ATLANTIS® FLO-TANK™ UNDERGROUND MODULAR TANKS

RETENTION : DETENTION : INFILTRATION

PRODUCT DESCRIPTION :

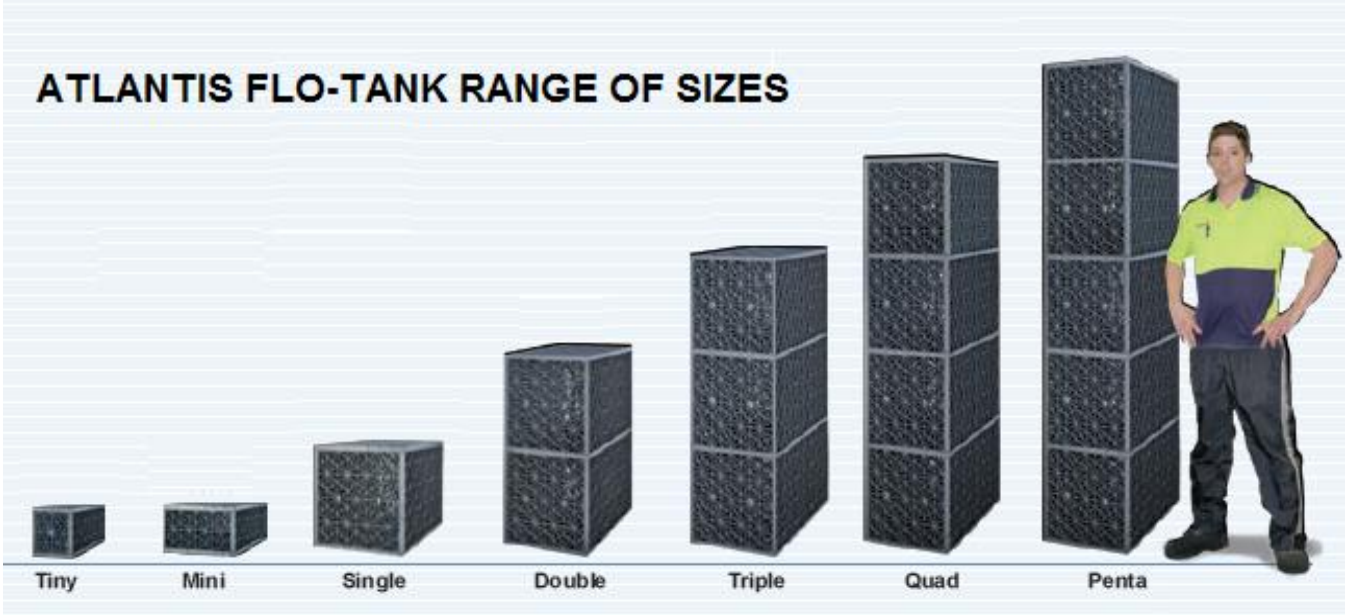
- Atlantis Flo-Tanks™ are suited to all subsurface ex-filtration, retention and detention applications.
- Atlantis Flo-Tanks™ consist of an assembly of lightweight structural components developed by Atlantis over 20 plus years of on-going research and improvement.
- Atlantis Flo-Tanks™ are manufactured using recycled polypropylene materials and are shipped as a 'flat pack, ready for on site assembly

FEATURES AND BENEFITS :

- High void to solid ratio maximises the tanks in ground water storage capacity.
- Flo-Tank's™ high water storage capacity minimises the tanks footprint.
- Range of Flo-Tank™ sizes and modules increases footprint and invert options.
- Range of 'cross plate' options (3, 4 or 5 plate) accommodates a range of imposed compressive loads.
- Being modular the final in-ground tank configuration can be designed and shaped as required.
- Open internal structure ensures a high flow rate when configured as a pipe as well as a tank.
- Manufactured from Eco friendly durable recycled polypropylene giving a long in ground life.
- Supplied as a flat-pack to minimise transport and on-site storage costs
- Simple peg and hole on site assembly ensures lower labour costs
- Lightweight elements enable assembled tanks to be readily manhandled

