S (Jubilee)	2	2	2	2
10		WISKA ESKV-L M20 x 1.5, Grey Polyamide Cable Gland IP68, Cable Diameter 6-13mm, Thread Lt 15mm	2	2	2	2
11		EMUG M20 x 1.5, Grey Polyamide Locknut for Cable Gland	2	2	2	2
12		Cable Ties - Double Loop, Nylon 66, 395x4.7mm, Black	2	2	2	2
13		High Level Float (5m cable and weight)	1	1	1	1
14		Ball Valve - 40mm True Union (PVC)	1	1	0	0
15		U-PVC Spring Check Valve 40mm connections	0	0	1	1
<u>40mm PVC pipe cut to lengths:</u>						
16		60 mm	2	2	2	2
17		120 mm	0	0	1	0
18		160 mm	0	0	1	1
19		440 mm	1	0	0	0

20		1260 mm (To be cut to required length onsite when using riser)	0	1	0	1
		<u>Pumps & alarms</u>				
21		Standard pump. Comes with rubber flap non return valve	1	1	0	0
22		Pump Alarm Kiosk	1	1	1	1
23		Pro pump	0	0	1	1

7.1 Pump kit Assembly:

7.1.1 Standard Pump:

If using a riser, the 1260mm length of PVC pipe in the kit needs to be cut to length if the riser is cut shorter. Remove 235mm from it for each section of the riser removed.

Assemble the pipework as per figure 10 below and glue the fittings using suitable PVC pipe cement. Use suitable PTFE tape on threaded joints. The 200mm length of flexi hose is fitted to the pump.

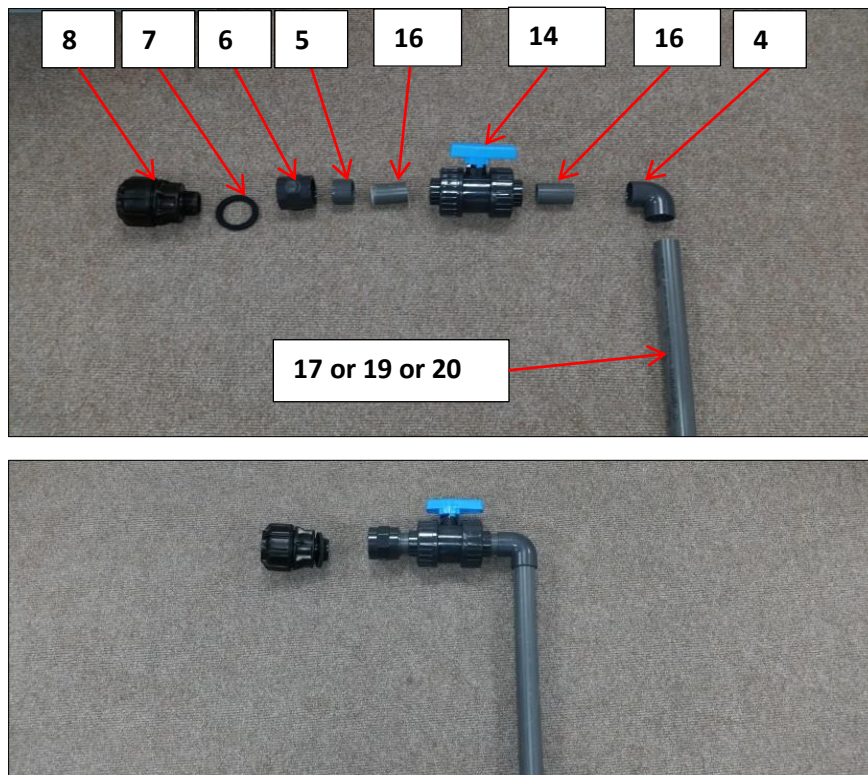
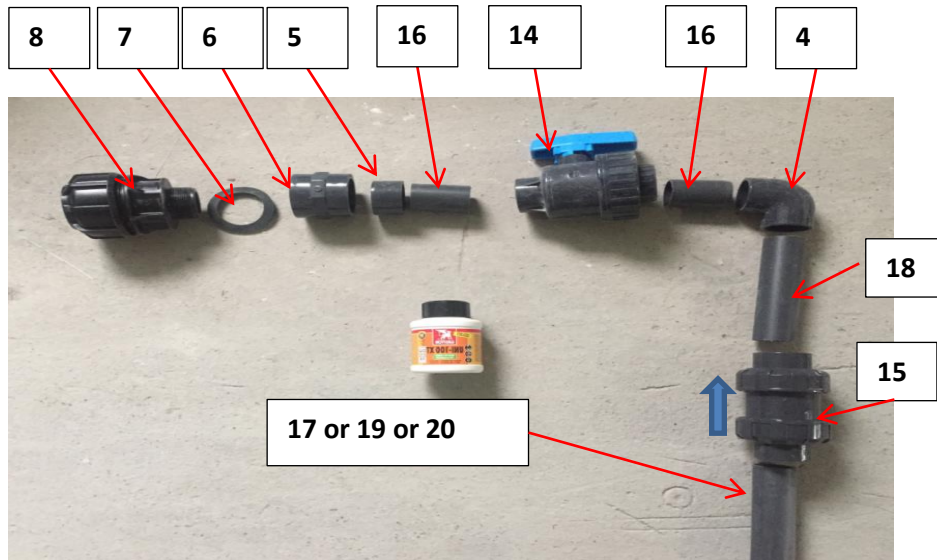


