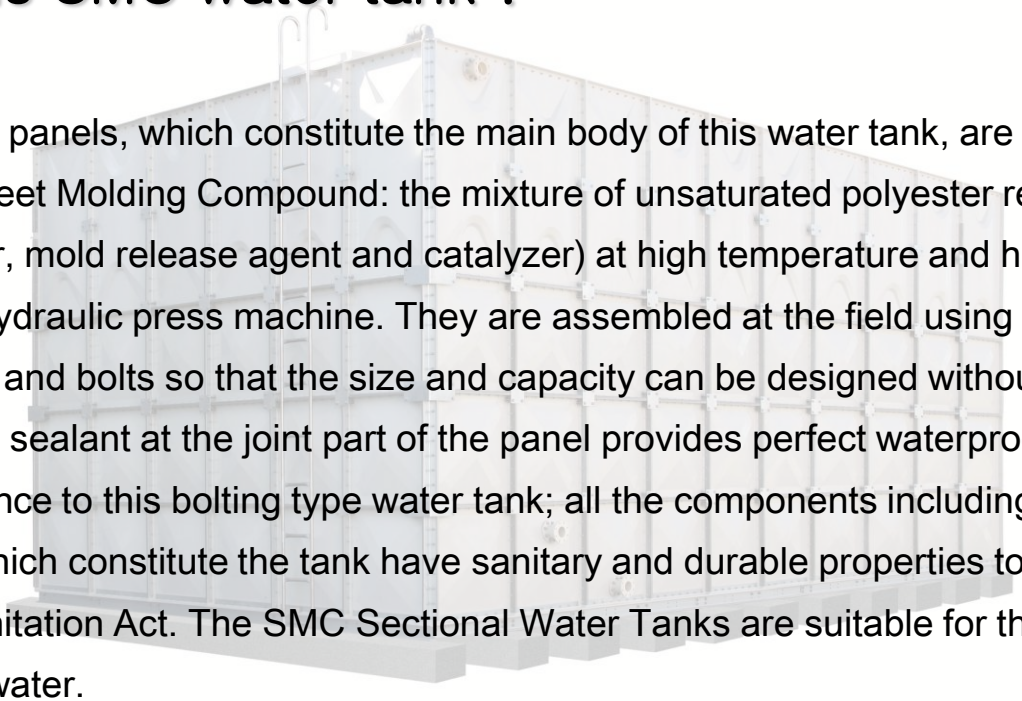
GRP water tank -LEETANI CO.

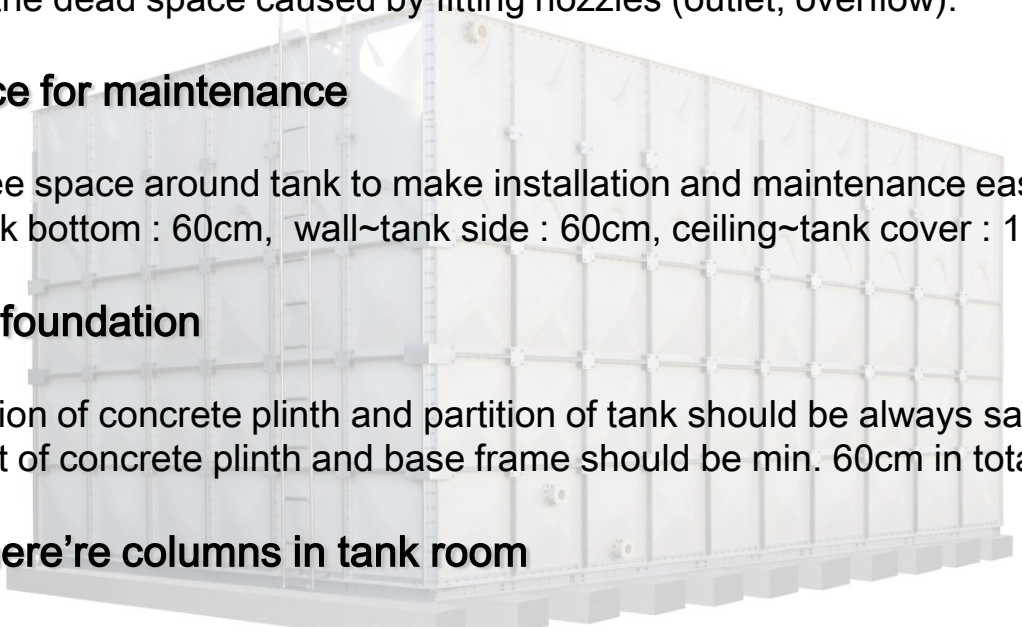
1. GRP water tank in brief

※ What is SMC water tank ?



The GRP panels, which constitute the main body of this water tank, are made using SMC (Sheet Molding Compound: the mixture of unsaturated polyester resin, glass fiber, filler, mold release agent and catalyzer) at high temperature and high pressure using a hydraulic press machine. They are assembled at the field using steel stiffeners and bolts so that the size and capacity can be designed without limitation. The foam sealant at the joint part of the panel provides perfect waterproofing performance to this bolting type water tank; all the components including GRP panels which constitute the tank have sanitary and durable properties to meet the Food Sanitation Act. The SMC Sectional Water Tanks are suitable for the storage of drinking water.

3. The basic design of GRP water tank



1. Tank capacity

- The actual capacity of tank should be 80~85% of nominal tank capacity.
- Consider the dead space caused by fitting nozzles (outlet, overflow).