ATLANTIS® FLO-TANK™ PHYSICAL DIMENSIONS

FLO-TANK NAME	TANK SIZE W X L X H	No. PLATES / TANK (4 CROSS PLATE MODULE)	GROSS TANK VOL.	WATER STORAGE VOL	No. TANKS / M3 WATER	TANK WEIGHT
TINY 1 x module	204 x 685 x 240mm	4 x side plus 4 x small cross	0.0335m3	0.0318m3	31.5 / m3	
MINI 1 x module	408 x 685 x 240mm	2 x large plus 2 x side plus 4 x small cross	0.0671m3	0.059m3	16.9 / m3	3.97kg
SINGLE 1 x module	408 x 685 x 450mm	4 x large plus 4 x cross	0.126m3	0.119m3	8.40 / m3	6.34kg
DOUBLE 2 x modules	408 x 685 x 880mm	7 x large plus 8 x cross	0.246m3	0.233m3	4.29 / m3	11.79kg
TRIPLE 3 x modules	408 x 685 x 1310mm	10 x large plus 12 x cross	0.366m3	0.348m3	2.87 / m3	17.24kg
QUAD 4 x modules	408 x 685 x 1720mm	13 x large plus 16 x cross	0.486m3	0.462m3	2.16 /m3	22.68kg
PENTA 5 x modules	408 X 685 x 2170mm	16 x large plus 20 x cross	0.607m3	0.576m3	1.73 /m3	28.12kg



ATLANTIS® FLO-TANK® PROPERTIES

MINIMUM GROUND COVER OVER FLO-TANKS™ ASSEMBLED WITH FOUR CROSS PLATES		
Traffic / Load	**Location**	**Minimum ground cover**
No vehicular traffic	Garden and landscaped area Pedestrian area and grassed area	300mm of compacted sand / soil
Occasional light vehicles	Garden - Lawn	450mm of compacted sand / soil
Regular vehicular traffic	Car-parks - Driveways	500mm min. of compacted sand soil / aggregate with Tenax LBO bi-axial geogrid, 600mm without geogrid Consult with your technical adviser to determine geogrid requirement. Paving system as normal
Highway traffic	Commercial car-parking Roadways	Consult with your technical adviser as to specific design

PHYSICAL PROPERTIES	
Material	85% recycled polypropylene plus 15% Atlantis selected materials
Biological and Chemical Resistance	Unaffected by moulds, algae, bacteria, naturally occurring chemicals in soil & bitumen
In Ground Service Temperature	-6º C thru to 55º C
Face void to solid ratio	95% void
As Pipe Flow Capacity	1,140 L/min.

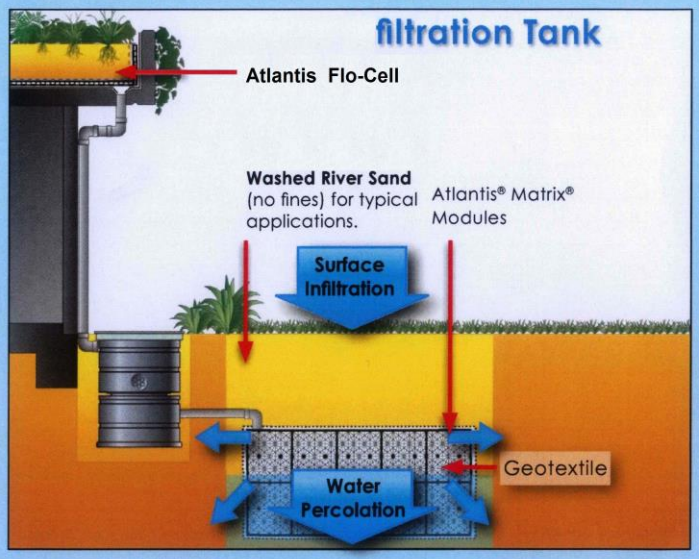
SINGLE MODULE FOUR CROSS PLATE FLO-TANK LONG TERM UNCONFINED DEAD LOAD CREEP TEST	
Applied Load	28.5kPa
Displacement 90 Days	1.7mm
Total Strain at 90 Days	2.3%
Creep at 90 Days	0.4%
Test Temperature	20º C

