



Registered ISO 14001:2004

SAMSUNG GRP TANK

Best Watertight Excellent Endurance
Easy to Construct Assembly Water Tank



SAMSUNG MCP CO., LTD
SAMSUNG GRP COMPANY

Clean World Clean Technology

SAMSUNG GRP TANK

Our company specializes in the development and production of GRP performance products including GRP water tanks, bathroom materials, windows and doors. Located in Daegu, our large-scale plant and research center are dedicated to on going development and production to lead the industry. Our advanced technology has received ISO9001 and ISO14001 and PSB & WRAS & BS certification and is garnering world acclaim.

In addition, with a corporate ideology rooted in placing our customers first, we base our management and product development upon this foundation of trust, contributing to technological innovation, quality improvement, and added value enhancement.

In order to carry out such customer-oriented management, we constantly keep in mind the priorities of stringent quality management and environmental protection. In following, we adopted ISO product quality and environmental management standards from the very beginning and our efforts to grow as an environmental friendly company along with our customers are never ending.

We ask for your continuing interest and support. Thank you.





SAMSUNG GRP TANK

Excellent in Clean & Hygienic; Outstanding performance against leakage.
GRP Sectional Water Tanks are easy to design, build & maintain.

Our GRP Water Tank always keep storage water clean.
SAMSUNG Sectional GRP Water Tank is designed to satisfy the stipulated requirements by optimizing the properties of glass-fiber reinforced composite.

Certificate of Patents & Design Registration

Heat Insulation Tank Panel: No. 0495287

Water Inspection Gauge Panel: No. 2004-0008395

Antibacterial Elvan Water Tank Panel: No. 2004-00011977

Water Tank Panel: No. 2005-0001929; No. 2005-0001930

International Standards

WRAS	Water Regulations Advisory Scheme
BS EN 13280: 2001	Specification for glass fibre reinforced cisterns of one-piece and sectional construction, for the storage, above ground, of cold water.
BS EN 578: 1994	Determination of The Opacity of Plastic Pipes and Fittings.
BS 6920: 2014	Suitability of Non-Metallic materials and products for use in contact with water intended for human consumption with regard to their effect on the quality of the water.
PSB SS 245: 1995	Specification of Glass Reinforced Polyester Sectional Water Tank
PSB SS 375: 2001	Suitability of Non-Metallic materials and products for use in contact with water intended for human consumption with regard to their effect on the quality of the water.
ISO 9001:2015	Quality Management System Certificate
ISO 14001:2015	Environmental Management System Certificate



Hot-Press Molding Machine



In House GRP Sheetting



Base Frame Foundation

Features of SAMSUNG GRP Tank

Design Flexibility

Panel available in different sizes and thickness to meet the customer needs.

Clean & Hygienic

Non corrosive materials, tank panels inhibit bacterial growth by isolating outside light.

Water-tightness

The special developed foaming type sealing tape design to ensure all joints are leakage free.

Dimensional Stability

GRP has low thermal coefficient of expansion and the hot pressing process inherit an uniform thermal movement even at extreme range of temperature condition.

Durability & Endurance

Each GRP panel is molded under high temperature and pressure to guarantee the strength and durability. Using premium grade stainless steel for inside structure and HDG steel for exterior supports, its combine the soundest performance against corrosion.

Heat Insulation & Dewdrops Prevention

The heat insulation sandwich panel with 4 layers is designed not only to enhance the insulation effect, but also prevent dewdrops by minimizing the temperature variations.

Easy to Assemble & Get Moving

Bolt & nuts connectons between sectional panels shorten construction time and save labour cost. GPR panels are standardized in sizes and can be easily stacked and carried around.

Design Standard of Sectional GRP Water Tank

Intensity and Endurance

Item	Guaranteed Loading Condition
Hydrostatic Pressure	4 times water pressure Deformation <1%
Wind Load	up to 60m/sec
Seismic Load	kh= 1/3G, Richter Magnitude Scale 5.0
Snow Load	200kg/m ² , Snowfall up to 1.0M in depth
Illumination Rate	Less than 0.2%
Out-fit Force	No leakage under condition of vertical 100Kg after installation of 100A fitting
Water Temperature	Up to 55 Deg°C

Dimension and Capacity

Item	Available Design Condition
Height	0.5 ~ 5.0 Meter
Capacity	1 ~ 3,000 ton
Shape	Square, □ Shape, □ Shape, □ Shape etc.

Thermal Conductivity

Materials	Type	Thermal Conduction W/m°C	
		Regular Type	Heat Insulation Type
Steel		37	37
GRP		0.15	0.02

