

GRP TANK SPECIFICATION- DATA SHEET

(GRP(SMC) Sectional Water Tank)



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1. General

A. Scope

This specification specifies the requirements of glass reinforced polyester (GRP) sectional tanks, with nominal capacity of at least 500 liters for above ground storage of water. GRP sectional water tanks shall be designed to have sufficient strength to withstand expected load. They shall comply with the test requirements given in hydrostatic test, leakage test, deflection test. The tank shall consist of each panel (roof, wall, bottom, drain) pressurized and molded by hydraulic press with a joining sealant in between for water tightness.

By molding SMC (sheet molding compound) materials manufactured with glassfiber reinforced Polyester to compound that mixed filler, and the application of a catalyzer and mold release agent to the unsaturated polyester resin should occur. Reinforcement, using reinforcing agents on both the inside and the outside should take place, and water tanks assembled "in the field" should use bolts and nuts by inserting sealing materials into the joining part.

B. Standards requirements

The manufacture and design Hot Press Moulded GRP sectional water Storage Tanks shall be to the quality standard requirements of ISO 9001 and shall comply with BS EN 13280:2001: glassfibre reinforced plastic cistern for cold water storage and SS245:2014 Specification for glass reinforced polyester sectional water tank.

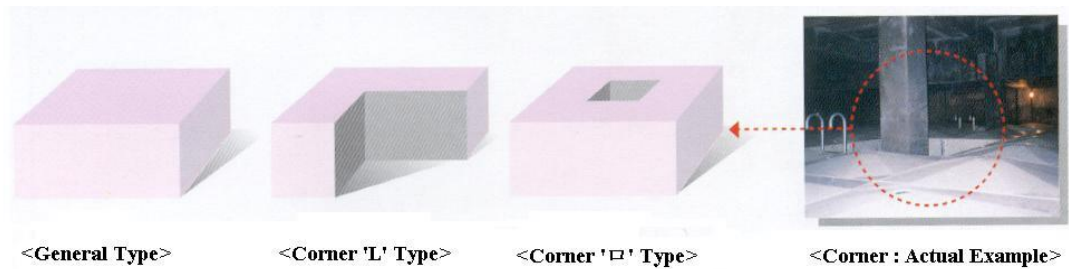
C. Scope of work

Assembly of Tank Panel (GRP panel), Steel Skid, reinforcing parts, internal/external ladder and fitting for piping.

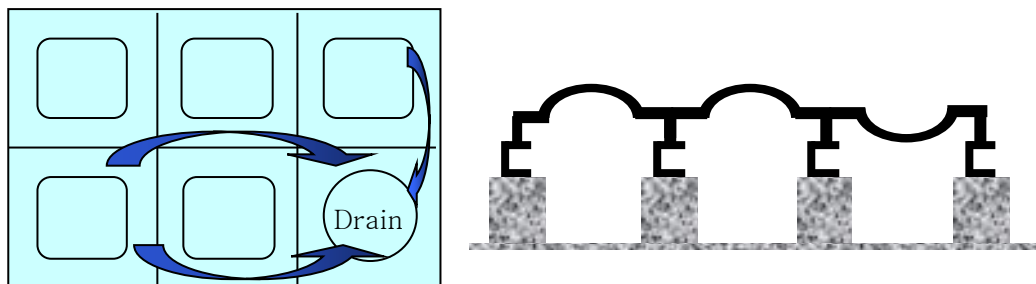
D. Structure

- 1) Configuration: The product should have the following body configuration so that it can be installed according to the available building space using a quadrilateral panel assembling type.

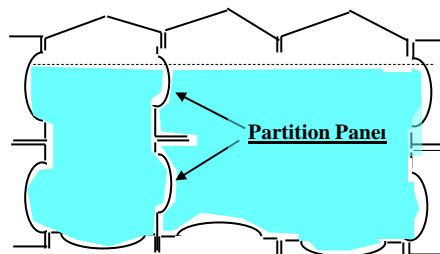
1. General



- 2) This product for storing drinking water should have no inflow and generation of contaminants and should comply with the rules for the sanitation of water supplies and the water tank installation guidelines.
- 3) This product should be equipped with a bottom panel in such a configuration so as not to allow deposits on the floor, and a drain panel that provides easy discharge of treated materials upon internal cleaning.



