



Product Profile & Application:

The Rainsmart Tank Modules are suited to any subsurface infiltration, retention or detention Stormwater applications. Manufactured using recycled materials, the Tank Modules are lightweight, engineered design, structural component developed through research & development. It is ideally used for the construction of underground Infiltration, Reuse, Detention Tanks, Grass Swale, Subsurface interception channels, Septic Leach Drains and light weight void fillers for roof gardens and planter boxes applications.

Rainsmart Tank Module system supersedes traditional gravel and pipe based systems by far. The system provides a void space ratio of over 95% compared to 30% in typical gravel and pipe based systems. Consequently, the Rainsmart system offers a smaller footprint for the same storage volume, significantly saving the amount of excavation, soil transport, importing clean aggregate and thus reducing earthworks related installation costs, and causes minimum site disruption.

The Tank Modules are available in kit form making it economical and easy to transport and handle. The lightweight nature of the Tank Modules also eliminates the use of heavy machinery, and makes installation quick and easy.

The modular design and stackable structural capabilities of the Tank Modules distribute the loads evenly and allows it to be used, in Traffic and Landscaped areas with high safety factor value. The modular design also means that you can create any shape and size of the underground Stormwater Structure on sites without disturbing the surrounding site conditions and maximize land use pattern.

As the Rainsmart Tank Modules are buried underground away from direct Sunlight and uses the principles of soil filtration and accelerated microbial actions(bio-remediation), it Stores and Conveys Stormwater of far superior quality. This underground feature also eliminates public safety risk, liability concerns and breeding grounds for vectors and vermin's.

Rainsmart Tank Modules has a unique low flow design to provide a total linear access, for inspection and maintenance purpose. This system will allow keeping the debris out of the cage structures; allow flushing out and controlling any silt build-up.

The Infiltration tank system is an ideal way to manage storm water run-off in permeable & semi-permeable soil conditions. The system is designed to capture surface water through infiltration or pipe network, the collected Stormwater is treated through the principle of sand filtration and the treated Stormwater is then discharged back in to the surrounding soils keeping it moist for surrounding vegetation, and recharging the ground water aquifers. No impermeable liner is used for infiltration tank application.

The Detention (Attenuation) tank system provides temporary storage and discharging the treated storm water at a predetermined rate through infiltration or storm water network, this controlled discharge system prevents downstream flooding and erosion in dense urban areas.

Rainsmart infiltration, Re-use, Detention Tanking systems Emulates the natural water cycle and delivers clean filtered water to underground aquifers and waterways, hence protecting terrestrial and aquatic flora and fauna for current and future generations.

System Benefits:

- Onsite Stormwater Management
- Environmentally friendly made from selected Recycled Polypropylene
- Recharges Groundwater Table through principle of infiltration.
- Mitigation of downstream flooding
- Site space utilization and minimum site disruption.
- Economical and Low maintenance system and reduces liability issues
- Modular Structure for design flexibility
- Heavy load carrying capacity
- Supplied in Kit form for ease in transportation
- High void surface ratio for quicker infiltration.
- Light weight hence no heavy machinery or skilled labor required.

General Specification Guide:

A) Dimension

Over all Ellipse tank module dimension has been given in the below table.

Tank Dimensions

Module (Units)	Width (mm)	Width (inches)	Length (mm)	Length (inches)	Height (mm)	Height (inches)
Single (1)	400	15.74	715	28.14	440	17.32
Double (2)	400	15.74	715	28.14	860	33.85
Triple (3)	400	15.74	715	28.14	1280	50.39
Quad (4)	400	15.74	715	28.14	1700	66.92
Pent (5)	400	15.74	715	28.14	2120	83.46

B) Storage Volume

Overall Ellipse tank void and water storage volume.

Actual Module Size & Storage Volume

Module (Units)	Tank Vol (Ltrs)	Tank Vol (cf)	Tank Vol (gal)	Water storage Vol (Lts)	Water storage Vol (cf)	Water storage Vol (gal)
Single (1)	125.77	4.44	33.26	119.47	4.22	31.60
Double (2)	245.94	8.68	64.97	233.64	8.25	61.72
Triple (3)	366.08	12.92	96.70	347.77	12.28	91.87
Quad (4)	486.29	17.17	128.46	461.97	16.31	122.03
Pent (5)	606.32	21.41	160.17	576.00	20.34	152.19

C) Physical & Chemical Characteristic

Ellipse Tank Modules are manufactured from Selected recycled material and has a 15% proprietary mix added.

