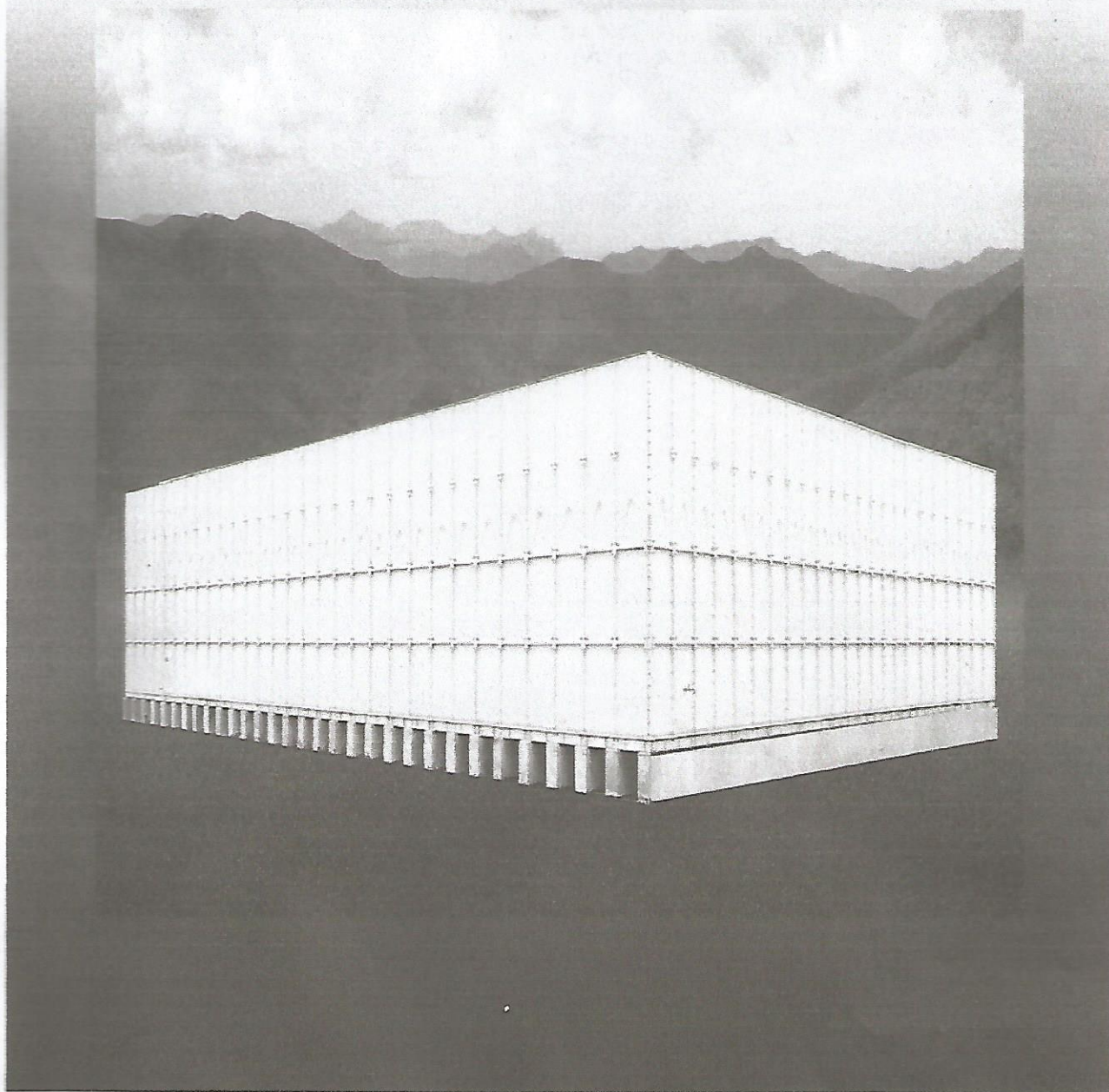




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PIPECO KOREA

PIPECO KOREA GRP Water Tank Company Profile

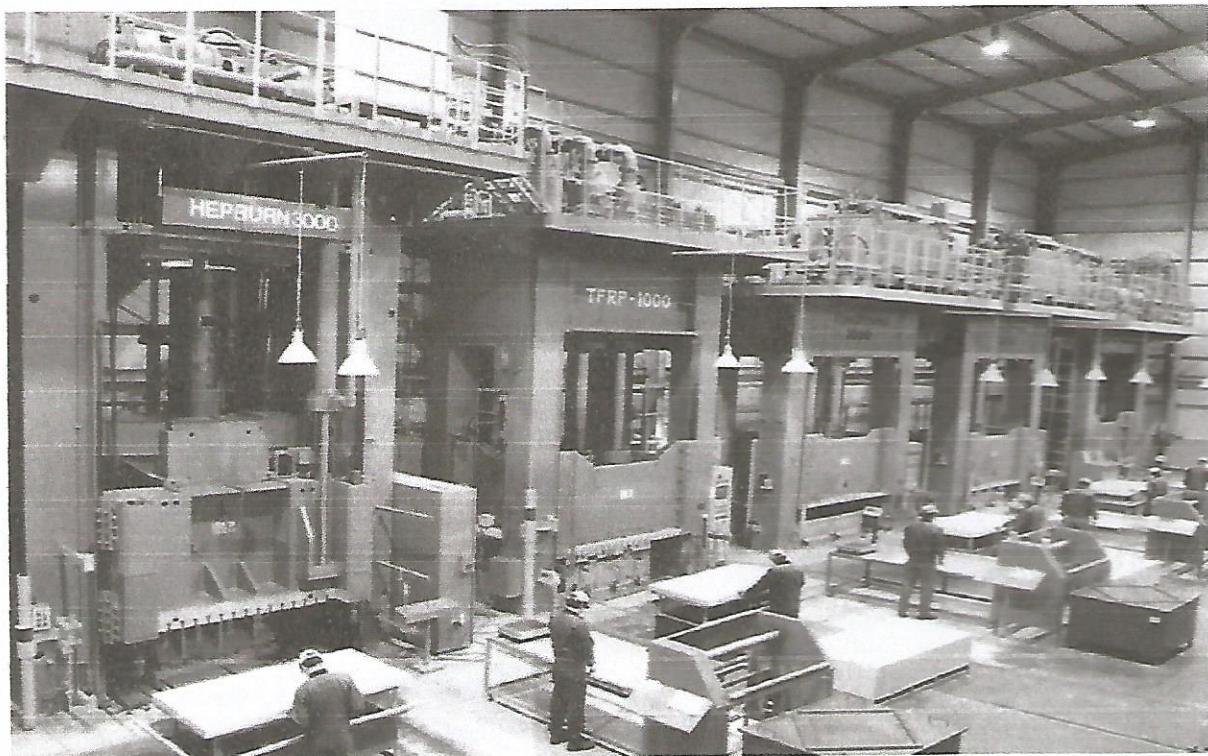
Excellent in Clean & Hygienic and, Non-Leakage.
Sectional GRP Water Tank for Easy to Design and Installation.

Our company specializes in the development and production of GRP Water Tanks. Located in Gimhae, our large-scale plant and research center are dedicated to on going development and production to lead the industry. Our advanced technology has received ISO, WRAS(UK), BSEN(UK), PSB(SINGAPORE) certificates and is garnering world acclaim.