2. Free space for maintenance

- Secure free space around tank to make installation and maintenance easy
  (floor~tank bottom : 60cm, wall~tank side : 60cm, ceiling~tank cover : 100cm)

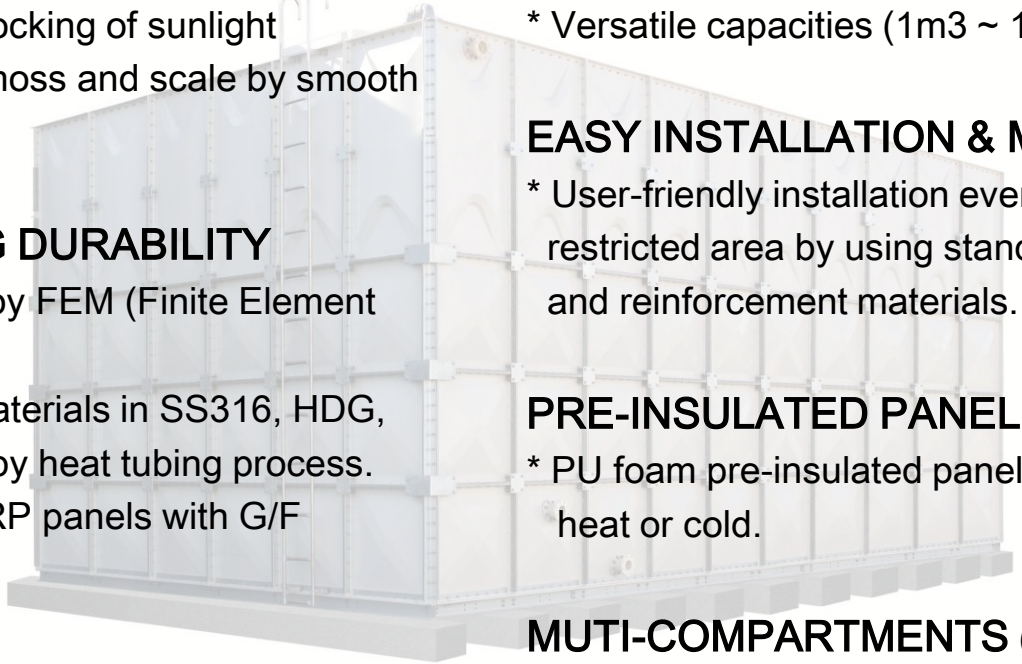
3. Concrete foundation

- The direction of concrete plinth and partition of tank should be always same.
- The height of concrete plinth and base frame should be min. 60cm in total.

4. In case there’re columns in tank room

- Columns shall be finished with SMC panels and used as a part of a tank in the tank.
- No need to build separated tanks between columns to meet required tank capacity.
  (Required tank capacity can be secured effectively, and it’s cost saving.)

4-1. The characteristic of GRP water tank



EXCELLENT HYGIENIC PROPERTISE

* Nontoxic, WRAS certified materials
* Suppression of algae and microorganisms with excellent blocking of sunlight
* Minimization of moss and scale by smooth surface finish

OUTSTANDING DURABILITY

* Optimal system by FEM (Finite Element Method) design.
* Anti-corrosion materials in SS316, HDG, PE coated S.S. by heat tubing process.
* High strength GRP panels with G/F contents 38%.

ABSOLUTE WATER TIGHTNESS

* Foam type gasket with excellent elasticity and resilience.

FREE CAPACITY DESIGN

* Various shapes to meet different site conditions (ㄴ-shape, ㄷ-shape, 口-shape).
* Versatile capacities (1m3 ~ 10,000m3).

EASY INSTALLATION & MAINTENANCE

* User-friendly installation even in the restricted area by using standardized panels and reinforcement materials.

PRE-INSULATED PANELS (optional)

* PU foam pre-insulated panels to avoid high heat or cold.

MUTI-COMPARTMENTS (optional)

* A tank can be partitioned into multi-compartments for respective use when tank is under cleaning or maintenance.

4-2. The characteristic of GRP water tank

※ The main components of GRP

Items	Ingredient	Function
Resin	ISO TYPE	The main ingredient of SMC panel
Shrink-proof	PS, PE	Prevent shrink of product volume on hardening process
Hardening material	T-BUTYL PERBENZOATE	Harden the SMC in molding tools
Viscosity increase material	MaO, CaO, Mg(OH)2, etc.	Increase the viscosity of SMC by certain level
Separate material	ZINC STEARATE	Helps the separation of molded goods from molding tools
Filler	CaCO3 (calcium carbonate)	Improves the feature, properties of matters, etc.
Reinforcement	GLASS ROVING	Reinforce the strength of SMC
Diluent	SM	Control the viscosity on the production process of compound

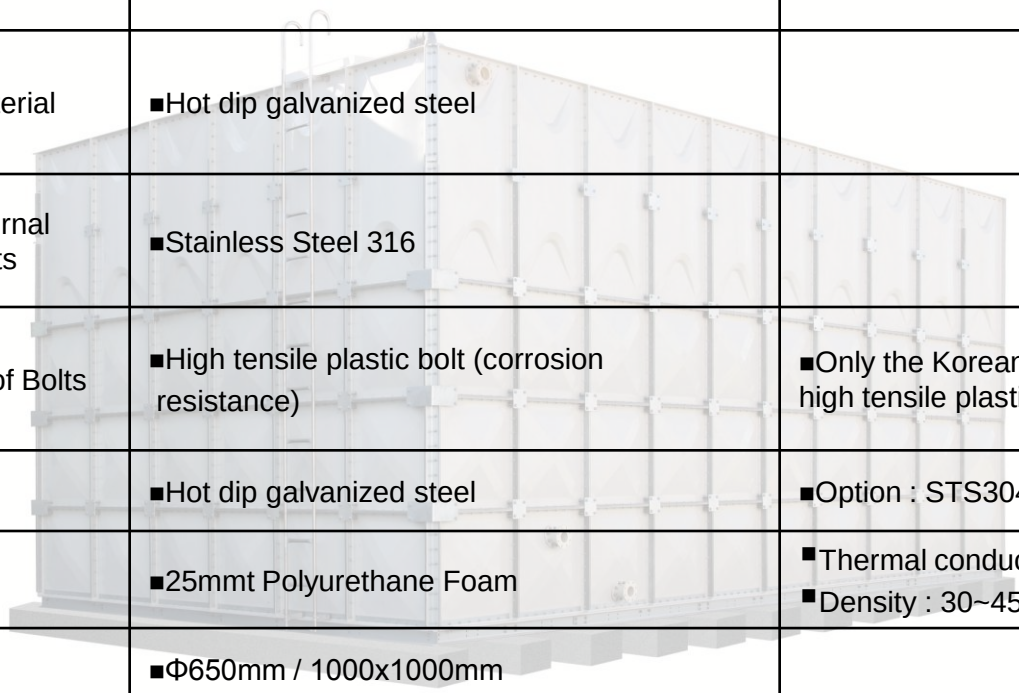
Remark) GRP doesn't include any substances which are classified as a forbidding/restricting material to use due to its hazardousness to human health.