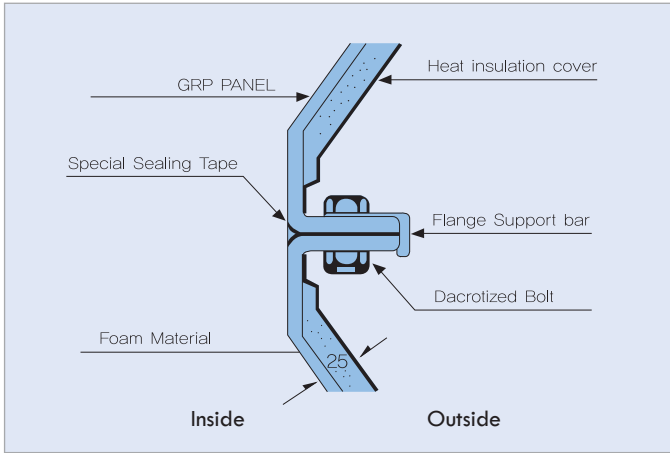


Excellent Insulation Performance

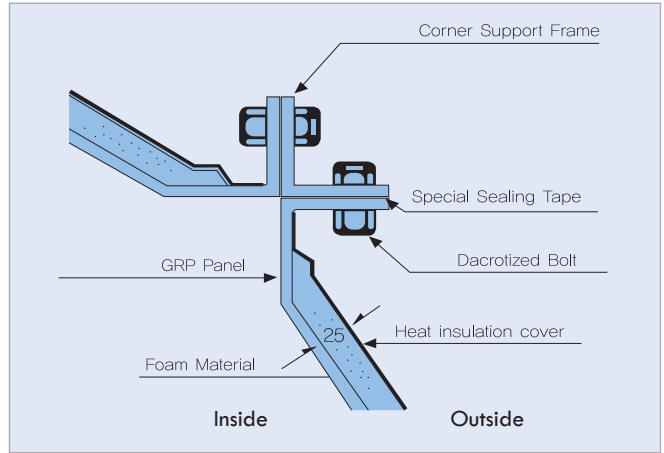
GRP panels prevent water condensation in the tank and minimize temperature variation of the storage water to avoid dewdrops phenomenon.

The 4 layer heat insulation panels minimize the heat loss and maintain the best reservoir environment.

Typical Connection Details of Panel Joint

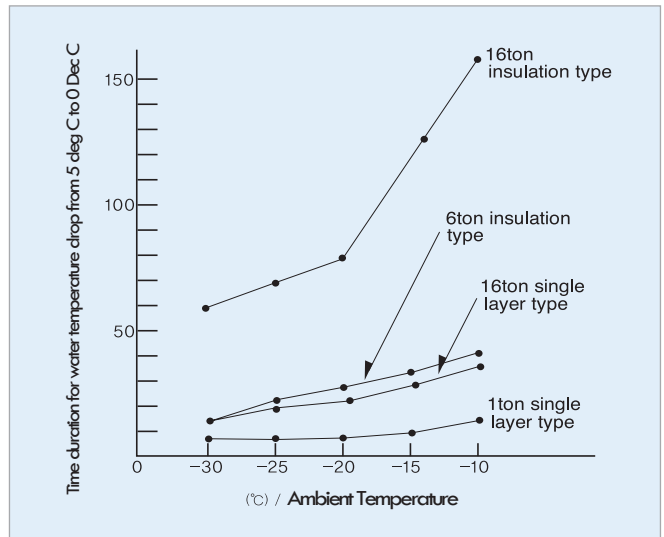
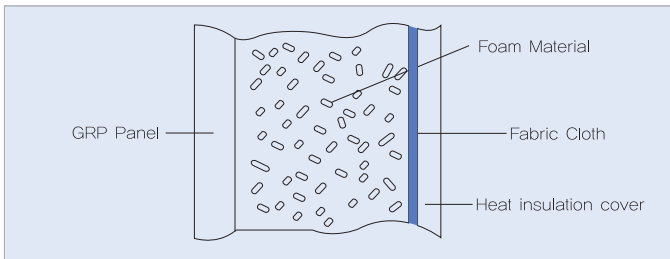


Typical Connection Details of Panel Joint at Corner



※ Unit: mm

Heat insulation panel with 4 layer structures filled with Poly-urethane foam showing its best performance



Time duration for water temperature drop from 5°C to 0°C

Capacity	Classification	Ambient Temperature		
		-10°C	-20°C	-30°C
16 ton	Single Layer Type	35	20	13.5
	Insulation Type	164	81	58.5
1 ton	Single Layer Type	11	6	4
	Insulation Type	37.5	23	13.5

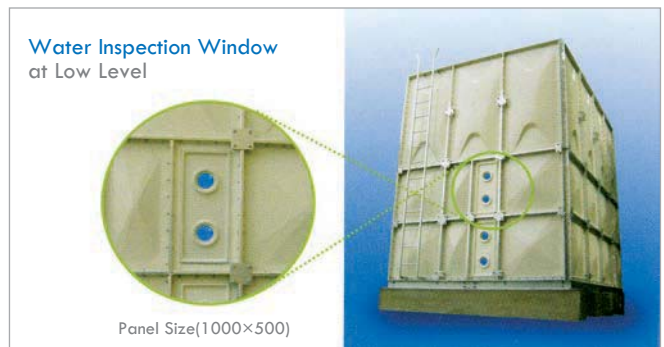
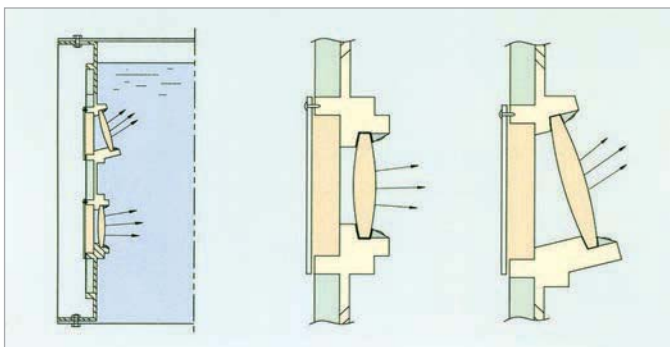
※Unit: Hour

※Test condition:

- a. Tank is filled with water.
- b. No further water supply, or drainage during the test.