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

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

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



The 3rd Hot Press Factory

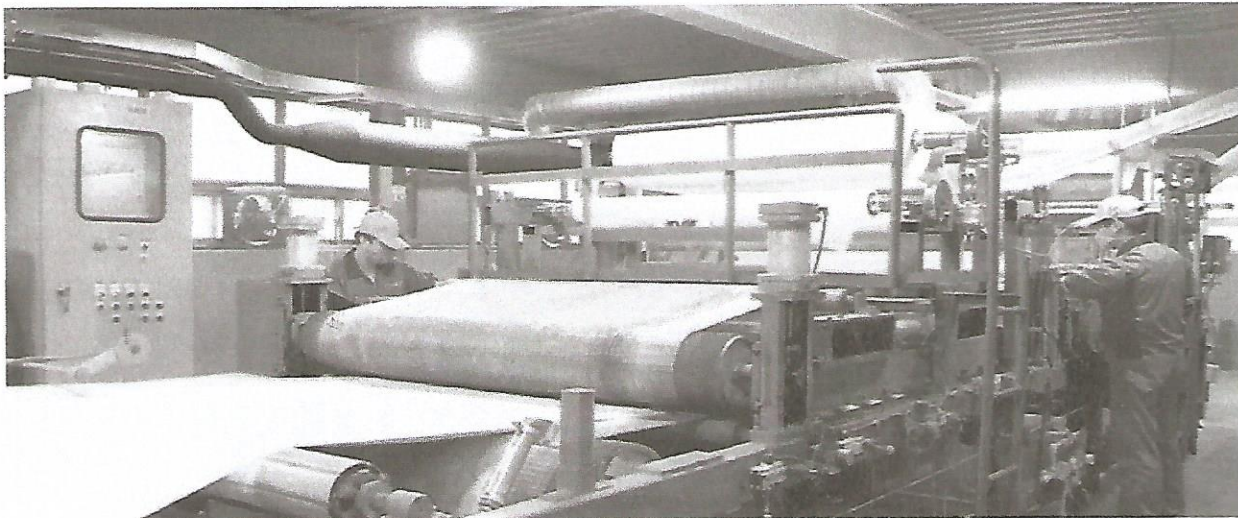
⚙️ Differentiated PIPECO KOREA GRP Water Tank

● GRP Water Tank Panel

| ITEM | Unique Characteristics of PIPECO KOREA (Strong Point) | Other Companies |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| GRP Sheet | PIPECO KOREA produces high-quality and differentiated GRP Sheet in the own GRP Sheet (Raw material) plant | No GRP Sheet plant |
| Competitive price for panel | Securing competitive pricing by in house production of GRP sheet, panel production by robot automation system. | Deterioration in product quality & uncompetitive prices |
| 2X1M Roof Panel | 2X1M twin Roof Panel production (it is possible to ensure competitive price) | 1X1M Roof Panel only |
| Manhole Panel | Double Rebated Structure of Manhole cover (No Dust and pollutant) | Single Rebated structure |
| Insulated Panel | Patented insulated cover which the special cloth applied. (Patent No. 0495287) Securing perfect insulation & preventing a defect by 40mm insulation. | Using ABS only so includes much defects |
| Automation system construction of hole drill facilities | As constructing automation system of hole drill facilities, it makes the mass production possible & it is possible to ensure competitive price. | Using hand-operated hole drill facilities. |
| Using high-pressure foaming equipment for panel insulation | As using latest high-pressure foaming equipment for panel insulation, secure effectiveness of insulation & excellent quality. | Using low-pressure & hand-operated foaming equipment. |

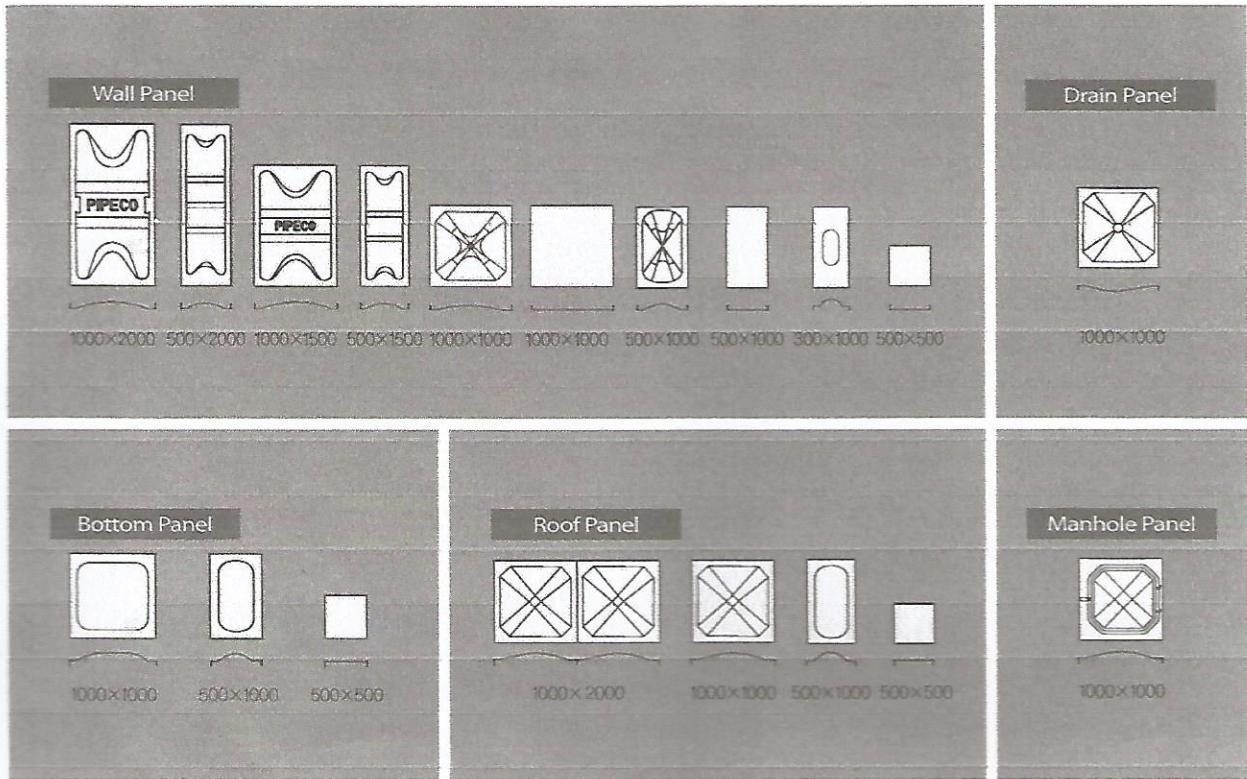
● GRP Water Tank Reinforced Materials

| ITEM | Unique Characteristics of PIPECO KOREA (Strong Point) | Other Companies |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| The Safety Factor for Skid Base | Structural strength highly improved by applying channels for main skid base (1MH – 5MH) and the patented sub skid base. (Design registration – 0664436) | Safety Factor highly improved by using main skid base of water tanks (1MH – 2.5MH) as channel instead of angle. |
| Earthquake Resistant Design for Skid base | Skid base of PIPECO KOREA is designed with Earthquake Resistant & there is stable and safe till magnitude 5.0. (Over magnitude 5.0, it needs additional reinforcement.) | |
| Tie-Rod | STS316 with PE Coating to prevent Corrosion & Rusting | Not using PE Coating or STS316 |
| Powder Coating for internal STS materials | Preventing corrosion & rusting issues with Powder Coating on the internal STS materials | No Powder Coating |
| STS Bolts for internal | As using STS316 bolt/nut/washer for internal, to solve rusting issue. | Using STS 304 Washer for internal |
| HDG Bolt for external bolt | As using STS316 bolt for external bolt/nut/washer to prevent the rusting issue | Using HDG Bolt |
| Epoxy Coating on Internal Bolting hole | Epoxy Coating on the all internal bolting parts & connection part for preventing corrosion and rusting issue | No Epoxy Coating |
| Using plastic Cap Bolt | As using plastic cap bolt for roof panel bolts prevent rusting issue. | No using plastic cap bolt |
| GRP Roof support | As using GRP Roof support, it is better easy to install tie rod and strong against loading | Using PVC roof support |
| Water Level indicator | PC clear tube type with Aluminum case | Using clear tube only |
| Name plate for water tank | It is easy to check the safety management rules with name plate on the water tank | No name plate |

