

## Eco-Friendly Water Tank

ECOCELAR will strive to be a company for water health and environment.



**ECOCLEAR CO.,LTD.**

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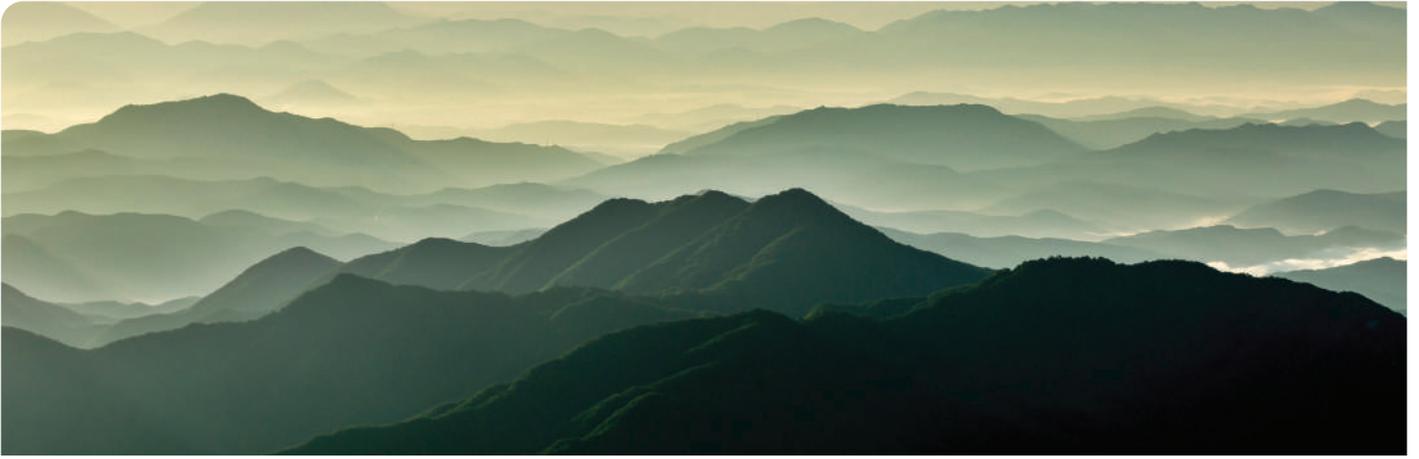
# ECOCLEAR Eco-Friendly Water Tank

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ECOCLEAR

## Eco-Friendly Water Tank

Quick and clear beyond time and thought -  
ECOCLEAR Co., Ltd.'s technology and quality are the driving force of a beautiful future.  
On the basis of the possibility of Infinite and the spirit of challenge, ECOCLEAR Co., Ltd  
leaps to become the best company.

We sincerely appreciate your support for the growth of our company in the meantime and we will do our best to provide customer satisfaction service.

All ECOCLEAR members will work hard to provide excellent products and quality services.

Thank you

### • SMC Water Tank Installation



• Certificates



Certificate of Design Registration (1)



Certificate of Design Registration (2)



Certificate of Design Registration (3)



Certificate of Design Registration (4)



Certificate of Design Registration (5)



ISO 9001



ISO 14001



Certificate of Venture Business



Research & Development Center



Certificate of Factory Registration



Water Regulations Advisory Scheme



Certificate of Patent (Stay bolt structure- B company)



Certificate of Patent



KC Certificate



Test Report (Stopper)



Test Report (Anchor Bracket)

## FEATURES AND MERITS OF ECO-FRIENDLY WATER TANK

### SMC Water Tank Features

#### SMC Water Tank Features

Easy installation regardless of space and size. Simple disassembly and reassembly of water tank.

#### Hygiene and Durability

Complete block out of external light for preventing growth of bacteria. Applied stainless steel for the internal structure to prevent corrosion or rust and hot dip galvanized the external structure for corrosion resistance.

#### Outstanding Insulation and Dew-Proofing

Complete block out of external light for preventing growth of bacteria. Applied stainless steel for the internal structure to prevent corrosion or rust and hot dip galvanized the external structure for corrosion resistance.

#### Absolute Water Tightness

Features absolute water tightness by applying high-stability sealing tape.

#### Simple Assembly

Use of standardized parts that require assembly at construction sites, which facilitate mobility to small spaces, expanding tanks, and reinstalling tanks in a different location.

#### Easy to Clean

The drainage hole located on the bottom of the tank facilitates the cleaning. The square-type manhole maximizes the space enabling easy access by people.

#### Antibacterial Water Tank

Special production of antibacterial water tank.

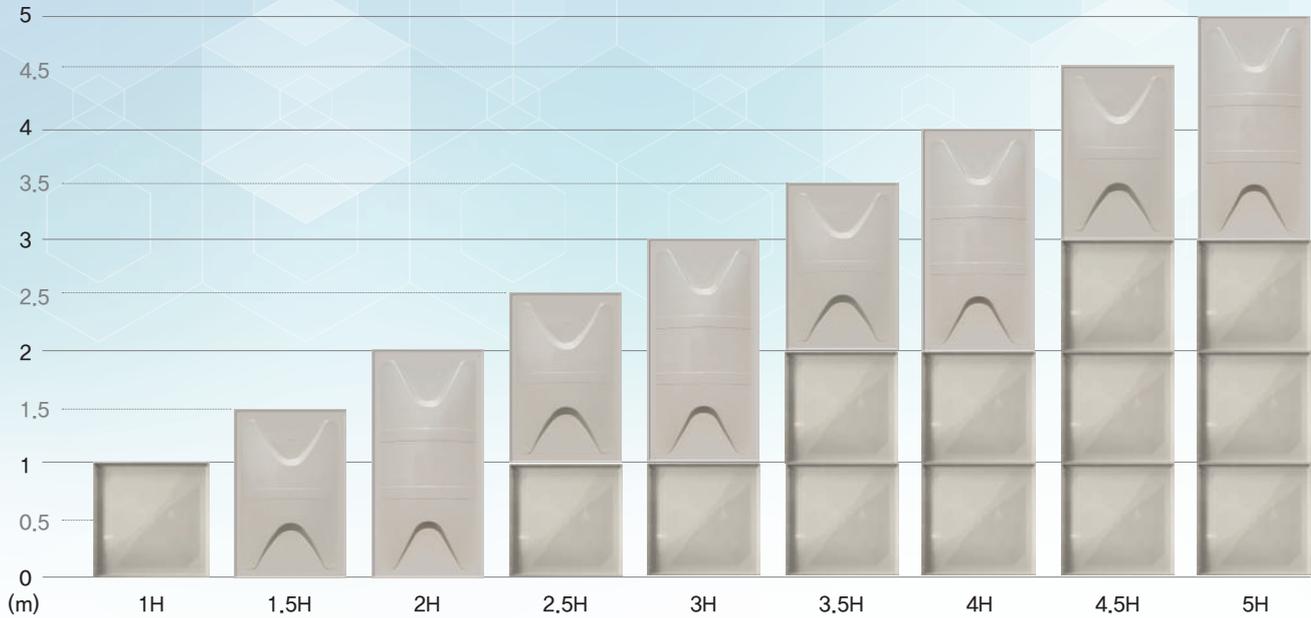
### Merits of SMC Water Tank

1. Use of exclusive panels according to parts and pressure distribution.
2. Guaranteed stability and durability by use of exclusive panels.
3. Use of standardized panels (1,000×2,000 / 1,000×1,500 / 1,000×1,000 / 1,000×500 / 500×500mm) that enable construction in various sizes and partial replacement and reassembly, if needed.
4. Use of assembly bolt in the foundation frame that last for a long time, unlike welded products which the gilded parts are prone to corrode.
5. Applied hot dip galvanized flange bar as reinforcer to minimize distortion by external factors, such as the weather, water pressure, etc., and other defects.
6. Applied SMC (Sheet Molding Compound) to minimize contraction and distortion of panels. Maintains good quality of material property that enables easy assembly of parts.
7. Applied special insulation materials for outstanding insulation features.



# COMPOSITION OF PANELS

## Composition of Wall Panels by Height



## Type and Shape

### Wall Panel



### Flat Panel



### Bottom Panel



### Roof Panel



### Drain Panel / Manhole Panel



## PHYSICAL PROPERTIES

### Physical Properties

Item	Unit	Physical Properties	KS Standard
Gravity		1.85	–
Tensile Strength	MPa(Kgf/mm <sup>2</sup> )	102.9(10.5)	60(6.12) ↑
Flexural Strength	MPa(Kgf/mm <sup>2</sup> )	151	80(8.16) ↑
Flexural Modulus	MPa(Kgf/mm <sup>2</sup> )	17,100	6,000(612.24) ↑
Absorption	%	0.06	1 ↓
Barcol Hardness	–	58	30 ↑
Glass Fiber Content	%	31	25 ↑
Thermal Conductivity	–	2.0×10 <sup>5</sup>	–
Distortion	–	2.0×10 <sup>5</sup>	–

\* The above mentioned data are subject to change depending on the testing conditions and environment.

### Design Criteria

#### Earthquake Resistance

Designed to KH = 1/3G

#### Snow Load

Designed to withstand 60kg/m<sup>2</sup> of snow load.

#### Wind Pressure

Designed to withstand wind at a 60m/sec speed maximum, even when the tank is not filled with water.

#### Hydrostatic Pressure

Designed to restrain distortion from hydrostatic pressure. Maximum distortion rate of wall panels after 48 hours of full tank is less than 1.0% of the total height of the water tank.

#### Strength of Drainage

Designed to withstand 100 kg of water poured to the tank with no leakage, with 100mm-diameter flange installed on the internal side of the wall of a full tank and props on the bottom part of the pipes every 70 cm.



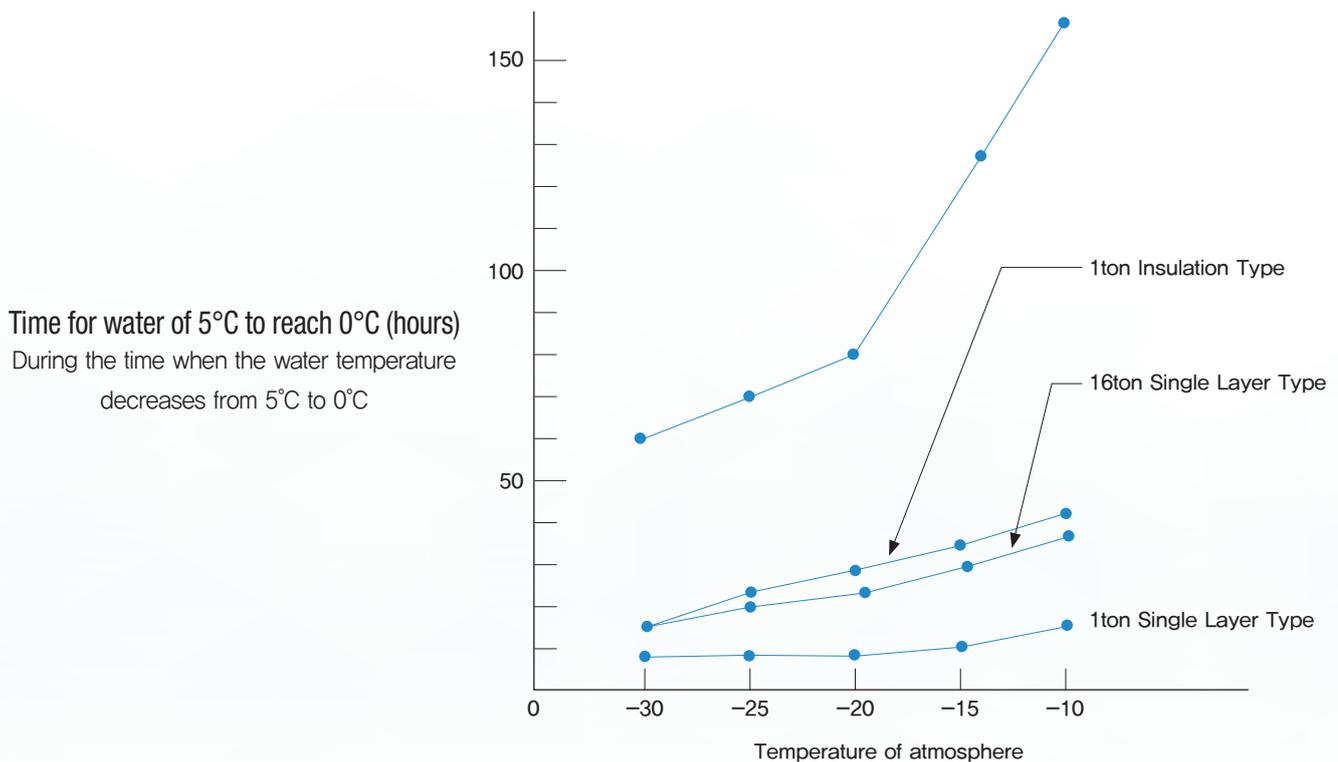
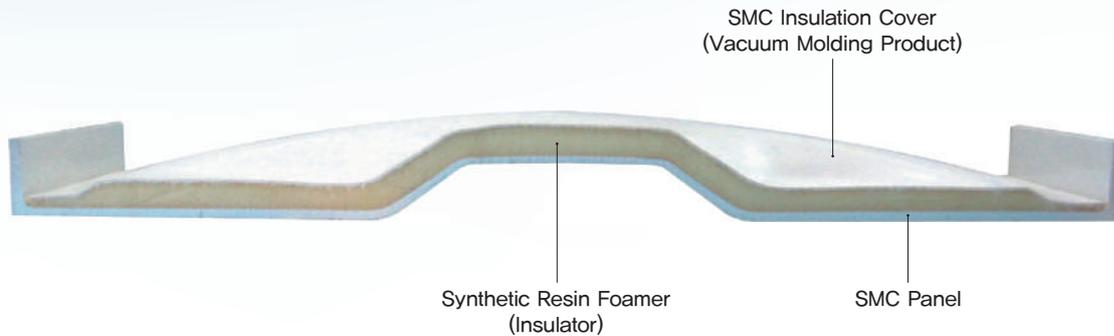
# PERFORMANCE AND FEATURES OF INSULATED PANELS

## Outstanding Insulation

SMC insulated panels are made from applying polyurethane, an efficient insulator, on a single-layer panel, and covering it with a special synthetic resin, creating a sandwich-like structure panel with high insulation performance.

## Performance

SMC water tanks have outstanding insulation and dew-proof as triple sandwich structure. Because single panel with heat retention which has 250 times conductivity more than other metal (STEEL, SUS etc) is laid, and polyurethanes foam with excellent insulation effect is inserted as lagging. Lastly special cover made of synthetic resin vacuum-molded is put on.



# REINFORCEMENT SYSTEM OF ECO-FRIENDLY WATER TANK

## Internal Reinforcement System

※The design criteria of water tanks are safeness, hygiene, and convenience.



Outstanding strength, durability, water tightness, and appearance. Safe structural design. SMC water tank strengths are gained by connecting the panels with stainless steel tie rods from the inside of the tank.