Material Properties and Characteristic	
Material	85% Recycled Polypropylene & 15% Proprietary Mix
Color	Black
Biological & Chemical Resistance	Unaffected by moulds and algae, soil-bourne chemicals, bacteria and bitumen.
Temperature	21-27 ^o C or 69.8- 80.6°F
Service Temperature	-10°C to 75°C (-14°F to 167°F)
Flow Rate	0.40 m3/sec

D) Physical Load Characteristic :

Ellipse Tank Module unconfined load bearing capacity table below.

Maximum Load* (Unconfined tons/m2)		
Number of Internal Plates	Maximum Load (tons/m2)	Displacement (mm)
3 Inner Plate tank	18.29	10.25
4 Inner Plate tank	23.00	10.77
5 Inner Plate tank	26.57	10.58
7 Inner Plate tank	33.28	9.98

**GENERAL GUIDELINES / SEQUENCE OF WORKS FOR INSTALLING RAINSMART® ELLIPSE TANK
INSTALLATION.**

With Geotextile Fabric / Liner (Stormwater Detention & Infiltration)

PART 1 - GENERAL

1.01 General Provisions

A. The Conditions of the Contract and all Sections of Division 1 are hereby made a part of this Section.

1.02 Description of Work

A. Work Included:

1. Provide excavation and base preparation as per Geotechnical Engineer's recommendations and/or as shown on drawings, to provide adequate support for project designs loads and safety from excavation sidewall collapse. *See 2.02 Materials.*
2. Provide Rainsmart® system products including Ellipse tank units, geotextiles, geogrids, inlet and outlet pipe with connections and installation per the manufacturer's instructions furnished under this section.

B. Related Work:

1. Subgrade excavation and preparation under Section- Earthwork.
2. Subsurface drainage materials and structures, as needed.

1.03 Quality Assurance

A. Installation: Performed only by skilled work people with satisfactory record of performance on pipe, chamber, or pond/landfill construction projects of comparable size and quality.

1.04 Submittals

- A. Submit manufacturer's product data and installation instructions.
- B. Submit a Rainsmart® Ellipse tank module for review. Reviewed and accepted samples will be returned to the Contractor.
- C. Submit material certificates for geotextile, geogrid, base course and backfill materials.

1.05 Delivery, Storage, and Handling

- A. Protect Rainsmart® Tank plates from damage during delivery and store under tarp to protect from sunlight when time from delivery to installation exceeds one week. Storage should occur on smooth surfaces, free from dirt, mud and debris.
- B. Handling is to be performed with equipment appropriate to the size (height) of the tank modules and site conditions, and may include, hand, handcart, forklifts, extension lifts, etc.

1.06 Project Conditions

- A. Review installation procedures and coordinate Rainsmart® tank Install work with other work affected, such as grading, excavation, utilities, construction access, erosion control to prevent all non-installation related construction traffic over the completed installation, especially with loads greater than design loads.
- B. Cold weather:
 - 1. Do not use frozen materials or materials mixed or coated with ice or frost.
 - 2. Do not build on frozen or wet, saturated or muddy subgrade.
 - 3. Care must be taken when handling Rainsmart® tank when air temperature is at 40 degrees F or below as plastic becomes brittle.
- C. Protect partially completed Rainsmart® tank installation against damage from other construction traffic when work is in progress, and following completion of backfill, with highly visible construction tape, fencing, or other means until construction is complete.
- D. Protect adjacent work from damage during Rainsmart® tank installation.

PART 2 – PRODUCTS

2.01 Availability

- A. Manufacturer: Rainsmart Solutions Pty Ltd. 34, Ashcott Street, Kings Langley, NSW-2147, Australia. (T) +61 2 9674 2276 (F) +61 2 96742276 (M) +61 414 786 778
- B. Distributor:

2.02 Materials

- A. Base of Excavation: Installer has to set out, dug and prepare the sub-base area to the required plan dimensions and level, ensuring that the excavation orientation will allow easy installation of geotextile filter fabric and Rainsmart® tank modules. Prepare the excavation with safe battered sides and sufficient working space. Base of the excavation shall be smooth level, firm and flat and free of lumps or debris and soft spots. Compact to at least 90% or as required by Engineer. The tank base should have a 3-5% CBR. Should the CBR be tested and found less than 3% then the engineers should be notified. Structural fill material may be used to amend the structural capacity of the soil. Materials that cannot be stabilized by compaction, such as drainage rock, should be avoided.

