TÜVRheinland CERTIFIED

LEADERGRATE GRP PRODUCTS

Fabricated by المستقبل AL MUSTAQBAL FIBERGLASS IND.

FIBREGLASS STORAGE TANKS FOR ALL INDUSTRIES

CONTENT

GENERAL INFORMATION

LG molded, Filament wound and hot pressed tanks are developed for corrosive applications where Light weight, free maintenance, corrosion resistant and Eco friendly tank are required.

Quality Manufactured Product

Leadergrate is an ISO 9001 certified company, The tanks are manufactured complying with ASME RTP-1, ASTM D3299, ASTM D4097, BS 4994, BS EN 13280 standards.
Every tank is subjected to a number of quality assurance inspections.
Complete traceability of resin batches and the glass is maintained and can be provided as needed. Chemical resistant tests and hydrostatic water tests are routienly performed.

Filament Wound Tank

Continuous, resin-impregnated fibers or roving are wound on a rotating mandrel in a predetermined pattern, providing maximum control over fiber placement and uniformity of structure. In the wet method, the fiber picks up the low-viscosity resin either by passing through a trough or from a metered application system. In the dry method, the reinforcement is impregnated with resin prior to winding.


Contact Molded Tank

Open Molding is the most flexible of all composite fabrication processes. Part size and design options are virtually limitless for open molded parts. Typically, the open molding process is used for very complex parts that cannot be produced in more automated processes, or for parts that are produced in low volumes and cannot justify the higher mold costs of the automated processes.
The open mold process frequently utilizes a surface coating called a gelcoat or topcoat. The gelcoat is applied directly to the mold using a spray process or manual which results in a high quality durable surface. After the coating is applied, the back-up reinforcement and binder resin is applied, either by spray or manual application. Entrapped air is removed from the resin/reinforcement mixtures, and additional layers of laminate are added to build thickness and strength as desired.


Hot Pressed Tank

The high-pressure molding process produces high strength, complex parts in a wide variety of sizes. Matched metal molds are mounted in a hydraulic or mechanical molding press. The material charge of choice is placed by robotics or hand in the open mold, the heated mold halves are closed, and pressure up to 2,000psi (137 bars) is applied. Cycle time, depending on part size and thickness, ranges from one to five minutes. Features such as ribs, bosses, inserts and attachments can be molded in.
Compression-molded composites are characterized by net size and shape, two excellent finished surfaces, and outstanding part-to-part repeatability. Trimming and finishing costs are minimal.


IMPORTANT FEATURES

1 Corrosion Resistant

Resistant to more than 1000 chemicals and combination of chemicals from 5 °C to 150 °C . Unlike Steel or concrete, GRP does not require coating . The corrosion resistance is achieved by the choice of the resin and is enhanced by adding chemical resistant surface veil to the inner Liner in contact with chemicals .

2 Light weight

GRP weighs 1/3 the weight of steel, resulting in lower installations cost.

3 Expansion and Contraction

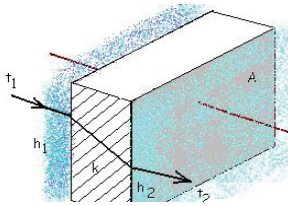
Concrete expands and contracts causing corrosion and cracks over time. Fiberglass does not expand or contract.

4 Maintenance free

GRP does not require any blasting or coating.

5 Low thermal Conductivity

Very low compared to steel (240 times less), excellent for chilled water application. Hence the cost of insulation for GRP is much less than for the steel.

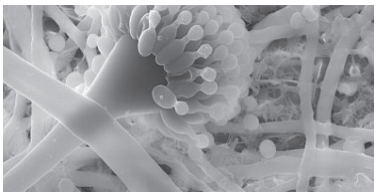


6 Bacteria and Algae resistance

Fiberglass has a smooth interior finish and is not porous making it a perfect environment to combat bacteria accumulation and algae from forming.

7 Microbial Induced Corrosion (MIC)

Fiberglass is resistant to hydrogen sulfide which creates sulfuric acid, a common cause of deterioration in concrete.



8 Installation time

Fiberglass tanks can be transported on a single truck and are delivered to the site. As a finished product making installation easier and faster.

9 Water Quality

Genuine food grade material, suitable for drinking water application.

AREA OF APPLICATIONS

LEADERGRATE Tanks systems are designed to accommodate a wide variety of applications, such as:

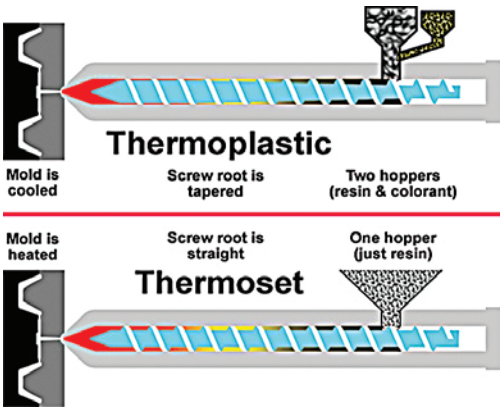
- Chemical vertical aboveground storage tanks for Desalination plants, chemical plants, STP.
- Scrubbers vertical vessels for Odor Control plants.
- Oil Water cylindrical vertical tanks for Petrochemical plants.
- Chilled water tanks for District cooling plants.
- Diesel & Fuel Underground horizontal tanks for petrol stations.
- Irrigation underground horizontal tanks for landscaping projects.
- Sewage holding underground horizontal tanks for villas, labor camps.
- Domestic Underground horizontal cylindrical tanks for villas, labor camps.
- Brine Underground horizontal tanks for RO plants & Oil Drilling.
- Fishery above ground vertical cylindrical tanks for Aquaculture hatchery project.
- Fishery above ground horizontal rectangular tanks for Aquaculture hatchery project.
- Fire fighting above ground Sectional tank for Residential, commercial Bldgs, factories & showrooms.
- Domestic above ground Sectional domestic tank for Residential , commercial Bldgs , hotels & Hospitals.
- Irrigation above ground Sectional water tank for Residential, commercial Bldgs, hotels & hospitals.
- Purified water sectional water tank for hospitals .
- Chlorinated water sectional water tank for swimming pools.

CHOICE OF RAW MATERIAL

Resins can be divided into two broad classes:

THERMOSETTING AND THERMOPLASTIC.

THERMOPLASTIC resins have a definite melting point, whereas thermosetting resins cure to produce an infusible solid material that does not melt when heated. They soften, but they do not liquefy.



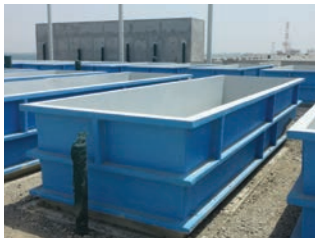
THERMOSETTING resins used for GRP are typically purchased in liquid form and are reacted to a solid with chemical additives. The most commonly used thermosetting resin systems:

- **Vinyl ester**
- **Bisphenol-A fumarate polyester**
- **Terephthalic polyester**
- **Isophthalic polyester**
- **Orthophthalic polyester**

Information can be provided on the recommended resins, ranging from orthophthalic polyester resins (which have good resistance to acidic conditions) to the improved resistance of isophthalic polyester resins. Also available are the more sophisticated and expensive bisphenol modified resins and vinyl ester resins, which are designed for exceptional all-round chemical resistance.

CHOICE OF TANK

The following table is included as a guide to help in choosing the best tank for a particular application :

			
APPLICATION TYPE	Molded tank	Filament wound Cylindrical tank	Sectional Hot pressed rectangular tank
Drinking water	Good	Excellent	Excellent
Sewage , Effluent	Good	Excellent	Not recommended
Aquaculture	Excellent	Average	Not recommended
Sea water	Excellent	Excellent	Good *
Chemicals	Excellent	Excellent	Not recommended
Diesel / Fuel	Good	Excellent	Not recommended
Underground	Good	Excellent	Not recommended
Fire fighting	Good	Excellent	Good **
Irrigation TSE water	Good	Excellent	Average ***
Chilled water	Excellent	Excellent	Good
Odor control	Good	Excellent	Good
Biological reactor	Excellent	Excellent	Average
Irregular L, U shape in confined space like mechanical floor, parking, pump room	Not recommended	Not applicable	Excellent
Elevated towers	Average	Good	Excellent
Islands or seaside	Good	Excellent	Average

**- for sea water application , tank shall be reinforced externally . SS shall be strictly not allowed inside the tank .*