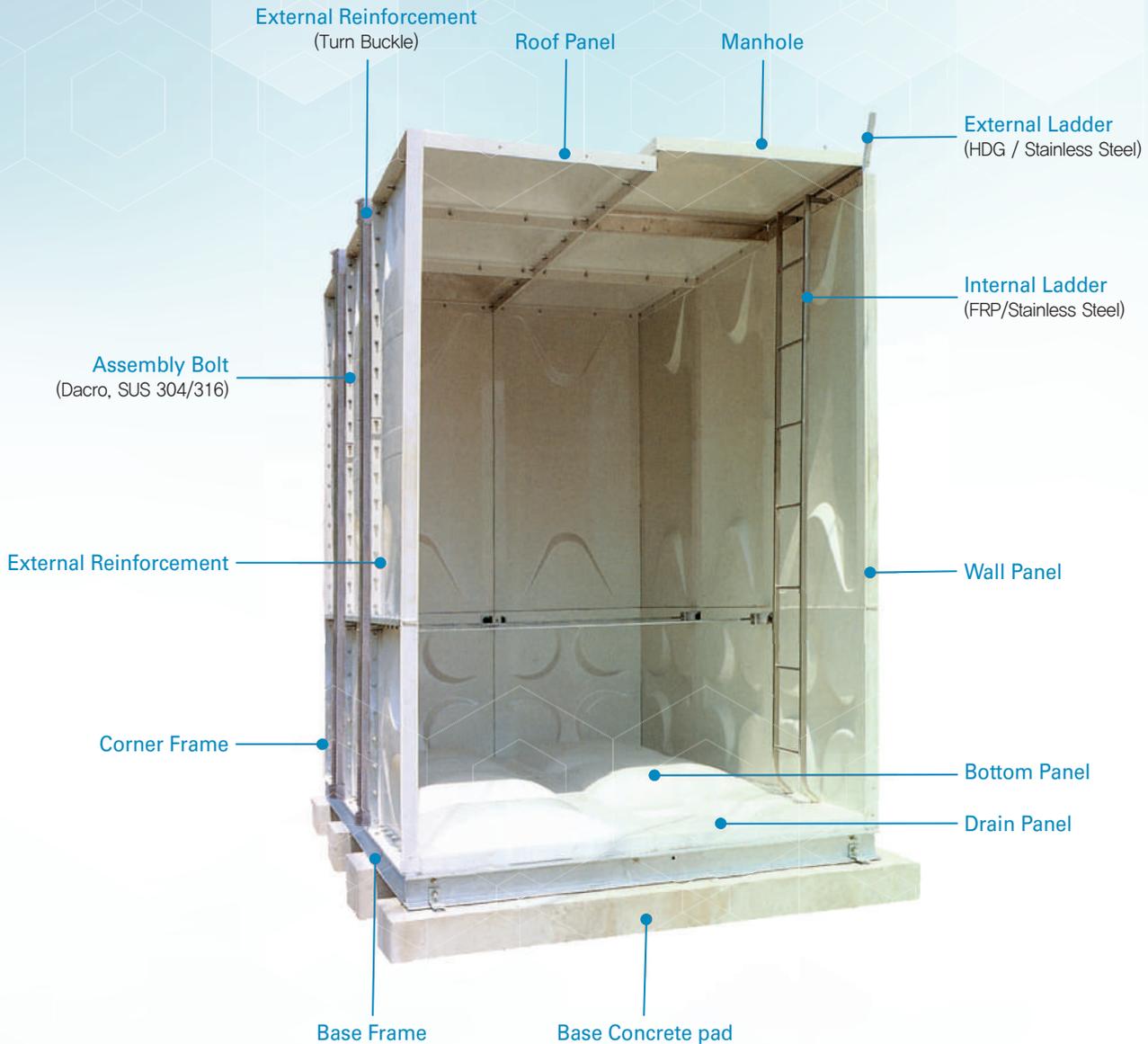
※Stainless steel 316 internal ladder is optional.



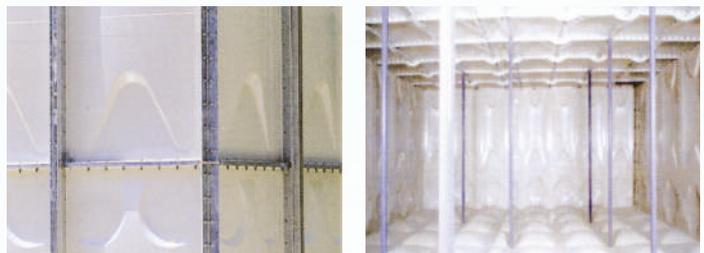
# REINFORCEMENT SYSTEM OF ECO-FRIENDLY WATER TANK

## External Reinforcement System

※ Outstanding durability and hygiene. Easy maintenance and repair.



Joints of wall panels are sustained with vertical external reinforcer frames. Roof panels are sustained with tie rods and pipes. Bottom panels are sustained by connecting each other with bolts using brackets. (For tanks below 2m.)



※ Stainless steel 316 internal ladder is optional.

# OUTSTANDING SAFENESS AND WATER TIGHTNESS

## Outstanding Safeness and Water Tightness

※ Perfectly improved safeness and water tightness.

1. Applied hygienically nontoxic materials that are not affected by temperature changes and PVC sealing tapes for perfect water tightness with outstanding weatherability and stability.
2. Adhesion type panels for easy construction and short working period.
3. We provide satisfying products with no leaks from joints and no defects.

## Stability of sealing tape certified by overseas standard test (PSB Standard)



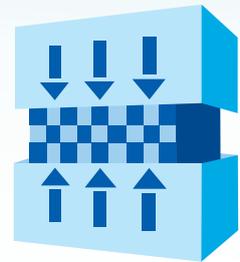
Item	Test Method	Result	Standard
Sealing Tape	PSB Standard	Pass	PSB Standard
Adhesion	PSB Standard	Pass	PSB Standard
Water Tightness	PSB Standard	Pass	PSB Standard
Weatherability	PSB Standard	Pass	PSB Standard
Stability	PSB Standard	Pass	PSB Standard

The results of the test certified to the requirements of the PSB Standard for permanent compliance from 1994.

PSB sealing tape test result



Sealing Tape



Thickness restored by 95% after 24 hours of applying sealing tape



### Applied drain panel on the front side that collects and discharges water.

1. Upgraded stability and semi-permanent bottom panel with improved weaknesses.
  2. Safeness upgraded by 100% by improving water flow
- We provide satisfying products with no leaks from joints and no defects.

### Available Types: Cube-type tank, corner-type tank (□, ㄱ, L type tank)

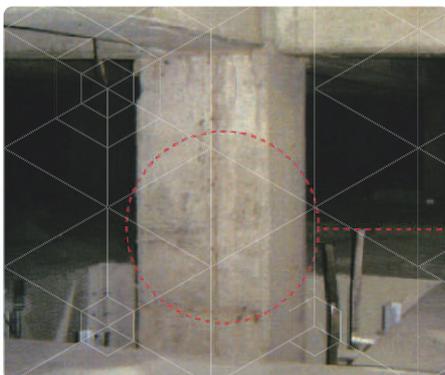


Image of a □ corner type



Corner : □ type



Corner : L type



Cube type

Tank height for installation: 1.0-5.0m

Tank volume for installation: 1-3,000ton

(Tanks of volumes that exceed 3,000 tons require customized designing.)

# ANTIBACTERIAL WATER TANK

Antibacterial water tank manufactured with SMC composition made from silver nano and titanium phosphate that prevents algae and bacteria, such as various types of viruses, mold, moss cell, organic floating matters, harmful organic compounds, to maintain clean water for a long time.

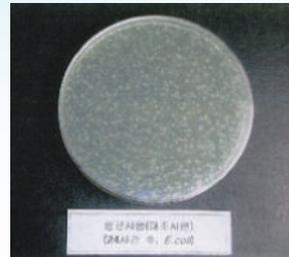
(Patent no. 10-0629451)

The tank is certified to restrain the proliferation of *E. coli* and *S. aureus*, in particular, which efficiently prevents food poisoning when installed in schools and nurseries.

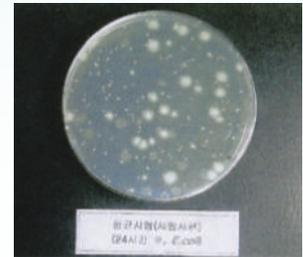


## Antibacterial effectiveness test against *E. coli*

	(Unit : CFU/specimen)
Control specimen immediately after inoculation	$2.5 \times 10^5$
Control specimen after 24 hours	$1.7 \times 10^7$
Test specimen after 24 hours	$5.0 \times 10^5$ (1.5)



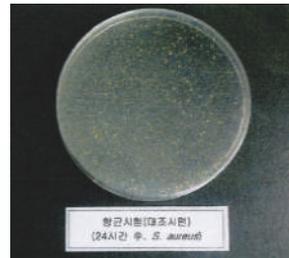
Antibacterial test  
(control specimen)



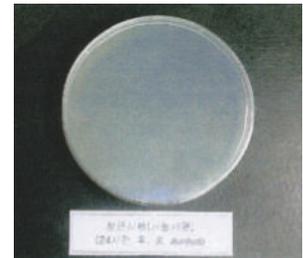
Antibacterial test  
(After 24 hours, *E. coli*)

## Antibacterial effectiveness test against *S. aureus*

	(Unit : CFU/specimen)
Control specimen immediately after inoculation	$2.1 \times 10^5$
Control specimen after 24 hours	$2.9 \times 10^7$
Test specimen after 24 hours	<10 (4.5)



Antibacterial test  
(After 24 hours, *S. aureus*)



Antibacterial test  
(After 24 hours, *S. aureus*)

## Antibacterial Test Result

※ ( ) : Antibacterial Activity Value (R) = [log(B/A)-Log(C/A)]=[log(B/C)].

From here,

A: Initial number of bacteria in the control specimen (average value)

B: Number of bacteria in the control specimen after 24 hours of culture (average value)

C: Number of bacteria in the test specimen after 24 hours of culture (average value)

	Control specimen after 24 hours	Control specimen after 24 hours	Test specimen after 24 hours
<b>E.coli</b>	$2.1 \times 10^5$	$1.7 \times 10^7$	$5.0 \times 10^5$ (1.5)
<b>S. aureus</b>	$2.1 \times 10^5$	$2.9 \times 10^5$	<10 (4.5이상)

## PARTITION TYPE WATER TANK

one water tank in a limited space creates an effect of installing multiple tanks, which is an economical alternative and efficient for maintenance.

### Performance

#### Maximized volume in a limited space

The Partition Water Tank can maximize the tank volume than installing separate water tanks, especially for limited spaces, such as basement or small areas.

#### Precautions when cleaning

One of tank must maintain less than 50% of water level for safety reasons when cleaning the other tank.

#### Easy Maintenance

Two tanks are installed as one, which enables easy maintenance and does not require water supply cutoff for cleaning.

#### Economical

The Partition Water Tank is more cost effective, including the cost for labor work, compared to installing separate tanks for different purpose.

#### Various Usage

When a partition is applied, one tank can be utilized as a potable water tank, and the other for utility water (for fire hydrant).

### Installation Example

If tanks for two different use are needed in a limited space of area or a boiler room, a 16-ton partition type tank can be installed to use half for potable water 8ton and the other half 8ton for utility water. 8ton however, if two separate tanks are installed instead, it needs 1 meter distance between the two tank. So each tank capacity is only 6 ton.

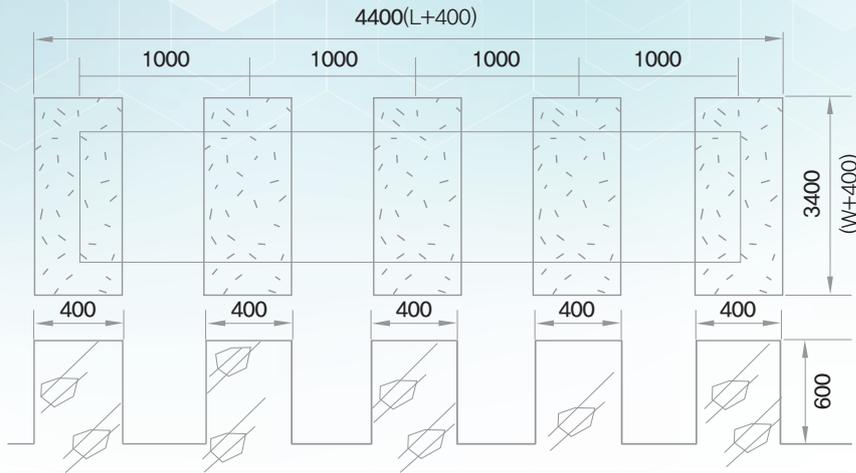
#### Section installation



# CONCRETE PAD PRODUCTION STANDARD

## PAD Production Standard

Width : Over 300~400mm | Height: Over 600mm (including base frame) | Gap: Max, 1m or less  
Outer dimensions: W, L+400mm | Horizontal degree: 1/500 or less (Keep the top surface as flat)



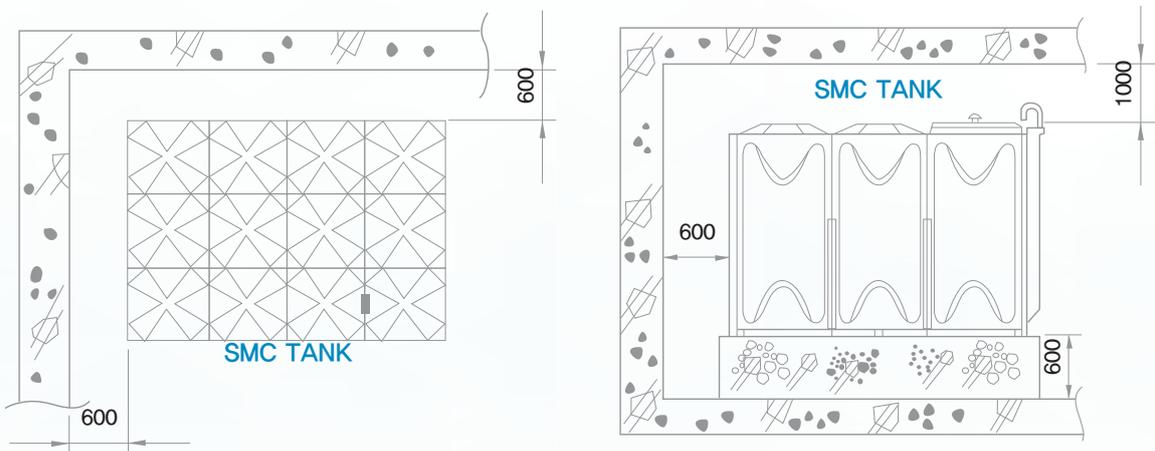
ex) 3W×4L×2H

※ SMC water tanks are recommended to be installed indoors for freeze prevention and maintenance.

## Installation Space

For installation and maintenance of water tanks, the tanks require an extra space of at least 600mm on each side and 1,000mm to the ceiling.

### Water Tank Installation Space



# INTERNAL AND EXTERNAL REINFORCED ACCESSORIES FOR WATER TANK

SMC Panel, metal materials for base and frame, ladder, etc.