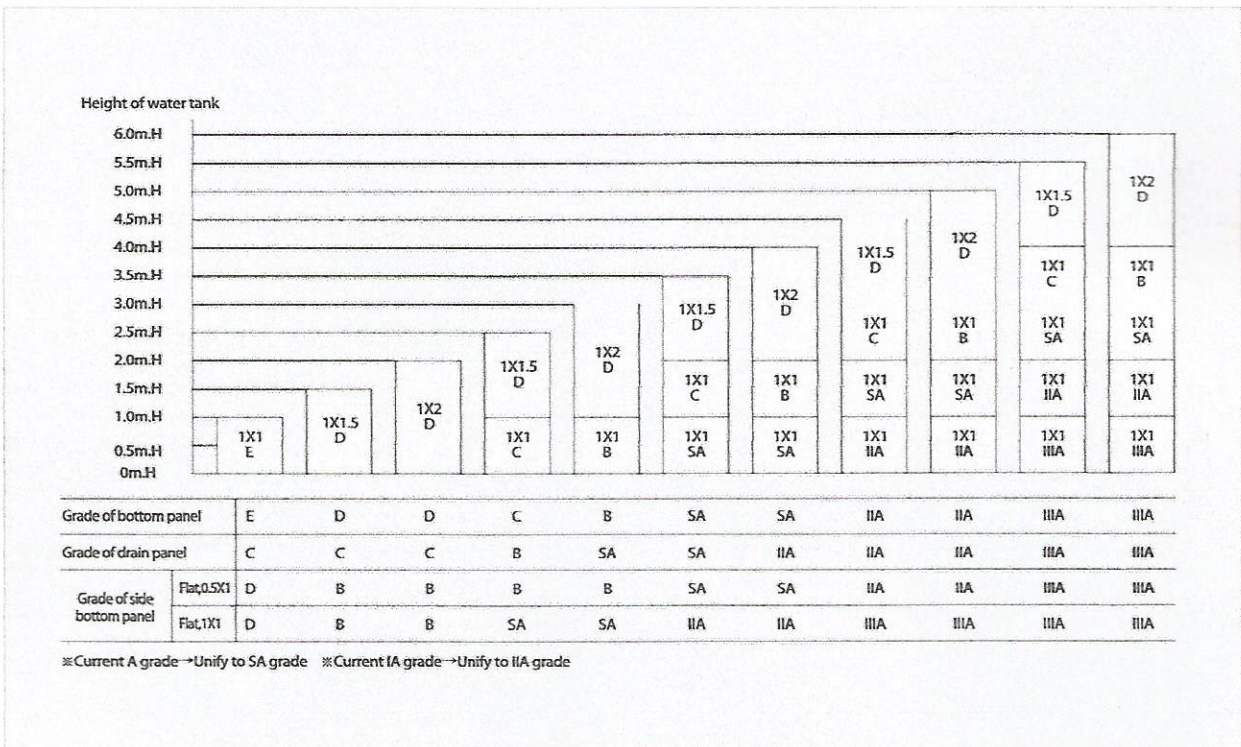


GRP Stirring Line

GRP Panel Type and Size



GRP Panel Composition by Height

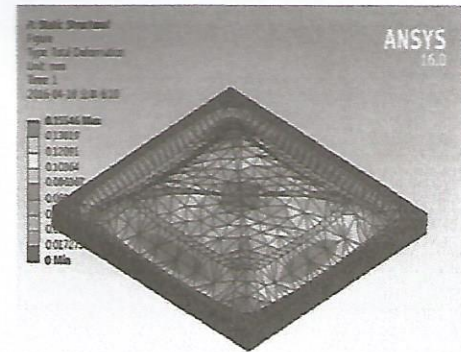


Panel Physical Properties (KS F 4811 Standard)

| item | Unit | Standard | Result | Test Method | Remark |
|----------------------------|------|--------------|---------|----------------|--------|
| Tensile Strength | MPa | Over 60 | 91.4 | KS F 4811:2016 | |
| Bending Strength | MPa | Over 80 | 200 | KS F 4811:2016 | |
| Elastic modules in Bending | MPa | Over 6000 | 15287 | KS F 4811:2016 | |
| Glass fiber Content | % | Over 25 | 31 | KS F 4811:2016 | |
| Barcol Hardness | - | Over 30 | 61 | KS F 4811:2016 | |
| Water absorption | % | Below 1.0 | 0.05 | KS F 4811:2016 | |
| Hydrostatic pressure | - | Over 6 times | 6 times | KS F 4811:2016 | |

Stress Analysis of GRP Panel

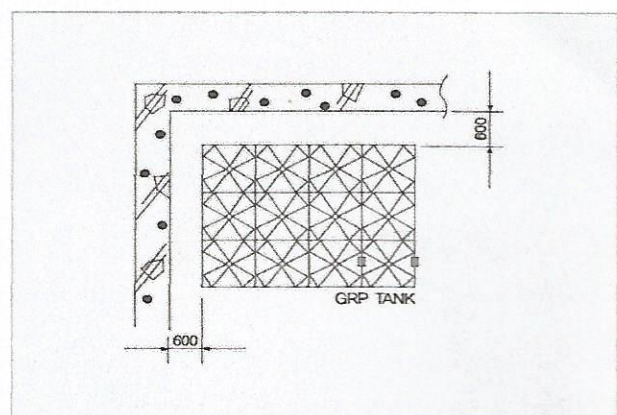
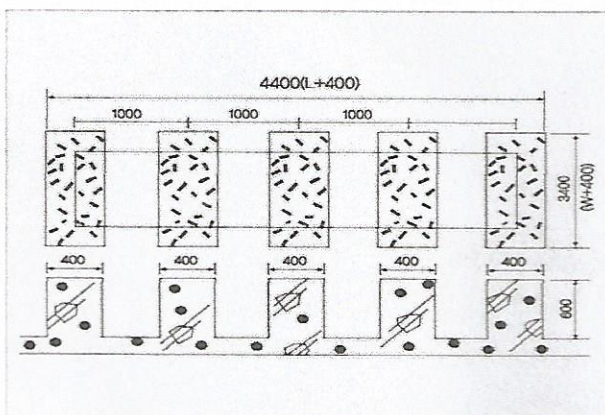
- GRP Water tank panel is designed with special shape for maximizing safety against stress and deformation, so it has better structural strength than normal circle designed panel.
- As GRP Water panel is manufactured by oil-hydraulic press under high temperature and high pressure, it maintains top water pressure strength and there is no dimensional deviation by temperature change.