- B. Geogrid: Use Bi-axel geogrid product, to overlay above the completed tank and topfill of 300mm (12")extending at least twice the width of side backfill, with geogrid joints overlapped by at least 300mm (12"). ***(only for tanks under carparks or traffic area to disperse point load effect If required by the engineer's design)***
- C. Geotextile: Shall be non-woven PP or PET with a weight of at least 200 gsm, appropriate for the soil type and depth conditions, placed on the floor of the excavation, the sides of the tank, and top of the tank.
- D. Rainsmart® Tank: Injection molded plastic tank plates assembled to form a modular structure of predesigned height (custom for each project) .Unit weight = 7.04 kg (14.2 lb.), volume = 5% solid.
- E. Side Backfill: Structural fill or sand materials, free from lumps and debris or any other sharp materials to backfill along the sides of the modular structure, taking care to compact with powered mechanical compactor, in lifts that do not exceed 300mm (12"), to provide a settlement-free surface over the top and sides of the structure.
- F. Top Backfill: Use 300 mm(12") minimum to 2.0m (79") maximum depth of sandy/gravel material (with fines less than 3%). If backfill mixture must be custom mixed, use a ratio of 2 parts clean 10 mm gravel to 1 part clean sharp sand.
- G. Utility Marker: Use metallic tape at corners of install to mark the area for future utility detection.

PART 3 - EXECUTION

3.01 Inspection

- A. Examine prepared excavation and conditions for smoothness, compaction and level. Do not start Rainsmart® tank installation until unsatisfactory conditions are corrected. Check for presence of high water table, which must be kept at levels below the bottom of the Rainsmart® tank structure at all times.
- B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance. If existing conditions are found unsatisfactory, contact Project Manager for resolution.

3.02 Installation of Geo-textile:

- A. Permeable geotextile is installed by rolling out on top of the compacted coarse base for soakaway construction only, with adjoining sheets overlapping by 300mm. The geotextile filter fabric s to be laid lengthways and width ways to form a complete layer of base line material, allowing sufficient excess material to be able to wrap around the whole tank structure. This will enable the whole unit to be able to be wrapped to the dimensions required. All overlaps are then to be suitably secured, weighted down tapped or stapled in order to minimize the ingress of deleterious materials.

3.03 Installation of Rainsmart® Tanks

- A. Install Rainsmart® Tanks by placing side by side, in accordance with the construction drawings and connection details, it is advisable to use a line to be able to form a straight edge along one or two of the structure axis.
- B. The modules are to be orientated as per the design drawing (400mm x 715mm) with required depth in units of 440mm, 860mm, 1280mm (contact Rainsmart for higher depths).
- C. After placement of Rainsmart® tanks, wrap with geotextile which is brought up around the sides and lapped over the top of the full structure. Should any gaps be evident additional fabric can be cut and placed over any of these areas. Fold excess fabric at corners to lay flat against sides of structure, securing folds and seams with staples or similar methods.
- D. Identify locations of inlet, outlet, inspection ports, and any other penetrations. All pipes should be positioned at 90 degree to the tank structure. Any inlets, outlets etc should be installed flush (butted up) to the tank and the geotextile fabric shall be cut to enable hydraulic continuity at the inlet and outlet and secured around the pipe using a suitable coupling or a stainless steel clamp prior to backfilling.
- E. Tanks require ventilation for proper hydraulic performance, number of pipes and vents will depend on the size of the tank. Vents are often installed using a 90 degree elbows etc with PVC pipe into soft landscape area with 'U' bend or venting bollard to inhibit the ingress of debris, Alternatively a ground level concrete steel cover can be fixed to suit.
- F. The side backfill should be done in layers of 300mm using a powered mechanical compactor to conduct backfill and compaction operations all around the structure in layers and shall continue up to the top level for the modular structure. During backfill it is imperative that the material is placed carefully around the sides and above the modules, in order to minimize any damage to the structure. The compaction process should not allow the machinery to come into contact with the modules and ideally should maintain a nominal 100mm clearance.
- G. Backfill above the modular tanks should be placed and compacted in layers no greater than 300mm (12"), the backfill should be done using a "forward dump machine", and compacted using a vibrating plates or walk-behind rollers (do not use drivable rolling compactors). No heavy machinery should drive on top of the tank until 500 -600 mm of backfill and compaction is achieved, then ensuring turning or maneuvering should be avoided.
- H. When tanks are installed under traffic loads with minimum top cover, place a geogrid layer over the top of the structure, 300mm (12") from the top of the tank, extending beyond the outside edge of the excavation by at least 1m (40") . Any joints must be overlapped by a minimum of 12". ***(only for tanks under car parks or traffic area with minimum cover to disperse point load effect if required by the engineer's design)***
- I. Ensure that all non-tank construction traffic be kept away from the limits of excavation until the project is complete and final surface materials are in place.
- J. Place surfacing materials, such as groundcovers (no shrubs or trees), or paving materials over the structure with care to avoid displacement of cover fill and damage to surrounding areas.

3.04 Cleaning

- A. Perform cleaning during the installation of work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair any damage to adjacent materials and surfaces resulting from installation of this work.

END OF SECTION

If you have any questions regarding this specification, please call
Rainsmart Solution Pty.Ltd. on +61 414 786 778

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