5-1. Specifications of GRP Water Tank

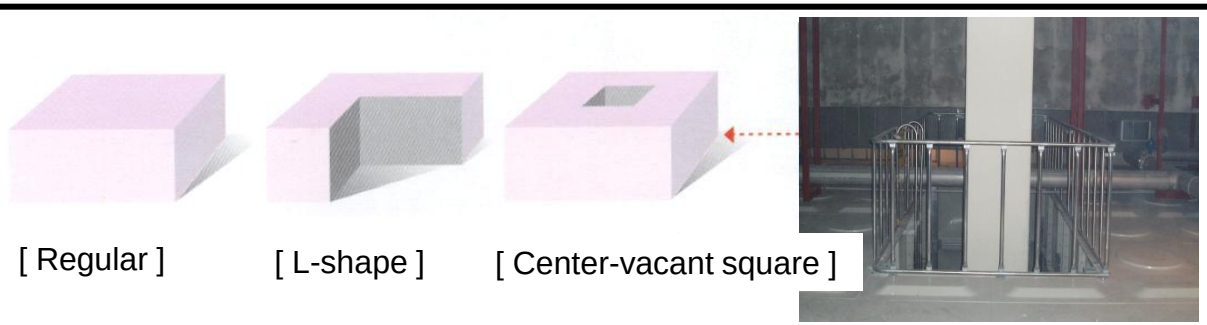
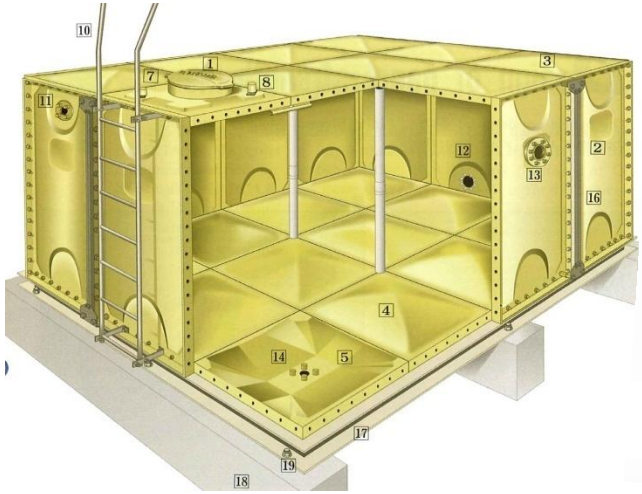
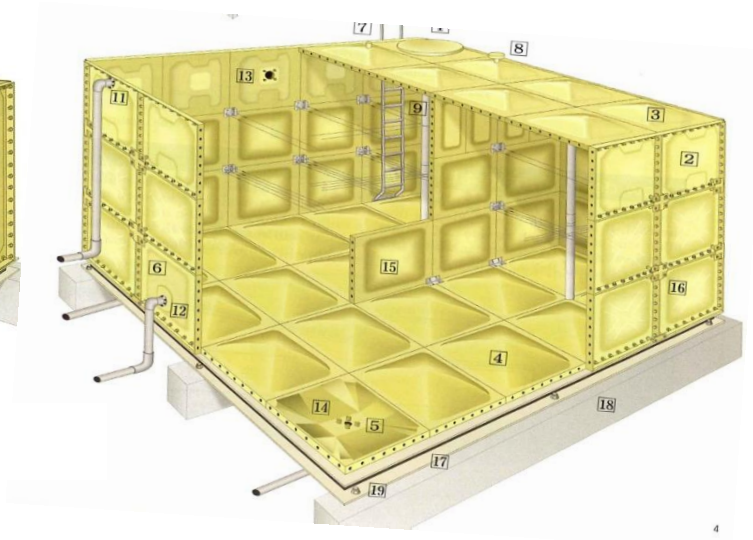
Items		SEJIN SMC TANK	Remark
1. Panel	Production	■Hot press molding method	■High strength and smooth surface
	Glassfiber Contents	■30~33% or more	■Standard : 25% ■Option : High strength panels with G/F contents 38%
2. Tank Capacity		■0.5m^3 ~ 5,000m^3 or more	■Largest tank installed : 3,461m^3
3. Tank Height		■0,.5m ~ 6mH	■Highest tank installed : 6m
4. Reinforcement System		■Both of internal and external reinforcement systems are available	
5. Steel Base Frame		■Hot dip galvanized steel ■Bolting assembly type	■Easy construction and constant quality by using uniformed material.
6. Internal Reinforcement	Tie-rods	■PET coated STS304 rod (Φ10.5) x 2pcs and GRP pipe (50 x 50 x 5t) -> Economical / Corrosion resistance	■Option 1 : Stainless steel 316 tie-rod ■Option 2 : No internal tie-rods system (external reinforcement system) is available up to 3mH or more
	Roof Support	■GRP pipe (Φ50 x 5t)	