Optional Water Inspection Window

Developed for easy water condition check from outside of the sectional GRP water tank at low level.



Internally Reinforced System

Standardized GRP panels deliver flexible design to various tank capacities even with a limited space to install. Stainless steel internal reinforced stay system provides excellent water tightness and structural integrity.



No.	Description	Material
1.	Manhole Panel	GRP
2.	External Ladder	SS400 (HDG) or STS316
3.	Internal Ladder	GRP
4.	Internal Tie Rod	STS304 (PET Coat) or STS316
5.	Internal Bracket	STS304 (Epoxy Coat) or STS316
6.	External Frame	SS400 (HDG)
7.	External Bracket	SS400 (HDG) or STS316
8.	Corner Bracket	SS400 (HDG)
9.	Bottom Bracket	SS400 (HDG)
10.	Corner Frame	SS400 (HDG)

No.	Description	Material
11.	Roof Post	GRP
12.	Base Frame	SS400 (HDG)
13.	Bolts and Nuts	Inside: STS304 or STS316
		Outside: HDG or STS316 + PVC Cap
		Connection: HDG or STS316 + PVC Cap
		Size: M10, M12 or M14
14.	Sealing Tape	PVC Sealant, EVA & Butyl
15.	Inspection Window	GRP
16.	Sectional Panel	GRP
※	Name Plate	STS316

Features of Internally Reinforced System

Hygienic Considerations

- Internal tie-rods are coated with high grade PET; STS 316 tie-rod is also available.
- Internal brackets are dacrotized coated; STS 316 brackets is also available.
- Internal bolt for tie-rod and brackets are coated with epoxy upon fastened.
- Top roof panels are supported by GRP Pultrusion section.
- Internal ladder are made in GRP in potable grade.

Aesthetically Pleasing

- External bolts in HDG fins are covered with PVC caps to prevent chlorine attack; STS 316 bolts are also available.
- All water panels are machine pressed with uniform and consistent beige color gel-coat finishes.

Easy to Assemble

- Internal reinforcement optimized the structural form of the entire water tank system.
- No external frame means lesser space required.
- All connection bolt holes are cut out by automated CNC machine with extreme precision.

Excellent Structural Stability

- Engineer design of the internal reinforcement system has been verified to be the most proficient way for GRP water tanks, which have been built in domestic and international sites for decades.



Externally Reinforced System



No.	Description	Material
1.	Manhole Panel	GRP
2.	External Ladder	SS400 (HDG) or STS316
3.	Internal Ladder	GRP
4.	Internal Tie Rod	STS304 (PET Coat) or STS316
5.	Internal Bracket	STS304 (Epoxy Coating) or STS316
6.	External Pair Frame	SS400 (HDG)
7.	External Bracket	SS400 (HDG) or STS316
8.	Corner Bracket	SS400 (HDG)
9.	Bottom Bracket	SS400 (HDG)
10.	Corner Frame	SS400 (HDG)

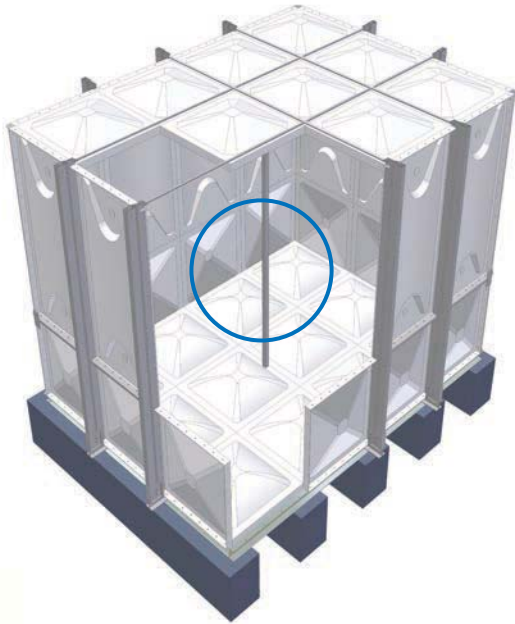
No.	Description	Material
11.	Roof Post	GRP (>4.5m)
12.	External Roof Beam	SS400 (HDG)
13.	Base Frame	SS400 (HDG)
14.	Bolts and Nuts	Inside: STS304 or STS316
		Outside: HDG or STS316 + PVC Cap
		Connection: HDG or STS316 + PVC Cap
		Size: M10, M12 or M14
15.	Sealing Tape	PVC Sealant, EVA Foam or Butyl
16.	Inspection Window	GRP
17.	Tank Panel	GRP

Features of Externally Reinforced System

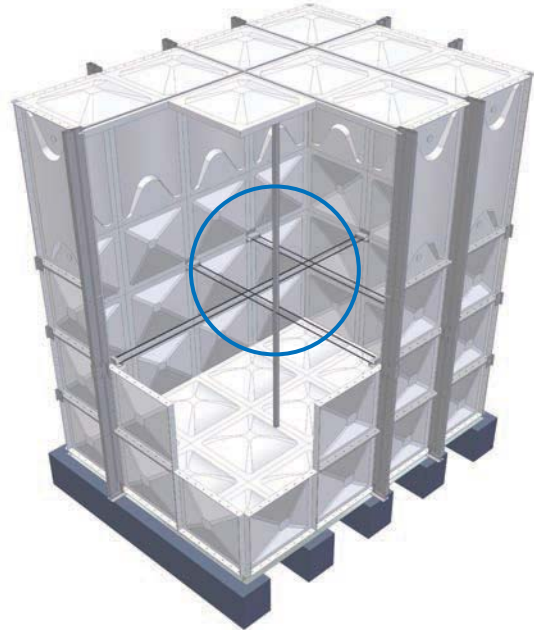
Structural System

- Minimum internal reinforcement structure

- No Internal Tie
(Water Tank Height up to 4m)