Installation Standard(Pad and Space)

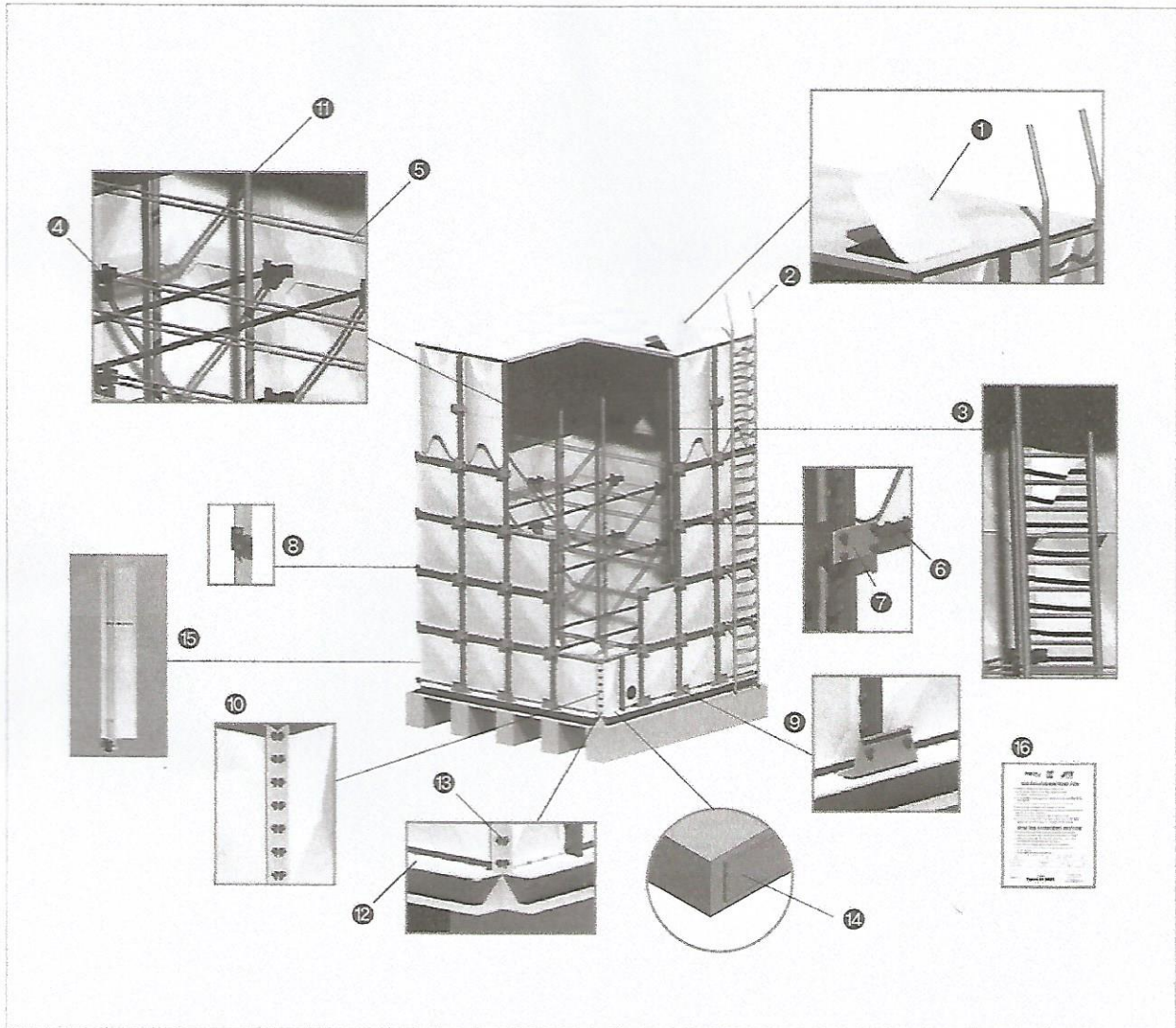
Standard of Base Concrete PAD Installation and Space

- For maintenance of GRP tank, it needs extra space at least 600mm from wall and 1,000mm from ceiling.



Internally Reinforced System

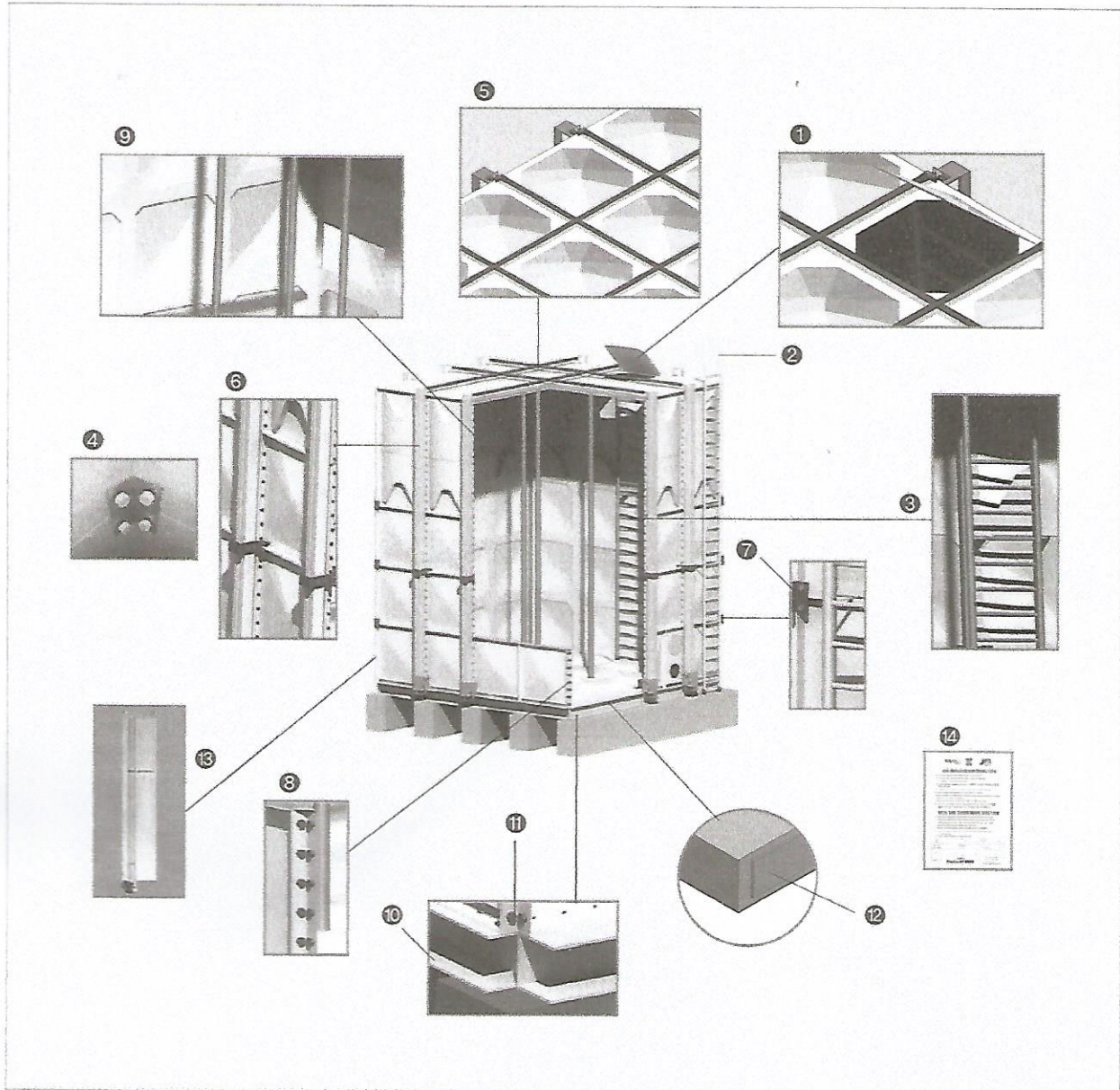
- It is possible that various capacity's design and flexible space should be used by GRP panels standardized
- Excellent watertightness, hygienic conditions and non-leakage applied internally reinforced stay(Stainless)



| No. | Name | Material |
|-----|----------------------|------------------|
| 1. | Manhole panel | GRP |
| 2. | External ladder | SS400(HDG) |
| 3. | Internal ladder | GRP (Pultrusion) |
| 4. | Internal Bracket | STS 316 |
| 5. | Internal Tie-Rod | STS 316 |
| 6. | Flange bar, Flat bar | SS400(HDG) |
| 7. | External bracket | |
| 8. | Corner bracket | |
| 9. | Bottom bracket | |
| 10. | Corner frame | |

| No. | Name | Material |
|-----|-------------------|-----------------------------------------------------|
| 11. | Roof support pipe | GRP(Pultrusion) |
| 12. | Base frame | SS400(HDG) |
| 13. | Bolts and Nuts | Internal : STS 316 |
| | | Roof : STS 316 |
| | | External : STS 316 |
| 14. | Sealing Tape | Tie Rod Bolt : STS 316 |
| | | PVC Sealant + Butyl |
| 15. | Water Level Gauge | Aluminum Case+PC Clear Tube+Socket |
| 16. | Name Plate | Aluminum(Water Tank Safety Management Instructions) |