Figure 10 Pipework assembly for Standard Pump Kit.

7.1.2 Pro Pump:

If using a riser, remove 160mm from the 1260mm length PVC pipe for max height riser. Remove 235mm from it for each section of the riser removed.

Assemble pipework as per figure 11 below and glue the fittings using suitable PVC pipe cement. Use suitable PTFE tape on threaded joints. The 200mm length of flexi hose is fitted to the pump.



Part15: Spring non-return valve. Comes with Pro Pump. Note direction of flow.

Figure 11 Pipework assembly for Pro Pump Kit.

7.1.2 Fitting Pipework to Pump:



Figure 12 Fitting pipework to Pump.

Ensure flexible pipe is pushed fully into couplings and secured in place with jubilee clamping clips provided.

Secure the pump power cable to the pipe at 300mm intervals with cable ties.

Lower assembly into the Pump Station and connect to the 1½" Philmac fitting using rubber seal provided in kit (Gasket - EPDM Seal Ring 70x50x5mm).

Fit the cable glands into the holes provided beside the outlet.



Figure 13 Cable Glands and Outlet connection fitted.



Figure 14 Pipework, assembly inside Pump Chamber.

7.1.4 High Level Float

Secure the high level float to the PVC pipe 100mm from the float and such that the float is approx. 200mm +/-20mm above the handle of the pump. Use the two double loop cable ties at the pivot point of the cable, supplied in the kit, as per figure 14.