- Internal Tie at 2m in height
(Water Tank Height 4.5m to 5m)



Hygienic Consideration

- Minimum internal reinforcement reduce the chance of corrosion at inner tank.
- Reduce the chance of corrosion due to Chlorine GAS attack at upper section.
- Easy to access, maintain & carry out routine cleansing & checking.



Head Office Water Tank
Size: 3m x 4m x 5m(H)



Externally Reinforced System

Internal Partition for Externally Reinforced Water Tank System



Externally Reinforced Water Tank System

- Location: Abu Dhabi
- Size(m): 20m x 66m x 4m(H) = 5,280m³



Partition Type Water Tank

It is possible to eliminate unusable space and utilize the maximum occupancy effectively by installing a partition type GRP water tank. The solution is economical while operational feasible.

Special Features

Utilizing Maximum Capacity

- In the basement or other confined areas, it is an effective way to eliminate unusable space by adopting a partition type GRP water tank.

Multiple Uses

- One section can be used for drinking water, and the other section for service water. (i.e. Fire Fighting)

Easy Maintenance

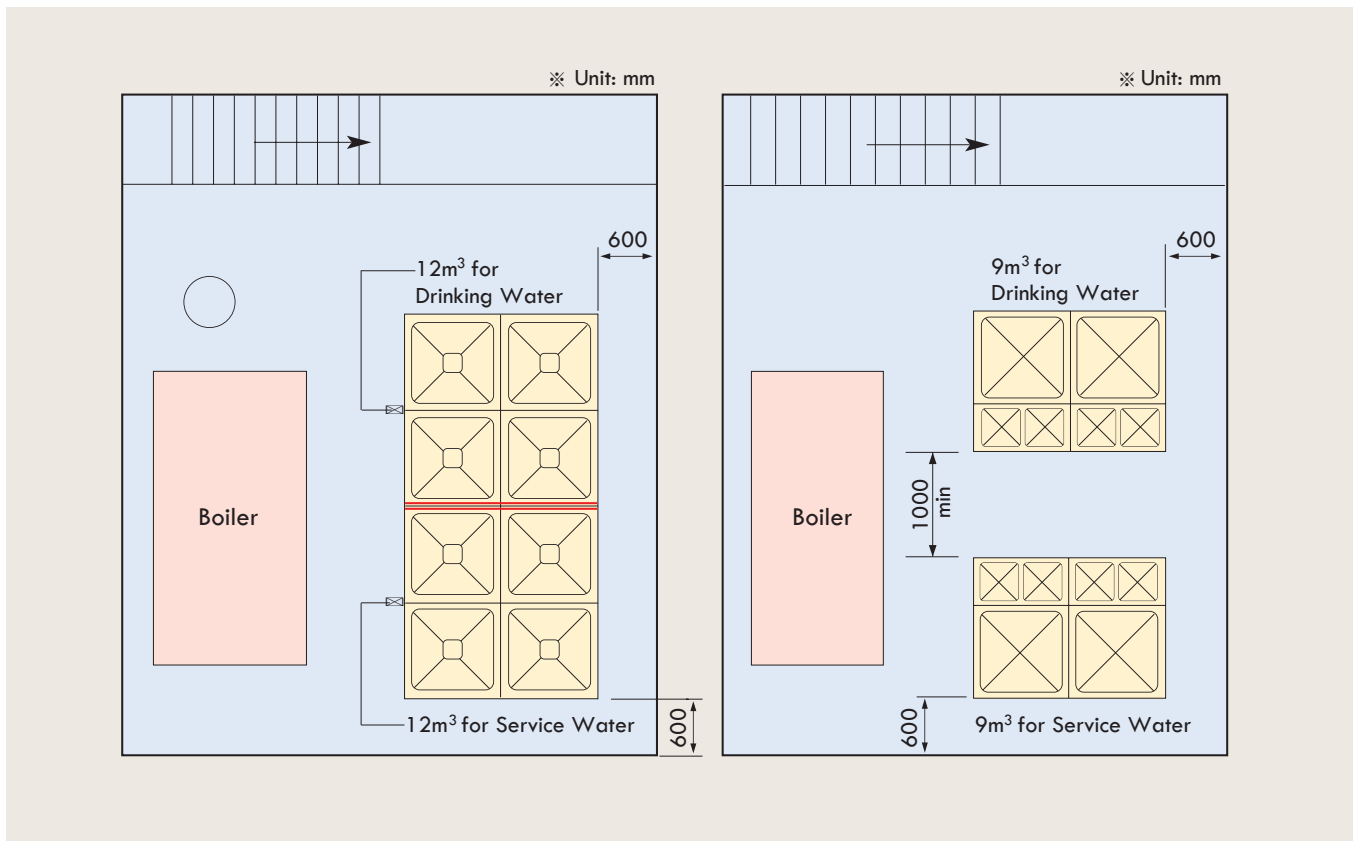
- It is convenient for maintenance, because two tanks can be installed as one unit.