5-2. Specifications of GRP Water Tank

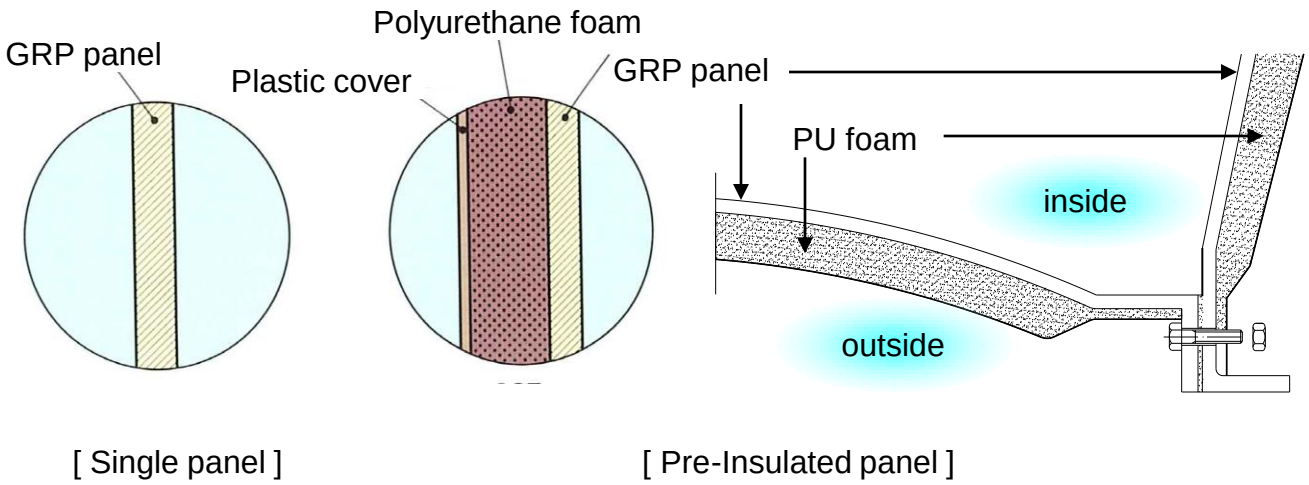
Items		SEJIN SMC TANK	Remark
7. External Reinforcement	Material	■Hot dip galvanized steel	
8. Internal Bolts	Internal Bolts	■Stainless Steel 316	
	Roof Bolts	■High tensile plastic bolt (corrosion resistance)	■Only the Korean company who developed high tensile plastic bolts.
9. External Bolts		■Hot dip galvanized steel	■Option : STS304 / STS316
10. Insulation		■25mmt Polyurethane Foam	■Thermal conductivity : 0.021 W/mK ■Density : 30~45 Kg/m^3
11. Manhole		■Φ650mm / 1000x1000mm	
12. Internal Ladder		■GRP : H50 x 30	■Option: STS304 / STS316
13. External Ladder		■STS304 (Φ32 x 1.5t)	■Option: HDG / STS316



6-1. Types of GRP Water Tank

Tank shape	 [Regular] [L-shape] [Center-vacant square]
Partition	 [One compartment without partition]  [Two compartments with a partition]

6-2. Types of GRP Water Tank

Insulation	 [Single panel] [Pre-Insulated panel]
Panel material	* Regular SMC (Glassfiber contents 33%) * High strength SMC (Glassfiber contents 38%) * Anti-bacterial SMC (more effective to prevent the spread of bacteria)

7. Reinforcing system per each height

☞ The above standard of panel arrangement is subject to change according to site conditions.

8-1. The structure of GRP water tank

※ The performance test (KS F 4811)

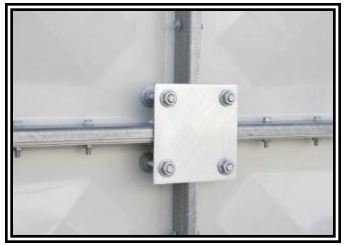
Items	Quality standard	Inspection
1. Hydrostatic pressure test	Fix a panel in the hydrostatic pressure tester and increase the pressure by 0.05kgf/㎠ (0.005MPa) per minute until it reaches certain pressure P. During the test, there should be no burst, crack and leak	Factory (safety factor S=4)
2. Leakage test	Fill the tank with water by the overflow level and check if there's any leakage after 48 hours.	Job site
3. Deformation test	The deformation at full tank should be less than 1% of tank height. (Ex: The deformation should be less than 30mm for 3mH tank)	Job site
4. Leakage test on outlet	Connect the outlet nozzle with 70Cm steel pipe of which the other end is supported with a span, and put a 100 kg load on the center of the steel pipe and check if there's any leakage on the joint.	Job site

☞ GRP Water Tank is designed to meet Korean standard which is equivalent to international standard.