UNCONFINED SINGLE MODULE FLO-TANK™ : ULTIMATE CRUSH STRENGTH TEST RESULTS									
Load Configuration	**Vertical load: top plate**			**Lateral load: large side plate**			**Lateral load: small end plate**		
No. of cross plates	**3**	**4**	**5**	**3**	**4**	**5**	**3**	**4**	**5**
Ultimate Load (Q_{ult}) kN / m2	200 kN/m^2	240 kN/m^2	280 kN/m^2	160 kN/m^2	180 kN/m^2	200kN/m^2	100kN/m^2	120 kN/m^2	140kN/m^2
Maximum design load (f_s2) See note 2.	100 kN/m^2	120 kN/m^2	140 kN/m^2	80 kN/m^2	90 kN/m^2	100kN/m^2	50kN/m^2	60 kN/m^2	70kN/m^2
Test Temperature	17.0º C	17.0º C	17.0º C	17.0º C	17.0º C	17.0º C	17.0º C	17.0º C	17.0º C
Note	1. Flo-tank tested with the 450mm dimension vertical. 2. Atlantis recommend the max. structural capacity be calculated using a min. factor of safety of 2 (f_s2). 3. Testing carried out at the University of Technology, Sydney Australia								

DESIGN CONSIDERATIONS:

1. Consult with your technical adviser, (eg; Hydraulic engineer as to tank size, location and configuration) for the complete system.
2. Always install a gross pollutant and suspended solids filter up-stream of the tank, typically filter to be capable of trapping suspended solids 200 micron and over. Fine silty material under 200 micron which enters the tank may, over many years blind the non-woven geotextile / tank floor.
   Allow a small additional (2% to 4% depending on floor to volume ratio.) volume to accommodate the fine silty material.
3. For maximum operational longevity of the tank disregard the tank floor area (blinding of floor) when calculating the percolation area for ex-filtration tanks, assume effective ex-filtration area as being 50% of wall area in contact with the surrounding soil.
4. For soils having a low percolation rate configure the shape of the group of tanks to give the maximum tank wall / ex-filtration area, avoid configuring the tanks in a single shallow block as this reduces the wall area.
5. Tank floor typically kept a minimum of 150 to 200mm above the mean winter water table level to ensure that the 'design' tank capacity is maintained under all conditions. If the tank is within the water table use a relief valve in the tank floor.
6. Consult with your technical adviser with regard to the proximity of the tank to building foundations and site boundaries for structural, geotechnical and the possible influence of ground water re-charge / percolation considerations.
7. Proximity of tanks to tree roots, do not intrude / place the tanks within the tree drip line.

ATLANTIS® FLO-TANK® CONFIGURATION OPTIONS



The infiltration tank system is the ideal way to manage stormwater runoff in permeable or semi-permeable soil conditions.

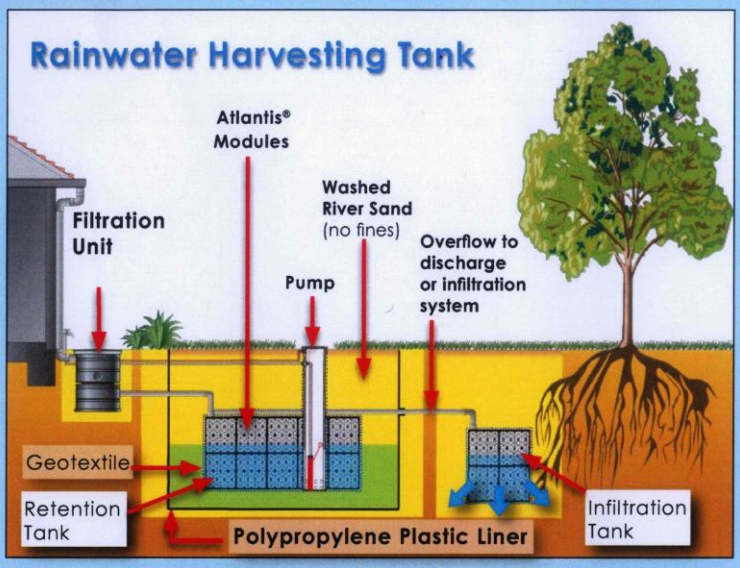
How It Works!
The system is designed to capture surface water through infiltration, and then clean and filter the water before it is allowed to recharge the water table providing moisture for surrounding vegetation.