Cost Saving

- The cost for one partition tank is cheaper than two separate tanks.

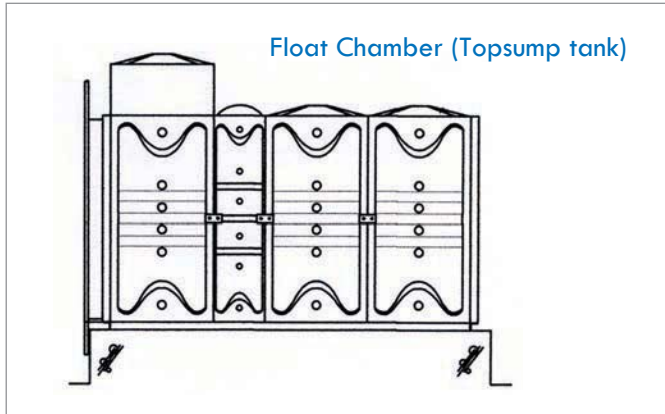
Example for Installation of a Partition Tank

If tanks for two different uses are in needed in a confined area, say a boiler room as below diagram, a 24m³ partition type tank can be installed so that half are serve for drinking water, and the other half for service water. If two separate tanks are installed, the overall capacity will be reduced because you will need to have at least one meter space distance between the two tanks for maintenance, fitting connections and operations.



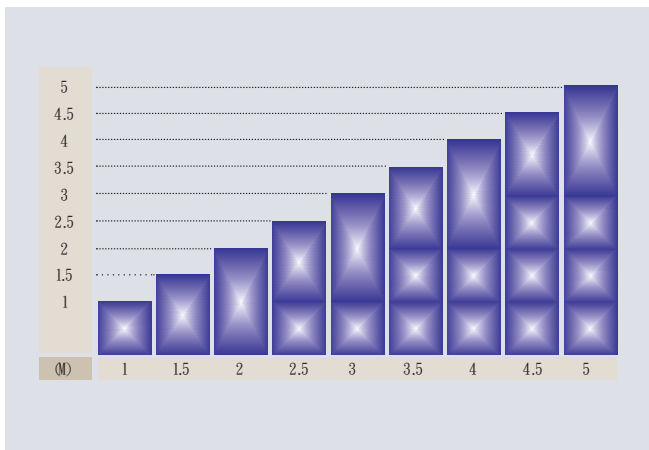
Effective Space Utilization

SAMSUNG Sectional GRP Tank utilizes space effectively and efficiently with various types of panel sizes.



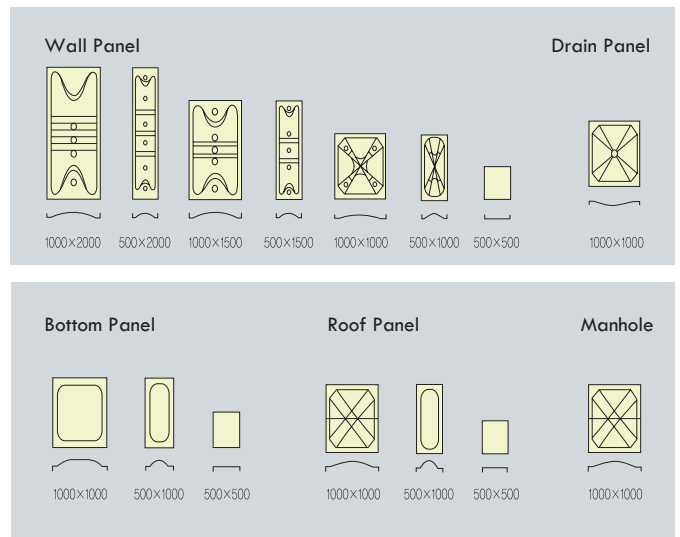
GRP Panel Combination

SAMSUNG Sectional GRP Tank can be easily installed even in a confined space since the standardized panels and accessories are merely connected with bolts & nuts.