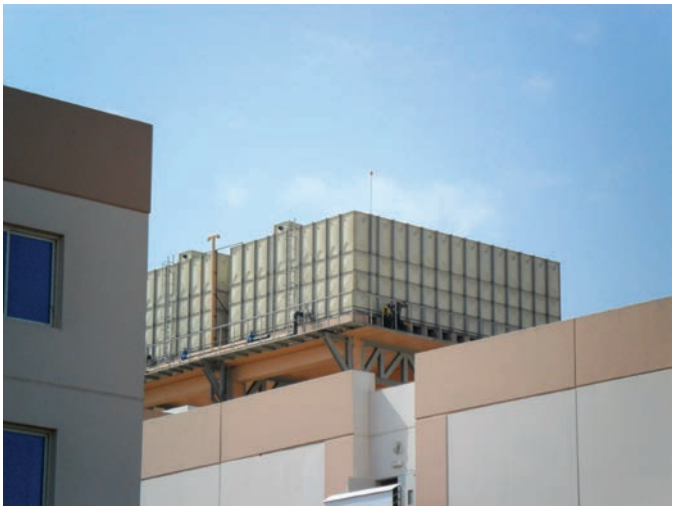
***-for fire fighting application , customer shall ensure water is never stagnant inside the tank as it becomes very corrosive . Water shall be circulated min 8 hours / day . it is always recommended to have a combined system Domestic & fire fighting application .*

****- For irrigation tank , TSE water can contain high content of TDS , Chloride and even bacteria which can speed us the corrosion rate of internal SS reinforcement. Regular maintenance 1 every 3 months is required for internal components of the tanks . In case of internal corrosion , water treatment should be provided .*

GRP ABOVEGROUND SECTIONAL TANKS

The sectional tank panels are hot press moulded in glass reinforced plastics (GRP) using isophthalic unsaturated polyester resins and electrical glass fiber reinforcement.

The panels are moulded at temperatures up to 150°C under strict quality control disciplines. The process results in strong, consistent panels which are fully cured, dimensionally accurate with sharply defined profiles and smooth surfaces on both faces. Drilling and finishing of the panels is undertaken in a purpose built controlled area, where high technology automated drilling equipment is used to complete production to exacting tolerance levels.



GRP ABOVEGROUND SECTIONAL TANKS

FEATURES

o INTERNATIONAL STANDARD:
Manufactured to international standard BS 4791 , SS245 :1995 , BS EN 13280 , BS 6920.

o FREE CAPACITY DESIGN:
Sectional tanks fits into any limited space as its structure utilizes horizontal and vertical spaces at the maximum through the use of diverse sizes of panels : 1mx1m , 1mx0.5 m , 1mx0.3m ,0.5mx0.3m , 1mx1.5m , 0.5mx1.5m , 1mx2m , 0.5mx2m.

o EASY& FAST CONSTRUCTION:
The standardized panels and accessories improve the economical and operational efficiency in the transportation and construction .

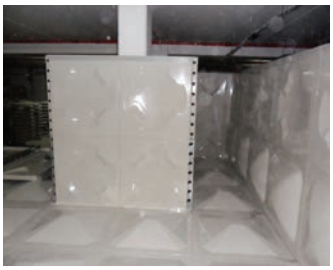
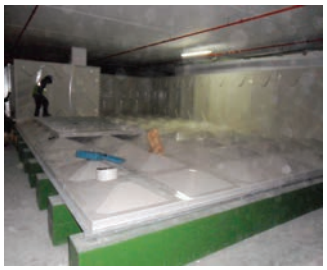
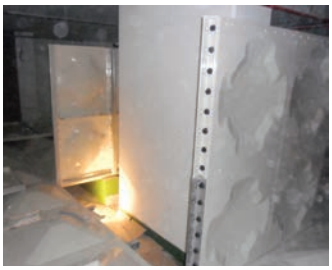
o RELIABLE QUALITY IN STRENGTH & DURABILITY:
A Structure analysis has been carried out based on the F.E.M (Finite Element Method)to pursue an optimal design and thus secure reliability for the strength of the reinforcement system and panels.

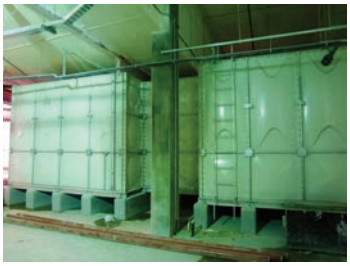
o BEST HYGIENIC PROPERTIES:
The WRAS certified GRP panels, of which surface is uniformly smooth without getting any sediment , and prevent the growth if any algae and fungi by blocking light transmission.

o WATER TIGHTNESS:
The joints of each panel are perfectly sealed with sealing tape which has good weathering resistance and restorative ability.

o COMPLETE DRAINAGE:
The dome shaped bottom panels with a concave drain panel facilitate complete and fast drainage.

o SPECIAL SHAPE:
Irregular shapes are possible especially in mechanical floors and basement, where columns and walls become an obstacle. The possible shapes are: Rectangular, square, L shape, U shape , Z shape, Hollow shape around concrete column.

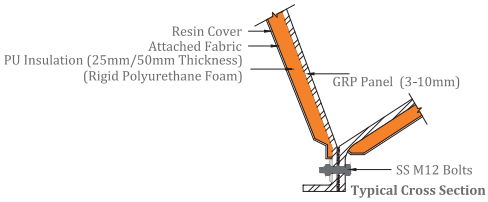





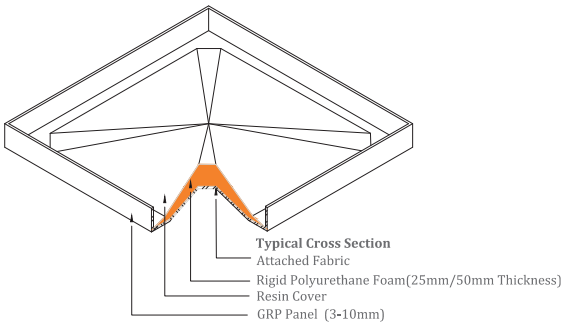


GRP ABOVEGROUND SECTIONAL TANKS

- **OUTSTANDING THERMAL EFFECT:**

The heat insulation panel with 3- layers (SMC +PU +GRP cover) structure protects dew condensation and minimizes temperature variation of the stored water. The insulation provides U value of 0.6W/m2K. CFC and HCFC free.



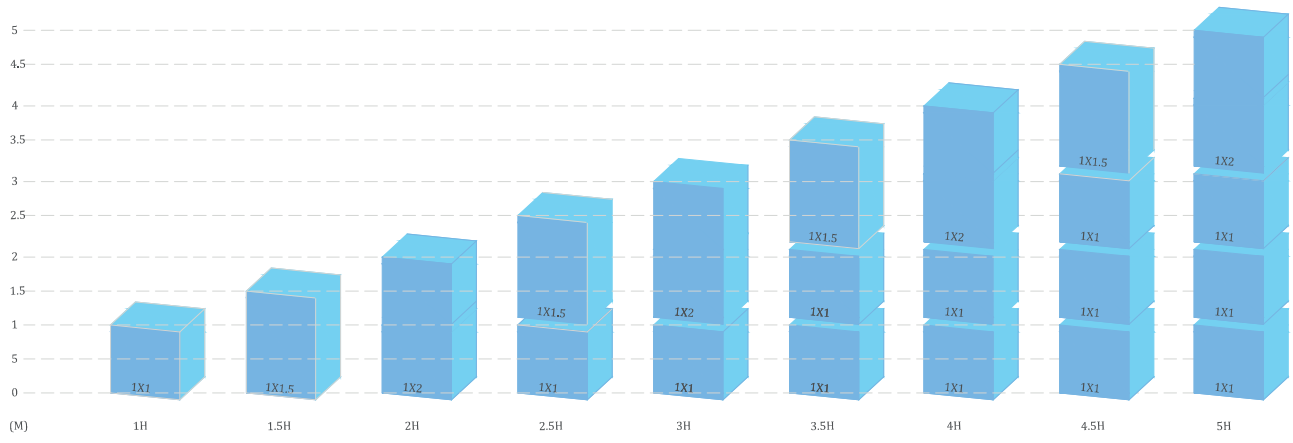


- **CAPACITIES:** 1 M^3 To 10,000. M^3

Small Tank

Big Tank

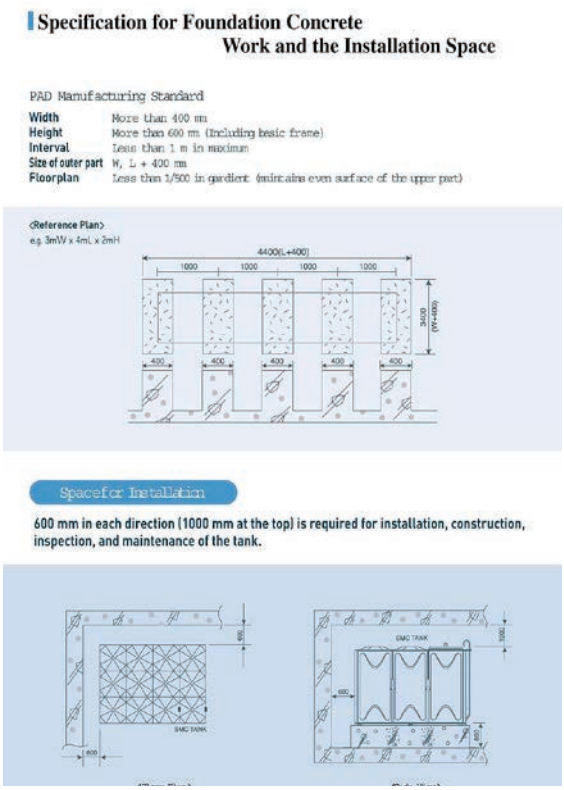
- **COMPOSITION OF WALL PANELS PER HEIGHTS:**



GRP ABOVEGROUND SECTIONAL TANKS

ACCESSORIES OF TANK:

- **TANK FOUNDATIONS:**



- **SKID FRAME :**

The tank leveling is achieved by a bottom skid frame made from MS galvanized beams, fixed on the concrete beams foundation and below the tank bottom panels.