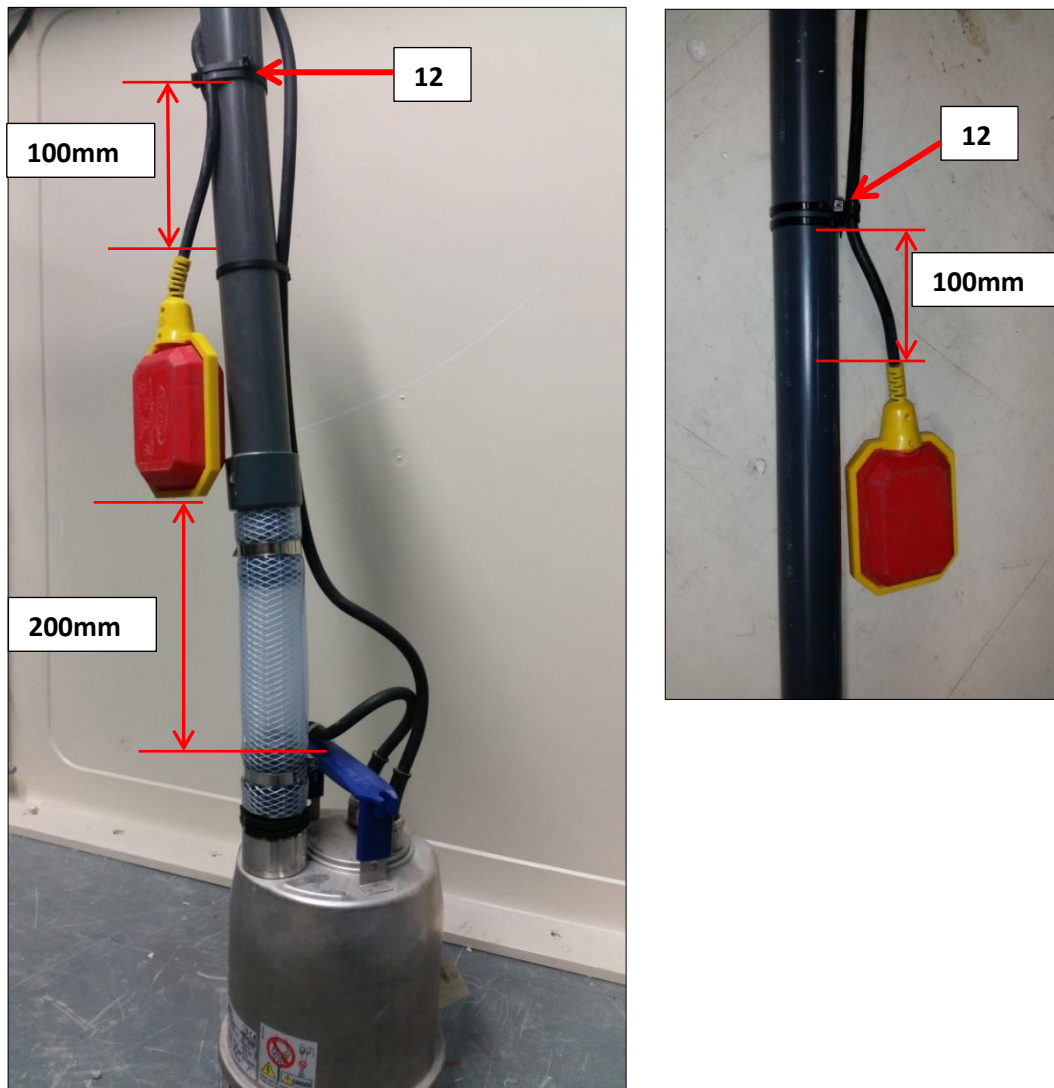


Figure 15 Fitting High Level Float

7.1.5 Alarm and housing assembly

The alarm Kiosk is to be positioned so that the light faces the house and the molded lip lines up with ground level at the top of the Pump Station (including riser, if fitted).

The 2no. Electrical cables for the pump and alarm float are to be fed through a duct to the alarm kiosk. A Hole to suit the duct is to be made in the lower part of the alarm kiosk

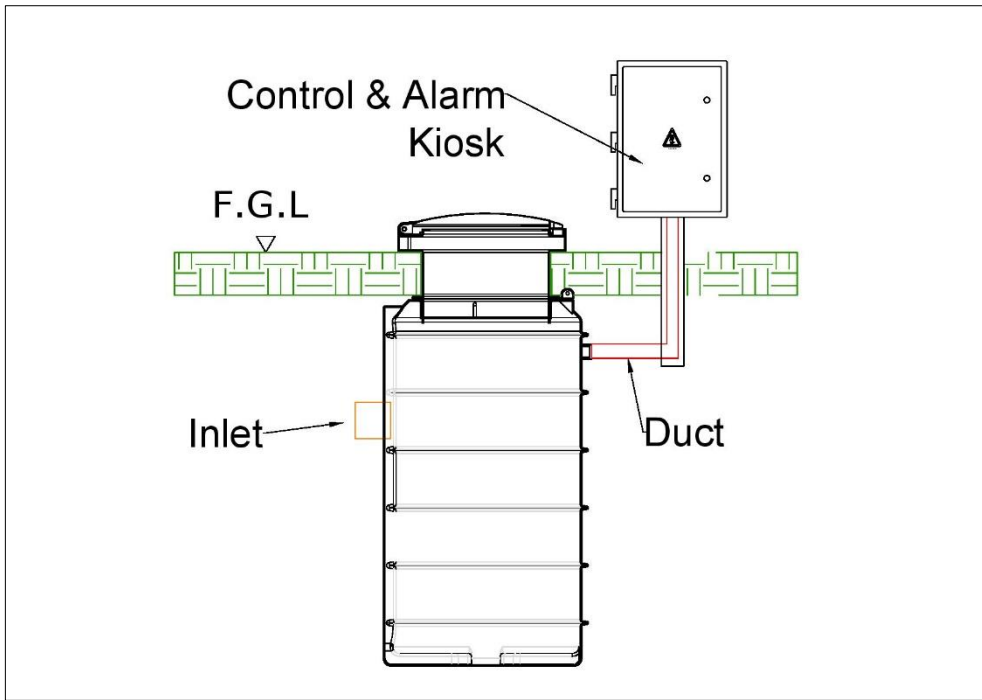


Figure 16 Alarm housing height set in the correct position relative to the Pump Chamber

8. Electrical Installation

Electrical installations must be carried out by a qualified and certified electrician. Please ensure the electrical installation complies with all national regulations and requirements. Connection labels are inside the lid of control box.

