



Panel Water Tanks



Modular Housing Systems

## HOT PRESS MOULDED GRP (SMC) MODULAR SYSTEMS



DEVI POLYMERS PVT. LTD., CHENNAI, INDIA.



An ISO 9001 Company

## ABOUT US

- ◆ Devi Polymers Pvt. Ltd., is a member of the well known TNK group based in Chennai, India.
- ◆ Devi Polymers are pioneers in India in the manufacture and supply of Glass Polyester based SMC and DMC Compounds since 1975.
- ◆ All 3 manufacturing facilities of Devi in Chennai are ISO 9001 certified.
- ◆ Devi has the most integrated SMC manufacturing facilities in India and is one of the very few concerns having such facilities under one roof, worldwide.
- ◆ Devi's Modular Panel Tanks developed indigenously, are widely used not only in India but also in the Middle East. Devi's panel tanks are approved by Water Research Council, U.K, For potability and have IS Licence (IS 14399:Part-1) for marking on GRP panels.
- ◆ Devi is continuously developing new products for Indian as well as for the world markets.



## ABOUT PANEL TANKS

When it comes to water tanks, apart from concrete, use of cast iron tanks was known for over 5 decades. The entry of pressed steel tanks had made the modular concept popular for bulk storage of water.

Convenience in handling, easy handability, ease of assembly and saving in time are the basic advantages of modular systems.

All advantages of steel panel tanks are over shadowed by their susceptibility to corrosion and hence high maintenance costs.

The advent of hot press moulded SMC panels in early 70s have totally eliminated the corrosion factor. The low weight SMC panels have permitted storage of all types of water including highly chlorinated water and seawater. SMC tank design also eliminated the need for any metal parts for internal reinforcement ensuring high water quality during storage.

### ADVANTAGES

- ★ **MATCHED METAL DIE MOULDING**  
Uniform thickness, void free Panels.  
Guarantees Uniformity of product quality.  
Eliminates part to part variation.
- ★ **100% CURE OF GRP**  
Minimum distortion of Panel Flanges.  
Negligible residual styrene, most suitable for storing potable water.
- ★ **UV- PROTECTED**  
Incorporated in the SMC formulation.  
Ensures long panel life.  
Time tested.
- ★ **ISOPHTHALIC POLYESTER BASED SMC**  
High Heat Distortion Temperature (+100°C).  
Panels do not distort in extreme summer and winter conditions of Middle East Countries.  
Resistant to sea water, mild acids & alkalis.
- ★ **SPECIAL FEATURES OF PANEL TANKS**  
Eliminates light transmission.  
Eliminates possibility of algae growth.
- ★ Accurately drilled and aligned bolt holes.  
Uniform Compression of the gasket throughout the flange Length.
- ★ Smooth gelcoat like finish on both faces ensures hygiene, does not harbour foreign matter.  
Easy cleaning of tanks.  
Eliminates painting of the external tank surface, and zero maintenance.



### COMPARISON OF SECTIONAL PANEL TANKS WITH OTHER TYPE OF TANKS

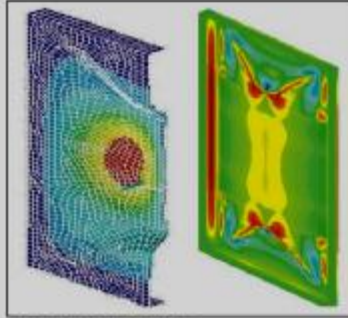
Item	Concrete	MS Sectional Tank	SS Sectional Tank	GRP Hand lay up sectional Tank	Other GRP (SMC) Panel Tank internally braced	Devi GRP (SMC) Panel Tank Externally braced
Durability	❌	❌	★	❌	★	●
Water Quality	■	■	★	■	●	●
Water tightness	❌	❌	★	■	★	●
Transport & assembly	■	❌	❌	❌	●	●
Corrosion & Resistance	❌	■	★	★	★	●
Maintenance Freedom	■	■	❌	❌	❌	●
Cleaning	■	■	★	★	■	●

● Excellent

★ Good

❌ Fair

■ Poor



### THE BASIS OF PANEL DESIGN :

The panels are designed using the latest **Finite Element Methods** of Analysis. Computer modeling allowed subtle changes to be made in thickness and geometry of panels, such that stresses and deflections are minimized for high factor of safety and good performance of tanks.

For instance :

Roof and floor panels of the tanks take compressive loads to make them self sealing and self draining.

Side panels have their central shell portion designed to take tensile loads.

In both cases the load is transferred to the flanges.

### MANUFACTURING:

Devi's moulding plants have the largest hot press moulding facility in India, ranging from 150 Tons to 1000 Tons capacity. Panels are hot pressed in a 600T & 1000T Hydraulic press at a pressure of 50 to 100 kg/cm<sup>2</sup> and a curing temperature of 130° to 150° using Glass Reinforced Polyester (GRP) Sheet Moulding Compound (SMC).