Externally Reinforced System



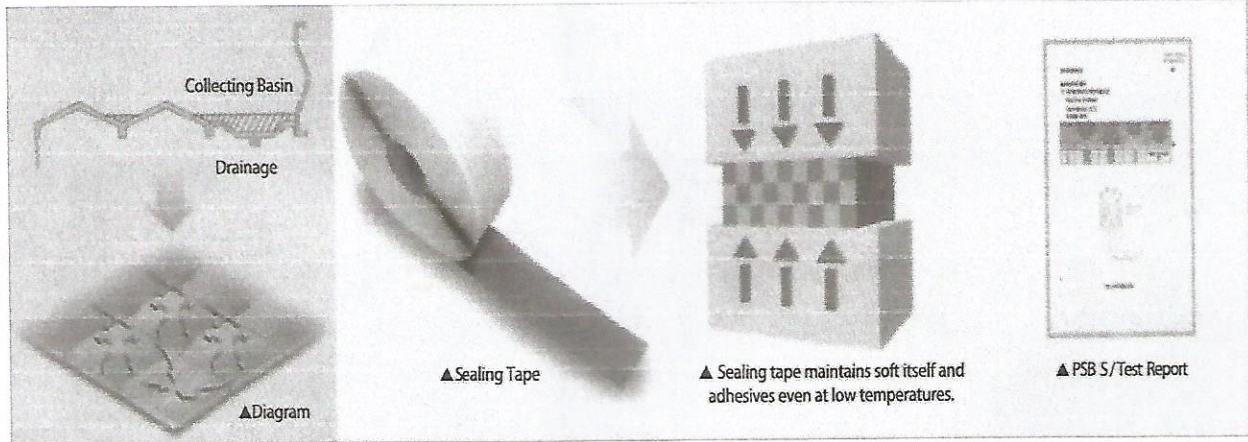
| No. | Name | Material |
|-----|----------------------|------------------|
| 1. | Manhole panel | GRP |
| 2. | External ladder | SS400(HDG) |
| 3. | Internal ladder | GRP (Pultrusion) |
| 4. | Internal Bracket | STS 316 |
| 5. | Roof Bar | SS400(HDG) |
| 6. | Flange bar, Flat bar | SS400(HDG) |
| 7. | External bracket | |
| 8. | Corner bracket | |
| 9. | Bottom bracket | |
| 10. | Corner frame | |

| No. | Name | Material |
|-----|-------------------|-----------------------------------------------------|
| 11. | Roof support pipe | GRP(Pultrusion) |
| 12. | Base frame | SS400(HDG) |
| 13. | Bolts and Nuts | Internal : STS 316 |
| | | Roof : STS 316 |
| | | External : STS 316 |
| | | Tie Rod Bolt : STS 316 |
| 14. | Sealing Tape | PVC Sealant + Butyl |
| 15. | Water Level Gauge | Aluminum Case+PC Clear Tube+Socket |
| 16. | Name Plate | Aluminum(Water Tank Safety Management Instructions) |

❖❖ Perfect Watertight & Drain System

- As using foaming type sealant tape which is excellent water proof & force of restitution, maintains perfect non-leakage of the Water tank. The concave drain panel facilitates complete and quick drainage.

| Type of Sealing Tape | | Characteristic |
|----------------------|-----------|-------------------------------------------------|
| Optional Items | EVA+PVC | Applicable to 50°C |
| | Butyl+PVC | Preventing to Stick PVC tape out from GRP Panel |

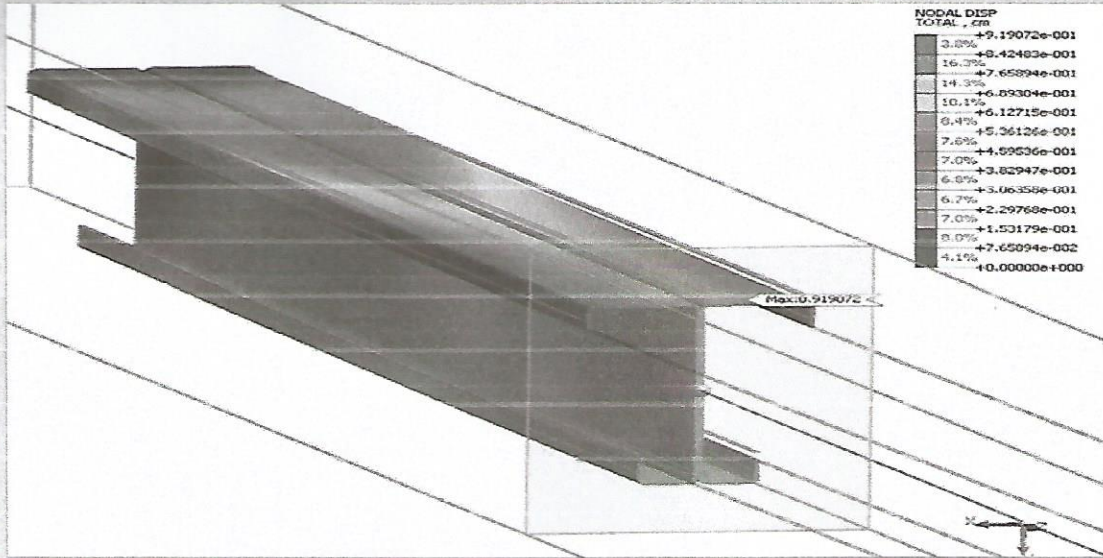


❖❖ Strength & Durability of GRP Water Tank

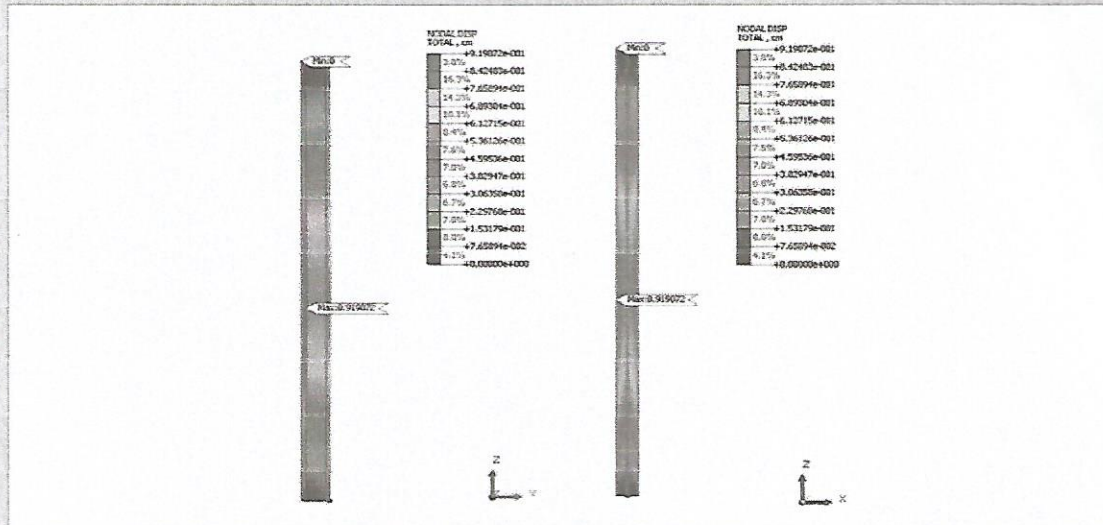
| Section | Design Standard |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Hydrostatic Pressure | Water pressure reinforcement 6 times standard Transformation rate in filled u with water : Less than 1% form water tank high |
| Wind Force | Less than 60m/sec |
| Earthquake Force | Stable and safe till magnitude 5.0 (Over magnitude 5.0, it needs additional reinforcement) |
| Snow load | 60Kg/m ² , Snow fall less than 30cm |
| Illumination Rate | Less than 0.1% |
| Out-fit Force | No leakage under condition of vertical 100Kg after install of 100A fitting with 70mm span supprot |
| Water Temperature | Usable temperature : Less than 30°C / Limited temperature : Max 70°C |
| Water quality | Tap water, well water : chlorine below 50mg/ℓ Seawater : applicantion Externally Reinforced water tank (max 3m height) |