Typical GRP Panel Type & Dimensions

※ Unit: mm



Keeps Water Temperature Cool

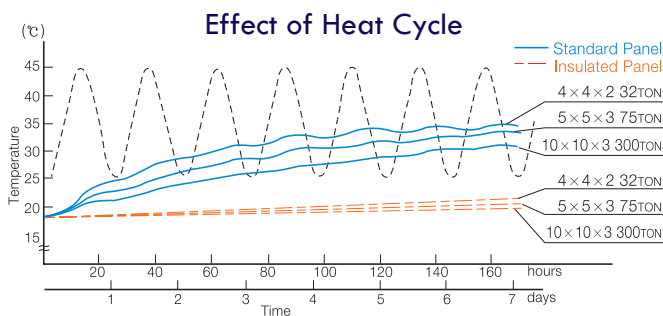
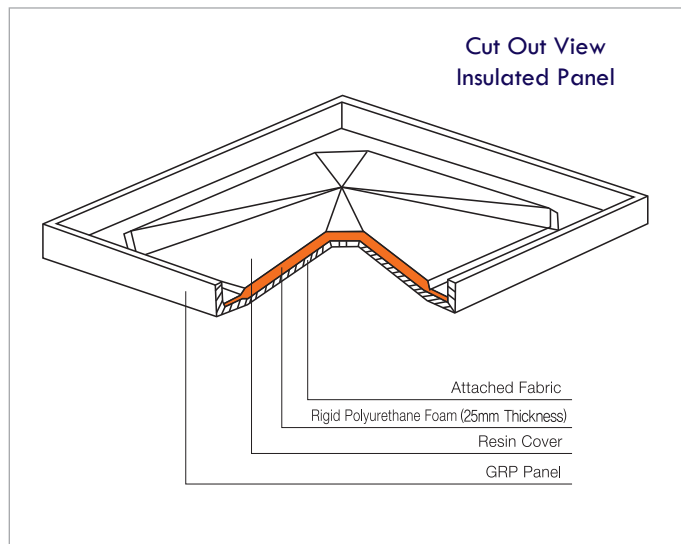
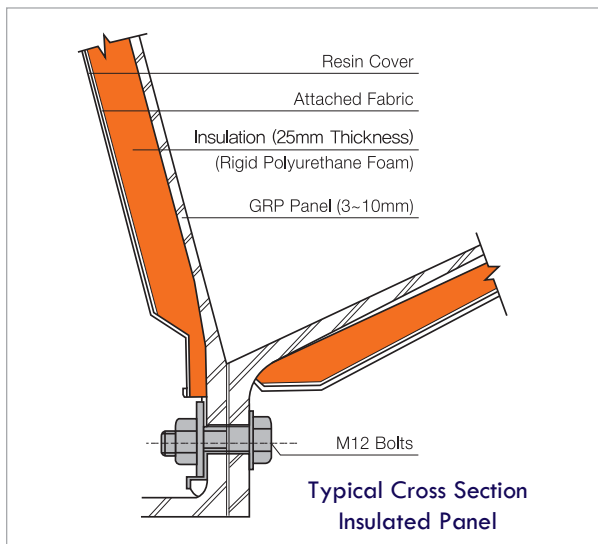
Glass-fiber Reinforced Plastic GRP has a relatively low thermal conductivity and its value is approximately 1/240 of steel. The typical problems with steel or metal tank has always been related to its high thermal conductivity and high expansion coefficient of steel which lead to loosening of the panel connection bolts in the area with wide temperature variation. However, the temperature of water stored in the GRP panel tanks will not rise as much even though the tanks are exposed to the extreme hot or cold weather.

SAMSUNG R&D team has successfully developed an unique insulated sectional panel to meet the extreme weather from desert to arctic regions. We have conducted a wide range of tests at both high and low temperature levels.

Patented Heat Insulated Panel

The SAMSUNG insulated panel has achieved an extraordinary low thermal conductivity by attaching a layer of rigid polyurethane foam with a special adhesive fabric by mean of high pressure pressing. These panels are suited only for the wall and bottom panel of the tank, since the air pocket between the roof and the water itself will acts as a thermal insulation layer.

Many insulation panels from other companies often delaminate under high temperature, while SAMSUNG panels have been proven to perform in the most severe weather situation worldwide.

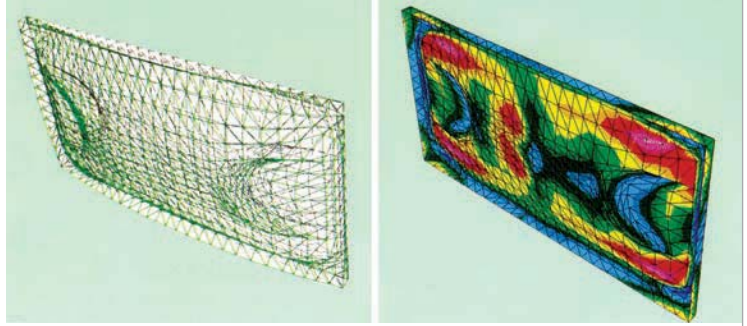


Thermal Conductivities Comparison

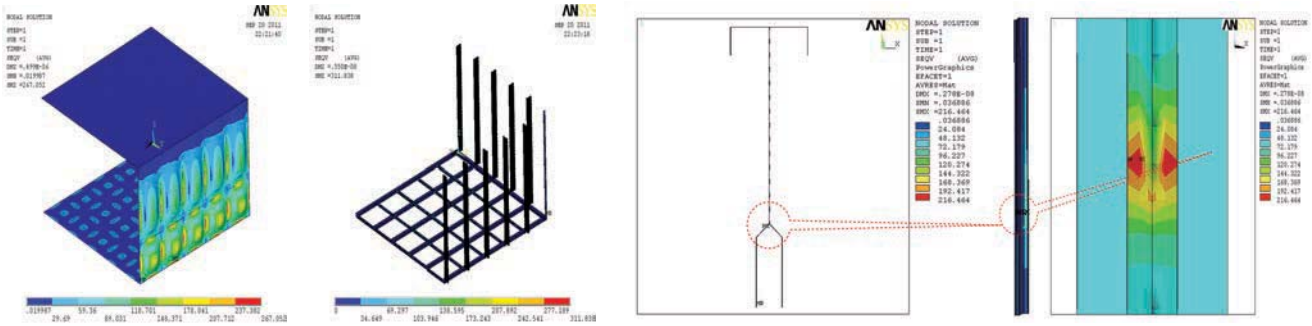
Material	K, W/m°C	Material	K, W/m°C
Carbon Steel	37	Aluminium	250
Stainless Steel	16	Air	0.02
GRP (Standard)	0.15	Rubber	0.14
GRP (Insulated)	0.02	Water	0.60
Pine Wood	0.15	Glass	0.80

FEM

Finite element method and 3D computer structural analysis program are used by our engineers to design and verify the GRP panels are structural sound under the consideration of the critical loading cases.