Hot press moulding is extensively used worldwide in the GRP industry. Tank panels are moulded using the highest quality materials and under strict quality control discipline. The result is strong, consistent fully cured panels, when leaving the press, dimensionally accurate with sharply defined and a smooth surface finish on both sides.



The major advantage over traditional labour intensive manufacturing methods is the assured consistent strength of the panels. Other manufacturing techniques depend upon high skill levels and intensive inspection to ensure repeatable quality products.

The panels possess high strength to weight ratio, are weather resistant, non-toxic and do not contaminate water. The panel shape has been meticulously designed to resist heavy hydrostatic loads, reduce distortion, to ensure many years of maintenance free service.

### PRODUCT:

The widest range of panels from sizes 2mx1m, 1.5mx1m, 1mx1m, 1mx0.5m and 0.5mx0.5m sizes, in varying configurations for use in side, bottom, top, manhole etc., are available to enable tanks assemblies up to 2 million liters capacity.



#### Design Conditions (as per BS 7491)

Tank Depth (Mts.)	Panel safety factor
1.0	6
2.0	6
3.0	6
Wind velocity	50 Meters / sec
Roof panel load	220 kg/m <sup>2</sup>

#### PANEL PHYSICAL PROPERTIES

Sl. No.	Panel Properties	Value	Standard
1.	Specific gravity	1.0	ASTM D 792
2.	Glass content	Min 30%	BS 2782
3.	Tensile strength	Min 900 kg/cm <sup>2</sup>	ASTM D3038/309
4.	Flexural strength	Min > 1300 kg/cm <sup>2</sup>	ASTM D790/86
5.	Barcol hardness	50	ASTM D2583
6.	Shear strength	Min 870 kg/cm <sup>2</sup>	ASTM D732
7.	Water absorption	Max 0.2%	ASTM D570
8.	Light transmission	Nil	ASTM D1003
9.	Check for Weathering using natural sunlight	Stabilized	ASTM D1434
10.	Toxicity	Nil	SS 245/IS 4391/ISO 623
11.	Micro biological growth	Nil	SS 245/IS 4391/ISO 623

### TESTING / QC:

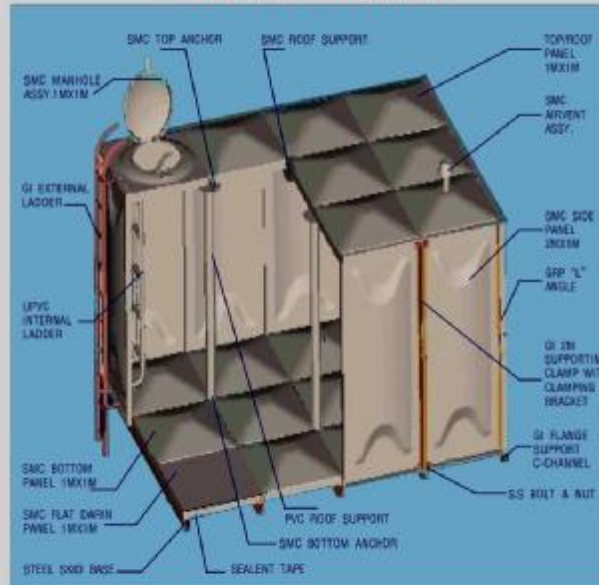
All materials used are rigorously tested for suitability with potable water, and also been thoroughly tested for mechanical properties and long-term degradation at various laboratories and proved with actual field performance. These tests form the basis of the production, Quality Control and testing.

The specification and acceptance criterion for the panels and panel tanks are laid down by the Ministry of Electricity and Water Supply, DOHA QATAR and Singapore Standards Institution and IS14399 (Part I).

SMC panels passed the biological tests specified by SS 245 and the water by laws scheme of UK. The results prove that our water tank panels do not impair the wholesome nature of potable water stored in them.



### TANK ASSEMBLY DETAILS



### TANK CONSTRUCTION:

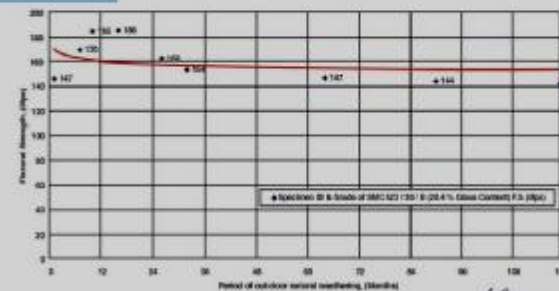
Devi panel tanks are assembled as shown with SMC panels, specially made standard parts in SMC / GRP, galvanized steel, stainless steel etc., and with special high quality tape sealant bolted between flanges of panels.

All Devi tanks are now always Externally Reinforced with GI steel members, ensuring that the tank interior is totally free of metal parts assuring 100% protection to water quality, easy cleaning, low maintenance and long life of tank.

All types of water whether seawater or chlorinated drinking water can be safely stored without fear of corrosion, or contamination.