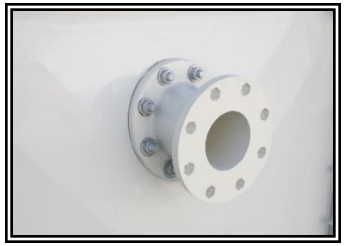
8-2. The structure of GRP water tank

External

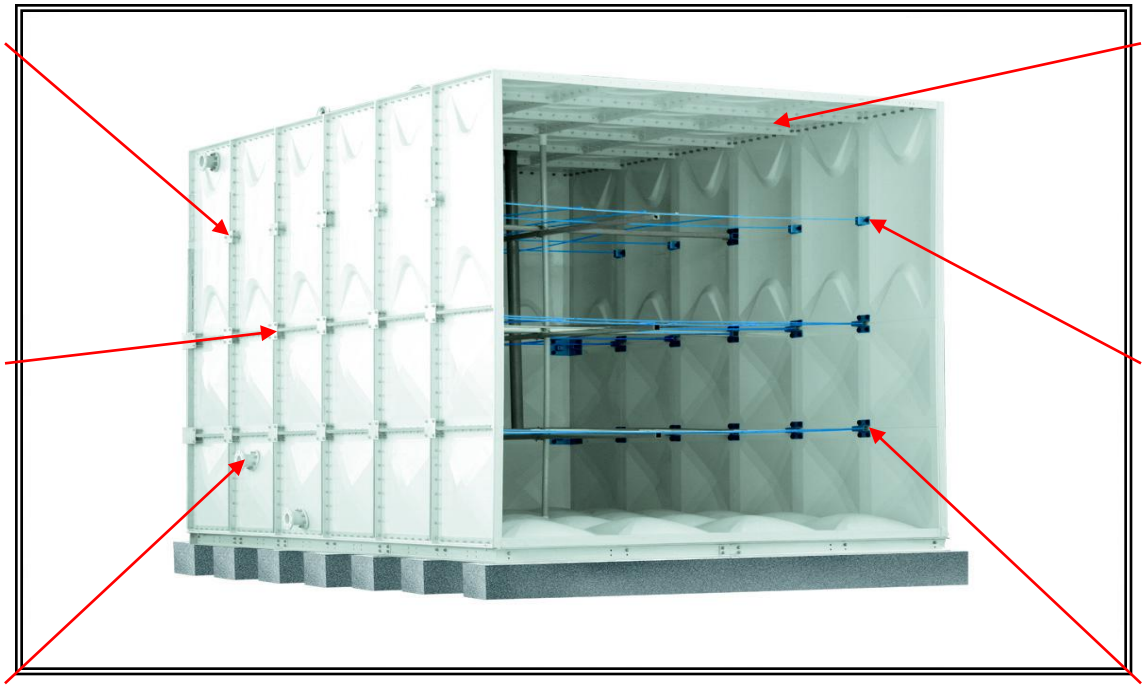
1. Up-wall position



2. Low-wall position



3. FLANGE (SMC)

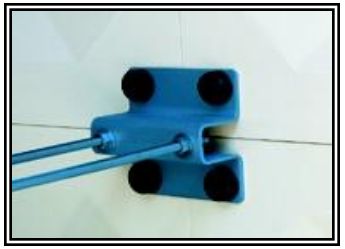


Option 1 : Externally reinforced system without internal tie-rods (up to 3mH)
Option 2 : Internal reinforcements – STS304+PE coating / STS316
Option 3 : Ladders – GRP / Stainless Steel / HDG steel

Internal

4. Engineering bolts

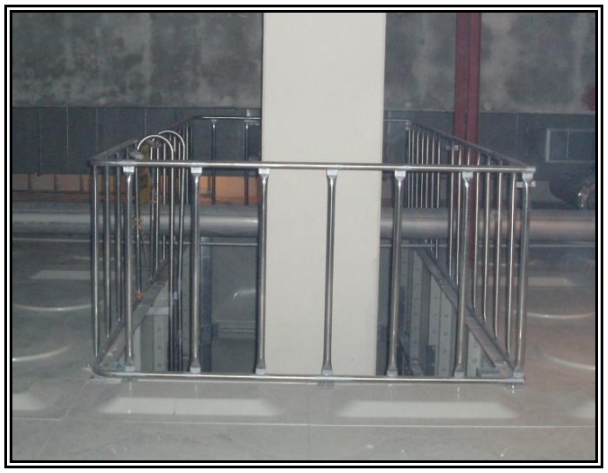
5. Up-wall position



6. Low-wall position

8-3. The structure of GRP water tank

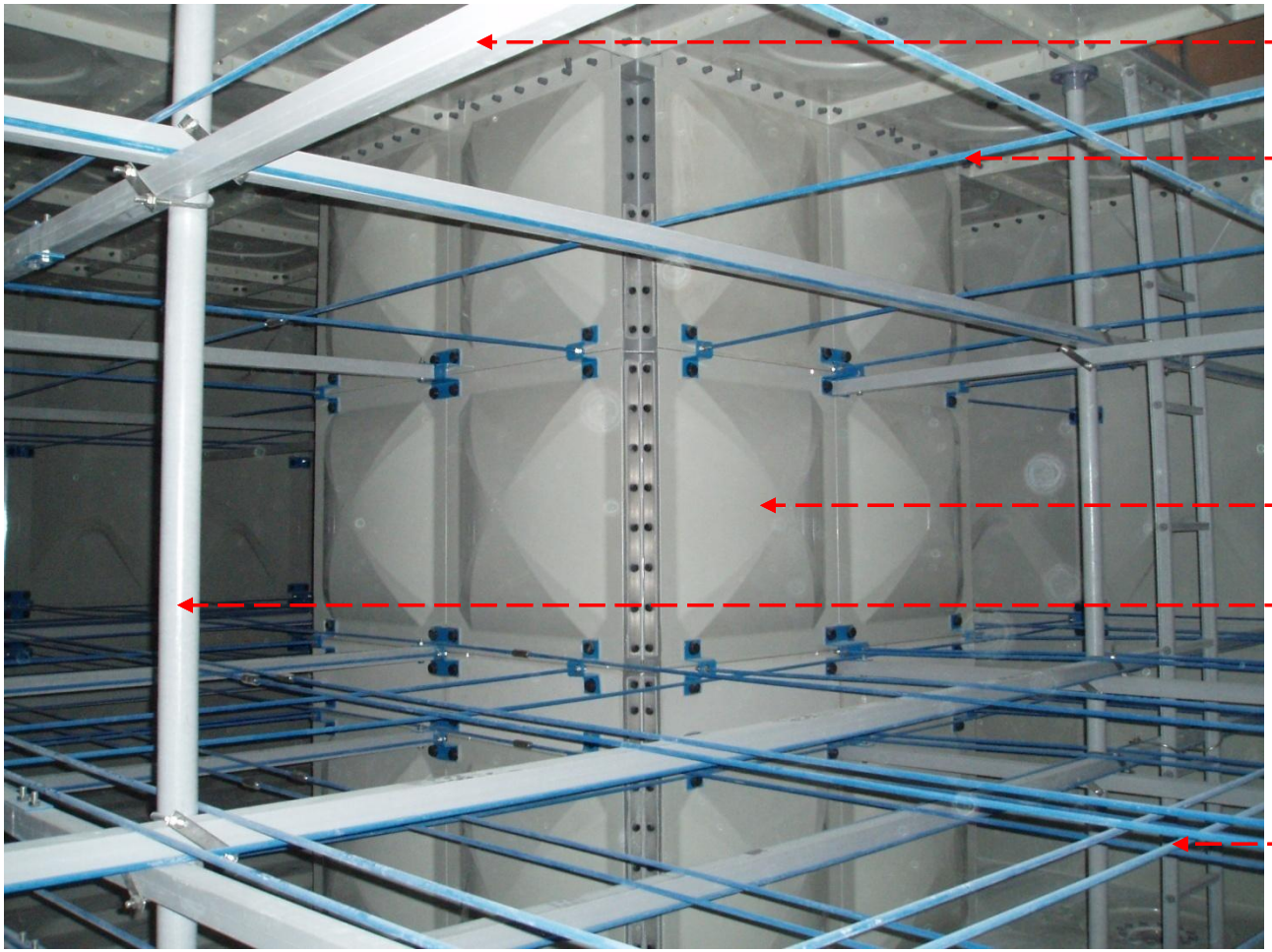
※ The wall panels arrangement around column