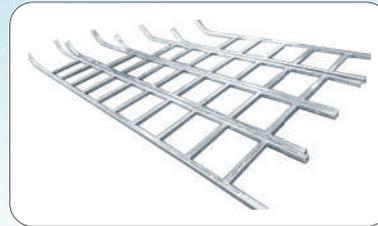
• Internal ladder



• Ventilator  
50A , 100A



• Ancor bracket



• External ladder  
(1.5M / 2M / 3M / 3.5M)



• External ladder  
Assembly bracket



• External flange bar  
(450 / 950 / 1200 / 1450 / 1950)



• External flat bar  
(450 / 950)



• Channel



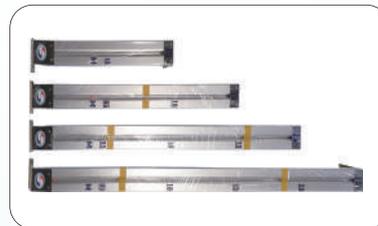
• Horizontal Plate  
(5070)



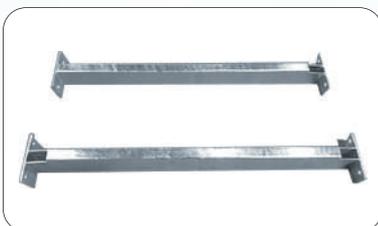
• Connecting bracket  
(7575z)



• 2 & 4 Holes Plate  
(4 & 2 holes)



• Water gauge  
(1M~5M)



• Sub-materials  
(563 / 525 / 990 / 957  
994 / 1026 / 1063)



• Base angle

# INTERNAL AND EXTERNAL REINFORCED ACCESSORIES FOR WATER TANK

## Features of Internal and External Reinforcers for Water Tank

**Special PE Coating Material by Applying Modern Equipment**

**Unique Eco-friendliness**

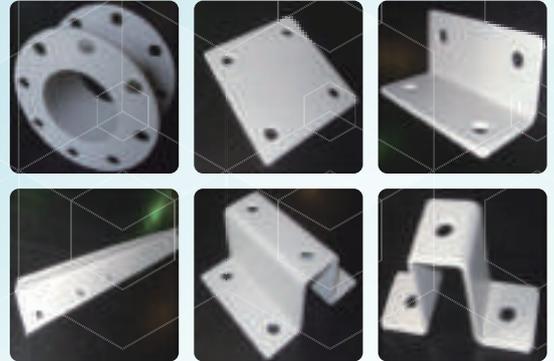
Fundamentally prevents the generation of toxic substances, including endocrine disruptors

**Hygiene Safeness**

Applied safe PE special coating technology for storing clean water

**Outstanding Durability**

- Strengthened adhesion and corrosion resistance by applying PE special coating technology
- Prevents the emission of hazardous substances generated by special PE coating chlorine gas and problems
- Reduced maintenance and repair costs
- Maintains clean water for people and the environment



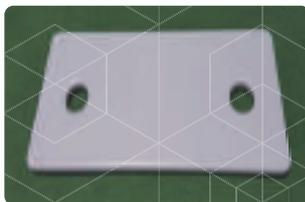
## PE Coating with POSMAC Material

ECOCLEAR's special PE coating by applying POSMAC (POSCO Magnesium Alloy Coating) is good for anti-corrosion. It can be solution about the issues of corrosion when using regular.

POSMAC is renowned for its corrosion resistance property, which is 5-10 times stronger compared to Hot-dip-galvanizing GI, GI(HI). The anti-corrosion property in cut surfaces is excellent.



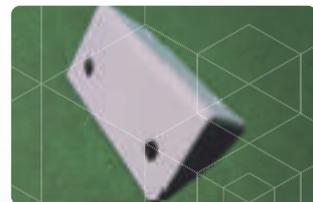
INTERNAL BRACKET 1760



PLATE(2 HOLES)



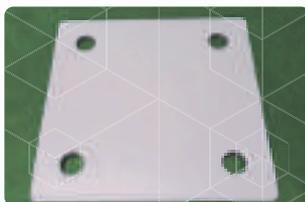
FLAT BAR 450/880/950



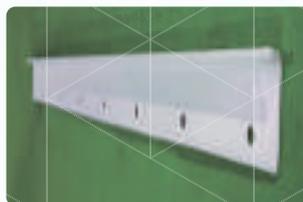
CORNER FLAT PLATE 9090



INTERNAL BRACKET 17160



PLATE(4 HOLES)



FLANGE BAR 450/850/950/1200

# INTERNAL AND EXTERNAL REINFORCED ACCESSORIES FOR WATER TANK

## PE Coating Metal Flange

### PE-Coating flange for water tank

Semi-permanent product with polyethylene applied on regular metal plates to fundamentally reduce corrosion and the emission of endocrine disruptors and heavy metals.

### Flat flange



65A



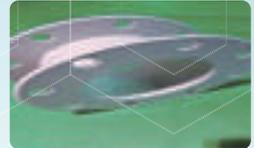
80A



100A



125A



150A



200A



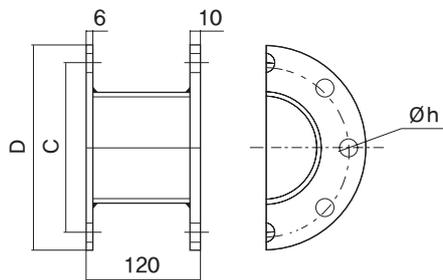
250A



300A



350A



SIZE	C	D1	h	Hole Q'ty
65A	140	175	19	4
80A	150	185	19	8
100A	175	210	19	8
125A	210	250	23	8
150A	240	280	23	8
200A	290	330	23	12
250A	355	400	25	12
300A	400	445	25	16
350A	445	490	25	16

### Slope flange



65A



80A



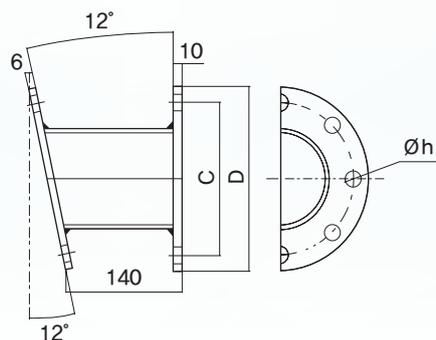
100A



125A



150A



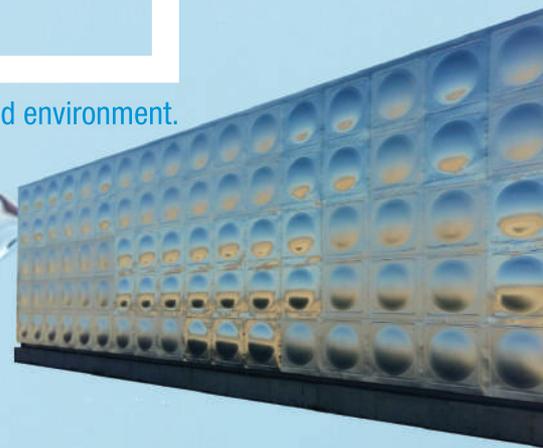
SIZE	C	D1	h	Hole Q'ty
65A	140	175	19Ø	4
80A	150	185	19Ø	8
100A	175	210	19Ø	8
125A	210	250	23Ø	8
150A	240	280	23Ø	16

Stainless steel panel tank

# ***ECOCLEAR***



ECOCLEAR will strive to be a company for water health and environment.



## STS PANEL TANK

### Features of Stainless Steel Panel Tank



#### Strength

STS panel tanks boast excellent strength, featuring evenly pressed stainless steel plates—1.5 times firmer than mild steel and 6 times than that of FRP—used to assemble the panels by welding after bending them on all four sides.

#### Cleanliness

Stainless steel itself is corrosion resistant and rust-free, and prevent formation of moss because of blockage of ultraviolet rays. It maintain a clean environment.

#### Airtight

All joints inside the tank are tig welded, creating a perfectly airtight environment.

#### Economical

Despite the use of high-priced stainless steel, STS panel tank minimized material loss from efficient design and press process, and no need of anti-rust coating makes an overall reasonable cost.

#### Corrosion resistant

The glossy surface of the material and the design for withstanding water pressure goes along well with buildings. The material itself does not generate heat, allowing semi-permanent use of the product.

#### Diversity

The standardized panels can be welded to the right size according to the needed tank capacity, and the lightweight material enables easy assembly.

#### Heat and impact resistant

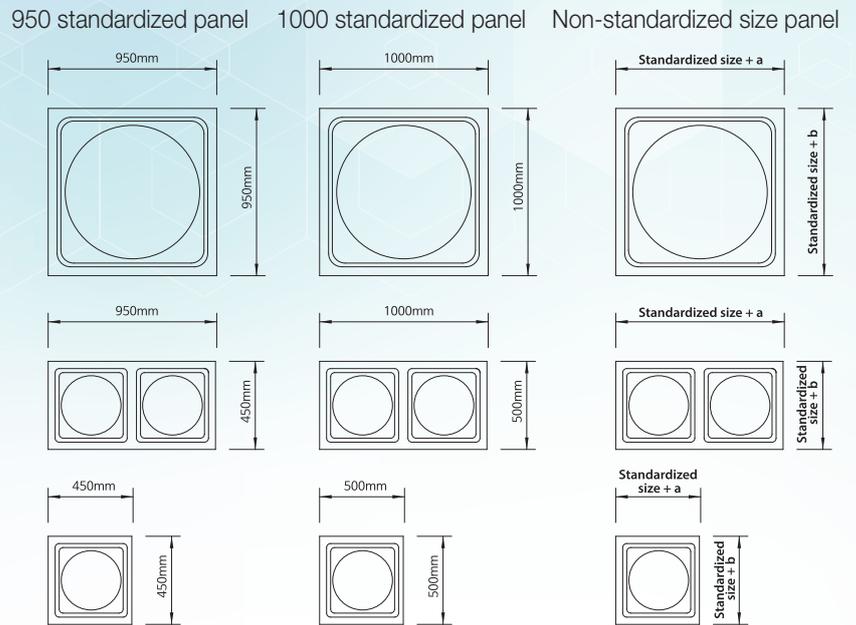
No concerns of damages from external impact or fire and designed to resist earthquakes.

# STS PANEL TANK

## Dimensions of STS Panel Tank

### Size of stainless steel panel

The STS panel tanks are made by assembling the panels with the following dimensions :  
 950L×950W, 950L×450W, 450L×450W,  
 1000L×1000W, 1000L×500W,  
 and 500L×500W  
 (Width and height can be manufactured in non-standardized dimensions)



### Stainless steel thickness by height

The thickness of the panels must be decided in accordance with the height of the tank. The thickness of roof panels is basically 1.5T.

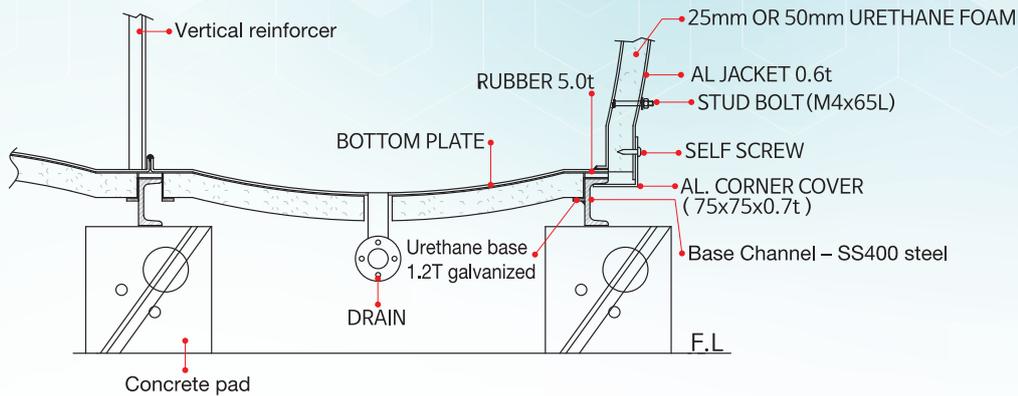
Height	1.0m	1.5m	2.0m	2.5m	3.0m	3.5m	4.0m	4.5m	5.0m	5.5m	6.0m
Thickness											
Channel	100 x 50 x 5,0T								125 x 65 x 6,0T		150 x 75 x 6,5T

## STS PANEL TANK

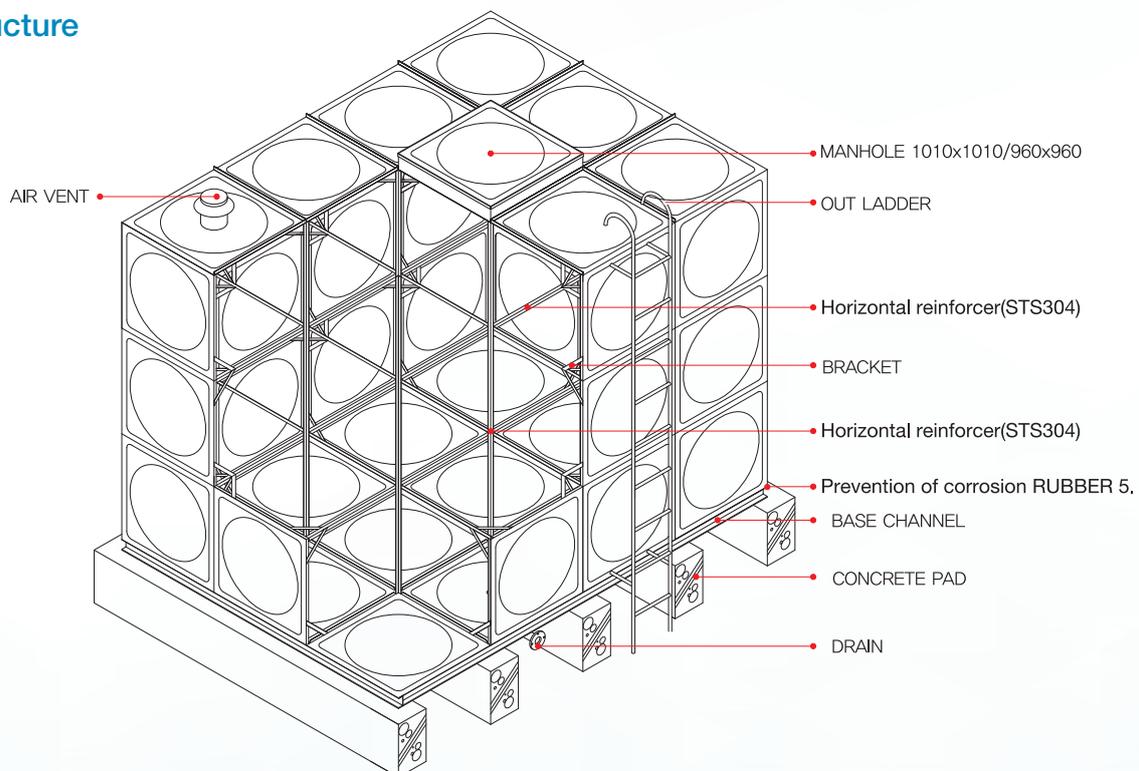
### Material and Property of Stainless Steel Panel Tank

P (XY urethane) is used for insulation with a thickness of 50mm (25mm).

The insulation cover is made from aluminum sheet processed in the same shape as the tank body.



### Structure



- **BASE CHANNEL**

Assembled in a checkerboard pattern after anti-rust coating

- **RUBBER**

Base channel installed to prevent corrosion on the base plate

- **MANUFACTURE**

Assembled into a cubical structure starting from the base plate to the walls, and lastly, the roof

- **Horizontal reinforcer**

Panels facing each other suspended with a reinforcer to support from pressure from the sides.