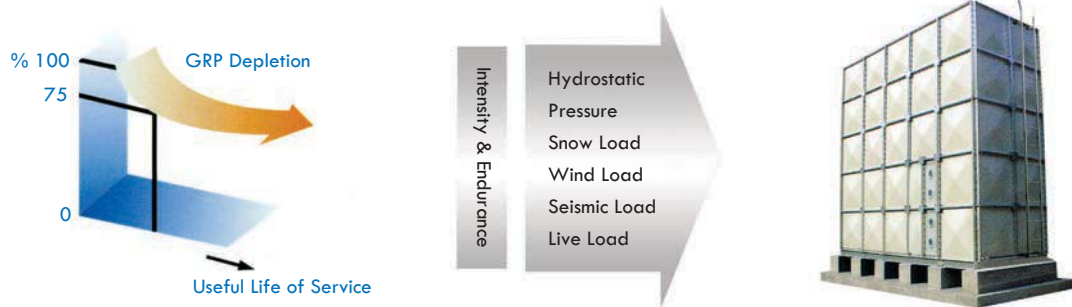


FEM - GRP Water Tank Panel & External Steel Frame



High Quality

In the aspect of strength, durability, dimensions, and stability; SAMSUNG always ensure our products are in compliance with the safety requirement, design regulation as well as the stringent standard of quality control.



Foaming Type Sealing Tape for Water Tight Joints • Bottom Draining Panel

- Special developed sealing tape system ensure leakage free water tank.
- Concave bottom drain panel facilitate quick and complete drainage.

▲ Bottom Drain Flow Diagram

▲ >95% of the Compression Strain of the Sealing Tape to be Restored in 24hr upon Release of Pressure

▲ PSB Test Report

Material Characteristics and Technical Specification

Physical Properties

A. Hot-pressed GRP Panel

Specific Gravity	1.7~1.8
Characteristic Flexural Strength	135 MPa; BS 2782-3: M335A
Flexural Modulus	12 GPa
Characteristic Tensile Strength	70 MPa; BS 2782-3: M230A
Characteristic Shear Strength	18 MPa; BS 2782-3: M341A
Impact Strength	70 J/m; ASTM D256
Barcol Hardness	Min 40; EN 59
Shore Hardness	D90; ASTM D2240
Opacity / Light Transmission	<0.2%; EN 578: 1994
Resistance to Deformation	<1% or 10mm
Quality of Water	Pass; BS 6920-1:2014
Coefficient of Thermal Expansion	$2.1 \times 10^{-5}/^{\circ}\text{C}$; ASTM D 696-79
Thermal Conductivity	$0.15 \text{ W/m}^{\circ}\text{C}$; BS 874 Pt2 Sec 2.1
Water Absorption Rate	0.03%

B. Stainless Steel shall conform to BS 970 Grade 304 or 316 (Optional).

Hot Press GRP Panel

All GRP panels are produced in one piece by high pressure (+1000 ton machine) hot press moulding process which result in irregularity free and very consistent, and stable in dimensions. Connection holes are drilled with CNC machine to assure the spacing distances are within tolerances.

Joint Sealing, Bolts & Nuts

The sealing tape is made in top quality EVA, PVC & Butyl conforming to SS375:2001 and BS 6920-1: 2014. It is designed to withstand the extreme weather condition in long-term. Bolts, nuts and washers used for panels connection at inner tank shall be in stainless steel, while for those not in contact with water (external), hot-dipped galvanized steel (HDG) to BS-729 could be used.

Internal Reinforcing Tie

The wall and roof of the GRP tanks is reinforced internally with stainless steel stays, tie and diagonal struts to provide strength and stability to the tank.

Roof Cover

Heavy duty GRP roof panels are supported from the bottom panel with GRP tubular section or stainless steel post.

Support Frame & Base Frame

HDG or stainless steel support frame, brackets, plates and corner angles. Proof skid base frame system are made in HDG steel section at 1m spacing to both directions.

Accessories

- A. Manhole Cover with 600x600mm opening and sealed lid.
- B. Access Ladders:
 - Inside tank - GRP or Stainless Steel
 - Outside tank - HDG or Stainless Steel
- C. Screened Air Vents
- D. Water Level Indicator to show water level from outside (aluminum case cover).

GRP Water Tank - Job Reference

Overseas



● Location: Vladivostok



● Location: Iran



● Location: Abu Dhabi



● Location: Australia



● Location: Iran



● Location: Iran

Installation Procedure

Low installation cost and easy to install with standardized panels.