※ The advantages of the design (a tank with built-in columns)

- Effectively meet required tank capacity by making a full use of tank room space.
- No need to build multiple tanks to avoid the interference of columns
- Cost and time saving of construction.

8-4. The structure of GRP water tank



Tie-rod
(GRP)

Tie-rod
(PET coated STS)
1-line for upper layer

Wall panels
around column

Roof support
(GRP)

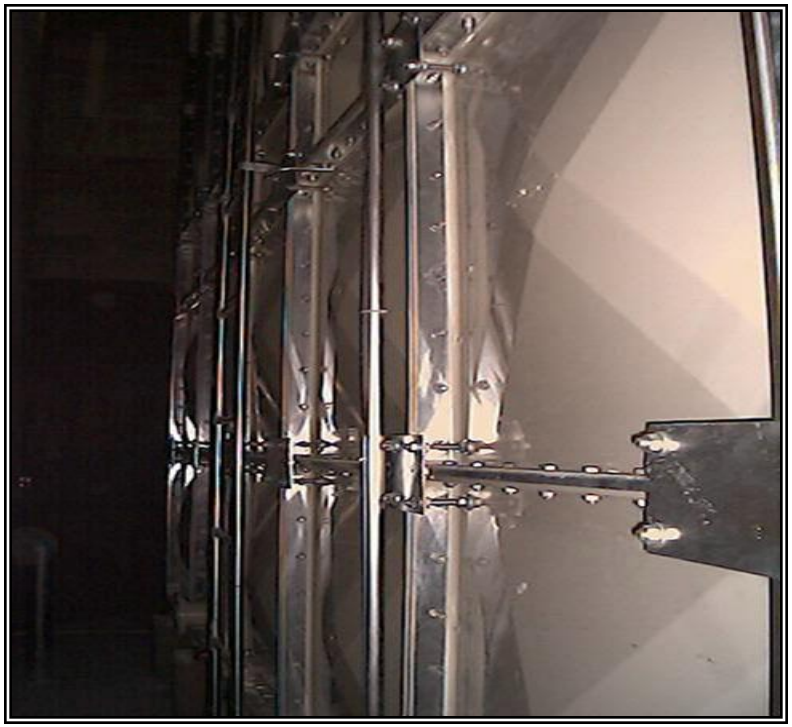
Tie-rod
(PET coated STS)
2-lines for lower layer`

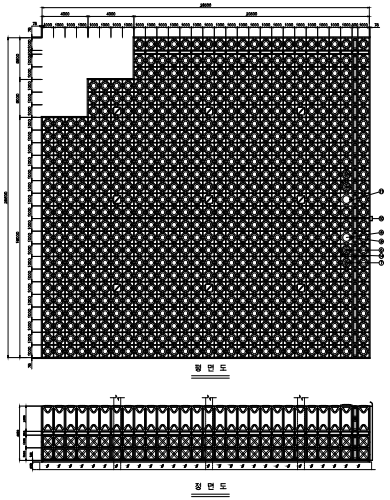
[Inside of tank around column]

11-1. Job references

※ Hyundai Apartment

Site : Kangdong-2nd complex, Seoul, Korea
Constructor : Hyundai Construction



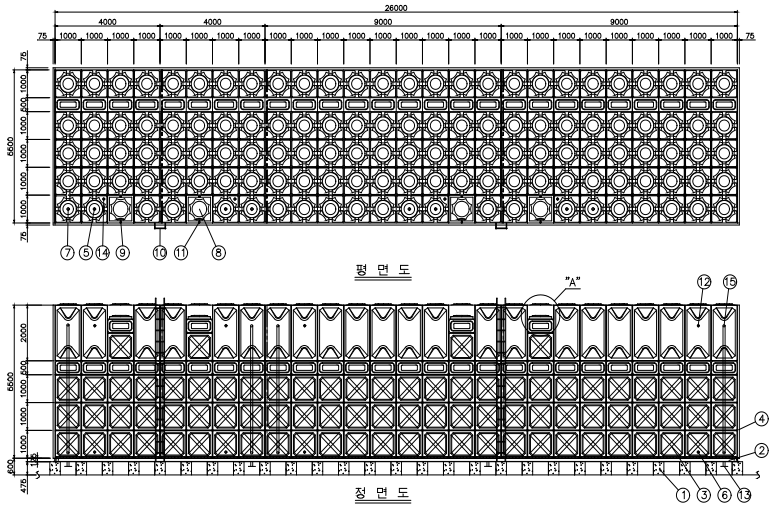


Construction : March, 2003
Dimension : {(19 x 28.5)+
(3 x 24.5)+
(3.3 x 20.5)}x4.3mH
Capacity : 2,935.4 ton