- **GRP ACCESS MANWAY COVER:**

Man access 600mm diameter hinged or lift off lockable SMC lid.

- **GRP ACCESS LADDERS:**

All tanks deeper than 1.5m shall be fitted to client requirements with internal stainless or GRP and external standard GRP or GI access ladders: to BS4211 with hooped safety cage.

GRP internal ladder

GRP external ladder

GRP ABOVEGROUND SECTIONAL TANKS

- **LEVEL INDICATOR :**

All tanks deeper than 1.5m shall be fitted to client requirements with glass clear tube level indicator or with mechanical type level indicator .

Glass clear tube level indicator

Mechanical type level indicator

- **GRP ROOF SUPPORT :**

The roof panels support are made from GRP pultruded vertical SQ tube.

- **TOP ROOF GI SAFETY HANDRAIL :**

The GI handrail should be considered to meet particular contract needs .

GRP ABOVEGROUND SECTIONAL TANKS

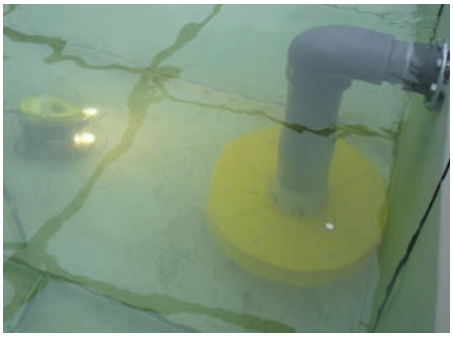
- **NAME PLATE AND MAINTENANCE INSTRUCTION BOARD :**

A name plate will be fixed on the tank with following min details :

- Manufacturing date
- Warranty expiry date
- Net capacity of tank
- Tank dimensions
- Design temp
- Testing date

A maintenance board will be fixed on the tank with following instructions :

- Cleaning frequency.
- Water parameters .
- Inspection procedures.
- Repair procedures for leakages.
- Emergency contact details for supplier.



- **VORTEX INHIBITOR:**

Fire fighting water tanks require a large, fast flowing volume of water with a vortex inhibitor playing a key role in preventing air being drawn into the system and reducing the flow. Vortex inhibitors are fitted to the outlet pipe of the pumped water system .

- **FLOAT VALVE CHAMBER:**

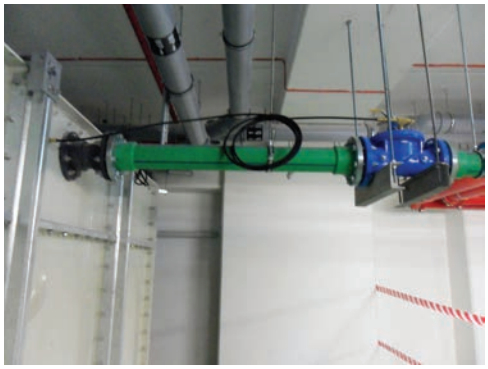
Float valve chambers can be provided with central hinged or lift off lockable SMC lid, with options of 180mm, 300mm and 500mm depth, where appropriate provision for type AB air gap incompliance with BSEN13077:2008.

GRP ABOVEGROUND SECTIONAL TANKS

- **PIPE CONNECTIONS:**

Connections can be supplied as PVC or GRP flanged stools to BS4504 standards, or, for small pipework, screwed sockets to BS1387. The connections are inlet, outlet, overflow, drain, balancing line, Re-circulation, return & test line (Fire fighting).

CI Fire fighting outlet



UPVC DF for PPR inlet pipe

ABS Air vent

GRP DF outlet for UVC line

UPVC drain pipe

UPVC overflow pipe

GRP MOLDED AQUACULTURE TANKS

VARIOUS STANDARD MOULD CONFIGURATIONS ARE AVAILABLE IN:

- **Circular Tanks**
- **Rectangular Storage Tanks**
- **Conical Bottom Tanks**

Circular Fiberglass Aquaculture Tanks

Circular fiberglass aquaculture tanks are designed and built with the customer in mind. Every tank goes through a 4 set process when being fabricated; Gel-Coating, Skim Coating, Main Lay-up and Installation of Accessories. Each step along the way is documented to ensure a high quality tank is being produced. Material batch numbers, cure times, room temperatures and thickness of parts are recorded and filled.

For large diameter > 4.5 m , the tank is manufactured on site in one piece and the floor is laminated insitu, after placing the concrete screed on the floor with 2 degrees slop .

GRP MOLDED AQUACULTURE TANKS

Rectangular Aquaculture Tanks

Our fiberglass tanks are rigid, durable, easy to clean and good looking. These high-quality tanks are constructed of FDA-approved materials and feature smooth gel coat interiors and light gray or white exteriors (custom colors available in quantity). The top lip is reinforced for strength .Fiberglass tanks are often preferred for long-term use because of their rigid durability. Rectangular tanks can come with PVC fitting in a variety of sizes for plumbing and clean out connections.

Free standing Conical Bottom Aquaculture Tanks

These tanks have the same features as the circular flat-bottom tanks and rectangular tanks with an added bonus – the bottom is cone shaped for total drainage, this allows easy clean-up for operators. These tanks must be supported with some type of stand, usually of PVC or GRP.

DIFFERENT TYPES OF FISH TANKS

GRP FREE STANDING FISH TANK

Ref	Capacity	A(mm)	B(mm)	C(mm)	D(mm)	Empty Wt of tank	Full Wt of tank	Color
LGFST-1	1 m^3	1200	1000	870	1870	78 Kg	1,078 Kg	As per Client Request
LGFST-1A	1 m^3	1200	700	870	1570	60Kg	1,060 Kg	As per Client Request
LGFST-2.3	2.3 m^3	1500	1300	870	2170	119 Kg	2,419 Kg	As per Client Request
LGFST-3	3 m^3	1750	1300	870	2170	155 Kg	3155 Kg	As per Client Request

GRP FREE STANDING FISH TANK

Ref	Capacity	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)	Empty Wt of tank	Full Wt of tank	Color
LGFST-5	5 m^3	2400	1100	1483	400	550	203 Kg	5,203 Kg	As per Client Request
LGFST-12.5	12.5 m^3	3500	1400	1783	500	800	368 Kg	12,868 Kg	As per Client Request

GRP IN SITU FISH TANK

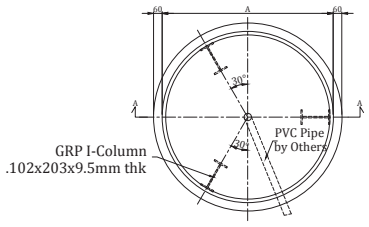
Ref	Capacity	A(mm)	B(mm)	C(mm)	Empty Wt of tank	Full Wt of tank	Color
LGIST-50	50 m^3	6000	2010	2000	900 Kg	15,900 Kg	As per Client Request
LGIST-75	75 m^3	6500	2650	2640	1550 Kg	76,550 Kg	As per Client Request

GRP WEANING RECTANGULAR FISH TANK

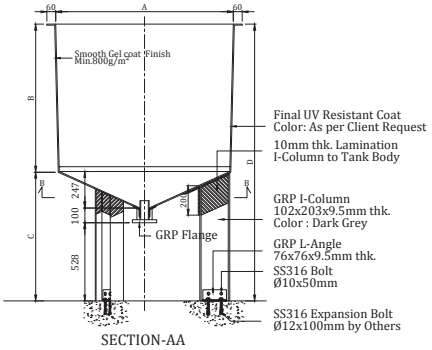
Ref	Capacity	A(mm)	B(mm)	C(mm)	D(mm)	Empty Wt of tank	Full Wt of tank	Color
LGWRT-15	15 m^3	6400	1800	1358	1580	791 Kg	15,791 Kg	As per Client Request