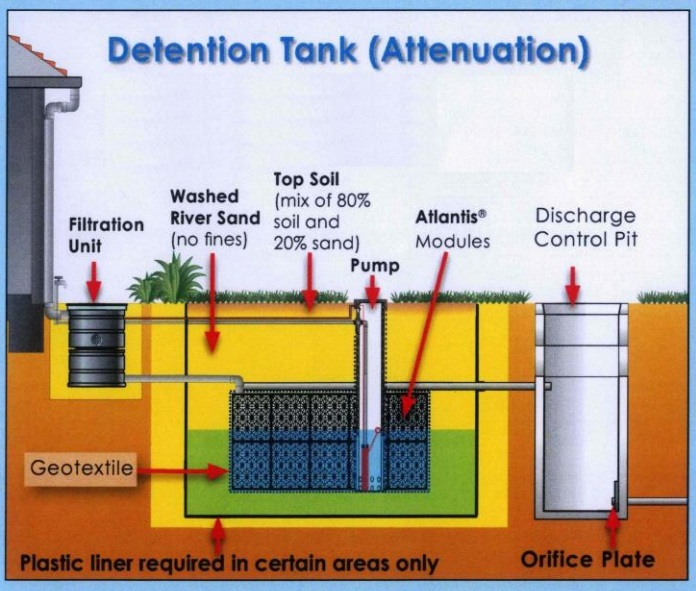
Applications: New developments required to meet water sensitive urban design standards.

The **Atlantis® Re-use System** has proven effective in providing a regular clean water supply for domestic and commercial applications.

How It Works!
The system captures water from both landscaped areas through surface infiltration and from roof areas. Clean water is retained within the storage area away from harmful U.V. light and heat remaining cool underground readily available for re-use.

Applications: Typical applications include flushing toilets, in washing machines, watering gardens and washing cars.

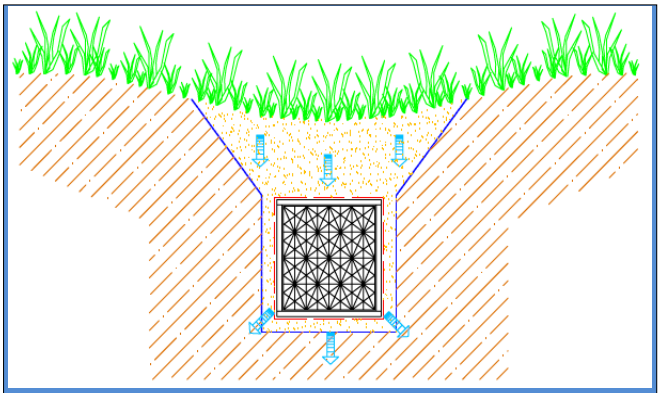




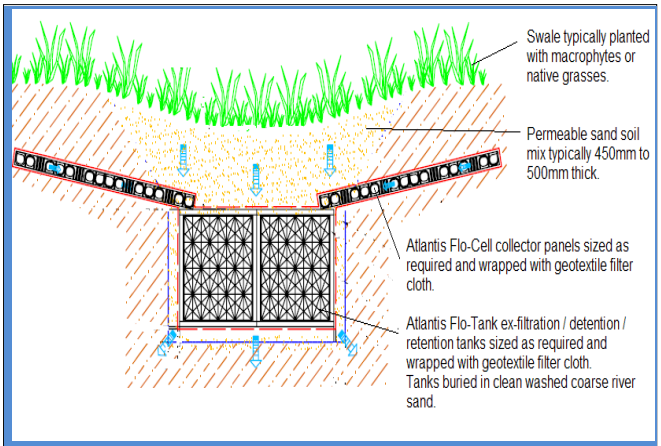
The system offers flexible design options, saving installation time and delays to site access.

How It Works!
Water captured from roof and paved areas are filtered before entering the storage area (Atlantis® Matrix® Modules). Water is then slowly released through the discharge control unit (DCU).

Applications: Developments that need to meet Local Council Stormwater requirements.