- **BRACKET**

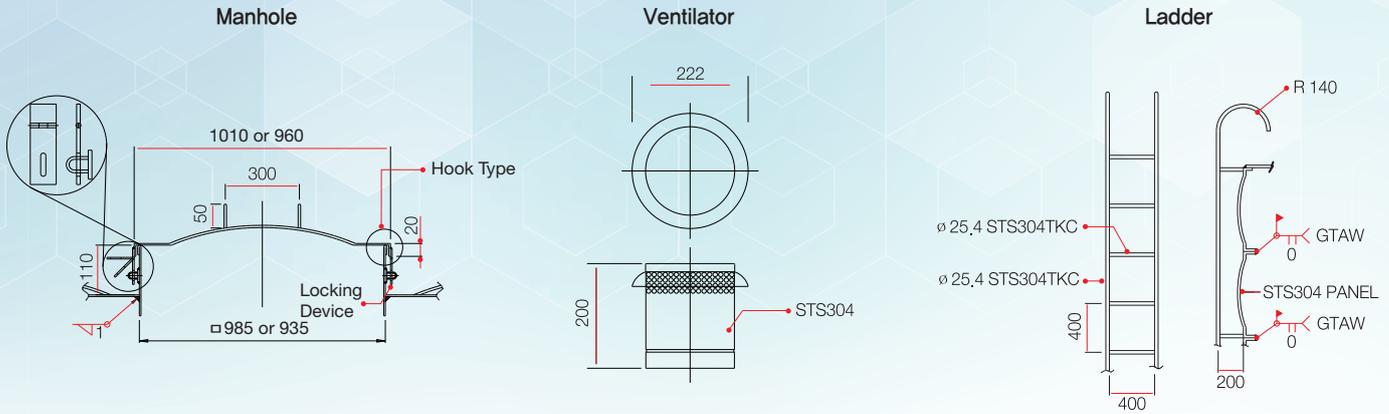
Reinforcers installed in a 45° angle to add firmness

- **AIR VENT**

Ventilates chlorine gas in the upper layer of air

# STS PANEL TANK

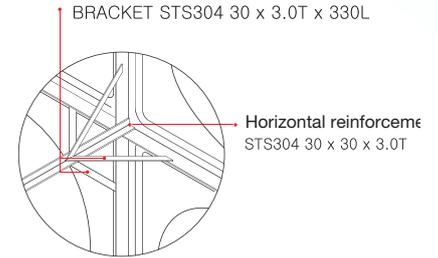
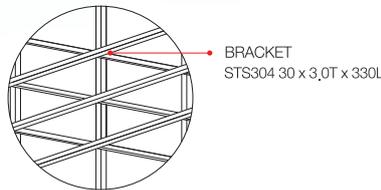
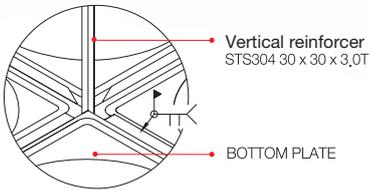
## Detailed Diagram of STS Panel Tank



Base surface reinforcer diagram

Wall reinforcer detail

Wall reinforcer detail

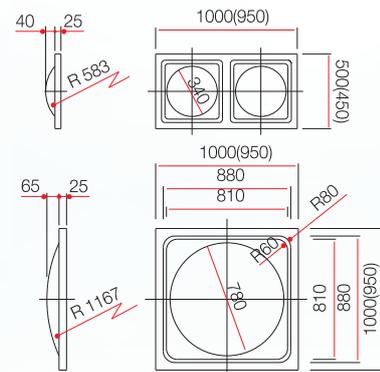
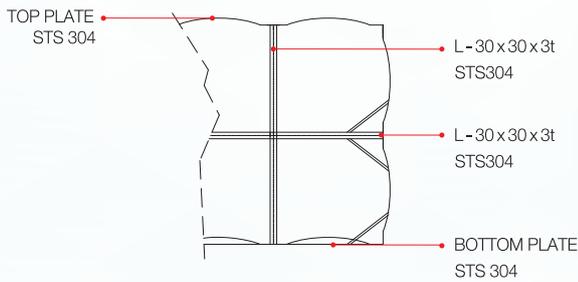


### Internal reinforcer

All 4 sides of the panels are folded for argon-tig welding the panels to each other with an angle and bracket made with STS304 material.

Internal angle structure

Detailed diagram of panel

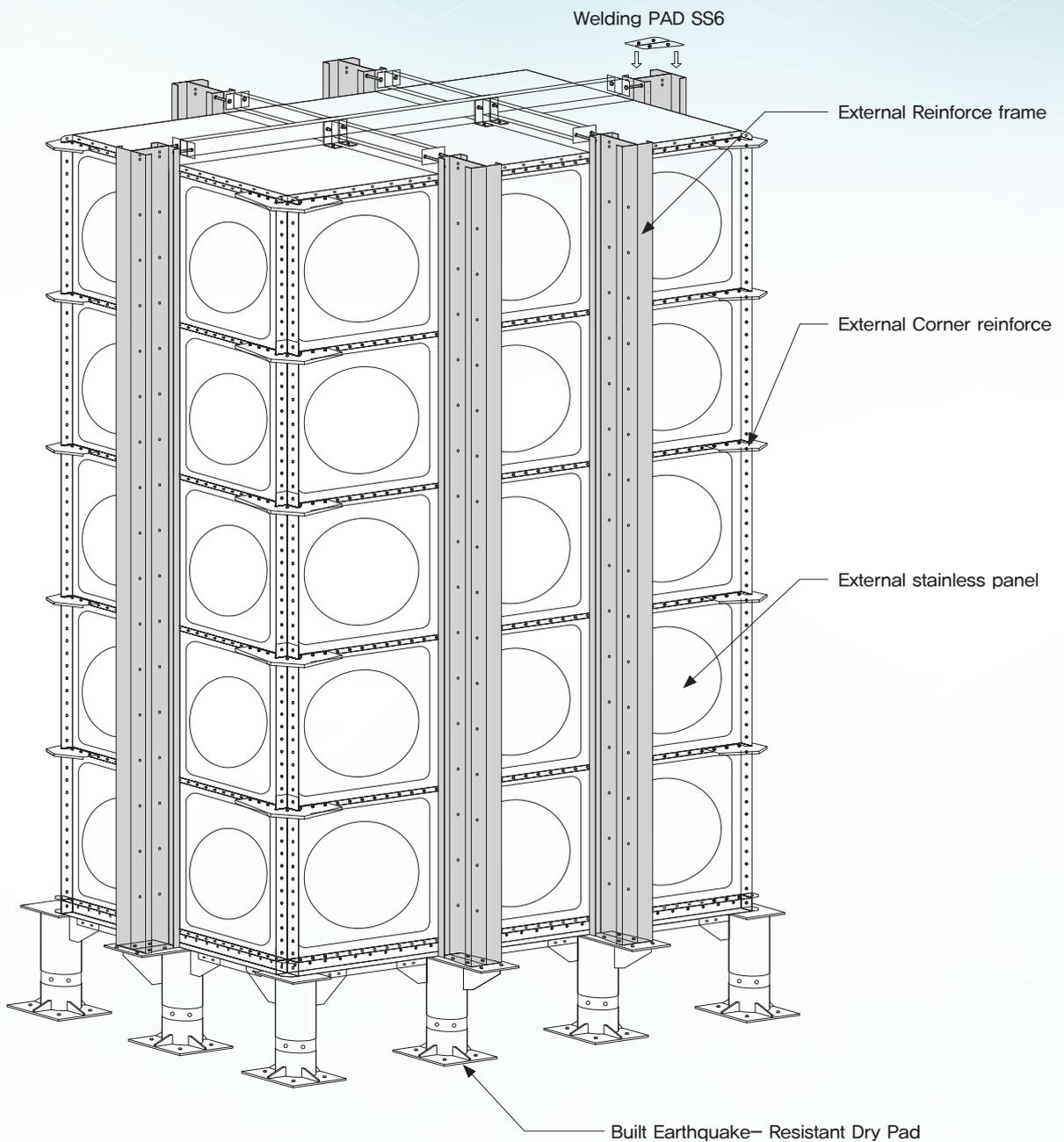


## ONE TYPE STAINLESS EARTHQUAKE RESISTANCE WATER TANK USING DRY-PAD

Durable, watertight, and clean water tank by applying safe built-in earthquake-resistant dry pad with POSMAC + PE sheet.

Easy assembly by applying external reinforcement for improved pricing, manufacturing, delivery, and assembly that also enables convenient cleaning and maintenance of clean water.

Fully prefabricated type enabling easy assembly and safety of workers from fire and hazardous gases.



# ONE TYPE STAINLESS EARTHQUAKE RESISTANCE WATER TANK USING DRY-PAE

## Safe Structure

Applied built-in earthquake-resistant dry pad, POSMAC base plate, and stainless steel molded to an external reinforcer 1.5 firmer than mild steel and 6 times than that of FRP for an overall higher intensity.

## Easy assembly

Does not require welding as all parts assembled with bolts, easing the work.

## Complete prevention of leakage

Applied PE sheet lining over the base plate and a special sealing tape for preventing water leakage, enhancing the overall water tightness.

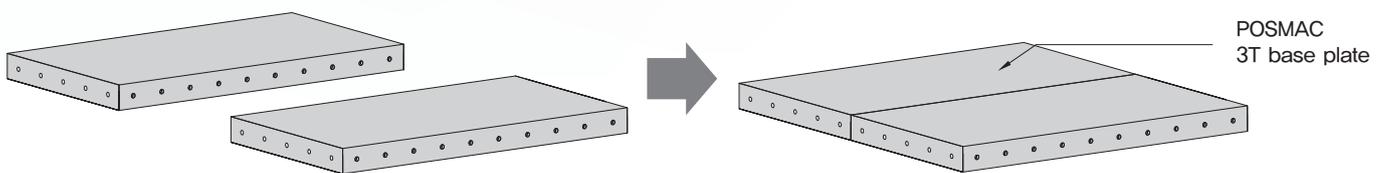
## Heat and impact resistant

Can be tailored to the perfect design concerning possibility of damages from fire and external impact.

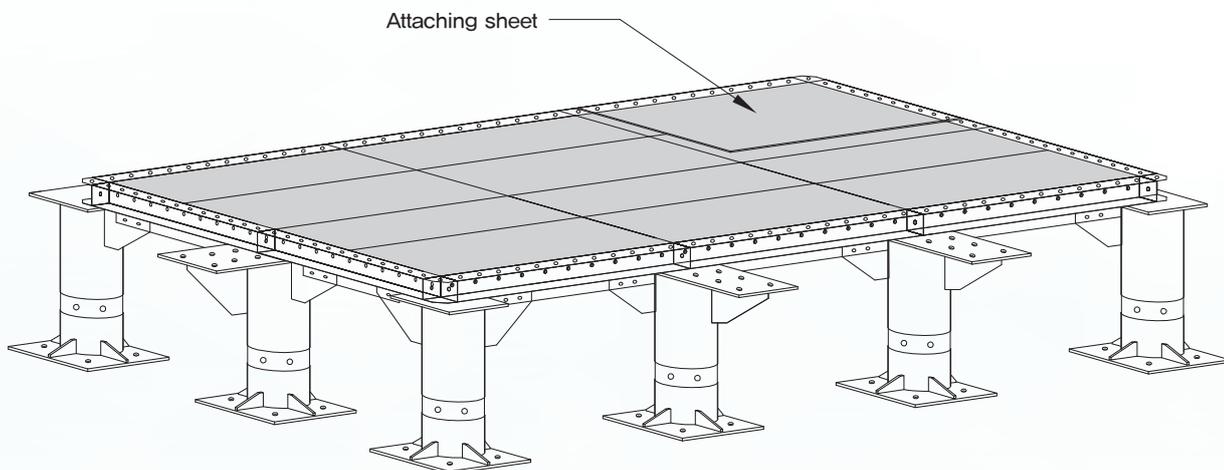
## Economical

POSMAC standardized plate used for the bottom plate

### POSMAC base plate (500×1000)×2



### Built-in earthquake-resistant lower structure



## ONE TYPE POSMAC/PE EARTHQUAKE-RESISTANT WATER TANK USING DRY PAD

### Features of POSMAC/PE Water Tank

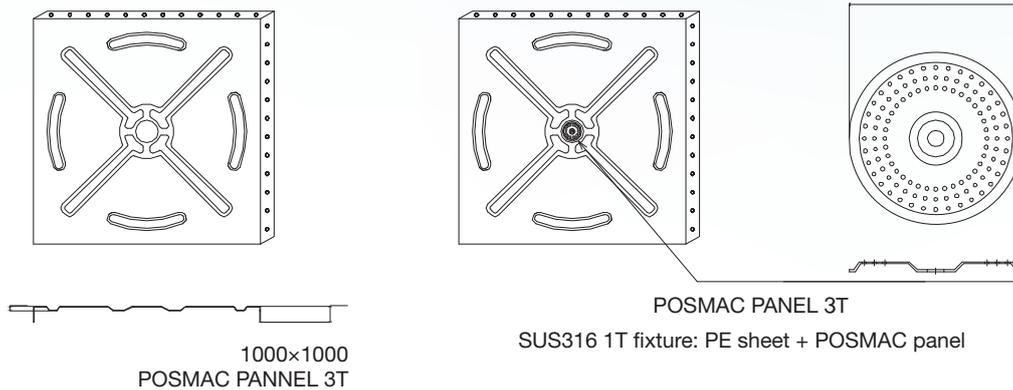
A safe one type earthquake-resistant water tank using dry pad that integrates a reinforced exterior design built by heat sealing PE sheets to the POSMAC panel, boasting easy installation and optimized for large-capacity water tanks.

Prevents contamination of water in the tank and features an exterior with enhanced earthquake-resistant reinforcement instead of a complicated tie rod reinforcement structure inside the tank, resulting in easier cleaning and maintenance.

PE sheet materials not harmful to the human body and completely hygienic.

Resists external shocks as well as being completely watertight.