DIFFERENT TYPES OF FISH TANKS

GRP FREE STANDING FISH TANK

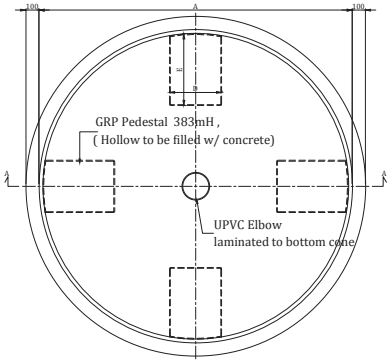


TOP VIEW

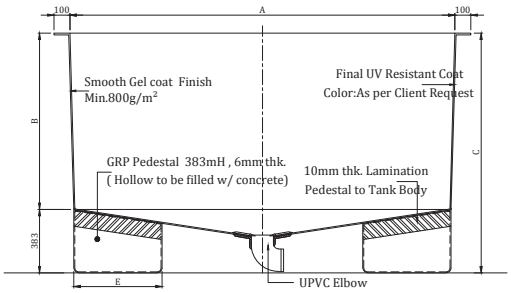


SECTION-AA

GRP FREE STANDING FISH TANK

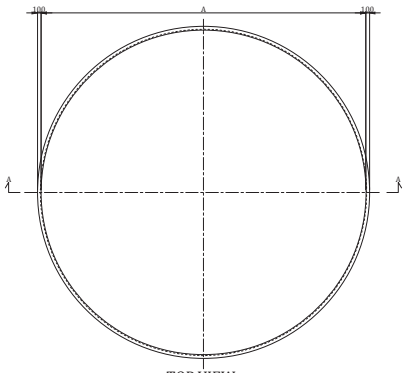


TOP VIEW

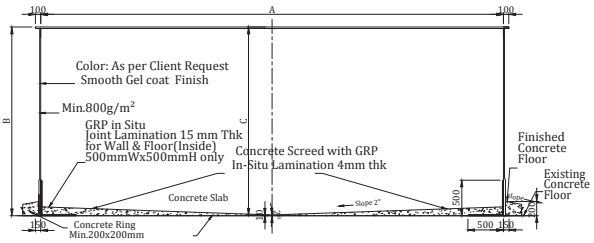


SECTION-AA

GRP IN SITU FISH TANK

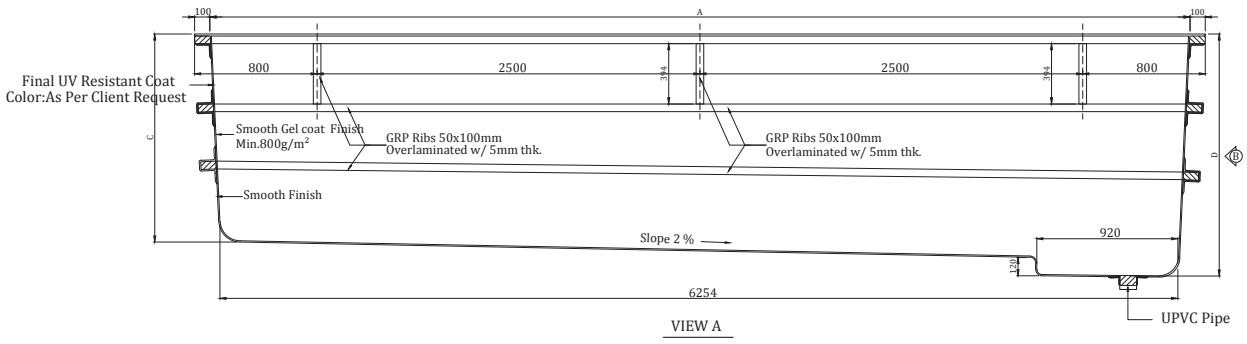


TOP VIEW



SECTION-AA

GRP WEANING RECTANGULAR FISH TANK



VIEW A

GRP FILAMENT WOUND TANKS

LG 's GRP cylindrical tanks are moulded on continuously rotating moulds to give a smooth internal (process) surface. The GRP laminate structure of each tank is controlled to meet the requirements of the final application in both laminate thickness (usually with fully integrated strengthening ribs on medium and large diameter underground tanks) and by using special resins for chemical resistance when required.

The laminate structure basically consists of four layers (listed from inner surface to outer surface):

- **Resin-rich corrosion barrier**
- **Resin-rich glass reinforced corrosion barrier**
- **Filament wound structural laminate**
- **Resin-rich water resistant barrier**

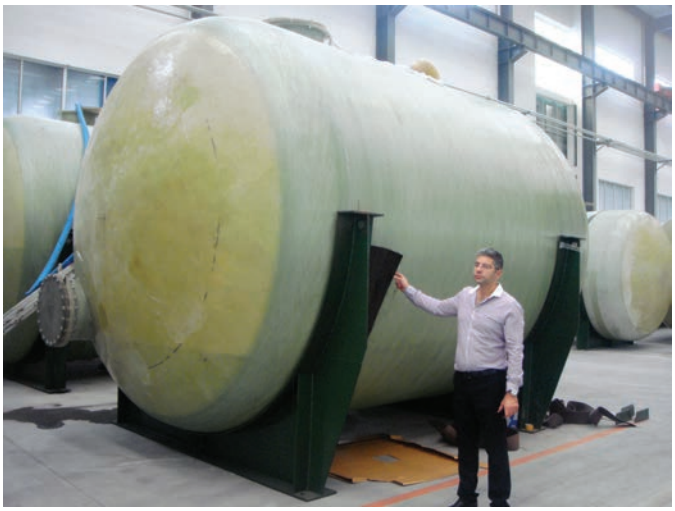
Synthetic veil / tissue material may be incorporated into the inner corrosion-resistant barrier for higher chemical resistant tanks. For underground tanks with strengthening ribs these are manufactured by incorporating rib formers into the main structural laminate layer. For above ground tanks a final pigmented coating layer providing UV stability is applied.

Horizontal filament winding process

Vertical Filament winding process

ABOVE GROUND APPLICATIONS

GRP tanks can be designed to stand in vertical position with a flat bottom or conical bottom supported by pedestals or they can be supplied horizontal with two dish ends in elliptical shape and the shell can rest on supports made either from Fiberglass or steel or concrete. These tanks can be either manufactured at factory if capacity < 250,000 liters or manufactured at site for larger capacity up to 6,000,000 liters.



THERMAL INSULATION

Should insulation be required, it is a simple task to equip the tanks with a 50 mm PU foam layer covered by a 5 mm GRP layer. This method of insulation produces a K value of 0.5 W/m2K. If needed the thickness can be adjusted, for example to 100 mm PU foam (0.3 W/m2K).

ABOVE GROUND APPLICATIONS

GRP Aboveground potable water tank

GRP Water Tanks are suitable for Potable water (drinking water), these tanks have been thoroughly tested by WRAS (Water Regulations Advisory Scheme) to ensure none of the Materials in the GRP leech into the water in any way or form, ensuring the water stays clean inside the GRP tank.

GRP Aboveground Chemical storage tank

Due to the application of GRP material, GRP storage tanks are chemical and corrosion resistant, they are designed for high abrasive resistance and be used in highly aggressive environments, operating at temperatures varying from -40°C up to +120°C.
The tanks are mainly used to store HCL , NAOCL , NAOH, Sea Water , Sludge , Petrochemical or Organic fuel , Liquid fertilizer ,oils …

GRP Aboveground Scrubber tank

Our GRP scrubbers are designed for chemical recovery and pollution control in industrial segments. These gas washers handle the full range of dynamic and hydrostatic loads for chemical environments in industries such as wastewater treatment, power generation and chemical processing.

Carbon scrubber

Odorous compounds (H2S , Mercaptans , and other VOC's) , can be blown through beds of carbon media and are absorbed into the carbon surface. Virgin, activated, catalytic, chemically impregnated carbon is used depending on the application or customer specification. H2S removal is effectively handled until about 25 % of the carbon pores are used .

ABOVE GROUND APPLICATIONS

Chemical scrubbers

We offer chemical scrubbers, that are efficiently and effectively designed to remove gas pollutants. Often these pollutants are chemicals such as ammonia, chlorine or sulfur compounds. Chemical Scrubbers work by dissolving or absorbing the pollutant into the scrubbing liquid. The scrubbing liquid used will depend on the properties of the targeted pollutant.

Bio Scrubbers

Similarly to all absorption processes, the odorous gases (H2S , Mercaptans and other VOC 's) are first dissolved into the liquid phase and then oxidized by the biomass. The microorganisms inside the packing consume the absorbed gases as food and yield by products that are free of odor .
At the bottom section of the scrubber, the flourished bacteria remove H2S and at the top section, other type of bacteria flourish to remove Mercaptan and VOC compounds. The overall tower performance yields a min of 99 % removal of Hydrogen sulfides and about 95 % of other odor causing compound.