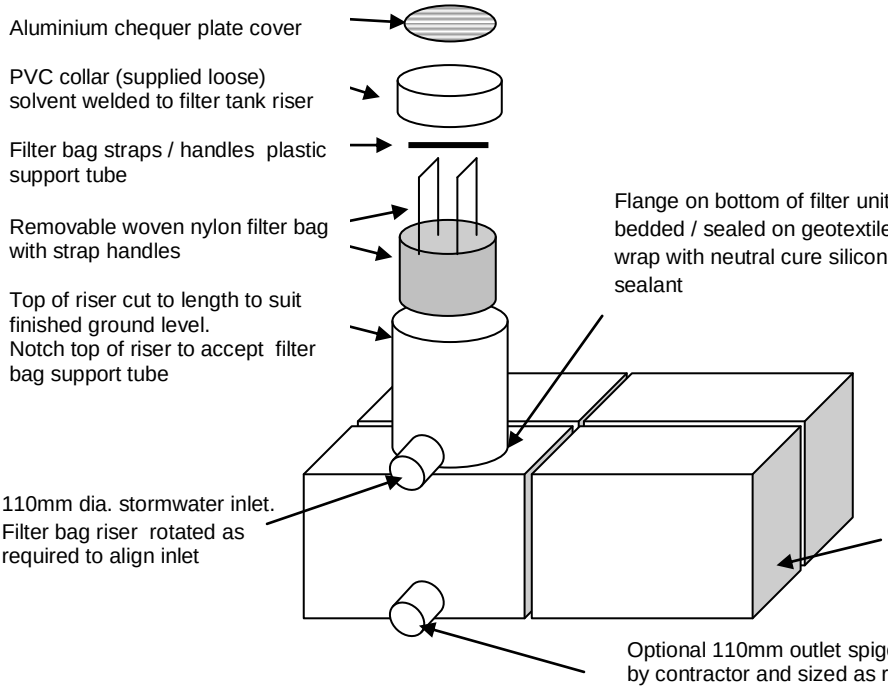


ATLANTIS FLO-TANK™ SWALE SYSTEM



ATLANTIS FLO-TANK™ / FLO-CELL™ SWALE SYSTEM

ROADING & CARPARK DRAINAGE
ATLANTIS FLO-TANK™ COMBINED WITH
ATLANTIS FLO-GRID™ PERMEABLE PAVING SYSTEM



NOTES :

Install the filter bag ensuring that it is firmly pushed home onto the lip at the bottom of the riser.

Raise the filter bag handles up to the top of the riser and support them on the plastic tube sprung / wedged into notches cut into the top of the riser.

Ensure that the bag handles do not conflict with water flows from the inlet pipe

Place top of PVC collar at finished pavement / grade level and solvent weld collar to PVC riser

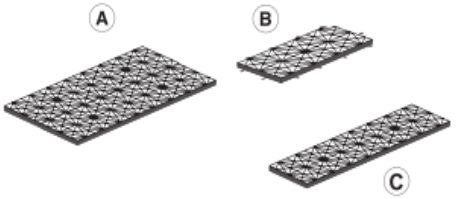
Place the light duty (non-vehicular) chequer plate lid into the PVC collar and secure thru the lid slots with self threading type 316 stainless steel round head screws into the lid seating.

GFA FILTER MODULE (RESIDENTIAL) AND ATLANTIS FLO- TANK™ ASSEMBLY

INSTALLATION OF ATLANTIS FLO-TANKS™

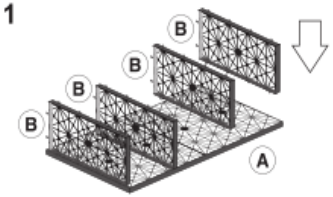
Note : Inset photo showing geogrid reinforcing the tank top back-fill

MINI MODULE FLO-TANK™ ASSEMBLY



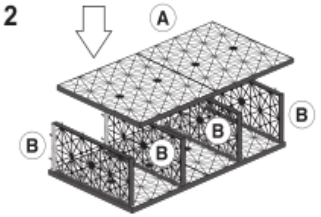
Components required per module:
2 x Large Flo-Tank plates (A)
4 x Small Flo-Tank cross plates (B)
2 x Small Flo-Tank side plates (C)

Step 1



Step 1:
Click small plates (B) into large cell (A), allowing an equal distance apart. Make sure the 4 long pegs on (B) are facing down.