11-2. Job references

※ Lions Valley (Industrial Tower)

Site : Kasan-dong, Seoul, Korea
Constructor : Woolim Construction

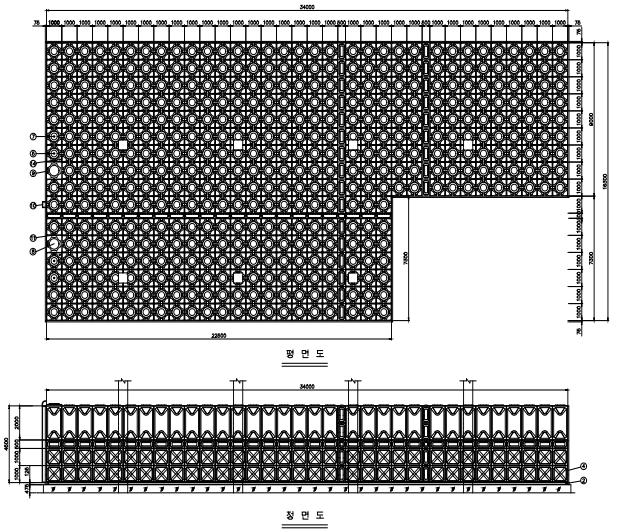


Construction : August, 2004
Dimension : 5.5m x 26m x 5.5mH
Capacity : 786.5 ton

11-3. Job references

※ Metan Apartment (by The Korea Housing Corp.)

Site : Metan-dong, Suwon, Korea
Constructor : Hyundai Corp.

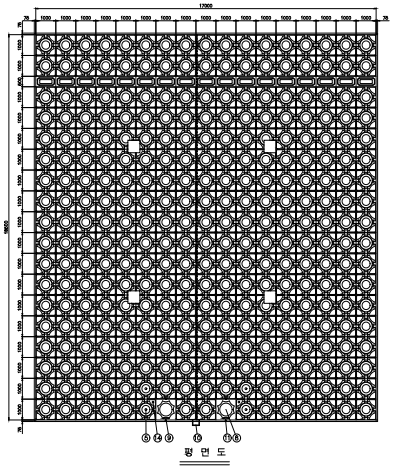


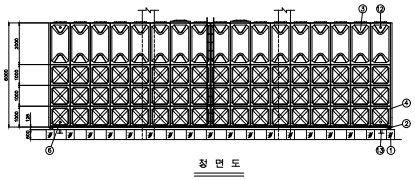
Construction : November, 2004
Dimension : {(34x9)+(22.5x7.3)}
x 4.5mH
Capacity : 2,116 ton

11-4. Job references

※ Xi-Hanam Apartment

Site : Hanam, Korea
Constructor : GS Construction



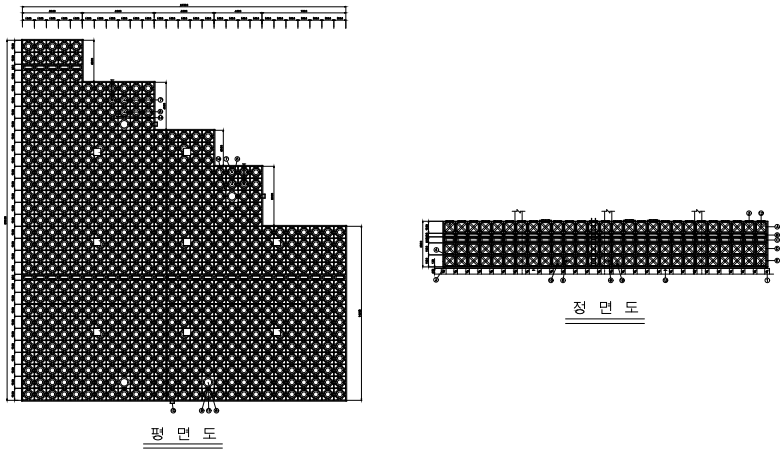


Construction : January, 2005
Dimension : 17m x 18.5m x 5mH
Capacity : 1,572.5 ton

11-5. Job references

※ Hyundai Apartment

Site : Nokyang-dong, Uijeongbu, Korea
Constructor : Hyundai Construction

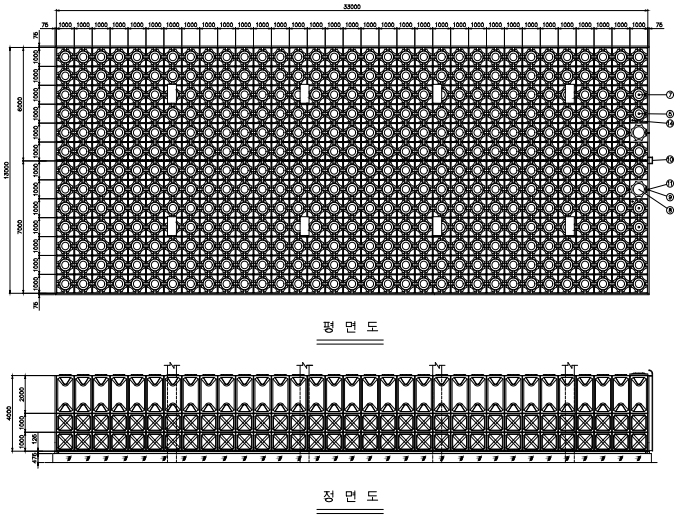


Construction : March, 2003
Dimension : {(30x5)+(26.5x6)+
(22.5x5)+(19.5x4)+
(14.5x7)}x3.8mH
Capacity : 2,283.8TON

11-6. Job references

※ Sangnok Apartment

Site : Mandeok-dong, Busan, Korea
Constructor : Hanshin Eng & Const.