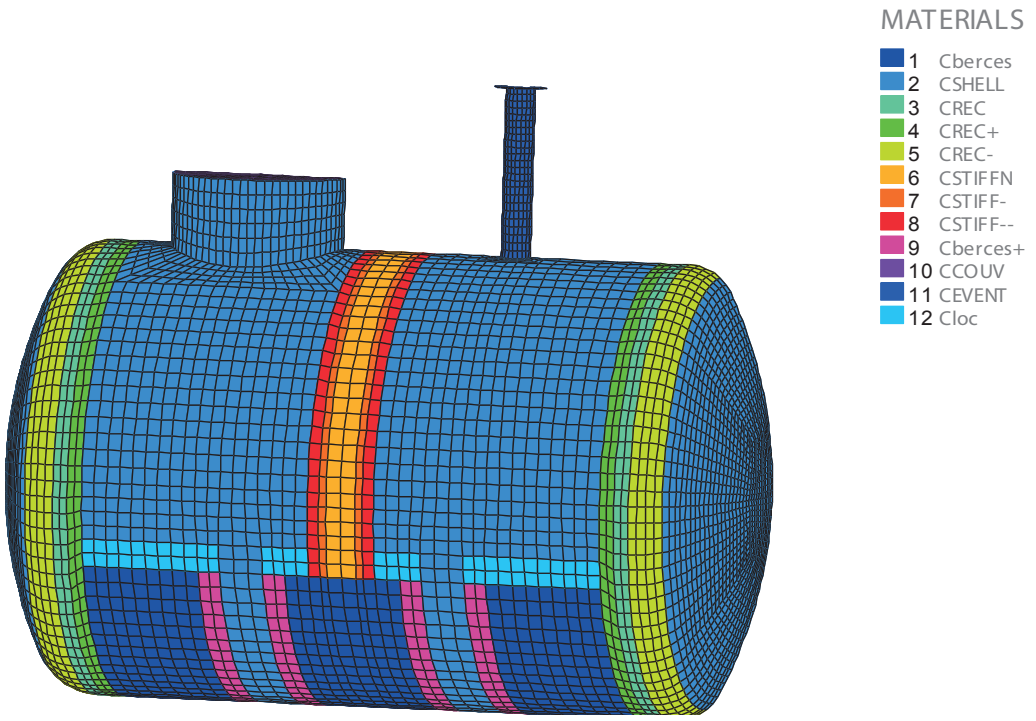
UNDERGROUND APPLICATIONS

GRP tanks can be designed to be installed underground without any pedestals .They are supplied horizontal with two dish ends in elliptical shape and the shell can rest on backfill bed of min 300 mm of approved gravel .

These tanks are manufactured at factory up to a capacity of 250,000 liters, max Dia 4 m .

UNDERGROUND APPLICATIONS

GRP Tanks are designed with Finite Element design according to BS 4994 , ASME RTP-1 and ASTM D3299 (standard Specification for Filament wound Glass –Fiber-Reinforced Polyester Chemical – Resistant Tanks) for various combinations of loads:

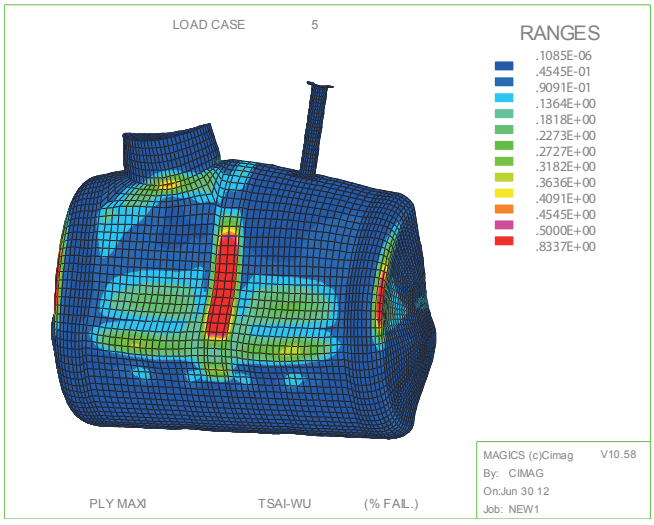


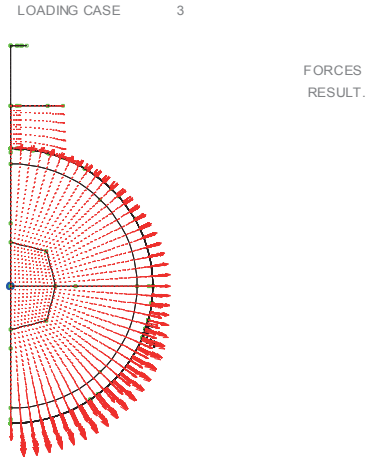
L1	Dead Load	Installed weight of the tank including internals , platforms, pipings ,etc..
L2	Operating Live load	Weight of the liquid at the maximum operating level
L3	Pressure Load	Internal or external load at the coincident temperature
L4	Thermal Load	Thermal loads caused by restraining thermal expansion/ interaction of the tank and/or its supports
L5	Test Load	Weight of the test medium
L6	Piping and superimposed Equipment loads	Loads caused by piping (other than the dead load) and superimposed equipment
L9	Dynamic Loads	Loads caused by the action of vibratory equipment
L10	Earth load	Weight of earth burial over the tank
L11	Live Load	Load imposed by personal during erection and operation
L12	Buoyancy Load	Load imposed on tanks due to liquid (including rainwater) filling partially or completely the reinforced concrete containment .
L 13	Transportation Load	Load imposed during transport of tank

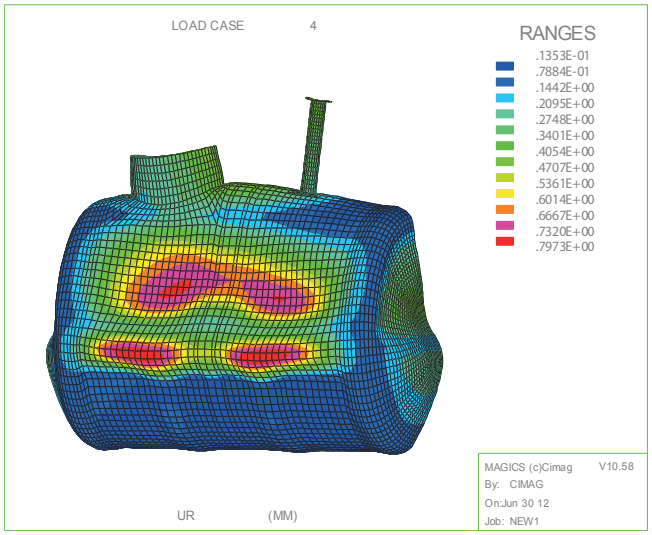
UNDERGROUND APPLICATIONS

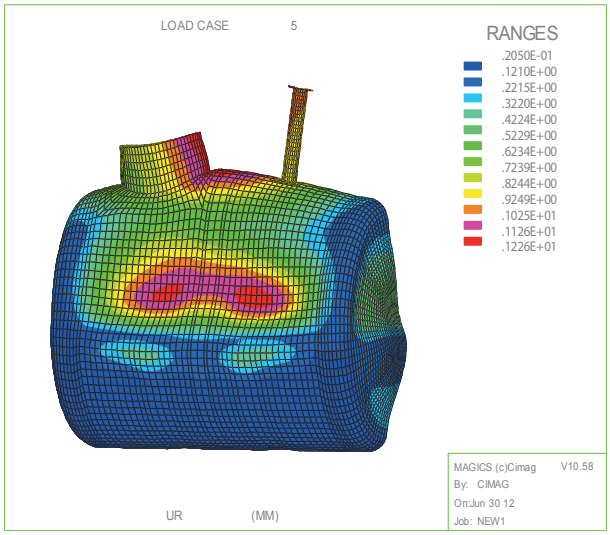
Analysis is based on the calculated number of cycles for a min 20 years service life, as determined in accordance with the rules of ASME Section VIII , Division , paragraph 5.5.2 .