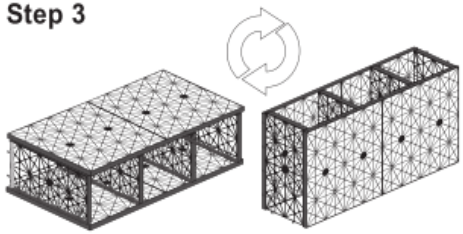
Step 2



Step 2:
Click large cell (A) on top of the module.

Step 3:
Flip module onto side.

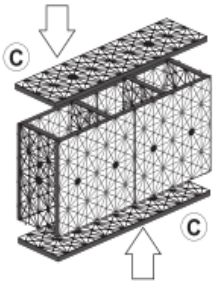
Step 3

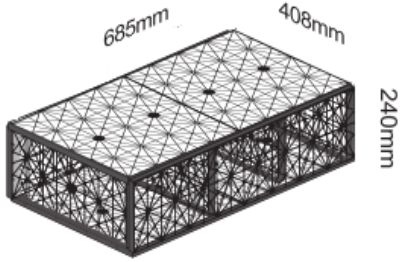


Step 4:
Click half large cell (C) on top and bottom of the module.

Important Note: When completed, the top must be supported on the two sides as well as on the two ends and the middle plate.

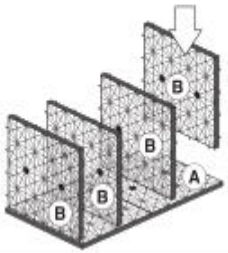
Step 4



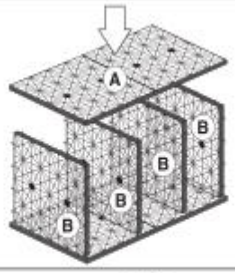


SINGLE AND MULTIPLE MODULE FLO-TANK™ ASSEMBLY

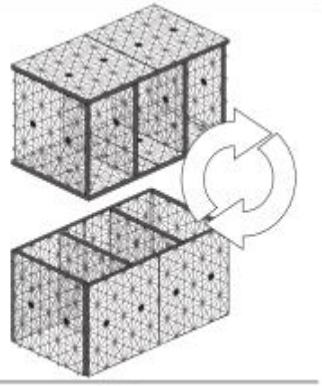
Step 1



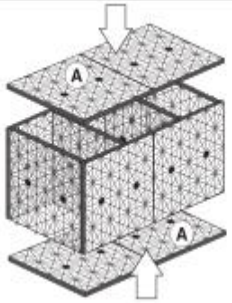
Step 2



Step 3



Step 4



Components required per module:
4 large Flo-Tank plates (A)
4 small Flo-Tank cross plates (B)

Step 1:
Click small cross plates (B) into large cell plate (A) spacing them an equal distance apart. Make sure the 3 pegs on the cross plate (B) are facing UP.

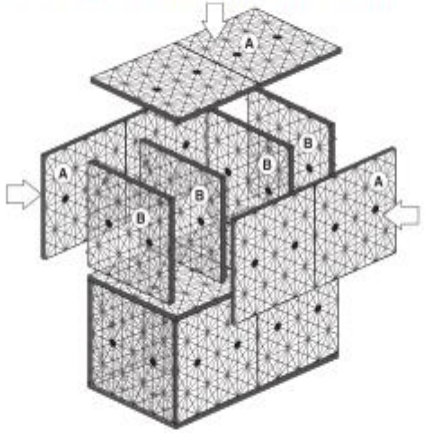
Step 2:
Click large cell (A) on top of the module.

Step 3:
Flip module onto side.

Step 4:
Click last large cell (A) on top and bottom of the module.

Important Note: When completed, the top must be supported on the two sides as well as on the two ends and the middle plate.

Assembly of multiple height Flo-Tank modules
Click small cross plates (B) into top plate of a completed module as in step (1) then steps (2), (3), and (4) as above. Repeat this process for each additional module.