- 4) In case of dividing one tank into 2 parts, it should be able to block disinfectants and contaminants from the adjacent tanks (during cleaning) by a private panel with the partition function.



- 5) This product should be in such a structure as to block rainwater from entering the inside, enabling locking. Also, it should have one(1) or more manholes with the inside diameter of 600mm or higher to allow service personnel, and their tools, entry.

2. Product and Specification**L. SMC panel****1) Panel Materials**

The materials should be not harmful to the stored drinking water. They should be products that are compressed and molded SMC materials which utilize reinforced fiberglass to compound the mixed filler, catalyzer and mold release agent to the unsaturated polyester resin with press.

2) Appearance

Internal and external surfaces shall be visually inspected for defects (pin hole, poor impregnation, scars, rough contour, repaired marks, blister). Defects shall be inconspicuous

3) Types of Panels

The panel is divided into a single plate structure and a heat insulation structure, and indoor tanks basically apply the single plate structure while outdoor tanks use the heat insulation structure.

4) Panel Specification

It is applied flexibly, according to tank size, based on 1x2(0.5x2), 1x1.5(0.5x1.5), 1x1(0.5x1), 0.5x0.5 m (Wall Panel configuration standard by tank height: see Annex #2)

5) Panel Thickness

Since load differs according to tank height and application part, apply different grades to panel thickness by location.

6) Panel Performance

Panel performance should meet BS 13280:2001

Category	Item	Performance	Test Method
1. Physical property test	Tensile strength (MN/m ²)	70(min)	SS245:2014
	Bending strength (MN/m ²)	100(min)	SS245:2014
	Elastic modulus in bend (MN/m ²)	6,000(min)	SS245:2014
	Glass content (%)	30%±5(min)	SS245:2014
	Barcol hardness	30 to 90% of resin manufacturer's specification whichever is higher	SS245:2014
	Opacity	0.2 % or below	BS EN 13280: 2001(E)
	Impact resistance	Not show any cracking	
	Water absorption	0.5 % or below	

2. Product and Specification

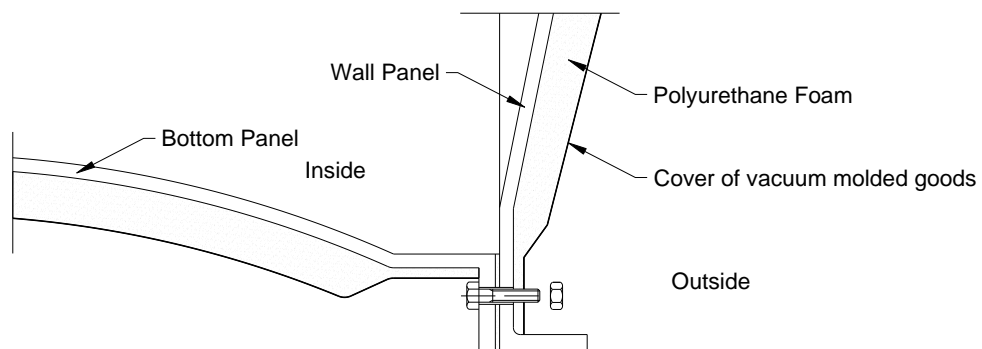
	Pressure test	Not rupture	
	Heat distortion temperature	Not less than 70°C	
Test for effects on Water		Not impair the wholesome nature of water	BS6920-1:2000 and/or 2014 Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water ¹ .

7) Hydrostatic test

Each panel, when fixed to a hydrostatic tester as described in SS245:2014 Annex G, shall stand six times the hydrostatic pressure corresponding to the maximum waterhead expected at the midpoint of that panel without bursting, cracking or leakage.

8) Insulated panel

The structure of the heat insulation panels requiring insulation is SMC panel + Polyurethane foam + the cover of vacuum molded goods. Any insulation should be applied to outer surface of the panel, not to a surface in contact with the tank contents



M. Manhole

Manholes should be equipped with a locking device, providing easy internal entrance and preventing rainwater inflow.