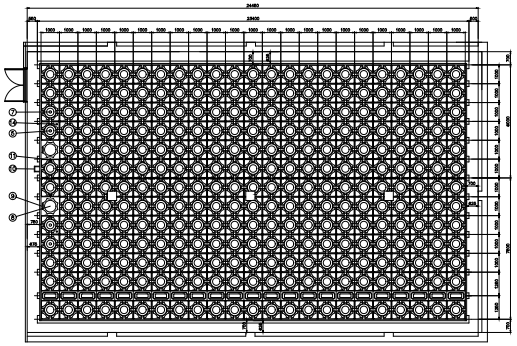


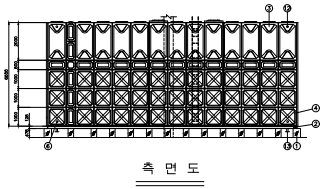
Construction : July, 2007
Dimension : 13m x 33m x 4mH
Capacity : 1,716 ton

11-7. Job references

※ Lumiart Apartment

Site : Balan-dong, Hwasung, Korea
Constructor : Woolim Construction



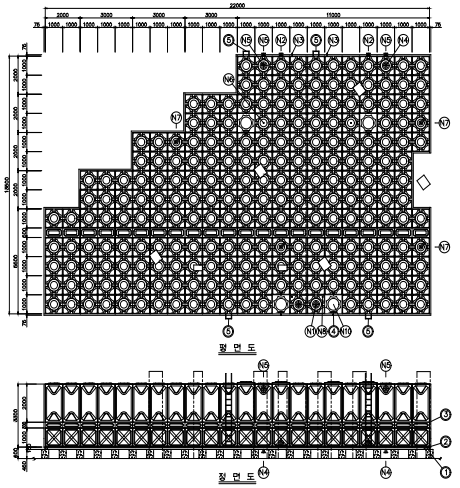


Construction : September, 2005
Dimension : 13.5m x 23m x 5.5mH
Capacity : 1,707 ton

11-8. Job references

※ Joongang Heights-Vill (Residential Bldg.)

Site : Seoklim-dong, Seosan, Korea
Constructor : Joongang Construction

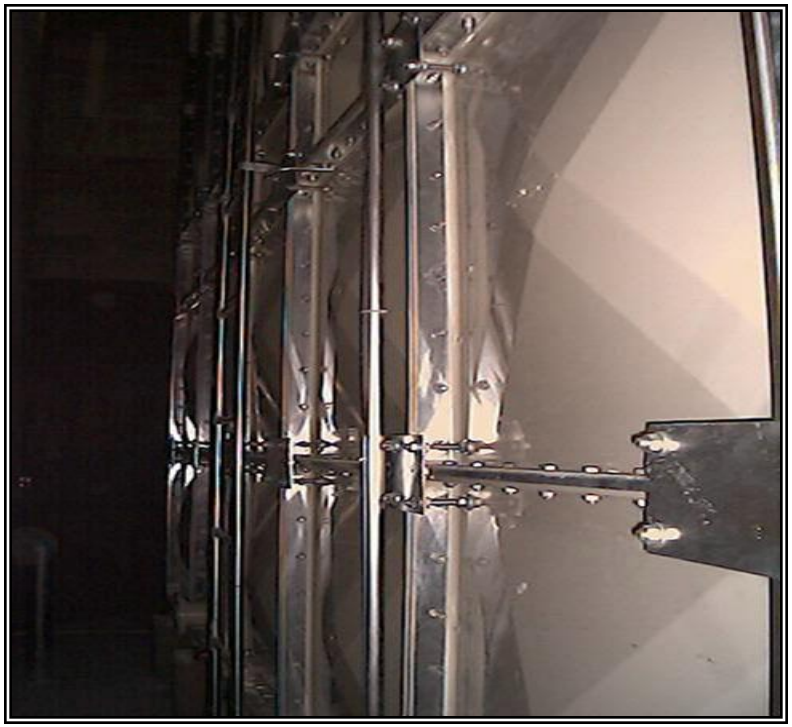


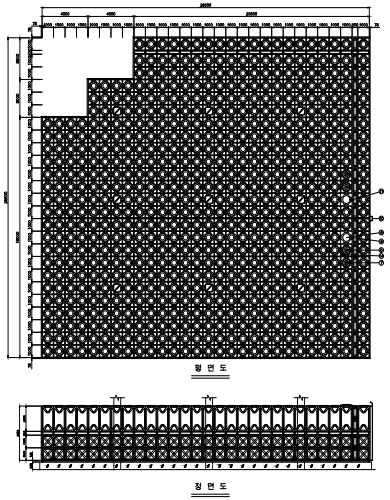
Construction : November, 2005
Dimension : {(5.5x22)+(2x20)+
(2x17)+(2x14)+(2x11)
-(1x3)}x3.3mH
Capacity : 799 TON

11-9. Job references

※ Hyundai Apartment

Site : Kangdong-2nd complex, Seoul, Korea
Constructor : Hyundai Construction





Construction : March, 2003
Dimension : {(19 x 28.5)+
(3 x 24.5)+
(3.3 x 20.5)}x4.3mH
Capacity : 2,935.4 ton

11-10. Job references

※ Guwol-dong Apartment (by The Korea Housing Corp.)

Site : Guwol-dong, Incheon, Korea
Constructor : Hyundai Construction
& Lotte Construction

Tank / Bldg.	Dimension (W x L x H)	Capacity (TON)
1100	8 x 12 x 6	576
	16 x 16.5 x 6	1,584
1200	20 x 20 x 5.3	2,120
1300	25.5 x 13 x 5	1,657.5
1400	14 x 14.3 x 5.3	1,061
1500	24.5 x 18 x 5.5	2,425.5
2100	21.5 x 12.8 x 5.3	1,458.6
2200	{(7x17)+(11x19)} x 5	1640
2300	13 x 15 x 5	975
2400	13 x 28 x 5.8	2,111.2
3100	{(11x21)+(5x13)} x 3	888
Total		16,496.8

Thank You !

[Contact Details]

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Email : m.alkawak@leetani.com