Acid and alkali resistant



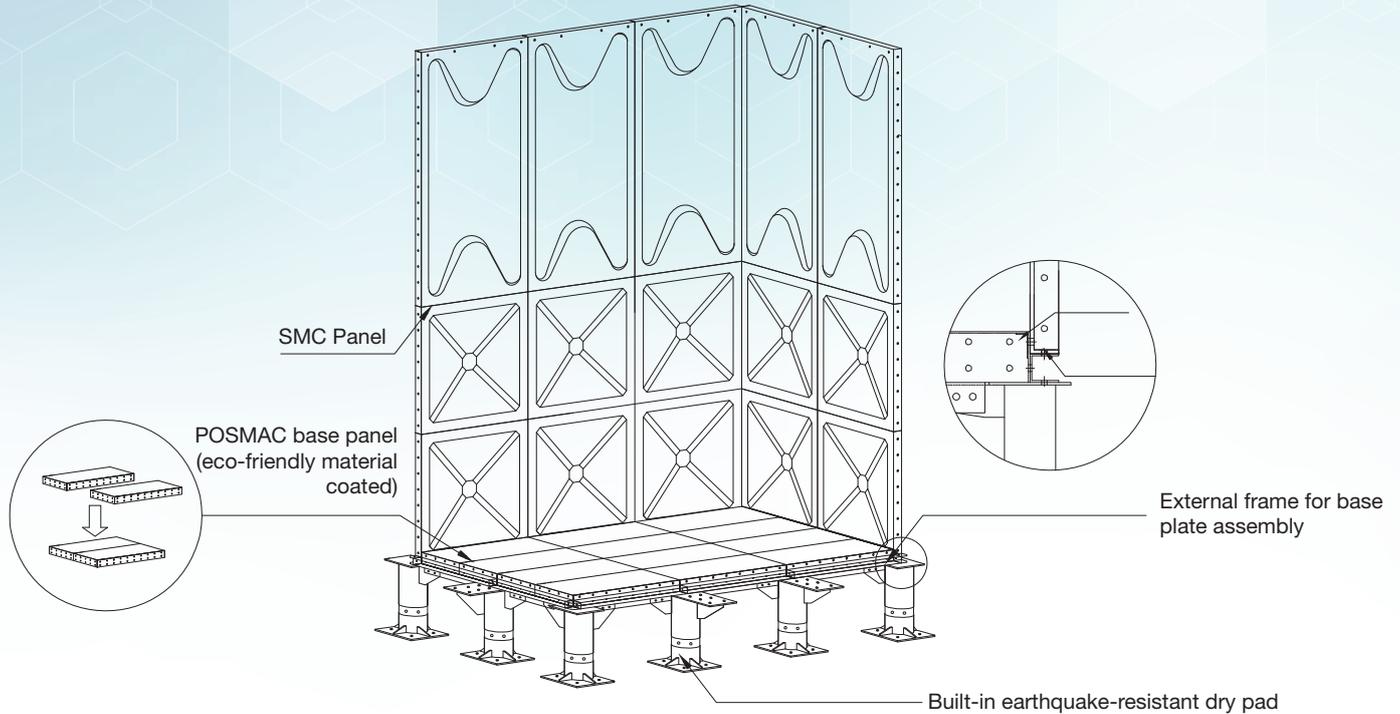
### Comparison chart

Category	ONE TYPE STAINLESS EARTHQUAKE-RESISTANT WATER TANK USING DRY PAD	ONE TYPE POSMAC/PE EARTHQUAKE-RESISTANT WATER TANK USING DRY PAD	ONE TYPE SMC EARTHQUAKE-RESISTANT WATER TANK USING DRY PAD
LOWER DRY PAD	One type earthquake-resistant using dry pad (Eco type)	One type earthquake-resistant using dry pad (Eco type)	One type earthquake-resistant using dry pad (Eco type)
BOTTOM PANEL	POSMAC panel + PE sheet welding	POSMAC panel + PE sheet welding	POSMAC panel + Eco-friendly particulate coating
SIDE PANEL	SUS PANEL	POSMAC PANEL + PE sheet welding	SMC PANEL
ROOF PANEL	SUS PANEL / SMC PANEL	POSMAC panel / SMC panel	SMC PANEL
INTERNAL / EXTERNAL REINFORCEMENT	External reinforcement	External reinforcement	External reinforcement
INSTALLATION METHOD	Bolt assembly	Bolt assembly	Bolt assembly
BASE FRAME	Not required	Not required	Not required

# ONE TYPE SMC EARTHQUAKE RESISTANCE WATER TANK USING DRY-PAD

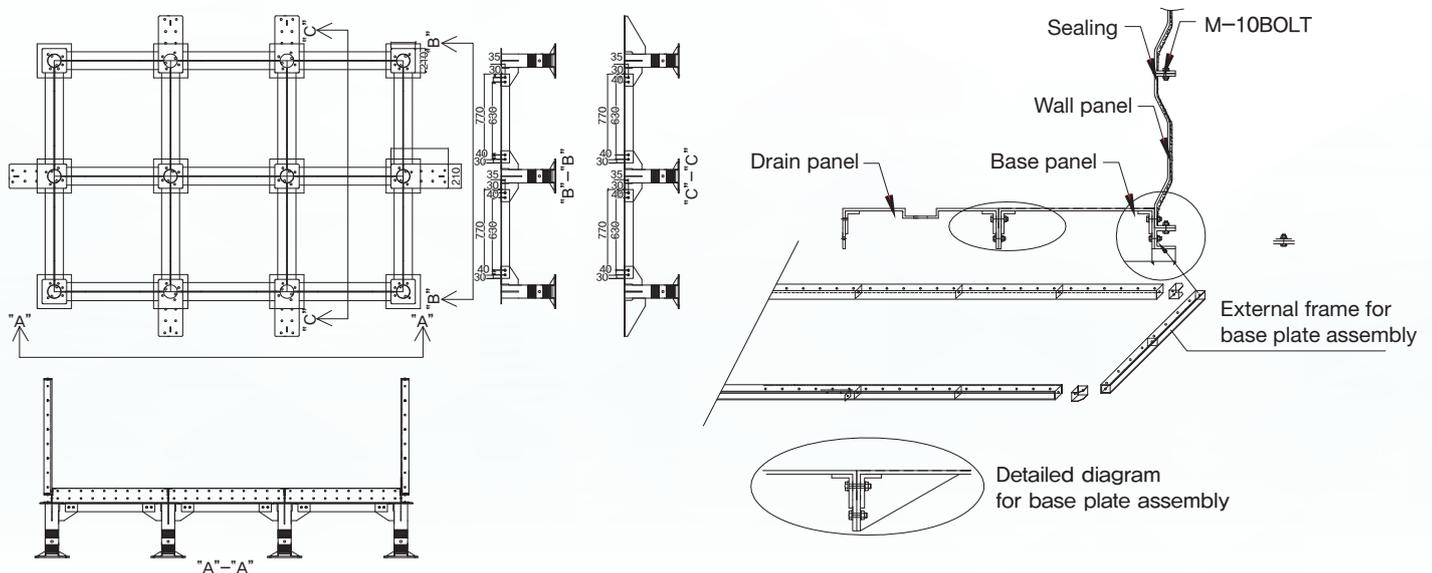
## New Material and Technology Applied POSMAC Composite Seismic SMC Water Tank

Base plate from POSMAC material with high corrosion-resistance, high weatherability, and high durability attached with built-in earthquake-resistant dry pad for a firmer and earthquake-resistant composite water tank.



## Assembly diagram for built-in earthquake-resistant dry pad

Base plate from POSMAC with high corrosion-resistance is semi-permanent and high in durability. Secured earthquake-resistance by utilizing POSMAC made from steel sheet for the base plate, which also functions as the base frame making it more price competitive. The dry-pad to be applied earthquake-resistant is firmer. Saving costs for maintenance as the product effectively resists earthquake, corrosion from aging, and damages.



# WATER TANK HANDLING PRECAUTIONS

## Installation Scope

### Foundation work

1. The foundation work must be done by the customer concerning the ground durability of where the concrete pad of the water tank is placed.
2. The installation of anchor bolts is done by constructo.
3. The concrete property for foundation work must be firmer than 180kg/ cm<sup>2</sup>
4. The width of base concrete must be over 300-400mm.
5. The thickness of mortar that goes above the concrete base must be less than 20mm.

### Piping

The customer must decide the sizes of drain and socket when placing the order.

We assist in the installation of the socket only.

(Socket connecting, piping, and insulation work must be done by the customer.)

## Handling Precautions

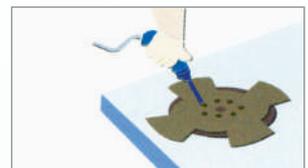
### Transportation

Do not place heavy loads or force on the panels during transportation of materials. Parts that have contact with ropes or other cargo must be cushioned.



### Pipe Installation

1. Installation support when piping, and ensure the drainage is not pressed with excessive force.
2. Start the pipe installation from the sides of the water tank.
3. Install the pipe exactly on the center, and ensure the drainage is not pressed with excessive force.



### Maintenance

1. The internal reinforcers shall not collide with each other.
2. Discharge the water and leave the tank empty when the tank will not be used for a long time.
3. Installation the pipe exactly on the center and ensuring the drainage is not pressed with excessive force.



# BMC SINK TOP TABLE

## BMC SINK TOP TABLE

Firm and light  
Scratchproof quality from strong surface.



### Features of BMC Sink TOP Table

#### Outstanding insulation and dew-proofing

BMC sink top table is made from excellent materials featuring a firm and light quality. The surface is very hard, giving it a scratch proof quality.

#### Convenient maintenance

Does not stain easily and can be maintained just by cleaning with water.

#### Pollution Resistance

Liquid cannot permeate easily, which avoids contamination from bacteria.

#### Stable dimensions

The sink top table that is molded from high temperature and pressure stabilizes dimension of the product. It also does not have joints which lessens the risk of forming mold. It is very hygienic.

### Color chart of BCM Sink TOP Table



Llanes



Artis



Caramel



Minos

## GRP BATHROOM CEILING

### GRP BATHROOM CEILING

Features a bathroom with special ambiance with a combination of curves and lines



#### Outstanding Durability

Made from eco-friendly material. The natural gloss of the material prevents discoloration of the product which can be used semi-permanently.

It can be cleaned easily with water.

#### Modern Sense of Design

Various designs and surface gloss create luxurious bathrooms.

Customers can choose either a dome type or flat type ceiling. The natural gloss of the material prevents discoloration of the product which can be used semi-permanently.

#### Installation

The material does not create dust from installation, which is safer for the human health. The eco-friendly materials do not generate construction waste.

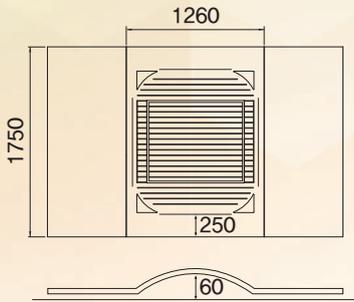
Also, the product itself functions as a reinforcer which reduces the need of subsidiary parts. The installation is therefore easier and lessens the period of installation time.



# GRP BATHROOM CEILING

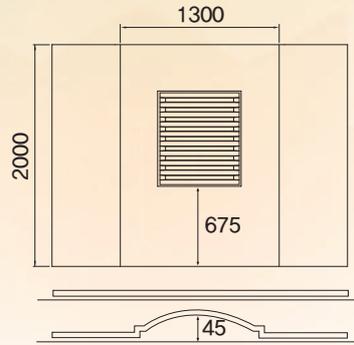
## BRP Bathroom Ceiling Drawing

### SI-1 Bathroom Ceiling



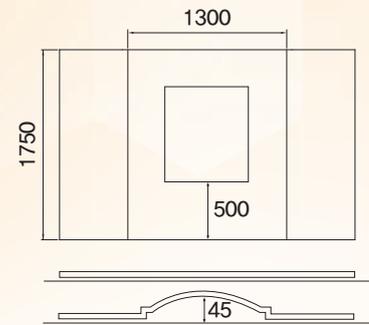
Model	Size(mm)	Shape	Color
Access Panel	750×900	Dome-type	White
Body	1260×1750	Dome-type	White

### SI-2 Bathroom Ceiling



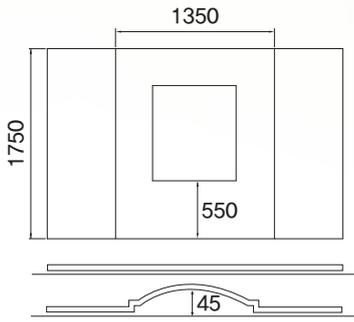
Model	Size(mm)	Shape	Color
Access Panel	750×900	Flat-type Dome-type	White
Body	1300×2000	Dome-type	White
	1300×1550		

### SI-3 Bathroom Ceiling



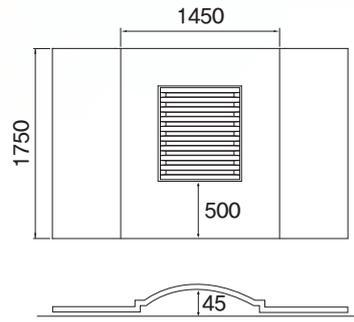
Model	Size(mm)	Shape	Color
Access Panel	750×900	Flat-type Dome-type	White
Body	1300×1750	Dome-type	White

### SI-4 Bathroom Ceiling



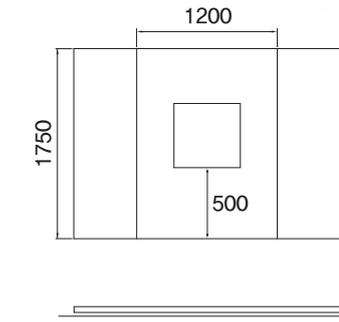
Model	Size(mm)	Shape	Color
Access Panel	700×900	Flat-type Dome-type	White
Body	1350×1750	Dome-type	White

### SI-5 Bathroom Ceiling



Model	Size(mm)	Shape	Color
Access Panel	700×900	Flat-type Dome-type	White
Body	1450×1750	Flat-type	White

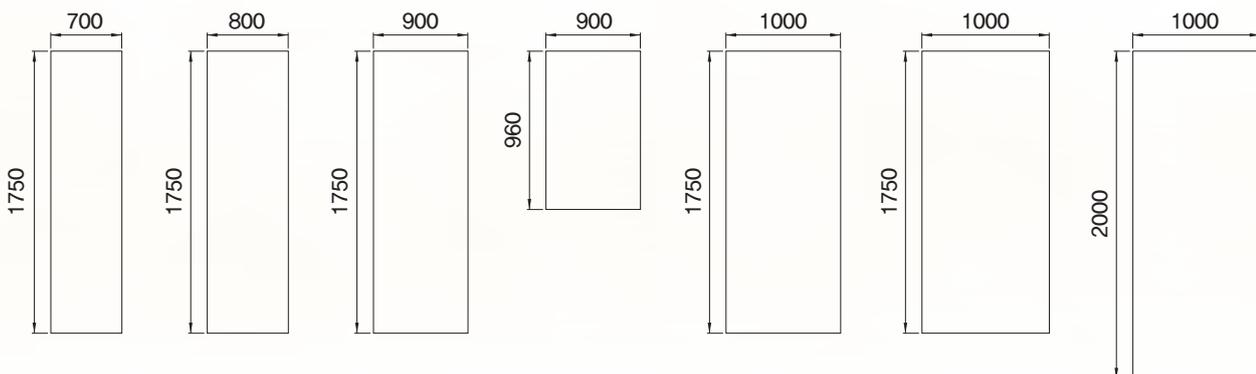
### SI-6,7,8 Bathroom Ceiling



Model	Size(mm)	Shape	Color
Access Panel	450×450	Flat-type	White
Body	1017	1000×1750	Flat-type
	1217	1200×1750	Flat-type
	1220	1200×2000	Flat-type
			White

## Bathroom ceiling side panel

Unit(mm)



## GRP BATHTUB

### Merits of GRP bathtub

Creating a bathroom of excellent design with even quality and easy installation in all types of bathrooms



### Merits of GRP bathtub

There is little color change due to resistant chemicals, excellent heat resistance and excellent heat insulation effect because of low thermal conductivity.