Manhole: GRP(SMC) materials (internal diameter of 600mm or higher)

Hinge: SS304 materials or higher grade

N. Steel skid

2. Product and Specification

1) Materials

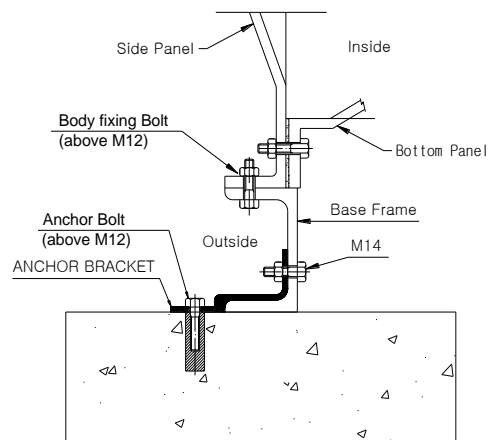
Use hot-dip galvanized steel, and the specification for materials used by tank specification is:

(Silver dust spray or paint coatings are not applicable due to lack of durability)

Tank height	Materials (main materials)	Materials (subsidiary materials)
1.0M below	-	-
1.3~2.5M or below	Angle 75 x 75 x 6t	Channel 75 x 4 x 5t
3.0~4M or below	Channel 125 x 65 x 6t	Channel 75 x 40 x 5t
4.3M or higher	Channel 150 x 75 x 6.5t	Channel 100 x 50 x 5t

2) Configuration method

- Bolting assembly structure
- Fix the base frame and the tank body with bolts to prevent tank vibration and location change owing to earthquake, wind pressure, etc.
- Fixing location: outside of the tank (4 sides)
- Bolt specification : M 10 or higher



O. Internal reinforcing parts

1) Materials

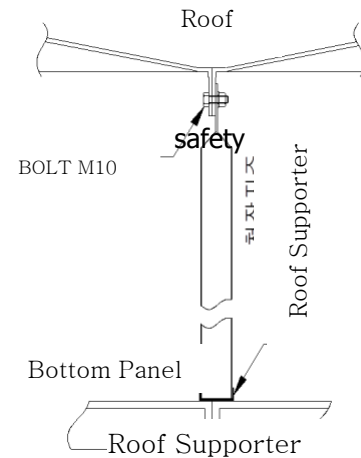
Where a metal brace is supplied with tank, it shall be corrosion resistant and free from sharp edges, sharp corners and surface projections.

Parts name	Materials	Specification
Inner tie-rod	SS304 or SS316	Tie rod : $\Phi 10.6$ or better
Roof Supporter (pole)	FRP Square Pipe	FRP Pole : 50x50x5t or higher
Inner Bracket	SS 304/SS316 or higher	170 x 60 x 5t 170 x 80 x 5t 170 x 170 x 5t 160 x 160 x 5t

2. Product and Specification

2) Method of configuring internal stay

1. Minimize the transformation of the side (transformation of 1% or less of the tank height), and it should be so designed as to improve the and life of tanks.



P. External reinforcing parts

Where a metal brace is supplied with tank, it shall be corrosion resistant and free from sharp edges, sharp corners and surface projections.

Parts Name	Materials	Specification
Flange reinforcing bar	SS41+hot-dipped galvanized (angle type)	Angle type : 65x30x3t 60x20x3t
External corner frame	SS41+hot-dipped galvanized (angle type)	Angle type : 70 x 70 x 3t
Inner Bracket	SS41+hot-dipped galvanized	170 x 170 x 5t 170 x 60 x 5t

Note) For surface treatment, silver dust spray or paint coating are not applicable due to lack of durability.

F. Sealant

Products, which facilitate the easy handling of tape configurations, with materials of a PVC or EVA system with excellent durability and recovery, and those which have the same life as that of panels and materials shall be tested to conform to the requirements of SS375. The material shall also be chemically resistant to the quality of stored water and shall not impair the wholesome nature of it.

- Use materials meeting the regulation of the rubber used for synthetic rubber (EPDM) used as sealing materials of bolts.

G. Bolts and Nuts

2. Product and Specification

The size of bolts should conform to ISO 898-1 and ISO 898-2, and the diameter should be 10mm or higher.

- Internal use (contact with water) : SS304/SS316 or higher
- External use and ground part : hot-dipped galvanizing
- For internal/external cross coupling: Use synthetic rubber (EPDM) capped bolts to improve water tightness.