● Concrete Base & Foundation



● Bottom Panel Assembly



● Wall Panel Assembly



● Wall Panel Assembly



● Roof Panel Assembly



● Assembly Completed



● 2m Height



● 4m Height



● 3m Height

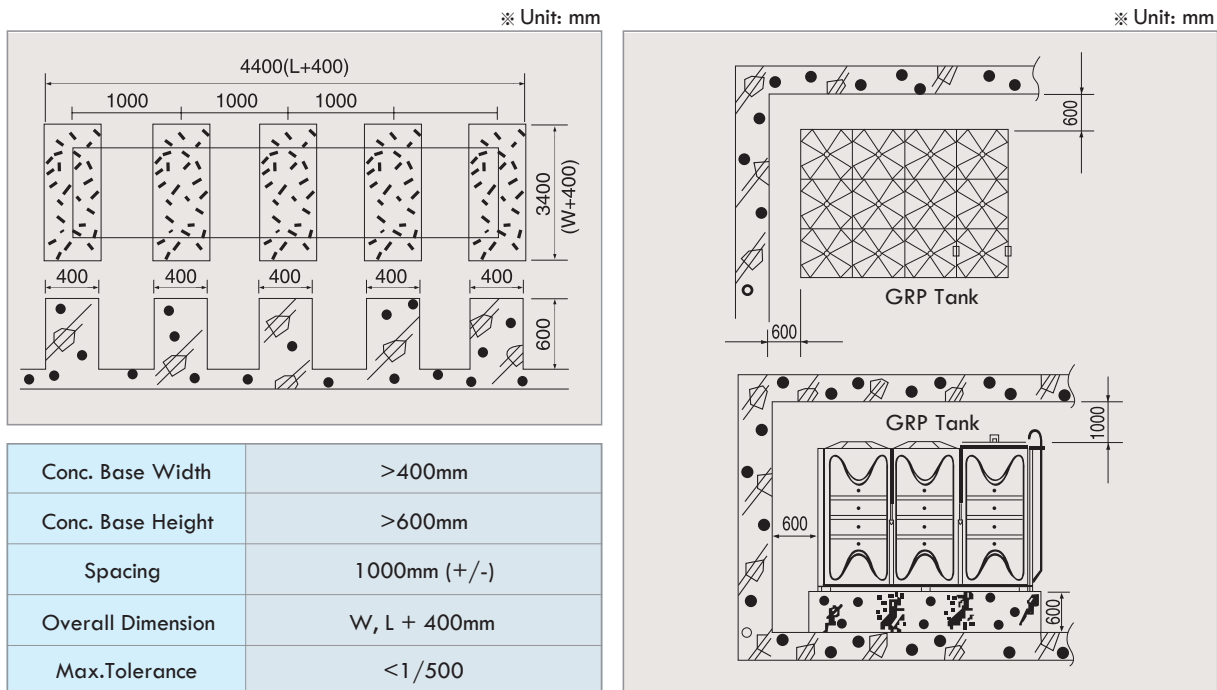


● 5m Height

Concrete Base/Plinth Foundation

Standard Dimensions

For maintenance of GRP tank, it is suggested that the minimum spacing between wall and tank is 600mm, while the minimum clearance from the ceiling is 1000mm.



Defining Scope of Works and Caution for Installation

1. Concrete Base PAD

Customers are required to construct the concrete base in according to the designed specifications and drawings.

Anchor bolts to be fixed by our agent.

Minimum compressive strength of the concrete base shall exceed 30MPa.

The thickness of the grouting mortar on the concrete base shall be less than 20mm.

2. Drainage & Fitting Connections

Customers shall specify the sizes and setting out of the sockets & fittings for P/D. Our agent will install the required sockets off-site.

After the sockets are in place, the P/D connections shall be done by the customer.

3. Minimum Installation Space

It is recommended to reserve at least 600mm width space at the perimeter to the tank for installation and future maintenance.

4. Transportation

Panels are packed in pallet with cushions during shipping. Do not put heavy weight on the panel particular on the flanges.

5. Pipe Installation

Be careful not to put any heavy weight on the pipes that are connected to the fittings.

Unbalance loads on the fitting during pipe installaiton will damage the sleeve and cause possible leakages.

Take all necessary precaution and protection to avoid fire or other hazardous occurrences while welding.

6. Stagnant Water

If the tank is not used for long term, be sure to drain the water from tank, close and lock the access manhole.

For potable water reservoir use, also refer to local government regulation. Clean the tank before reuse.

Maintenance • Inspection • Cleaning

SAMSUNG GRP Tanks are designed and manufactured for long-term service. Maintenance and inspection must be conducted regularly to secure hygienic and ensure long life performance. In order to facilitate easy and safe maintenance and inspection works, a proper access with adequate clearance shall be provided around the water tanks.

Inspection Item Maintenance Works	Suggested Frequency	Action / Remarks
Clean the Inner Side of Tank	Once a year	Clean with cloth, sponge or other soft material. To avoid scratches to the GRP surface, never use rough materials such as wire brush or scuff pad.
Loose Bolts	Twice a year	Retighten loose bolts with hand wrench.
Clog up Air-vent and Overflow	Once a month	Check for clog up and remove any trapped foreign matters.
Manhole Cover	Once a month	Make sure the manhole cover is completely closed. Always keep the manhole cover locked.
Turbid Water	Once a month	Check the inner parts of the tank, the outlet, inlet and other fittings for turbid water.
Water Leakage & Panel Deformation	Once a month	If leakage and deformation is the found, contact the local sales representatives immediately for rectification actions.
Corrosion of External Frame Connection Bolts & Ladder	Once a month	Replace the rusted bolts, apply rustproof coating or zinc-primer on the corroded steel frame, brackets and plates.

Whenever there is an earthquake, typhoon, fire, flooding, turbid water contamination or other accidents occurred, check the water tank or contact our representative for inspection.

Maintain 85% water level of water tank height at all times. If the tank water is not used for long term due to summer vacation, holidays or other reason, discharge the stored water before re-use.



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