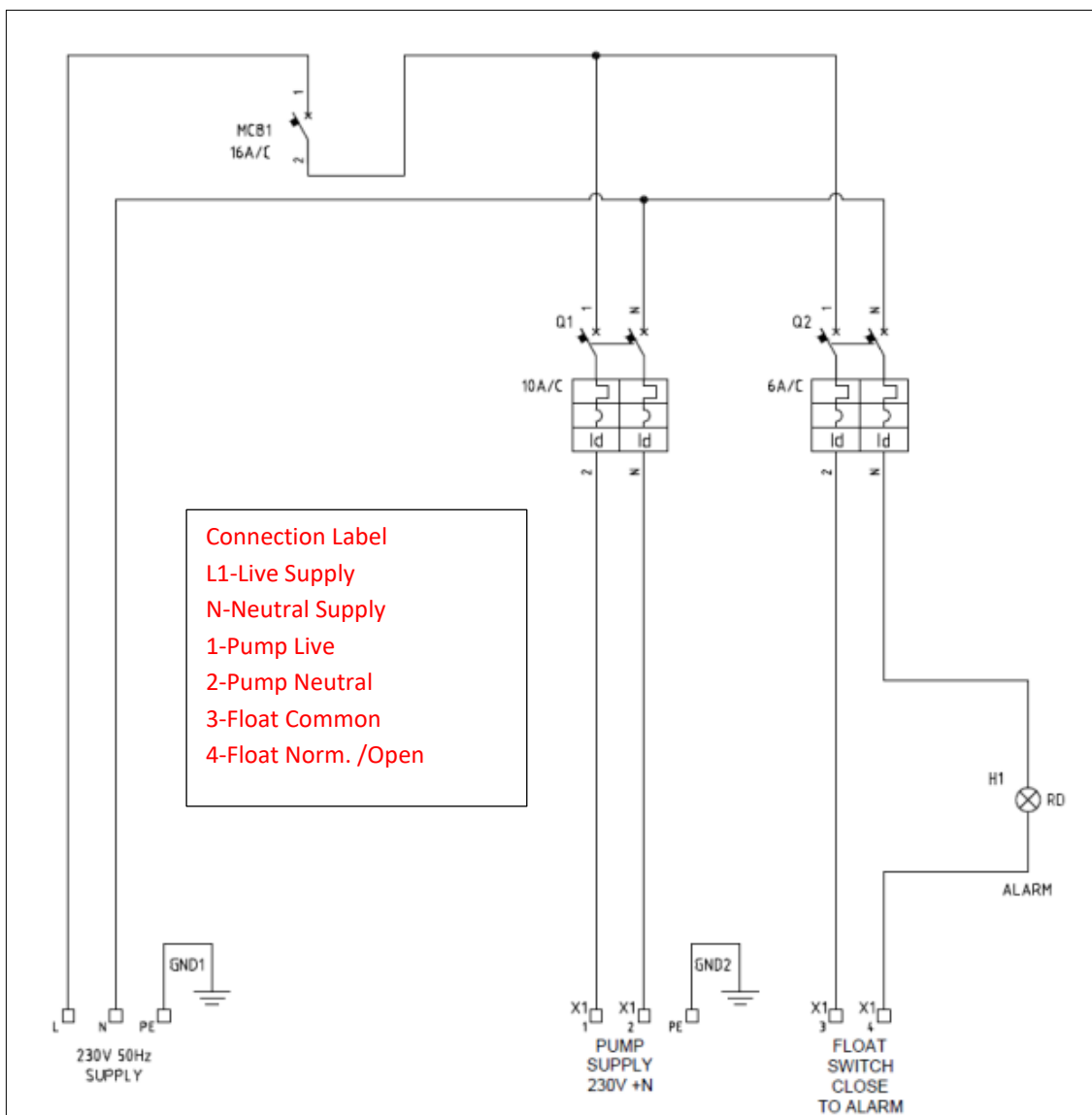


Figure 17 Pro Pump Wiring Diagram.

9. Maintenance

A certain amount of maintenance of the plant is required on an ongoing basis to ensure that the system is working correctly. This is the responsibility of the homeowner.