Stress analysis include the junctures : head to shell, Nozzle to shell, etc…







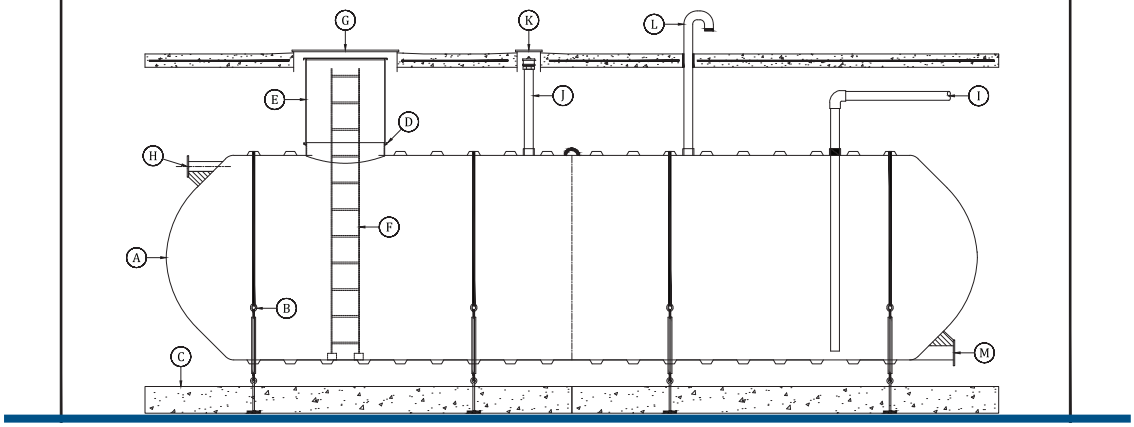


UNDERGROUND APPLICATIONS

GRP Underground Potable tank:

GRP Water Tanks are suitable for Potable water (drinking water), these tanks have been thoroughly tested by WRAS (Water Regulations Advisory Scheme) to ensure none of the Materials in the GRP leech into the water in any way or form, ensuring the water stays clean inside the GRP tank.

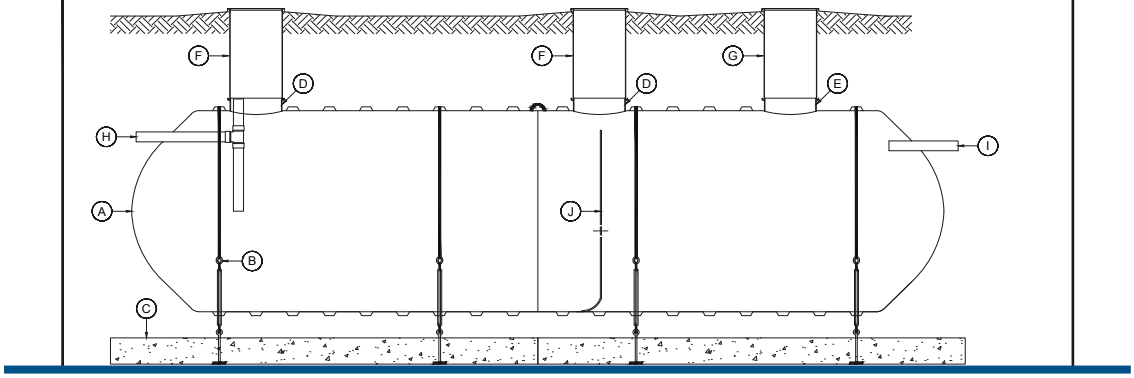
MARK	EQUIPMENT LISTING	MARK	EQUIPMENT LISTING
A	SINGLE WALL FIBERGLASS TANK	G	Ø 1200 DIAMETER MANHOLE AND COVER
B	FRP HOLD DOWN STRAP & TURNBUCKLE ASSEMBLY	H	Ø 150 TANGENTIALLY MOUNTED FLANGED NOZZLE - INLET
C	PRECAST DEADMAN ANCHOR WITH EYEBOLTS	I	Ø 150 NPT FITTING WITH FRP SUCTION PIPE - OUTLET (OPTION-1 VERTICAL SUPPLY)
D	Ø 900MM FIBERGLASS COLLAR WITH TANK ACCESS OPENING	J	Ø 100 NPT FITTING WITH RISER PIPE - FILL / GAUGE
E	Ø 900MM FRP RISER WITH COVER	K	Ø 300 DIAMETER MANHOLE AND COVER
F	FRP PULTRUDED LADDER	L	Ø 100 NPT FITTING - TANK VENT
		M	Ø 150 NPT FITTING WITH FRP SUCTION PIPE - OUTLET (OPTION-2 HORIZONTAL SUPPLY)



GRP Underground Septic tank:

LG's septic tanks are manufactured with two stages offering primary settlement of wastewater and sewage allowing further settlement before discharge of the settled effluent to a soakaway.

MARK	EQUIPMENT LISTING	MARK	EQUIPMENT LISTING
A	SINGLE WALL FIBERGLASS TANK	H	Ø 100MM PVC INLET PIPING WITH SANITARY TEE
B	FRP HOLD DOWN STRAP & TURNBUCKLE ASSEMBLY	I	Ø 100MM PVC OUTLET PIPING
C	PRECAST DEADMAN ANCHOR WITH EYEBOLTS	J	7/8 HEIGHT FRP COMPARTMENT BAFFLEw/ Ø 75-150MM FLOW HOLES
D	Ø 590MM FIBERGLASS COLLAR WITH TANK ACCESS OPENING		
E	Ø 600MM FIBERGLASS PIPE TANK ACCESS OPENING		
F	Ø 600MM FRP RISER WITH COVER		
G	Ø 600MM FRP RISER WITH COVER		

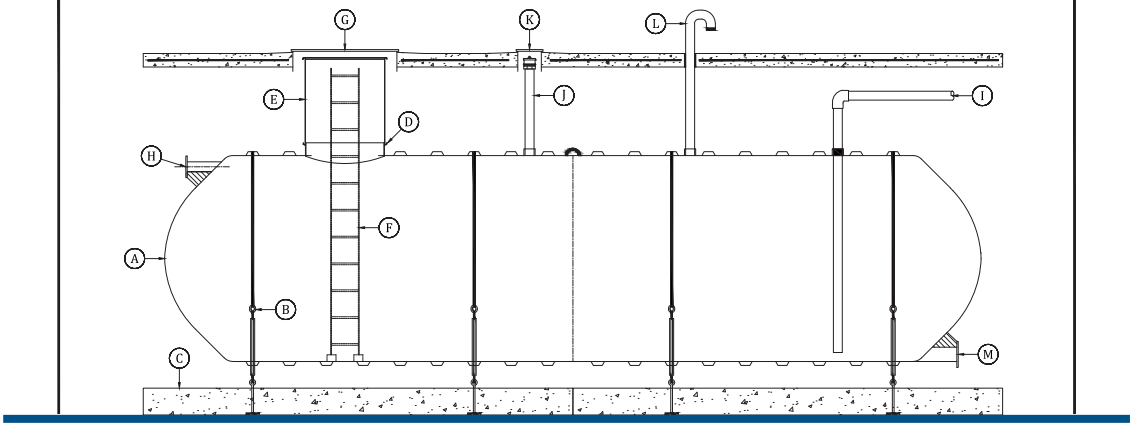


UNDERGROUND APPLICATIONS

GRP Underground holding tank:

Designed for wastewater storage only – not treatment.

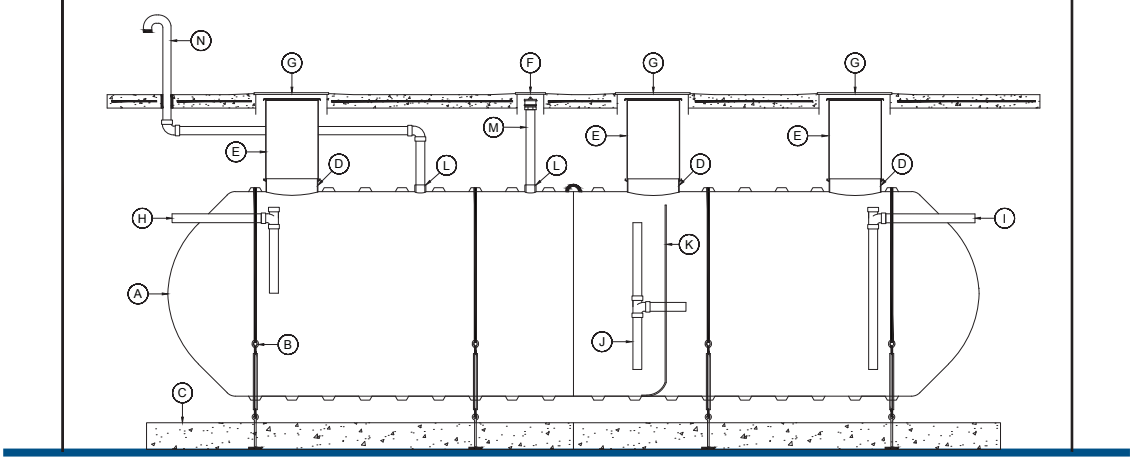
C	PRECAST DEADMAN ANCHOR WITH EYEBOLTS	I	Ø 150 NPT FITTING WITH FRP SUCTION PIPE - OUTLET (OPTION-1 VERTICAL SUPPLY)
D	Ø 900MM FIBERGLASS COLLAR WITH TANK ACCESS OPENING	J	Ø 100 NPT FITTING WITH RISER PIPE - FILL / GAUGE
E	Ø 900MM FRP RISER WITH COVER	K	Ø 300 DIAMETER MANHOLE AND COVER
F	FRP PULTRUDED LADDER	L	Ø 100 NPT FITTING - TANK VENT
		M	Ø 150 NPT FITTING WITH FRP SUCTION PIPE - OUTLET (OPTION-2 HORIZONTAL SUPPLY)



GRP Underground Grease unit:

Our range of underground grease separators are 2 stage units designed in accordance with EN1825-1 .
The range of units is suitable for a variety of catering and food processing application.