MULTIPLE HEIGHT MODULE ASSEMBLY

FLO-TANK™ INSTALLATION SEQUENCE / SPEC. NOTES

Assembly time of units approx. as follows

Tank Size	Time
Tiny	2 minutes
Mini	2 minutes
Single	2 minutes
Double	4 minutes
Triple	8 minutes
Quad	10 minutes
Pent	13 minutes

Assemble tanks as specified / documented

Completed tank modules should be staged as close to the installation area as possible to minimize handling.
Strength determined by No. of cross plates. Ie;3, 4 or 5 cross plates.
Evenly distribute and connect the cross plates over a large plate.
To build a multiple height tank build on top of an existing completed single tank module to the required height.

Cut holes thru horizontal plates as required for vertical inspection and maintenance ports before assembling multiple height units.
Cut holes with a reciprocating saw, all holes cut between the vertical internal cross plates.
See page 8 detailing the Flo-Tank™ assembly sequence.

NOTE

1. Atlantis® Matrix® tank modules must be installed with the 450mm side in the vertical dimension to ensure maximum strength.
2. For multiple height tanks the 3 pin edge of the cross plate must face up.

Installation of Atlantis® Flo-Tanks™

Step 1 – Excavation

Excavation size to allow for the tanks dimensions, backfill material encompassing the tank and compaction equipment access at the tank side walls.
Size of bulk excavation to be as documented or use the following minimum dimensions;

Tank base allow 100mm to 1 50mm
Tank side walls allow perimeter 300mm to 500mm
Tank top cover depth typically 300mm 600mm plus paving system as specified.
Excavate floor to an even level plane to the reduced level specified.

Step 2: Prepare Base

Place the specified base material to the specified thickness, evenly spread to the correct line and level.
Typically base material is a coarse washed river sand or a free draining open graded 20mm aggregate.
If the tank is not expected to ex-filtrate water to the surrounding soils then a GAP 20 type material is acceptable.
Base material compacted to 95%.

Step 3: Placing of the impermeable plastic liner.

If required install specified liner.
Drape the plastic liner across the floor and up walls.
Take care not to tear or puncture the liner
At aggregate or GAP20 base material use TerraTex non-woven geotextile cushion layer under the liner.
All overlapping edges / joins to be heat welded by an experienced poly-plastic welder.

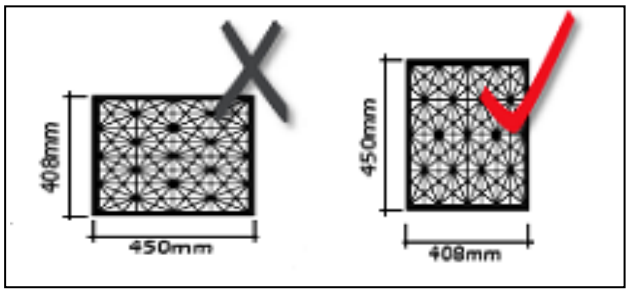
Use only large liner sheets to minimize the number of welded joins. Avoid site welded vertical joints if possible.
Ensure liner at the ends and sides is sufficient to wrap up and over the tank.

Step 4: Place Geotextile Wrap to Tanks

Typically for most applications TerraTex 160N non-woven needle-punched geotextile is used.
Lay the Geotextile into the excavation, over lapping edges by 300mm or as specified.
Ensure geotextile at the ends and sides is sufficient to wrap up and over the tank.
Secure / tape the geotextile against sliding or blowing down into the excavation.

Step 5: Install Atlantis Flo-Tank™ units.

Establish two string lines at right angles at one corner of the prepared excavation..
Place the tanks to the string lines true to line.
Ensure the tanks are placed right way up.



Complete the placement of the tanks ensuring that adjacent tank units are snug to each other.

Step 6: Wrap the block of Flo-Tanks™

Wrap the geotextile and or liner up and over the block of tanks creating an envelope to totally exclude fine backfill material from entering the system.
All geotextile laps to be 300mm minimum and to be sealed / secured with duct tape.
All liner laps sealed / heat welded to prevent the loss of water.
Cut entry points for inlets / outlets / vertical risers thru the geotextile / liner as shown in the sketch below.

Step 6: Inspection and or maintenance ports.