9.1 Yearly Maintenance

Maintenance must be carried out by a competent person. The pump station should be inspected annually and the following checks and procedures should be followed:

1. Ensure that you have the correct P.P.E. before commencing any work. Gloves, mask and goggles.
2. Follow all national health and safety regulations for working with manholes and underground tanks.
3. Remove the manhole cover and de-sludge pump station if necessary.
4. Ensure there is no inflow into the system before commencing work.
5. Turn up the High-Level Alarm Float and check that the Alarm Light illuminates in the Control Panel.
6. Clean the floats if necessary.
7. Ensure that the Alarm Float is positioned correctly to ensure correct operation.
8. Functionality of the pump is to be checked.
9. Check the position of the Pump to ensure that the control float has free movement within the pump station.
10. Re-fit Manhole cover and secure.
11. Wash hands thoroughly immediately.

9.2 De-sludging/Emptying of Pump Station

If de-sludging is required, it is done with a vacuum tanker (Tricel recommend the use of a licensed company). Get the de-sludging company to wash out the Pump Station with a water hose and remove this dirty water afterwards. Wash grease/dirt off the floats and pump. De-sludging should never be carried out alone. Do not allow equipment drive over the plant. The access cover should never be left off unattended plant.

10. Operating Conditions

- The manufacturers' instructions outlined in the Technical Manuals must be followed at all times.
- It is important that the unit is operated under the conditions for which it is designed. Any variation in these conditions could lead to the unit not performing to its full potential.
- If the system is not installed correctly, flooding, overloading or floatation may occur. Tricel is not responsible for incorrectly installed systems.
- Tricel shall not be liable for any damage or loss, including consequential loss, caused by the failure of any plumbing equipment or failure caused by the inclusion of gross solids.

11. Troubleshooting Guide

Properly installed, operated and maintained plants will give many years of trouble free service. All Pump stations are fitted with an alarm, which will alert of irregularities. If the pump stops working a light will illuminate to indicate there is a problem with the plant. Once fixed, the alarm will reset automatically. All electrical work should be carried out by a qualified person. Ensure pump is disconnected from the mains power supply before carrying out any work to it. See below table for troubleshooting.

Table 5 Troubleshooting guide.

Symptom	Possible causes	Corrective action
Pump won't start or run.	Fuse blown (if applicable).	Replace with fuse of proper size.
	Tripped breaker.	Reset breaker.
	Low line voltage and wet electrics.	An electrician should check the power supply to the system.
	Defective Pump.	Pump must be checked by a qualified person.

Symptom	Possible causes	Corrective action
Pump operates but delivers no water.	<p>Low line voltage or wired incorrectly.</p> <p>Something caught in impellers.</p> <p>Delivery hose blocked.</p> <p>Other pump malfunction.</p>	<p>An electrician should check the power supply and wiring to the plant.</p> <p>Clean out impellers or replace pump. Ensure pump is disconnected from the mains before you attempt to unclog it.</p> <p>Find blockage and remove or replace damaged hose.</p> <p>Pump must be checked by a qualified person.</p>
Pump runs intermittently.	<p>Thermal overload tripped.</p> <p>Float from the pump stuck.</p> <p>Damaged float.</p>	<p>Check for clogged impeller.</p> <p>Ensure the float on the pump is set correct and can move freely.</p> <p>Pump must be checked by a qualified person.</p>
Plant fills above working water level.	<p>Storm water flooding.</p> <p>Pump not working.</p> <p>Discharge hose/pipe blocked.</p>	<p>Redirect storm water drains. Storm water must never enter the system.</p> <p>Check pump is functioning properly as above.</p> <p>Find blockage and remove or replace damaged hose/pipe.</p>
Alarm is lighting but the pump is working.	<p>Electrical fault.</p> <p>High level float is snagged or caught on the side of the tank.</p> <p>The electrical panel is wet.</p>	<p>Get a qualified person to check that the alarm is wired correctly.</p> <p>Free the high-level alarm float; unsnag it from the side of the tank.</p> <p>Get a qualified person to check that the alarm is installed correctly.</p>

Symptom	Possible causes	Corrective action
Build-up of grease on pump and float.	Excessive grease entering the system	Withdraw the pump and float and wash down. Once the pump and float has been cleaned, they will operate in a more efficient manner. Reduce grease and fat entering the system (a grease trap should be installed)
Bad effluent odour directly over the tank.	Pipe work to or from the tank is blocked.	Check the level of liquid in the tank. Ensure the pipes are not blocked and are fitted correctly to the tank.

Appendix A - Concrete Pump Station

A concrete version of the above pump station is also available. See figure 19.