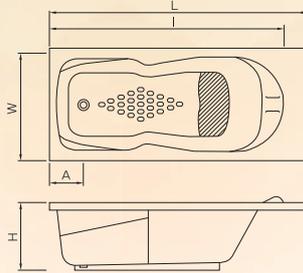
- Excellent surface strength and yellowing resistance
- Quality stability with excellent chemical resistance
- Semi-permanent durability with high temperature and high pressure molding
- Beautiful surface, excellent gloss
- Uniform quality, exact size
- Excellent durability of composites
- Excellent scratch resistance



# GRP BATHTUB

## GRP Bathtub Design

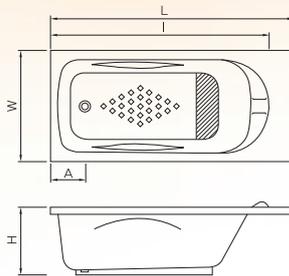
### GRP SP 1700 / ENM SP 1700



※Unit:mm

Model	Thickness	L	W	H	I	A
GRP SP 1700	3.5	1700	750	450	1540	230
ENM SP 1700	3.5	1700	750	450	1540	230

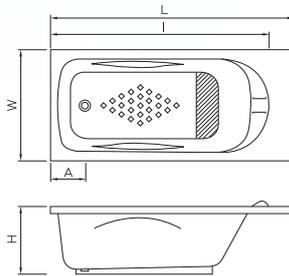
### GRP SP 1600 / ENM SP 1600



※Unit:mm

Model	Thickness	L	W	H	I	A
GRP SP 1600	3.5/6	1600	740	445	1440	230
ENM SP 1600	3.5/6	1600	740	445	1440	230

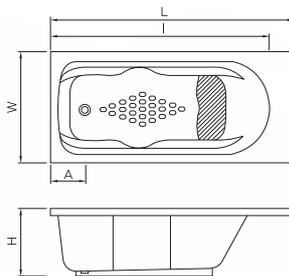
### GRP SC 1500 / ENM SC 1500



※Unit:mm

Model	Thickness	L	W	H	I	A
GRP SC 1500	3.5/6	1500	740	445	1440	230
ENM SC 1500	3.5/6	1500	740	445	1440	230

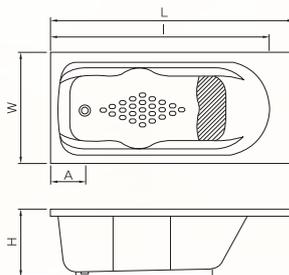
### GRP SP 1500 / ENM SP 1500



※Unit:mm

Model	Thickness	L	W	H	I	A
GRP SP 1500	3.5	1500	720	455	1400	230
ENM SP 1500	3.5	1500	720	455	1400	230

### GRP SP 1400 / ENM SP 1400



※Unit:mm

Model	Thickness	L	W	H	I	A
GRP SP 1400	3.5	1400	720	455	1300	230
ENM SP 1400	3.5	1400	720	455	1300	230

## GRP CEILING

### Merits of GRP Ceiling

Excellent surface durability and high strength  
Excellent insulation and sound insulation



### GRP Ceiling Merit

- Excellent dimensional stability due to high temperature and high pressure molding
- Excellent durability of high strength materials
- No shrinkage and No deformation to use Special composite material
- Elegant design and beautiful surface treatment
- Easy installation and excellent maintenance
- Excellent thermal insulation due to very low thermal conductivity
- Various colors and designs
- Semi-permanent with advanced new materials
- Used cap bolts of same color

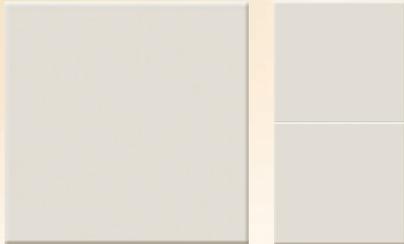


# GRP CEILING

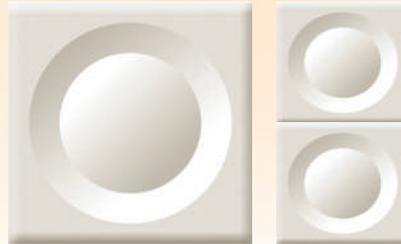
## GRP Ceiling – General Model

### Size

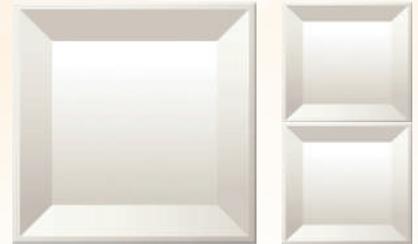
600×600 / 600×300  
450×450 / 300×300



GRP – Flat



GRP – Circle



GRP – Square

## Aluminum – Flat

### Size

600×600 / 450×450  
300×600 / 300×300



Aluminum – Flat



Aluminum – Square

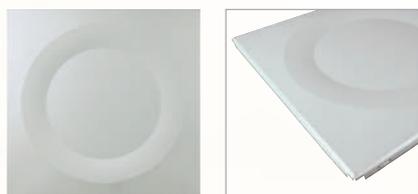
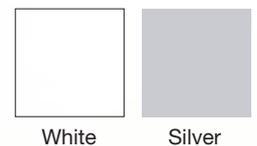


Aluminum – Circle

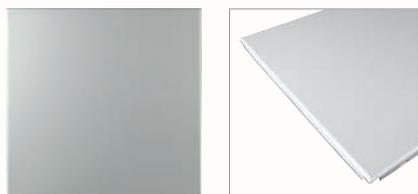
## Colored plate

### Size

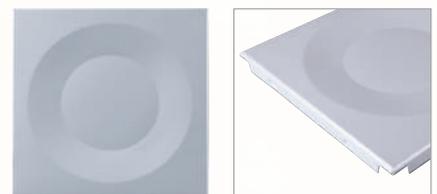
600×600 / 300×300 / 300×600



Colored plate – Circle



Colored plate – Flat

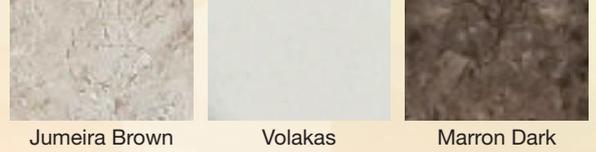


Colored plate silver – Circle

# SYSTEM BATHROOM (Semi-nonflammable certificate: MLTM Notice no. 2012-624)

## Panel

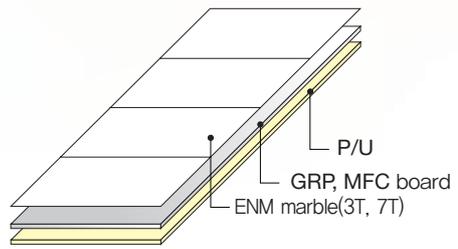
### ENM Marble Panel



### ENM Marble Pattern



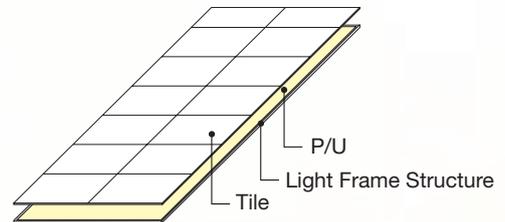
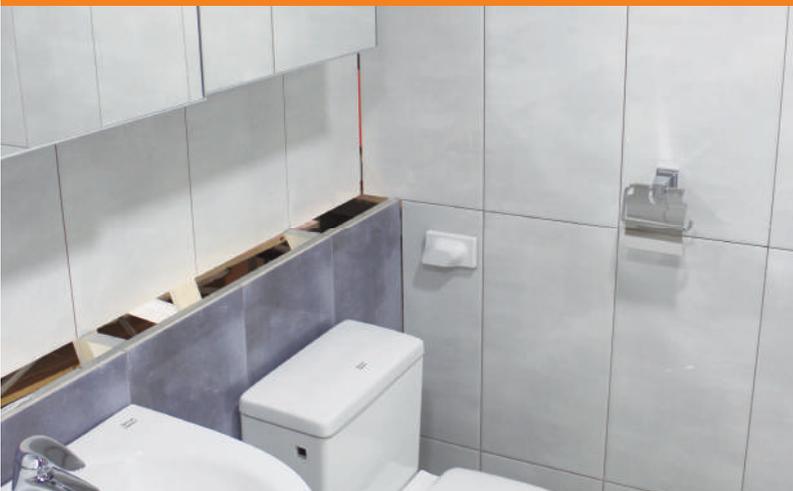
### ENM Marble Panel Composition



Model	Dimensions(mm)			Color
	Thickness	Width	Height	
ENM Tile Panel	30	600 1200	2025	Jumeira Brown Volakas Marron Dark
	70			
	100			
※ Customized Production				



### ENM Tile Panel



Model	Dimensions(mm)			Color
	Thickness	Width	Height	
ENM Tile Panel	25T	600 1200	2025	Tile Selection
		2400	900 1200	
	70T	600 1200	2025	
※ Customized Production				

# SYSTEM BATHROOM (Bathroom floor tile: Patent no. 10-1951596)

## Various design spaces with patented technology

### Corner (Shower type) 1522



※Unit:mm

Specifications	Tile Classification	Dimensions		Panel assembly-type
		Width	Height	
Corner-type (shower-type)	Adhesive-type tile	1400	2100	Built-in-type
		1500	2200	

※Unit:mm

Specifications	Tile Classification	Dimensions		Panel assembly-type
		Width	Height	
Corner-type (shower-type)	Adhesive-type tile		1900	Built-in-type
			2000	
		1300	2100	
		1400	2200	
		1500	2300	
		1600	2400	
			2500	

※Unit:mm

Specifications	Tile Classification	Dimensions		Panel assembly-type
		Width	Height	
Square (bathtub-type)	Adhesive-type tile		1900	Built-in-type
			2000	
		1400	2100	
		1500	2200	
		1600	2300	
			2400	

### NEW CORNER (SHOWER TYPE) 1520



※Unit:mm

Specifications	Tile Classification	Dimensions		Panel assembly-type
		Width	Height	
Square (shower-type)	Adhesive-type tile		1300	Built-in-type
			1400	
		1300	1500	
		1400	1600	

※Unit:mm

Specifications	Tile Classification	Dimensions		Panel assembly-type
		Width	Height	
Square (bathtub-type)	Tile integrated type	1300	1900	Mounting-type
		1500	1900	
Square (shower-type)		1200	1400	
		1300	1500	
		1400	1800	

## SYSTEM BATHROOM

### Floor Tile Status

■ : SHOWER-TYPE (TILE INTEGRATED-TYPE) □ : SHOWER-TYPE (TILE ADHESIVE-TYPE) ● : BATHTUB-TYPE (TILE INTEGRATED-TYPE) ○ : BATHTUB-TYPE (TILE ADHESIVE-TYPE)

#### Corner-type (shower-type) floor tile

※Unit:mm

Length Width	2100L	2100R	2200L	2200R
1400	□	□	□	□
1500	□	□	□	□

#### Corner new-type (shower-type) floor tile

※Unit:mm

Length Width	1900	2000	2100	2200	2300	2400	2500
1300	□	□	□	□	□	□	□
1400	□	□	□	□	□	□	□
1500	□	□	□	□	□	□	□
1600	□	□	□	□	□	□	□

#### Square (shower-type) floor tile

※Unit:mm

Length Width	1300	1400	1500	1600
1300	□	□	□	□
1400	□	□	□	□
1500	□	□	□	□

#### Square (shower-type) floor tile

※Unit:mm

Length Width	1900	2000	2100	2200	2300	2400
1400	○	○	○	○	○	○
1500	○	○	○	○	○	○
1600	○	○	○	○	○	○

#### Square (shower-type) floor tile

※Unit:mm

Length Width	1900	2000	2300	2400
1200	■			
1300		■		●
1400			■	
1500				●

### Precautions for Installation

#### Installation range of system bathroom

- Drainage and sewer pipe sleeves must be paint coated
- Water and hot water supply should be installed inside the system bathroom (40cm of space needed behind the system wall)
- Installation of ventilation fan and damper for preventing adverse wind, connection with flexible duct
- Installation of bathroom lighting, connection of electricity supply for ventilator fan (main electricity connection excluded)
- Warranty period is 2 years for the main body (floor, wall, ceiling) and 1 year for the internal parts

#### Excluded services from installation of system bathroom

- Line-drawing on system bathroom floor for installation
- Relocating Drainage and sewer pipes due to eccentricity of over 20mm
- Connection of the system bathroom electricity with main power line
- Relocating tap water and cold/hot water pipes from the original wall
- Duct installation after completion of ceiling and ventilator installation
- Exterior construction and repair of gap and flush of system bathroom

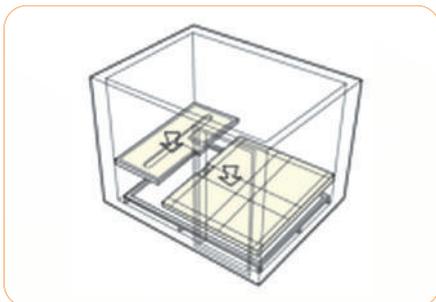
# SYSTEM BATHROOM

## System bathroom and wet bathroom comparison

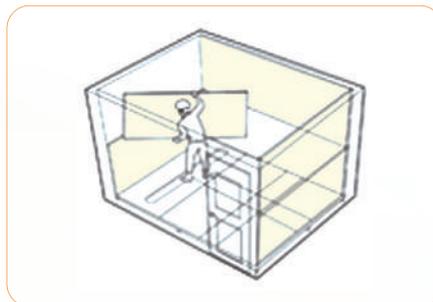
Classification	System Bathroom	Wet Bathroom
Use of standardized materials	<ul style="list-style-type: none"> <li>Supply of certified and factory-produced bathroom products</li> <li>Installation of uniform products by standardization</li> <li>Mechanic production that avails competitive bathroom materials</li> <li>Mass production available at the right time</li> </ul>	<ul style="list-style-type: none"> <li>Insufficient inspection of subsidiary materials by installation process</li> <li>Difference in installation quality depending on the workers' skills</li> <li>Inefficient inspection and securing of uniform materials</li> <li>Problem in supplying and storing materials at the right time</li> </ul>
Installation	<ul style="list-style-type: none"> <li>Use of GRP base plate for absolute waterproofing and efficient draining</li> <li>Reduce issues of prolonged installation period due to shortage of workers</li> <li>Easy installation by lightweight materials</li> <li>Low defect rate by standardized materials</li> <li>Installation available in winter season</li> </ul>	<ul style="list-style-type: none"> <li>Contains risk of leakage defect from mortar installation</li> <li>Falling off of tiles caused by the work of unskilled tiler</li> <li>Need of a completely skilled tiler for installing wall tiles</li> <li>Shortage of skilled workers by process that prolongs the installation period</li> <li>Mortar installation unavailable in winter season</li> </ul>
Handling defects	<ul style="list-style-type: none"> <li>GRP floor plate does not cause leakage</li> <li>Perfect adhesion from use of epoxy adhesive on floor plate tile</li> <li>Remove the cause of peeling off of wall tiles by mechanically producing wall tiles</li> </ul>	<ul style="list-style-type: none"> <li>A lot of defect factors from mortar installation on the floor</li> <li>Uneven floor and wall tiles from mortar installation</li> <li>Peeling off of floor and wall tiles depending on the skill of tilers</li> </ul>

## Installation method

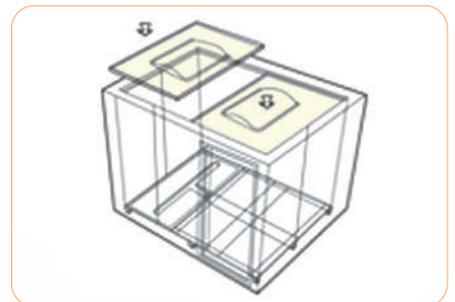
### 1. Floor tile installation



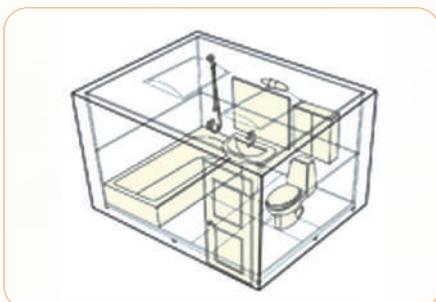
### 2. Wall installation



### 3. Ceiling installation



### 4. Internal product installation



### 5. Finishing (door frame, sealing)



#### ※Precautions

- Evenness when installing floor tiles!
- Pipe installation spot!
- Wastewater pipe spot!