Maintenance and inspection ports typically PVC pipe cut vertically thru the tank and resting on the tank floor and rising to the finished surface at the locations specified.
Cut holes as required, see tank assembly instructions above.
Typically inspection port pipes (dip stick access to check water level) are 100mm perforated pipe.
Typically maintenance port pipes (to flush tank floor) are 150mm to 200mm solid pipe with large vee notches cut in the bottom end.
All pipes to enter the tank at 90º to the face.
Seal pipes to the tank envelope as detailed in the sketches below.
Cap the top of maintenance and inspection pipes as specified.

Step 7: Inlet and or outlet pipes

Inlet and outlet pipes sized as specified to be cut thru the tank envelope at the locations specified.

Pipes 450mm dia. and larger with the approval of the system designer need only abut the tank and not penetrate the face.
Caution: The filter system to be capable of trapping all floatables, eg plastic bags.
All pipes to enter the tank at 90º to the face.
Seal pipes to the tank envelope as detailed in the sketches below.

Step 8: Placing backfill to sides of tank.

Backfill the tank sides in lifts of 200mm.
Backfill to be evenly placed side to side to minimize displacement of the tank (shoving).
With smaller tank units / configurations place fill material on top of the tank to 'weight it' to help minimizing shoving.
Compact to 95% using a hand-held powered compactor, a vibrating type compactor will assist in eliminating minor gaps between adjacent tank units.

Step 9: Placing backfill to top of tank.

Exercise care when placing the first 200mm lift of backfill on to the top of the tanks.
Place first lift of backfill with an excavator reaching out and over the tank.
For subsequent lifts it is acceptable to use a small tracked or wheeled machine with a low ground pressure.
Do not drive directly on the exposed tank surface.
Generally overfill final lift, compact then blade down to required level.
Compact each lift to 95% using vibrating plate / roller compactor of appropriate size.
Backfill material and profile as specified.

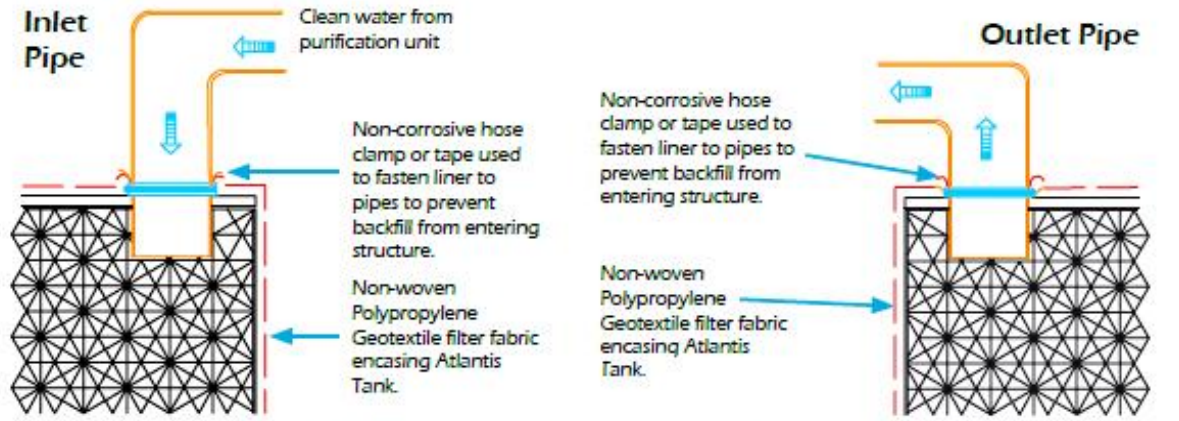
Step 10: Optional geogrid

At load bearing applications such as car-parking areas where there is reduced cover over the tanks install geogrid as specified by project designer.
Typically Tenax bi-axial LBO330 geogrid is used.
Geogrid laps to be 500mm minimum and to extend a 500mm beyond the excavation footprint.

IMPORTANT

ALL water entering the Atlantis system must be filtered by an appropriate device including during the the construction phase of the tank system, use appropriate sediment / silt control systems

PIPE TO TANK CONNECTION DETAILS




Cut X slightly smaller than pipe as fabric will stretch, making a tighter boot.


Raised X cut geotextile.


Core drill into the Atlantis module.


Place pipe into the X cut hole of the geotextile.


Slide the pipe through the geotextile and the hole made in the Atlantis module.


Seal base of pipe with adhesive tape and silicon.