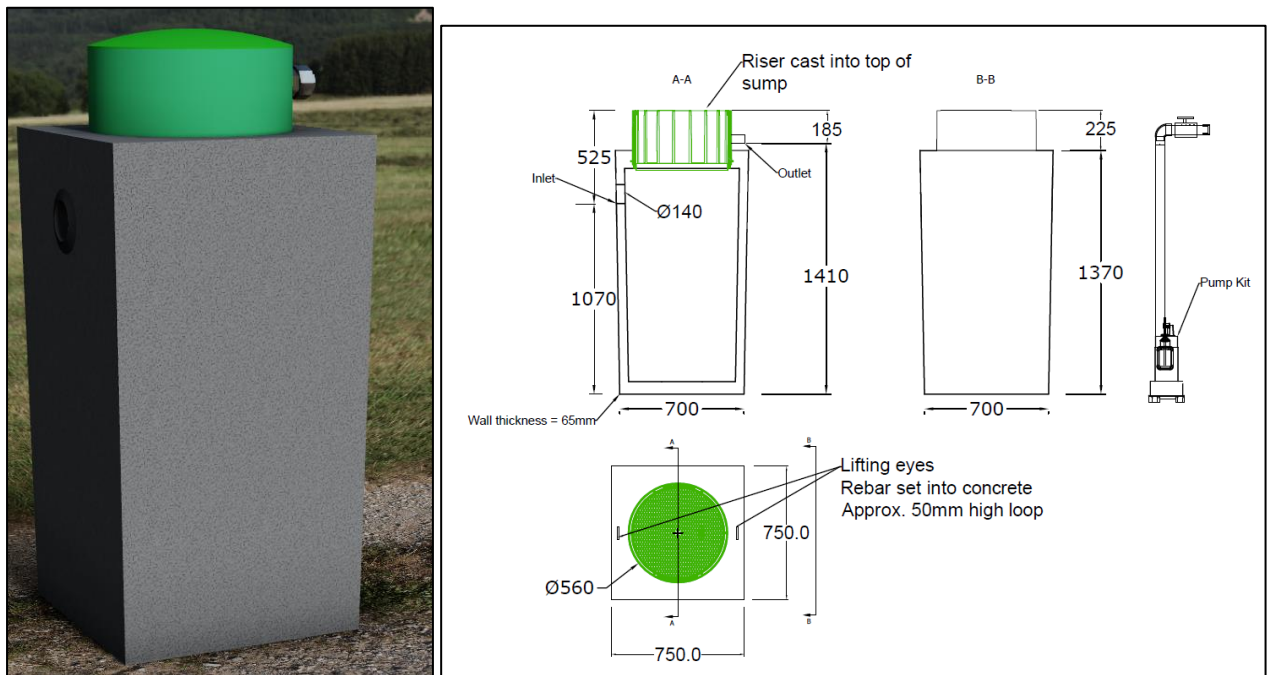


Figure 18 – Concrete Pump Chamber

The concrete pump chamber has a capacity of 450 liters and is fitted with a plastic riser. It is supplied with a cover and pump kit. It is supplied with one 300mm riser. If further risers are required they can be ordered separately.

Pump kits options are the same as in the plastic pump station and are to be assembled on site. PVC pipe supplied must be cut to length on site.

The outlet of the pump chamber is to be drilled on site and is recommended to be at least 185mm below ground level. A 48mm hole saw is required to drill this outlet. Cable glands are also provided and holes for these should also be drilled in the riser.

Specifications of pump chamber can be found in Table 6:

Table 6 - Concrete Pump Station Specifications

Product:	Unit	Concrete Pump Station with Standard Pump Kit.	Concrete Pump Station with Pro Pump Kit.
Capacity	Litre	450	450
Inlet pipe diameter	mm	110	110
Outlet Fitting*	Inch	1 1/2" Philmac*	1 1/2" Philmac*
Overall height	mm	1595**	1595**
Overall width	mm	750	750
Inlet invert to ground level	mm	525	525
Outlet invert to ground level	mm	185	185
Standard volume pumped per cycle	Litres	40	40
Approx. volume remaining after alarm activated	Litres	90	50
Weight empty	kg	600	600
Pump	-	Standard	Pro

*Suitable for 1 1/2" Hydrodare NG pipe or equivalent

**Height excluding additional risers.

Terms & Conditions

Subject to our standard terms and conditions, which are available on request.

June 2021



TRICEL
GENERATIONS OF INNOVATION

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In accordance with Tricel's normal policy of product development these specifications are subject to change without notice.