# PERFORMANCE OF ECO-FRIENDLY WATER TANK CONSTRUCTION WORKS IN DOMESTIC CONSTRUCTION COMPANIES AND GOVERNMENT OFFICES

## Performance of eco-friendly water tank construction works in domestic construction works in domestic construction companies

NO.	Date	Company	Size	Site
1	2017. 6	SG Shinsung E&C	4*8*4	Apartment complex in Yanggyeong-dong, Seoul
2	2017. 6	Dawon ENG	2.5*4*4	CFRP Plant of Hyundai Steel in Dangjin
3	2017. 7	Changsung E&C	9.5*11*3.5	Centum Premier Hotel, Busan
4	2017. 7	CHANGSUNG E&C	3*4*2.5	
5	2017. 8	SEILENS	2*5*3.5	SK Hynix Cheongju Plant
6	2017. 8		5*14*3.5	
7	2017. 9	DAEWOO E&C	3.5*4*3.5	Central Prugio, Gwangju
8	2017. 9	DOOSAN HIC	8.5*11.5*4.5	Doosan We've Senior Citizens' Welfare Housing, Gwanggyo
9	2017. 9		21m*3	
10	2017. 9		4.5*2*3	
11	2018. 2	HONGHWA	112m*3.5	Honghwa HAAV, Wolsong, Gongju District
12	2018. 2	JUNGWOO CONSTRUCTION	4.5*(2+3)*3.5	Senior Citizens' Welfare Center, West Gimhae
13	2018. 2		2.5*7*3.5	
14	2018. 2	SG SHINSUNG E&C	8*(4.5+5)*3.5	Urban Living Housing, Gyeongju
15	2018. 3	Ee-hwa Construction	8.5*(5+5)*3	File Korea Logistics Center, Hobeop, Icheon
16	2018. 3	Taeyoung E&C	4.5*(7+9)*4	Residential-Commercial Mixed-use Buildings in West Shinshigaji, Jeonju
17	2018. 3		3*6*4	
18	2018. 3		3*5*4	
19	2018. 3	Taewang E&C	141m*3.5	Taewang Honors Centum, Waegwan, Chilgok
20	2018. 3	Hanyang	10*(14+15)*3.5	Hanyang Sujain Apartment Complex, Cheongna, Incheon
21	2018. 3		2.5*4*5*3	
22	2018. 4	DS Construction	5*(2+2+4+4)*3	Residential-Commercial Mixed-use Buildings in Shinseol-dong
23	2018. 4		3*3*3	
24	2018. 5	Namwoong Construction	5*(6+6)*4.5	Apartment houses in Nokchon District 2-6 Namyangju
25	2018. 5		8*(4+5)*4.5	
26	2018. 5		5*(7+6.5)*3	
27	2018. 5		6.5*(4.5+5)*4	
28	2018. 5		8.5*(5+5)*4	
29	2018. 5	MKG	4*(4+5)*4.5	Complex facility in Hongik University area
30	2018. 5		4*(3+3)*2.5	
31	2018. 5	IS Dongseo	22m*3.5	Dasan, Namyangju
32	2018. 5	Ilkwang E&C	5.5*(5+4.5)*4	Officetel in Seocho-dong
33	2018. 5	Daewoo E&C	13.5*12*3.5	Prugio Hillstate, Ansan
34	2018. 5		14.5*13*3.5	
35	2018. 5		3.5*9.5*2.5	
36	2018. 5		3*6*3	
37	2018. 5		9.5*(3.5+3)*4	
38	2018. 5		2*3*4	
39	2018. 6	Hoban Construction	8.5*11.5*4.5	Hoban Summit Place, Eunbye, Siheung
40	2018. 6		6.5*9*4.5	
41	2018. 6		7*8*4.5	
42	2018. 6		3*3*3	
43	2018. 6	Doosan HIC	223m*4	10BL apartment house, Deokgye, Yangsan
44	2018. 6	Ilgoon	4.5*(5+6)*3.5	Koaroo City, Songhyun-dong

NO.	Date	Company	Size	Site
45	2018. 6	Ilgoon	3*7*2	Koaroo City, Songhyun-dong
46	2018. 6	Cheonma Construction	68.25m*4	Accommodation facility in Jungmun-dong, Seogwipo
47	2018. 6		3*6*2	
48	2018. 6	Tracon Construction	4*(6+6)*3.5	Brother Livingtel, Yongdap-dong
49	2018. 7	Shinsegae E&C	90m*5	Wirye Emart Town
50	2018. 7	Jeongu Environment	4*5*4	Naerinceon Service Area
51	2018. 7	Kyeryong Construction Industrial	6*(7+7.5)*4	Livestock Logistics Center in Gimhae
52	2018. 7	Cheonma Construction	6.5*(7+7)*3.5	Jeju La Mer 1
53	2018. 7	Sungwan Construction	5*(5+5)*4	REGIONAL EMERGENCY CARE CENTER, WONKWANG UNIVERSITY HOSPITAL
54	2018. 7		5*(4+5)*4	
55	2018. 8	Shinyoung E&C	4*(2+4)*5	Neighboring commercial and business facilities in Magok District
56	2018. 8		4*(4+4.5)*5	
57	2018. 8		4*6*3.5	
58	2018. 8		4.5*(3+4)*3.5	
59	2018. 8	SK E&C/ Daewoo E&C	111m*4.5	SK View Prugio, Duho, Pohang
60	2018. 8		3*1.5*1.5	
61	2018. 8	Shinhal Construction	8*(4+5)*4.5	Officetel in Jungsang 8-4 Block, Misa, Hanam
62	2018. 8	Kyeryong Construction Industrial	7*9*4.5	Dormitory Bldg., Hanbat University
63	2018. 8		4*4.5*4	
64	2018. 8		3*3.5*4	
65	2018. 9	Daewoo E&C/Poong San Construction	5.5*(8+8)*4	Dongtan the First Tower 3
66	2018. 9	Kwang Yang E&C	85m*3	J-2 Tower 2, Juan, Incheon
67	2018. 9	Daewoo E&C	6*14*4.5	SK View Prugio, Duho, Pohang
68	2018. 9	Hae-Dong E&C	8*(5+5)*3	Seoul Forest site in Seongsu-dong
69	2018. 10	Joeun D&C	95m*4.5	Joeun Class, Jeonggwan, Busan
70	2018. 10		3*6*1.5	
71	2018. 10	Sewon Construction	7.5*(7+7)*3	Gangbyeon Koaroo Oturium, Gangneung
72	2018. 10		3*(2+3)*3	
73	2018. 10	Wooseong Group	3*(11+12)*3	Le Bois Park, Misa, Hanam
74	2018. 10		4*(11+11)*3	
75	2018. 10	Changsung E&C	5*(4+4)*3	Gochon Logistics Center, Gimpo
76	2018. 10		4*9*2	
77	2018. 10	CJ Logistics	4*(3+4)*4	Neighboring commercial and sales facilities in Mok-dong
78	2018. 10	Sejung Construction	4*(7+8)*3	Well-made, Ulsan
79	2018. 10		3*(5+5)*3.5	
80	2018. 10	Hyundai E&C	4*(11+11.5)*4.5	Yulha Apartment Complex, Gimhae
81	2018. 10	Daewoo E&C	12.5*(5.5+6)*4	Prugio, Jichuk Station, Goyang
82	2018. 11	Hoban Construction	8.5*(5+5)*3	Ulsan Techno
83	2018. 11	Lead Construction	7.5*(5.5+6)*3.5	Magok
84	2018. 11		4*4.5*3.5	
85	2018. 11	Ace Construction	6.5*(4+4)*3.5	High Tech City 3rd site
86	2018. 11		3.5*8*3.5	
87	2018. 11	Haenglim Architecture	10*(17+18)*4	Livestock Logistics Center, Nonghyup, Yang-dong, Daejeon
88	2018. 11		4*10*2.5	

NO.	Date	Company	Size	Site
89	2018. 12	Namhai Housing Construction	10*(6+6)*3.5	Namhai Honnete Apartment Complex, Hopyeong
90	2018. 12		9*19*2.5	
91	2018. 12		2.5*4.5*4	
92	2018. 12	Changsung E&C	57.5m*4	Classia Officetel, Guri
93	2019. 1	Youngjin Construction	6*(11+11)*3	D-Auto Mall, Daejeon
94	2019. 1	Cheongsan Construction	6*9.5*3.5	Maitus, Jangseungpo, Geoje
95	2019. 1		3*5*2	
96	2019. 2	Hwaseong Construction	Non-standard*2	Rico Villa Park View, Dasan
97	2019. 2	Kyesung	5.5*(7+8)*2.5	Koaroo Easyum Apartment Complex, Subsan
98	2019. 2	Daechang Construction	4*(7+8)*2.5	Siheung City Tower
99	2019. 2	Jinseong City Construction	7*(3.5+4)*3	Magok, Seoul
100	2019. 2		3*5*5*3	
101	2019. 2	Supreme Synthetic Construct	11*(4+5)*2.5	Theocetel Officetel
102	2019. 2	Hoban Construction	Non-standard*3	NAMAK HOBAN VERTIUM
103	2019. 2		Non-standard*3	
104	2019. 3		12*(6.5+7)*3	
105	2019. 3		3*3*1	
106	2019. 3	Hyundai Engineering	5*11*3	Dongtan M Tower
107	2019. 3		5*9*3	
108	2019. 3	Daelim	6*(2+7)*2.5	e-Pyeonghan Sesang Yangju
109	2019. 3	DS/Daesung Verthill	6*(2.5+17)*3	Daesung Verthill, Ilgwang District
110	2019. 3	Jians Construction	5*(6+7)*3.5	Gangbyeon District Housing Association Apartment Complex
111	2019. 3		12.5*(8+8)*2.5	
112	2019. 3	Daewoo E&C	4.5*(4+5)*2.5	Misa Station Myum Prugio City
113	2019. 3	SAC PMC & Construction	10*(4+4)*2.5	Donghee, Suwon
114	2019. 3	Munyoung Construction	6*(8+8)*3	Neighboring Commercial Facility in Bucheonok-gil
115	2019. 3		5*(5+5)*3	
116	2019. 3		4*6*3	
117	2019. 3		5*(4+5)*3.5	
118	2019. 3		4*5*3.5	
119	2019. 3		6*(7+8)*4	
120	2019. 3		4*6*3	
121	2019. 3	Hanyang	5*21*3.5	Hanyang Sujain Sigajeong Park
122	2019. 3		5*5*2	
123	2019. 4	Ace Construction	5*(3.5+4)*5	Block 13, Housing Development District 2, Dongtan Central
124	2019. 4		3*(3.5+4)*5	
125	2019. 4	Daesung Construction	6*(2.5+17)*3	B11, Ilgwang District, Gijang, Busan
126	2019. 4	Poong San Construction	5*(4+5)*3.5	Gimpo No.1 Richian Officetel
127	2019. 4	Daesung Construction	Non-standard*3.5	Construction of Daesung Verthill in Cheongju, Block 86
128	2019. 4	DAEWOO E&C	13*(6+7)*4	Cheonan Lake 3 Prugio
129	2019. 4		2.5*4.5*3	
130	2019. 4	Hamwon Construction Group	Non-standard*2	The Terrace, Hamwon Hilltrium, Uijeongbu
131	2019. 4	Sewon (20 Area Land & Housing) Corporation	6*(3+3)*2.5	Ganja Jungup Apartment Complex 6, Inwol, Ansan
132	2019. 4	Shinsaegyee Construction	2.5*(1+1.5)*3	Religious facility site in Nowon-gu, Seoul

# PERFORMANCE OF ECO-FRIENDLY WATER TANK CONSTRUCTION WORKS IN DOMESTIC CONSTRUCTION COMPANIES AND GOVERNMENT OFFICES

## Performance of eco-friendly water tank construction works in domestic construction works in domestic construction companies

NO.	Date	Company	Size	Site
133	2019.4	Solih	3.5*(1+2)*2	G Place construction site in Chungju
134	2019.4		3*4*1.5	
135	2019.4	SS Construction	5*(4+4.5)*2.5	Neighborhood commercial facility in Yangsu-gi, Yangpyeong
136	2019.4	Gwangwon Construction	5*(3+4)*2.5	Nexus Plant, Songdo
137	2019.4	Gwoon City I	5.5*(4.5+5)*3	Gwoon Feltine Apartment Complex, Cheonan
138	2019.4	Hyeonhae E&C	6.5*(3+4)*2	Aurora Tower construction site in Wodong-dong, Paju
139	2019.4	Jungheung Construction	4*7*1	Block C2, Gwanggyo, Suwon
140	2019.4	Woomi Construction, Lead Construction	2*(3.5+4)*3	Woomi Lynn construction site in Namyeongju
141	2019.4	Namhai	4*(5+6)*3	Nanta Home Residential complex facility, Han-dong, Jeju
142	2019.4		18*22*4	
143	2019.4		4*10*4	
144	2019.4	Posco E&C	3*7*3.5	Seongnam site, Gyeonggi
145	2019.5	Ace Construction	3.5*(5+5)*2.5	Techno Tower, Magok
146	2019.5	Doosan E&C	Non-standard*1.5	I'Park We've, Shinjeong New Town
147	2019.5	Daesung Construction	6*(2.5+17)*3	Ilgwang District, Gijang
148	2019.5	Hanwon Construction Group	Non-standard*2	The Terrace, Hanwon Hilltrium
149	2019.5	Daeyang	6*(4+4)*2.5	Nonsan Arista CC
150	2019.5	Hanju Construction	4*4.5*2.5	Hanju Construction Headquarters
151	2019.5	Coone House	5*(4+4)*2.5	CGV, Dongducheon
152	2019.5		4*5*1	
153	2019.5	Samsung Home E&C	8*(4.5+4.5)*2.5	Jeju Herencium 2
154	2019.5	Taejo Construction	5*(3+4)*3	Yooeun Tower 5, Paju
155	2019.5	SM Construction	6*(5+6)*2.5	Tap Korea, Ansan
156	2019.5	Bando Construction	2*3*4	Bando U.Bora Apartment Complex, Wonju
157	2019.5	Doosan E&C	15*(10+11)*3.5	I'Park We've, Shinjeong New Town
158	2019.6	Haun Construction	4.5*(2+3)*2.5	Gimhae Double Ryan 4
159	2019.6	Daewoo E&C	9*(7.5+8)*4	Osstem Implant, Magok
160	2019.6	Booyoung	7*22*3.5	Gyeongsan Booyoung Apartment Complex
161	2019.6	Hyundai E&C	1.5*1.5*1.5	Hyundai Technology Research Center
162	2019.6	Gwangwon Construction	Non-standard*3.5	Magnolia 2, Changwon
163	2019.6	Kyeryong Construction Industrial	6*(6+7)*4	Enterprise-type rental housing PETS, Namyeongju
164	2019.6	Logebien Construction	Non-standard*2	Logebien, Gwangju
165	2019.6	GS E&C	5*(3.5+4)*5	Dongtan Central Park
166	2019.6	Daesung Construction	Non-standard*3.5	Daesung Verthill, Cheongju
167	2019.6	Daewoo E&C	13*(6+7)*4	Cheonan Lake 3 Prugio
168	2019.6	Samjung Construction	3*(2+3)*3	457-21, Ichung-dong
169	2019.6	Jungin Construction	1.5*4*2.5	Jungin Tower, Incheon
170	2019.6	Daechang Construction	5*(5+6)*3	Zoom City Officetel, Ansan
171	2019.6	Daewoo E&C	1*3*1.5	Central Park Prugio, Jung-dong, Bucheon
172	2019.6		1.5*2*1.5	
173	2019.6		Non-standard*1.5	
174	2019.6	Samsung Home E&C	4.5*(1+1.5)*4	Samsung Home Prestige, Incheon
175	2019.6	Dasan Construction	Non-standard*4	Dasan Rodeo 3, Namyangju
176	2019.6		3*(4+5)*3	