Externally Reinforced System Structural Analysis

FEM - Water Tank Height (3MH-75m³)



FEM - External Pair Frame (3MH-75m³)



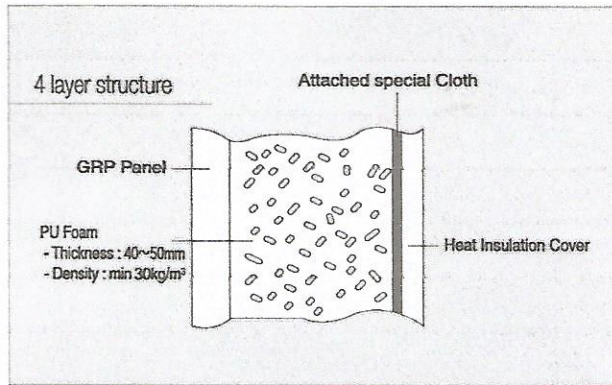
- Result of Skid base strength review (Safety Factor 2.0)

| Height | Contents | Bending Stress(kg/cm ²) | Result | Remark |
|--------|----------------|-------------------------------------|-------------------------------|--------|
| 3.0mH | Main Skid Base | Long term | 1520 < 1600 (Allowable value) | OK |
| | | Short term | 2130 < 2400 (Allowable value) | OK |

Excellent Heat Insulation

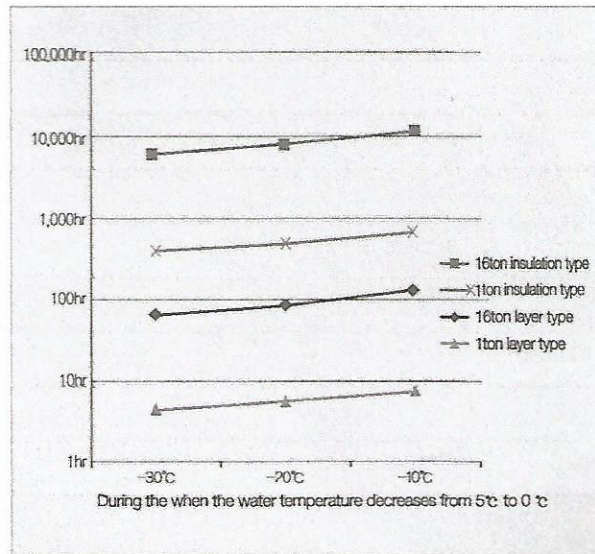
Composition of Insulation Panel

- Excellent insulation of GRP Material itself with Eco-friendly Polyurethane heat insulating material prevents freeze & water condensation.
- There is non-woven fabric with excellent adhesion inside GRP insulated panel, ensuring shape stability of panel throughout longer time periods.
- GRP insulated panel with 4 layer structure ensures excellent insulating effect.
- Thickness of insulated panel : 40~50mm



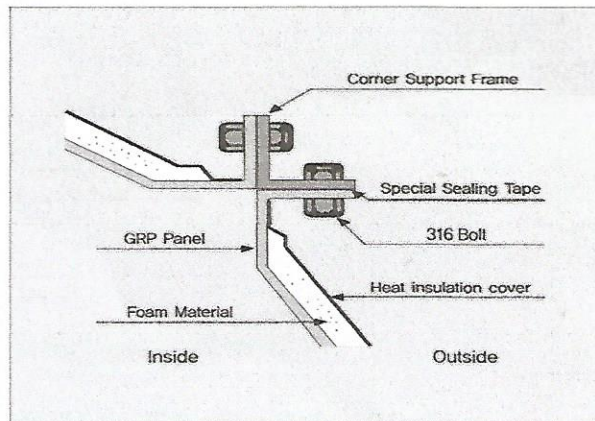
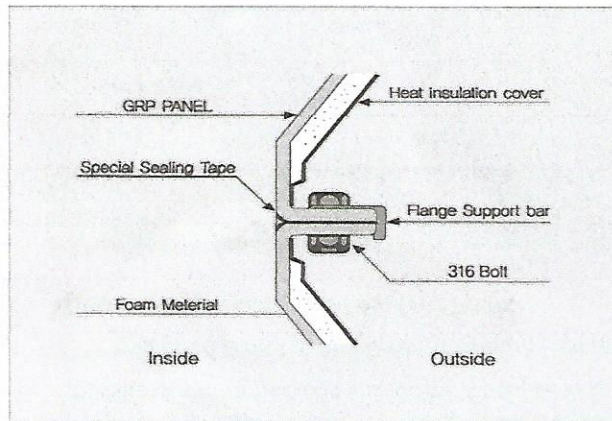
During the time when the water temperature decreases from 5° to 0°

| Capacity | Classification | Temperature of Atmosphere | | |
|----------|-------------------|---------------------------|----------|-----------|
| | | -30°C | -20°C | -10°C |
| 16 m³ | Single Layer Type | 67 hr | 86 hr | 120 hr |
| | Insulation Type | 6,363 hr | 8,182 hr | 11,454 hr |
| 1 m³ | Single Layer Type | 4.2 hr | 5.4 hr | 7.6 hr |
| | Insulation Type | 398 hr | 511 hr | 716 hr |



- ※ Test Condition
- Tank is filled with water
 - No further water supply, or drainage during the test

Drawing of the Panel Joint Part / Corner Part



- Heat insulation foam core thickness : 40~50mm

●● Partition Type Water Tank

- It is possible to eliminate unusable space, and utilize the maximum space, by installing a partition type tank. Economical and effective for maintenance.

● Special Feature

- Utilizing Maximum Capacity

In the basement or other confined areas, it is possible to eliminate unusable space, and utilize the maximum space, by installing a partition type tank.

- Various Uses

If partition type tanks are installed, one section can be used for drinking water, and the other section for service water (Ex fire fighting).