MARK	EQUIPMENT LISTING	MARK	EQUIPMENT LISTING
A	SINGLE WALL FIBERGLASS TANK	H	Ø 100MM PVC INLET PIPING WITH SANITARY TEE
B	FRP HOLD DOWN STRAP & TURNBUCKLE ASSEMBLY	I	Ø 100MM PVC OUTLET PIPING WITH SANITARY TEE
C	PRECAST DEADMAN ANCHOR WITH EYEBOLTS	J	Ø 100MM PVC TRANSFER PIPING WITH SANITARY TEE
D	Ø 590MM FIBERGLASSCOLLAR WITH TANK ACCESS OPENING	K	FULL HEIGHT COMPARTMENT BAFFLE
E	Ø 600MM FRP RISER WITH COVER	L	Ø 100MM NPT TANK MOUNTED FITTING
F	Ø 300MM ACCESS MANHOLE w/ COVER	M	GREASE CLEAN-OUT RISER w/ CAP
G	Ø 900MM ACCESS MANHOLE w/ COVER	N	ABOVEGRADE VENT w/ SCREEN

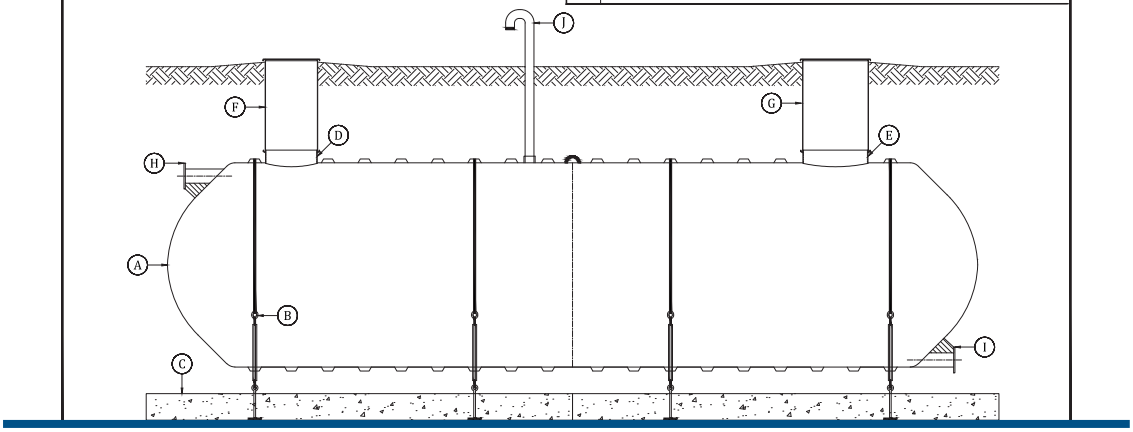


UNDERGROUND APPLICATIONS

GRP Underground Rain harvesting tank:

Rainwater harvesting is the collection of rainwater directly from the surface it falls on.This water would otherwise have gone directly into the drainage system or been lost through evaporation and transpiration. Once collected and stored it can be used for non-potable purposes.These include toilet flushing, garden watering and clothes washing using a washing machine.

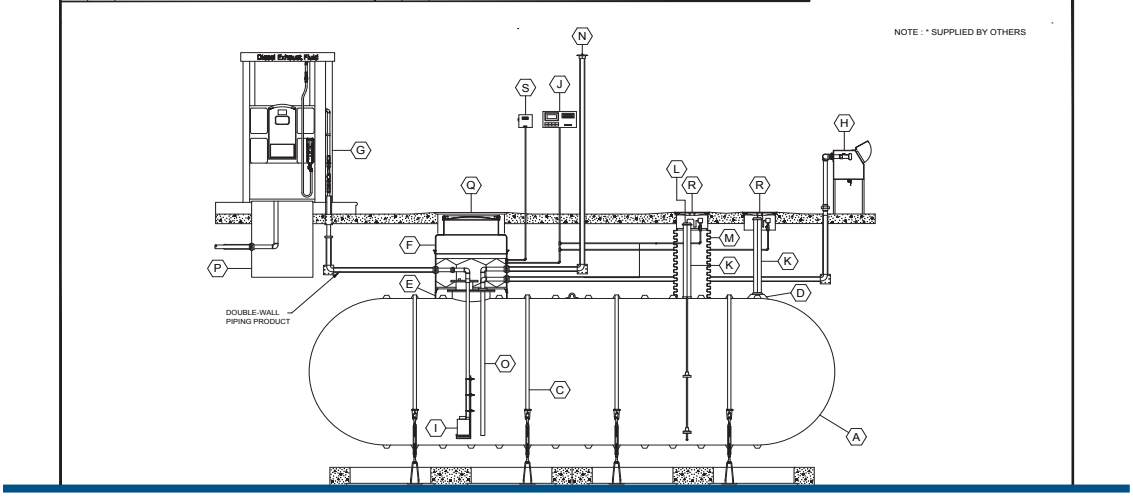
MARK	EQUIPMENT LISTING	MARK	EQUIPMENT LISTING
A	SINGLE WALL FIBERGLASS TANK	F	Ø 600 FRP RISER WITH COVER
B	FRP HOLD DOWN STRAP & TURNBUCKLE ASSEMBLY	G	Ø 750 FRP RISER WITH COVER
C	PRECAST DEADMAN ANCHOR WITH EYEBOLTS	H	Ø 150MM TANGENTIALLY MOUNTED FLANGED NOZZLE - INLET
D	Ø 590MM FIBERGLASS COLLAR WITH TANK ACCESS OPENING	I	Ø 150MM TANGENTIALLY MOUNTED FLANGED NOZZLE - OUTLET
E	Ø 740MM FIBERGLASS COLLAR WITH TANK ACCESS OPENING	J	Ø 100MM NPT FITTING - TANK VENT
		K	Ø 150MM TANGENTIALLY MOUNTED FLANGED NOZZLE - OUTLET



GRP Underground Fuel Diesel ttank:

LG has the expertise to design and manufacture single and double wall GRP tanks produced by filament winding process. Single or double wall tanks are supplied with a capacity of 250,000 liters, up to 4m diameter.

ITEM	QTY	EQUIPMENT LISTING	ITEM	QTY	EQUIPMENT LISTING	ITEM	QTY	EQUIPMENT LISTING
A	1	DOUBLE WALL FIBERGLASS STORAGE TANK	G	1*	DEF DISPENSER	N	1*	Ø50MM PRESSURE/VACUUM TANK VENT CAP
B	-	PRECAST CONCRETE DEADMEN SYSTEM	H	1*	STAINLESS STEEL REMOTE FILL BOX	O	1*	Ø50MM SCH 40 STAINLESS STEEL PIPE
C	-	FIBERGLASS HOLD DOWN STRAP WITH TURNBUCKLE ASSY.	I	1*	STAINLESS STEEL SUBMERSIBLE PUMP	P	1*	DISPENSER SUMP
D	1	DRY PROBE MONITORING SYSTEM	J	1*	CONTINUOUS MONIOTORING INVENTORY & LEAK DETECTION PANEL	Q	1*	Ø1060MM MANHOLE
E	1	Ø1060MM FIBERGLASS CONTAINMENT COLLAR	K	2*	PVC RISER	R	2*	Ø450MM MANHOLE
F	1	Ø1060MM FIBERGLASS 8 SIDED SW CONTAINMENT SUMP WITH Ø800MM WATERTIGHT TOP	L	1*	TANK INVENTORY GAUGE	S	1*	PUMP CONTROL PANEL
			M	1*	HDPE EXTENSION TO TOP OF TANK			



UNDERGROUND APPLICATIONS

GRP Underground brine dilution and Backwash tank:

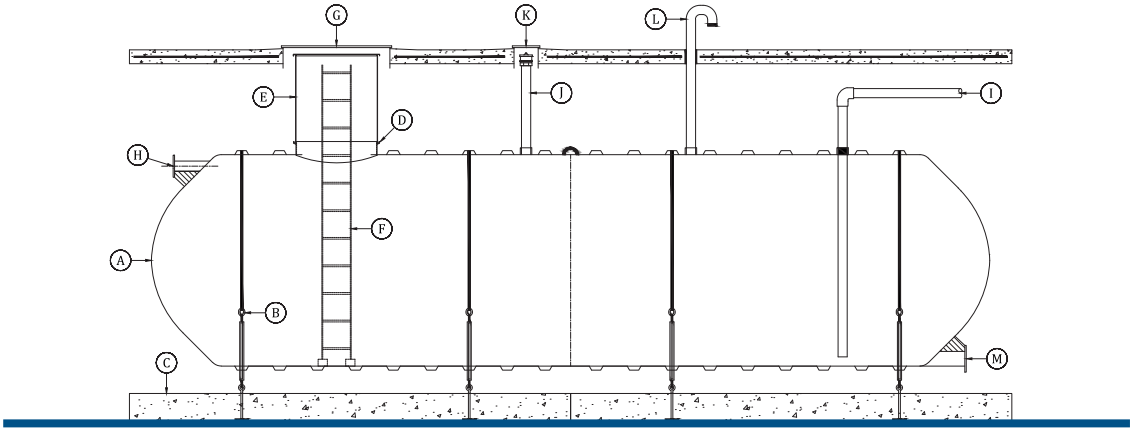
Prior to disposal of brine, the brine of salinity of 68,300 ppm coming as effluent from the desalination plant will be diluted in the dilution tank with seawater of salinity level 41,000 ppm being pumped from the beach intake borehole.

The dilution tank has two entry points:

- Sea water from beach seawater tank.
- Brine from RO desalinator and back wash water from sand filter.

If the brine of concentration of 68,300 ppm is discharged into the lagoon, it will adversely affect the marine ecosystem i.e the marine flora and fauna. It is therefore , imperative that the salinity of the brine should be reduced to an acceptable level (not exceeding 45,000 ppm) prior to discharge into the lagoon. This will be carried out by incorporation a GRP underground dilution tank into the design of the desalination plant system.

ARK	EQUIPMENT LISTING	MARK	EQUIPMENT LISTING
A	SINGLE WALL FIBERGLASS TANK	G	Ø 1200 DIAMETER MANHOLE AND COVER
B	FRP HOLD DOWN STRAP & TURNBUCKLE ASSEMBLY	H	Ø 150 TANGENTIALLY MOUNTED FLANGED NOZZLE - INLET
C	PRECAST DEADMAN ANCHOR WITH EYEBOLTS	I	Ø 150 NPT FITTING WITH FRP SUCTION PIPE - OUTLET (OPTION-1 VERTICAL SUPPLY)
D	Ø 900MM FIBERGLASS COLLAR WITH TANK ACCESS OPENING	J	Ø 100 NPT FITTING WITH RISER PIPE - FILL / GAUGE
E	Ø 900MM FRP RISER WITH COVER	K	Ø 300 DIAMETER MANHOLE AND COVER
F	FRP PULTRUDED LADDER	L	Ø 100 NPT FITTING - TANK VENT
		M	Ø 150 NPT FITTING WITH FRP SUCTION PIPE - OUTLET (OPTION-2 HORIZONTAL SUPPLY)



REFERENCE LIST

CLIENT	CITY	COUNTRY	YEAR	CONSULTANT	PROJECT	PRODUCT	APPLICATION	TOTAL CAP	QTY
Ministry of Public work	Dubai	UAE	**2015**	Ministry of Interior	Control Room project	GRP sectional water tanks	Potable water	338 m3	2 Nos
Ministry of Public work	Dubai	UAE	**2015**	HDP	Al Amal Psychiatric Hospital	GRP sectional water tanks	Potable water & irrigation water	1500 m3	6 Nos
Majid Al Futtaim	Dubai	UAE	**2015**	WSP	The mall of Emirates expansion , Dubai	GRP sectional water tank	Potable water	48 m3	1 no
Fish Farm	Dubai	UAE	**2015**	Anaf	Fish farm jebel Ali	GRP molded fish tanks	Aquaculture sea water	2400 m3	34 nos
NAKHEEL	Dubai	UAE	**2014**	DAR GROUP	Dragon Mart District cooling Plant , Dubai	GRP sectional water tank	Make up water	788 m3	1 no
Shk Khalifa bin Zayed Hospital	Ajman	UAE	**2014**	MOPW	Sheikh Khalifa bin zayed hospital Ajman	GRP sectional water tank	Potable water	240 m3	1 no
RTA	Dubai	UAE	**2014**	Systra	Al Sufouh Dubai tram	GRP sectional water tanks	Domestic water	2 m3	12 nos
Ministry of Public work	UM Qiwan	UAE	**2014**	Core Alliance Engineering	Sheikh Khalifa Bin Zayed Center of Marine Research , Um Qiwan	GRP molded fish tanks	Aquaculture sea water	590 m3	110 nos
Dubai municipality	Dubai	UAE	**2014**	DM	Al Warsan Sewage treatment Plant – Dubai	GRP filament wound vertical vessel	chemical odor control scrubbers	40 m3	2 nos
ADSSC	Abu Dhabi	UAE	**2014**	ADSSC	Maintenance Mafraq & Zakher WwTW	GRP vertical tank	Chemical tank	15 m3	1 No
Ministry of public work	Ras Al Khaimah	UAE	**2014**	MOPW	RAK secondary school	GRP sectional water tanks	Potable water	306 m3	3 No
Ministry of Public work	Khorfakan	UAE	**2014**	MOPW	Labor office in khorfakan	GRP sectional water tanks	Potable water	148 m3	2 No
Ministry of Public work	Sharjah	UAE	**2014**	MOPW	Kuwaiti Hospital in Sharjah	GRP sectional water tanks	Potable water	36 m3	1 No
Ministry of Public work	Ajman	UAE	**2014**	MOPW	Al Manama Police center	GRP sectional Water tanks	Potable water	170 m3	5 Nos
TDIC	Abu Dhabi	UAE	**2013**	PARSONS	Saadiyat Island Cultural District project	GRP Filament wound tank	Break water	30 m3	1 No
Al Bustan Co.	Riyadh	KSA	**2013**	Khatib & Alami	Al Bustan II Utility Complex – Riyadh	GRP Filament wound buried tanks	Brine water, Rjected water	300 m3	3 nos
Dubai municipality	Dubai	UAE	**2013**	DM	Al Warsan Sewage treatment Plant – Dubai	GRP filament wound vertical vessel	Bio trickling odor control Scrubber	35 m3	1 No
Directorate of Military works	Sharjah	UAE	**2011**	CMW	CMW-11076-C001 Construction of Building for Falah Hospital	GRP sectional water tanks	Potable water	1380 m3	4 nos
MIRK	Dubai	UAE	**2011**	Burthill	5 stars Palm Jumeirah Sofitel Resort	GRP sectional water tanks	Domestic water, Fire fighting, Irrigation, swimming pools	1061 m3	43 nos
EMAAR Properties	Dubai	UAE	**2011**	Arif & Bintoak	Burj Residential Tower on plot 50 & 51 - Dubai	GRP sectional water tanks	Domestic	300 m3	2 nos
ADNOC	Abu Dhabi	UAE	**2010**	Al Torath Engineering	J367- P.I High school Accommodation @ sas Al Nakhl – Abu Dhabi	GRP sectional water tanks	Domestic	108 m3	6 nos
Luxury Real Esate Devlpt.	Abu Dhabi	UAE	**2010**	UPA/PJSI	Mangrove Place Hotel –Shams	GRP sectional water tanks	Domestic	300 m3	2 nos
Al Mubadala Dvlpt co	Abu Dhabi	UAE	**2010**	WSP	Rosewood Hotel – Al Reem Island	GRP sectional water tanks	Domestic	292 m3	2 nos
H.E Shk Ahmed Bin Saif Bin Mohd Al Nahyan	Abu Dhabi	UAE	**2010**	ACG	Novotel & Ibis Hotels in Abu	GRP sectional water tanks	Domestic	360 m3	2 nos
ALDAR properties	Abu Dhabi	UAE	**2010**	PELL FRISCHMANN	Al Raha Beach Dev't , Al zeena	GRP sectional water tanks	Domestic water , Fire fighting, Irrigation water	3900 m3	26 nos

COMPLETED PROJECTS

Rosewood Hotel - Abu Dhabi

5 stars Palm Jumeirah Sofitel Resort - UAE

Sheikh Khalifa Specialist Hospital Ras al Khaimah - UAE

The Index Tower @ DIFC - Dubai

Sheikh Khalifa Bin Zayed Center of Marine Research

Ibis & Sofitel Hotel - Abu Dhabi

Al Raha beach, Al Zeina Project

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