H. Ladder

A GRP sectional water tank of 1.5m depth or more shall be provided with an internal ladder made of materials. The external ladder shall be located at the side panel closest to the manhole. The ladder should provide enough load resistance and solidity, and the internal ladder should be in an assemblage structure without welding and not harmful in sanitation.

- Internal use : FRP – H-30x50(Pole), Diagonal type-35x25(steps)
- External use : HDG Steel – 20x30x1.2t square pipe(poles) + ϕ 19x1.2t pipe(steps) or higher

I. Ventilation

The air-vent should be in ABS material with PE insect-guard.

- Required quantity : 1 no per 30m² of roof
- Required size : 100 ton tank > : 50A, 100 ton tank ≤ : 100A

J. Fitting

- ϕ 50 or below : Socket type in Brass material.
- ϕ 65 or higher : Flange type in Steel + Nylon coated or plastic materials

Q. Performance of sectional tanks

1) Leakage Test

When the tank is tested in accordance with the method described in SS245 Annex H, there shall be no visible sign of leakage

2) Deflection Test

Water tanks shall be installed on the foundation, filled with water to overflow level and maintained for not less than 2h for this test. After conditioning, the deflection of sides and ends of the tanks shall not exceed 1% of the depth of the tank and deflection of the bottom shall not exceed 10mm. A dial gauge with an accuracy of at least ± 0.01 mm shall be used. The weight of one panel on each tier is measured, the test is described in SS245 Annex I.

- The End -

Glass Fused to Steel Tanks

Advantage:

- Short construction period, cost effective tank solution;
- Superior corrosion resistance, service life is more than 30 years;
- Easy to install, no need for big installation equipment and/or crane;
- Tank volume can be easily expanded;
- It can be dismantled, removed and relocated;
- Elegant appearance, tank color can be customized;

The Leader of GFS/Enamel Tank in China
The Largest and Most Professional GFS/Enamel Tank Manufacturer in China



ROOF:

- Self –supported glass- fused Plastic Textile with integrated galsholder.



BOTTOM:

- An integral watertight concrete slab
- Steel Welded Assembled from glass-fused to steel bolted sheets



AUXILIARY STRUCTURES

- Ladders
- Platforms
- Trafficable Bridges, other technical structures.



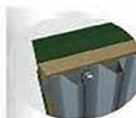
BONDS:

- Sheets are connected by special high-grade bolts with a plastic covered head.
- All bonds of sheets are sealed by special elastic silicone or polyurethane sealant



SEALING

- A glass fused to steel tank can be equipped by thermal insulation covered by a protective trapezoidal sheet.



MANHOLES:

- Side Wall manholes.
- Roof top manholes.



What is Glass-Fused-to-Steel Tank ?

After firing at 820°C -930°C high temperature, the molten glass reacts with the profiled steel surface to form an inert, inorganic bond, which combines the outstanding chemical and physical resistant properties of glass with a highly engineered ultra-fine glass structure surface. As the superior corrosion resistance performance, Glass-Fused-To-Steel technology is the premium coating technology in the storage tank market, is widely used for biogas energy, municipal and industrial liquid applications.

GFS/Enamel Sheet Specifications

Category	Specification
Coating color	Standard dark green and blue color or customized
Coating thickness	0.25~0.45mm, double coating
Acid and alkalinity proof	Standard PH: 3~11, Special PH: 1~14
Adhesion	3,450N/cm
Elastic	7.9*104MPa
Hardness	6.0Mohs
Service life	≥30 Years
Holiday test	>1500V
Permeability	Gas liquid impermeable
Easy to clean	Smooth, glossy, inert, anti-adhesion
Corrosion resistance	Excellent, suitable for wastewater, salt water, sea water, high sulfur crude oil, salt fog, organic and inorganic compounds

● Reference(Overseas)



COMMERICAL CENTER AGH



LEASING CENTER MODON



AL MANA MEDECAL CENTER



ICE FACTORY



AL MAIMANY BRICK FACTORY



ARAMCO-The Dhahran Restanura
Park - Dhahran



GIRLIS COLLEGE DAMMAM



ARAMCO ZONE

Reference(Overseas)



DAMMAM UNIVERSITY



PALACE-AL KHOBAR



COMMERCIAL RESIDENTIAL
BUILDING-MECCA



PRINCE SULTAN UNIVERSITY
RIYADH



AL MANA - AL KHOBAR



HOTEL-AL KHOBAR



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