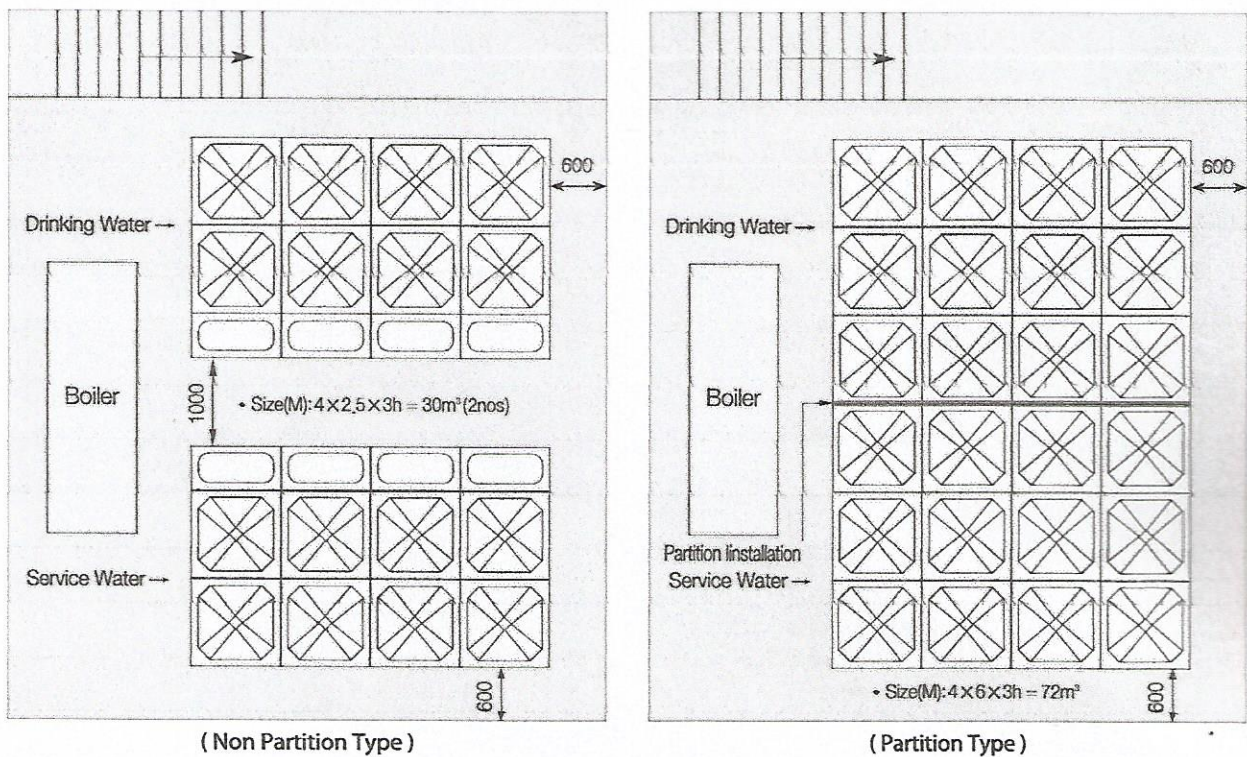
- Easy Maintenance

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

- Cost Effectiveness

The cost and installation of 1 partition tank is cheaper than 2 separate tanks.

● Partition Installation

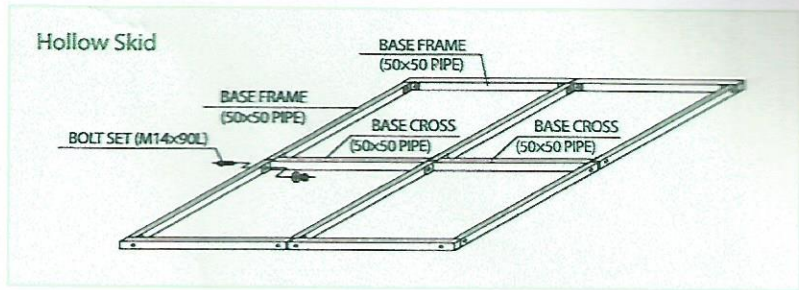


● Effect for Partition Water Tank System

- If tanks for two different uses are needed in a confined area or boiler room, a 72 ton partition type tank can be installed to use half for drinking water, and half for service water. If separate tanks are installed, however, you have to installed two tanks with a maximum of 30 tons, because you need to have 1 meter distance between tanks for maintenance and operating space.

Earthquake-Proof Skid Base System

-Height of water tank 2.5mH,
 Height of water tank 4m,
 GRP Sectional Panel, Putting water to
 85% of water tank height,
 Earthquake-Proof Strength 5.0



• Result of Skid base strength review (Safety Factor 2.0)

| Height | Contents | | Bending Stress(kg/cm ²) | Result | Deflection(cm) | Result |
|--------|----------------|------------|-------------------------------------|--------|------------------------------|--------|
| 2.5mH | Main Skid Base | Long term | 1170 < 1600(Allowable value) | O.K | 0.15 < 0.25(Allowable value) | O.K |
| | | Short term | 1340 < 2400(Allowable value) | O.K | 0.17 < 0.33(Allowable value) | O.K |
| | Sub Skid Base | Long term | 1590 < 1600(Allowable value) | O.K | 0.21 < 0.25(Allowable value) | O.K |
| | | Short term | 1830 < 2400(Allowable value) | O.K | 0.25 < 0.33(Allowable value) | O.K |
| 4mH | Main Skid Base | Long term | 790 < 1600(Allowable value) | O.K | 0.06 < 0.25(Allowable value) | O.K |
| | | Short term | 900 < 2400(Allowable value) | O.K | 0.27 < 0.33(Allowable value) | O.K |
| | Sub Skid Base | Long term | 1540 < 1600(Allowable value) | O.K | 0.15 < 0.25(Allowable value) | O.K |
| | | Short term | 1750 < 2400(Allowable value) | O.K | 0.17 < 0.33(Allowable value) | O.K |

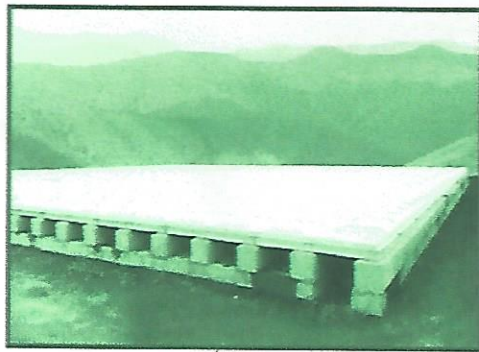
Wave Proof Panel for Earthquake-Proof

Sample Size
 $4.0(W) \times 4.0(L) \times 4.0(H) = 64.0Ton$

"Earthquake-resistant design and Fire safety standards of Fire fighting facility" The third clause of Article 4

-Wave proof panel shall be installed from the center of water tank to 4 directions, the length must be over one half of water tank length, the height must be over one half of water tank height.

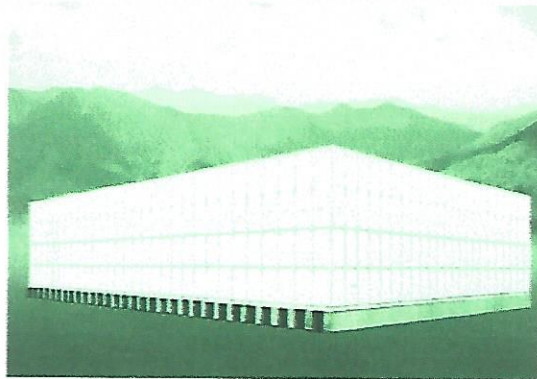
GRP Water Tank Installation Processing



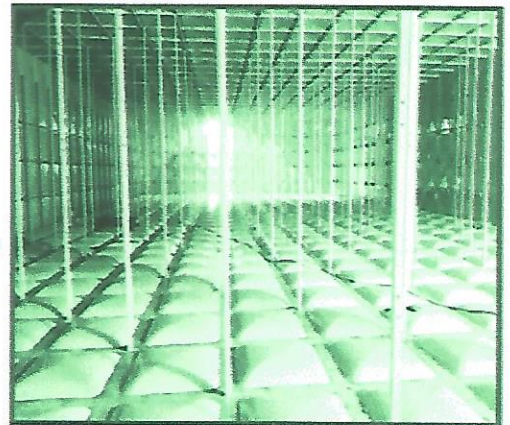
Base Concrete
PAD & Bottom Panel assembly