### WEATHERABILITY:

ASTM D 1435-75 (Re-approved 1979) method was adopted to test the weatherability of the panel material (SMC). Flexural strength and flexural modulus are measured in six month (approx.) intervals up to the 10<sup>th</sup> year. No Significant reduction in either of the property was observed and the result verified with actual field conditions, since 1989.



Variation of Flexural Strength Vs Period of out-door natural weathering

Head of Composite Technology Centre  
Indian Institute of Technology, Madras  
Chennai-600 025.

*Signature*  
18.7.2008

## **SOME OF OUR TANK INSTALLATIONS**



2m deep 24 KL tanks with 2x1m panel for drinking water storage at a Hotel in Kashmir



2m. Deep 88 KL and 84 KL tanks for Service Water at a Service Yard



2m. Deep 200 KL tank for Raw water at a Irrigation site



2x24 KL tank for Soft Water at a Soft drink Plant



2.5m deep 62.5 KL tank for drinking water at a Railway Colony



2.5m. Deep 180 KL tank for Drinking Water at a Residential Colony

## SOME OF OUR TANK INSTALLATIONS



3m deep 54 KL tank for drinking water  
for a Housing Colony



3m. Deep 2x72 KL tanks for soft water  
at a Milk dairy in Dubai.



70 KL, 56 KL 2x42 KL for raw and drinking water  
at a Shopping Complex



3m. Deep 36 KL tank for Drinking water  
at a Metro Colony.



3m. Deep 108 KL tank for Drinking Water  
at a Housing Colony



3m. Deep 168 KL tank for Drinking water  
at the terrace of an InfoTech Building

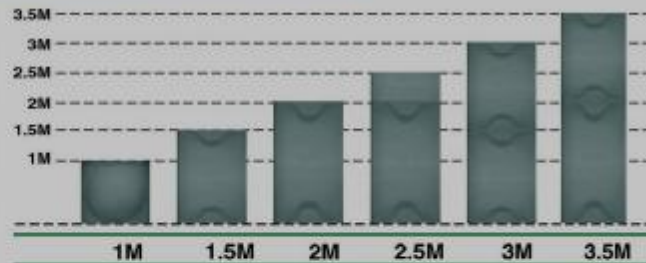
**Capacity and Selection of Optimum Size Tanks :**

Flosto Panel Tanks can be assembled to various capacities from 1000 liters (220 gallons) to 2.19 million liters (481250 gallons) by selecting desired length and width from 1m to 25m, and height of tank from 1m to 3.5m in increments of 0.5m, as rectangular or square tanks or to any special size or shape such as 'L' shaped tank to suit site conditions. The table provides some sizes and capacities of tanks.

**TANK CAPACITY CHART**

Capacity		Standard Options Tank Size (M)		
Liters	L.Gallon	Length	Width	Height
1,000	220	1	1	1
1,500	330	1	1	1.5
2,000	440	1	1	2
		2	1	1
3,000	660	3	1	1
		1	2	1.5
4,000	880	2	2	1
		1	2	2
6,000	1,320	3	2	1
		2	2	1.5
9,000	1,980	3	3	1
		3	2	1.5
12,000	2,640	4	3	1
		4	2	1.5
18,000	3,960	4	3	1.5
		3	3	2
24,000	5,280	4	3	2
50,000	11,000	5	5	2
72,000	15,840	8	6	1.5
100,000	22,000	10	5	2
150,000	33,000	10	5	3
200,000	44,000	10	10	2
300,000	66,000	15	10	2
		10	10	3
450,000	99,000	15	10	3
1,200,000	264,000	20	20	3
1,875,000	412,500	25	25	3
2,187,500	481,250	25	25	3.5

**NOMINAL CAPACITY DATA**



2m deep 2x12 KL tanks for Drinking water at an Educational Institute

**INSULATED PANES**

The highly efficient low density polyurethane insulating core is totally encapsulated between the GRP sectional panel and the insulation cover. The encapsulating external weather skin is manufactured from ultra violet stabilised material to provide total protection against weathering and physical damage. Standard thickness of insulation is 35 mm. For special requirements higher thickness can be provided up to 50mm.



1.5m. Deep, PUF insulated panel tank for drinking water in KSA, with FRP skin for protection of PUF)

# CERTIFICATES

## ISO 9001 Quality System Certification



## Water Quality Certification

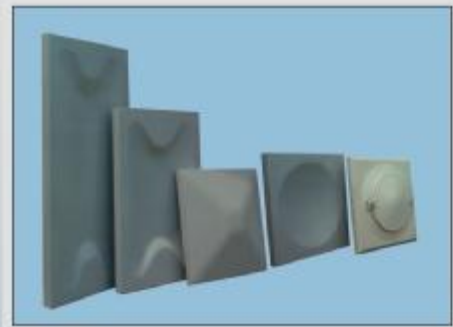


## Outdoor applications Certification



## Product Certification





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