NO.	Date	Company	Size	Site
177	2019.7	Hanhwa E&C	4*5*4	Suwon Training Center, Hanhwa General Insurance
178	2019.7	CJ E&C	Non-standard*4.5	CJ SEOCHO HOTEL
179	2019.7	Daewoo E&C	2.5*(3+4)*3	Daeshin 2 Prugio, Seodaeshin-dong
180	2019.7	Daeyang	15.*2.5*2	Nonsan Arista CC
181	2019.7	Sunhyung E&C	4*(4+4)*2	Baekam Logistics Center
182	2019.7	Daesung Construction	12*(4+5)*3	Daesung Verthill, Gijang
183	2019.7	Hanyang Construction	3*3.5*2.5	Snug City, Cheongna, Incheon
184	2019.7	Irto Construction	2*(2+3)*2.5	Residential/Commercial Mixed-use Bldg. 1, 178-4, Sejeong-dong, Suwon
185	2019.7	Woosung Construction	2*(2+2.5)*1.5	Woosung Nursing Home, Godeok-ro, Seoul
186	2019.7	Daewoo E&C	Non-standard*4.5	Prugio Eoullim, Gwacheon
187	2019.8	Dongseo Construction	5*(4+4)*3	Koaroo Apartment Complex, Siheung
188	2019.8	Daewoo E&C	3*(3+3)*3	Central Park Prugio, Jungdong, Bucheon
189	2019.8	Anin Hwajoon Construction	3*(2+2)*3	The Terrace, Song Ji-ro Beach, Goseong, Gangwon
190	2019.8	Daebang Construction	Non-standard*4	Gosan 1 Daebang Noble Land, Uijeongbu
191	2019.8		8*(6+6.5)*3.5	
192	2019.8	DSME Construction	10*(14+15)*4	Rehabilitation Nursing Hospital for Intensive-care Patients of Ajou University
193	2019.8	Hyundai BS&C	5*(7+7)*4.5	Hyundai Heriot, Samsung, Goyang
194	2019.8		5*6*4.5	
195	2019.8	Posco E&C	18*(11+11)*4	Forestia, Saecheon Station, Seongnam
196	2019.9	Bando E&C	2.5*(4+4.5)*1.5	Nonghyup, Yeongdeungpo
197	2019.9	Poong San Construction	4.5*(4+5)*3.5	Gimpo No.1 Richian Officetel
198	2019.9	Hyundai BS&C	6.5*(6+5.5)*4.5	Hyundai Heriot, Samsung, Goyang
199	2019.9		4*5*4.5	
200	2019.9	Seohai Construction	Non-standard*4	Seohai Grand Bleu, Incheon
201	2019.9	Hallim Construction	3*3.5*3.5	Hallim S Tower, Gunpo
202	2019.9		4*5*1.5	
203	2019.9	GS E&C	3*7*2	Munseong Urban Development District

## Performance of eco-friendly water tank construction works in domestic government offices

NO.	Date	Site	Size
1	2018.2	Senior Citizens' Welfare Center, West Gimhae	4.5*(2+3)*3.5
2	2018.2	Senior Citizens' Welfare Center, West Gimhae	2.5*7*3.5
3	2018.5	Seosomun Annex Bldg., Seoul City Hall	1*2*1.5
4	2018.5	Seoul Fire Academy	
5	2018.5	Sewage Treatment Plant, Cheongpyeong	2*5*2
6	2018.5	Sewage Treatment Plant, Namsa	6.5*8.5*1
7	2018.5	Baekseong Elementary School, Anseong	5*(4+5)*2
8	2018.5	Bibong Wetland Park	4*(5+4.5)*2
9	2018.6	Palyong Tunnel, Changwon	2.5*(2+2)*1.5
10	2018.6	Hopyeong Small Library	2*2*1.5
11	2018.6	Mid-Long-Term Youth's Center, Gunpo	3*4*2.5
12	2018.7	Saha Middle School	2*2*2

NO.	Date	Site	Size
13	2018.7	Saha Middle School	2*3*2
14	2018.8	Seoul Gwangjin Special School	2*3*2.5
15	2018.8	Yanggam Middle School	1.5*3*2
16	2018.8	Namsan Elementary School	2.5*4*3
17	2018.8	Dormitory Bldg., Hanbat University	7*(4+5)*4.5
18	2018.8	Dormitory Bldg., Kongju National University	4*(2+2.5)*4
19	2018.8	Dormitory Bldg., Kongju National University	3*3.5*4
20	2018.9	Changreung Elementary School	3*(4.5+5)*3.5
21	2018.10	Cheongcheon Library	1*2*1.5
22	2018.10	Seoryong Elementary School	1.5*1.5*1.5
23	2018.10	Yongma Elementary School	1.5*1.5*1.5
24	2018.11	Hanu R&D Center, National Institute of Animal Science, Pyeongchang	2*2*1.5
25	2018.12	Maehol Elementary School	5*(3+3)*2
26	2018.12	Seoul National Cemetery	3*(3+3)*2.5
27	2019.1	Seoul Senior Citizens' Social Welfare Center	4*2*2.5
28	2019.3	Maehol Elementary School	5*(1.5+2)*2
29	2019.3	Uijeongbu Girls' High School	2*(2+2.5)*2
30	2019.3	Hallyu World	9*(3+6)*3
31	2019.4	Ganghwa Senior Citizens' Culture Center	4*(3+2)*2.5
32	2019.4	Yongin House of Love	3*7*1.5
33	2019.4	Dongtan 14 Middle School	3*5*2.5
34	2019.4	Dongtan 14 Middle School	4*(5+5)*2.5
35	2019.5	NAVAL ACADEMY, JINHAE	2*2.5*1
36	2019.6	SONGSHIN ELEMENTARY SCHOOL	2*382
37	2019.6	MANDEOK MIDDLE SCHOOL	2*2*2
38	2019.6	National Forestry Cooperative Federation	2*3*2
39	2019.6	Korea Institute of Science and Technology	3*6*2.5
40	2019.7	Namsan Elementary School, Jinhae	2*3*1.5
41	2019.7	Shincheon Elementary School, Gupo	2*2*2
42	2019.7	Welfare Center for PWD, Hwaseong	2*2*1.5
43	2019.7	Dongdo Elementary School	4*(4+4)*2.5
44	2019.7	Mulgeum Elementary School	2*2*2
45	2019.7	Naeseong High School	2*3*2
46	2019.7	Naeseong High School	2*2*2
47	2019.7	Korea Digital Media High School	2*3*1.5
48	2019.8	Gaepo Child Welfare Center	3*(2+3)*3
49	2019.8	Seongsim School, Osan	3*6*1.5
50	2019.8	Dementia Center	2*5*2
51	2019.8	Dangri Middle School	2*3*2
53	2019.9	Gochon Middle School	3*(3+4)*4

# PERFORMANCE OF OVERSEAS SALES OF ECO-FRIENDLY WATER TANK

## Performance of Overseas Sales

NO.	Date	Site	Tons	NO.	Date	Site	Tons	NO.	Date	Site	Tons
1	2018.8	Saudi Arabia	3	51	2019.4	Dubai	25	101	2019.6	Dubai	15
2	2018.8	Saudi Arabia	66	52	2019.4	Dubai	30	102	2019.6	Dubai	63
3	2018.9	Kuwait	216	53	2019.4	Dubai	131.63	103	2019.6	Dubai	20
4	2018.9	Kuwait	62.5	54	2019.4	Dubai	40	104	2019.6	Dubai	140
5	2018.9	Saudi Arabia	144	55	2019.4	Dubai	60	105	2019.7	Dubai	24
6	2018.9	Saudi Arabia	1024	56	2019.4	Dubai	10	106	2019.7	Dubai	40
7	2018.9	Abu Dhabi	32	57	2019.4	Dubai	10	107	2019.7	Dubai	24
8	2018.9	Abu Dhabi	12	58	2019.4	Dubai	14	108	2019.7	Dubai	32
9	2018.9	Abu Dhabi	22.5	59	2019.4	Dubai	50	109	2019.7	Oman	180
10	2018.9	Abu Dhabi	28	60	2019.4	Dubai	30	110	2019.7	Oman	108
11	2018.9	Abu Dhabi	1000	61	2019.4	Dubai	24	111	2019.7	Oman	20
12	2018.9	Abu Dhabi	1872	62	2019.4	Dubai	60	112	2019.7	Dubai	72
13	2018.10	Sudan	100	63	2019.4	Dubai	40	113	2019.7	Dubai	5
14	2018.10	Sudan	80	64	2019.4	Dubai	75	114	2019.7	Dubai	60
15	2018.10	Kuwait	273	65	2019.4	Dubai	50	115	2019.7	Dubai	63
16	2018.10	Kuwait	48	66	2019.4	Dubai	48	116	2019.7	Dubai	3
17	2018.10	Kuwait	60	67	2019.4	Dubai	32	117	2019.7	Dubai	8
18	2018.10	Sudan	96	68	2019.4	Dubai	40	118	2019.7	Dubai	12
19	2018.10	Sudan	72	69	2019.4	Dubai	25	119	2019.7	Dubai	63
20	2018.10	Sudan	36	70	2019.4	Oman	8	120	2019.7	Singapore	90
21	2018.10	United Kingdom	200	71	2019.4	Oman	6	121	2019.7	Singapore	5
22	2018.10	Djibouti	720	72	2019.4	Oman	2	122	2019.7	Oman	68
23	2018.10	Sudan	128	73	2019.4	Oman	9	123	2019.7	Oman	48
24	2018.10	United Kingdom	108	74	2019.4	Oman	12	124	2019.7	Vietnam	1750
25	2018.12	United Kingdom	364	75	2019.4	Oman	240	125	2019.7	Jakarta	23
26	2018.12	United Kingdom	300	76	2019.4	Oman	25	126	2019.7	Jakarta	32
27	2018.12	Panama	36	77	2019.4	Oman	72	127	2019.7	Jakarta	5
28	2018.12	Panama	80	78	2019.4	Dubai	30	128	2019.7	Qatar	90
29	2018.12	Panama	36	79	2019.4	Dubai	15	129	2019.7	Qatar	24
30	2018.12	Iraq	1350	80	2019.4	Dubai	62.5	130	2019.7	Qatar	8
31	2018.12	Iraq	1296	81	2019.4	Dubai	20	131	2019.7	Qatar	48
32	2019.1	Qatar	126	82	2019.5	Qatar	504	132	2019.7	Qatar	147
33	2019.1	Qatar	20	83	2019.5	Qatar	750	133	2019.7	Qatar	24
34	2019.3	Iraq	24	84	2019.5	Qatar	950	134	2019.8	Panama	80
35	2019.3	Iraq	90	85	2019.5	Panama	36	135	2019.8	Panama	21
36	2019.3	Cambodia	30	86	2019.5	Panama	80	136	2019.8	Panama	24
37	2019.3	Australia	20	87	2019.5	Panama	40	137	2019.8	Panama	50
38	2019.4	Singapore	20	88	2019.5	Dubai	75	138	2019.8	Panama	36
39	2019.4	Singapore	2	89	2019.5	Dubai	50	139	2019.9	Oman	24
40	2019.4	Singapore	2	90	2019.5	Dubai	48	140	2019.9	Oman	15
41	2019.4	Singapore	2	91	2019.5	Dubai	32	141	2019.9	Oman	250
42	2019.4	Singapore	3	92	2019.5	Dubai	40	142	2019.9	Oman	24
43	2019.4	Singapore	2	93	2019.5	United Kingdom	10	143	2019.9	Oman	100
44	2019.4	Singapore	2	94	2019.5	Singapore	18	144	2019.9	Oman	24
45	2019.4	Singapore	3	95	2019.5	Singapore	64	145	2019.9	Oman	64
46	2019.4	Dubai	100	96	2019.6	United Kingdom	10	146	2019.9	Kuwait	570
47	2019.4	Dubai	150	97	2019.6	Dubai	183	147	2019.9	Kuwait	72
48	2019.4	Qatar	126	98	2019.6	Dubai	113	148	2019.9	Kuwait	60
49	2019.4	Oman	128	99	2019.6	United Kingdom	10	149	2019.9	Oman	600
50	2019.4	Oman	15	100	2019.6	Dubai	30	150	2019.9	Oman	25

# COMPARISON OF WATER TANKS BY MATERIAL (SMC, STS, PDF)

## COMPARISON OF WATER TANKS BY MATERIAL

Item	SMC TANK	STS TANK	PDF TANK
Structure	SMC Molding Panel Bolt Assembly Type (Unsaturated polyester + Filler + Glass fiber) Standardized panel sizes STS angle reinforcement on the upper, lower, right and left on the internal side FRP lining on the center column	Stainless Steel Molding Panel Welding Type (Stainless steel + Urethane 50T + AL Jacket) Standardized panel sizes STS angle reinforcement on the upper, lower, right and left on the internal side STS lining on the center column	Steel frame + PDF + PE Composite Bolt Assembly Type (PE sheet molding + PDF + steel frame) Adjustable length of panel Round bar angle reinforcement on the upper, lower, right and left on the internal side PE lining on the center column
Durability	Semi-permanent: Maintains the utmost water pressure resistance	Semi-permanent: Advantageous for earthquake-resistant designing	Over 20 years: Stiffening and fatigue of PE sheet
Corrosion Resistant	Outstanding: Resolved the issue of corrosion with PE coating	Outstanding: Formation of oxide film	Outstanding: No concerns of corrosion by using PVC pipe
Hygiene	Outstanding corrosion resistance by applying reinforced plastic composite materials	Prevents UV rays where bacteria cannot grow	No corrosion from using PE sheet
Maintenance	Easy cleaning with high-pressure water jet cleaner	Difficult to clean because of dense internal reinforcers	Easy to clean and maintain because of flat floor surface
Important Precautions for Installation	Insulating and non-insulating plate material need confirmation Painting of external steel material and reinforcing of the inside by height Dimensions need confirmation	Maintenance of welding needed Thickness of wall plates by height need confirmation	Welding of external steel frame need maintenance Painting of external steel frame and PE welding need maintenance
KS Certificate	KS F 4811 Certificate 	KS B 6282 Certificate 	Standards of Private Sectors Certificate 



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