Wall Panel and Partitional Panel Assembly



Assembly Completed"



Internal Tie-rod & Roof Support Assembly

Installation and Caution

- 1) Customers are requested to make foundation pad construction according to the designed specifications and the strength of the site.
- 2) Check the evenness of foundation (Within 5mm) and the flatness of base material. (Within 0.5mm)
- 3) Check rust of the external reinforced material and any bolts and nuts, their tightness.
- 4) Check installed state of the external ladders and water level gauge.
- 5) Check bending of the water tank wall panel (maximum up to 1% of water tank height) and check deformation of the water tank.
- 6) Check a corrosion inhibitor coating on the internal reinforced material and bolts tightness.
- 7) Check drooping the internal reinforced tie rod and check assembled state the internal bracket.
- 8) Check assembled state of the internal ladder and roof supports.
- 9) Check the size of socket for plumbing will be installed.
- 10) Check assembled state of a fitting for plumbing.

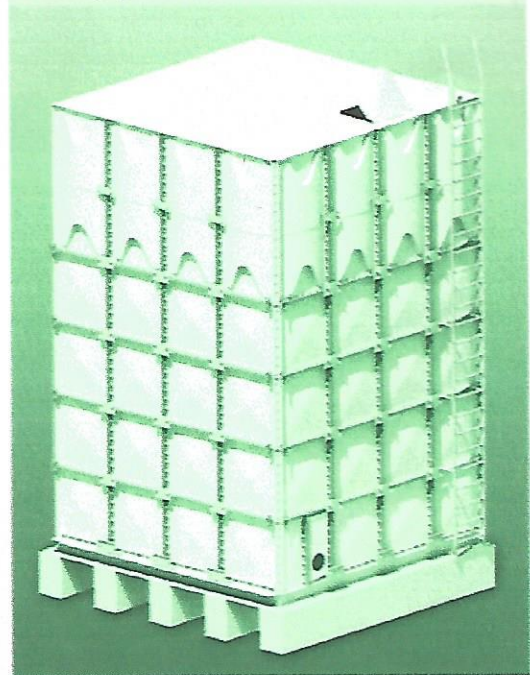
Maintenance Control

- To keep the tank clean and ensure its safe use, please perform the following inspection and maintenance work.
- PIPECO KOREA Panel tanks are designed and manufactured for long-term service. Maintenance and inspection must be conducted to secure hygienic and long life. To facilitate easy and safe maintenance and inspection, a proper space must be secured around water tanks.

User Regulation Maintenance Items

- 1) Caution the damage to the water tank from outside shock.
- 2) Do not use the GRP water tank for other unapproved purpose.
(For example chemical storage tank)
- 3) Do not dismantle internal components or change it to other components without official approval.
- 4) Prohibit to install unapproved components or non-consent equipments.
- 5) Keep standard water level at all times.
(Uppermost tie rod is soaked in water)
- 6) When cleaning one compartment the inside of the tank, keep the water level less than 50% at the other compartment.
- 7) Clean the inner side of water tank at least two time per a year.
- 8) Do not use any organic solvent such thinner, acetone, chlorine bleach when cleaning inner side of water tank and recommend with soft materials.

- Location : Head office water tank
- Size(M) : 4×4×6mH



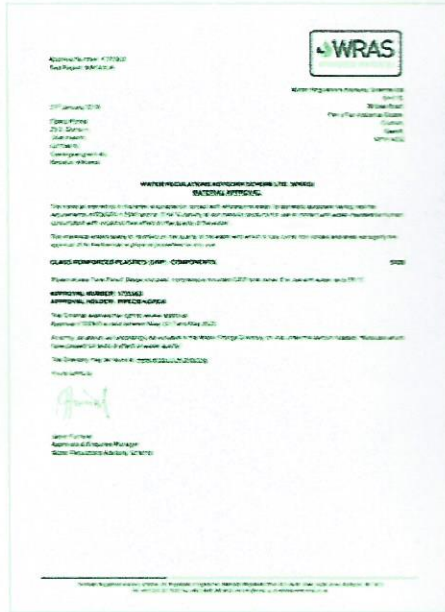
Maintenance item

| Maintenance item | Interval | Remarks |
|-----------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Clean the inner side of water tank | 2 times / Year | When cleaning innder side of water tank, need to use soft materials like soft cloth or sponge, do not use rough materials like steel brush or wire. |
| 2. Looseness of the bolts and nuts | 2times / Year | Retighten any loose bolts and nuts. (Do not use impact wrench) |
| 3. Check standard water level | 1 time / Month | Checking operation of water level control valve. |
| 4. Check clogginess of Airvent, Overflow | 1 time / Month | Removing foreign body and cleaning. |
| 5. Manhole Cover | 1 time / Month | Make sure that the manhole cover is completely shut. Always keep it locked. |
| 6. Turbid water | 1 time / Month | Check the inner parts of the tank, the outlet and the other places for turbid water. |
| 7. Water leakage and deformation of the tank | 1 time / Month | If the water tank leaks or deformed immediately contact the local sales representatives. |
| 8. Internal & External pressure other than hydrostatic pressure | 1 time / Month | If any pressure other than hydrostatic pressure applied to the tank, immediately return the tank to its normal state. |
| 9. Looseness of the bolts and nuts for Ladder. | 1 time / Year | - Fasten loose bolt for ladder - When bolt rusted, need to remove the rusting and coat for rustproofing on the bolt. - When the bolt is corroded, need to replace the bolt. |

☘ Certificates for GRP Water Tank

- Getting all international certificates and Test reports for GRP Water tank
- Realization of customer satisfaction through quality management system
- GRP Water tank of best quality with competitive price

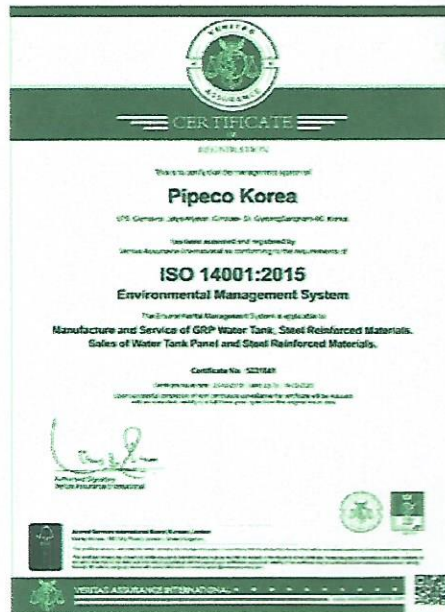
● GRP water tank Certificates and test reports



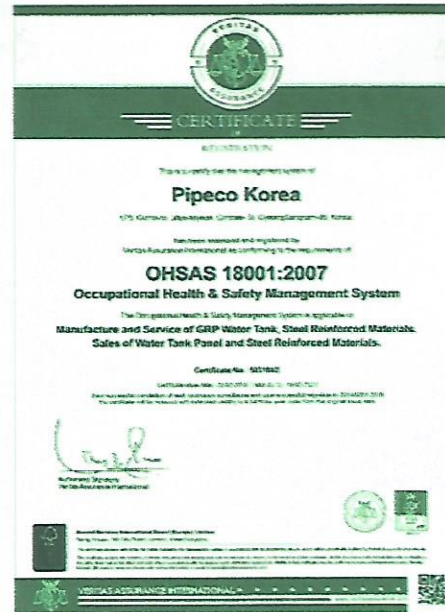
WRAS Certificate (U.K)



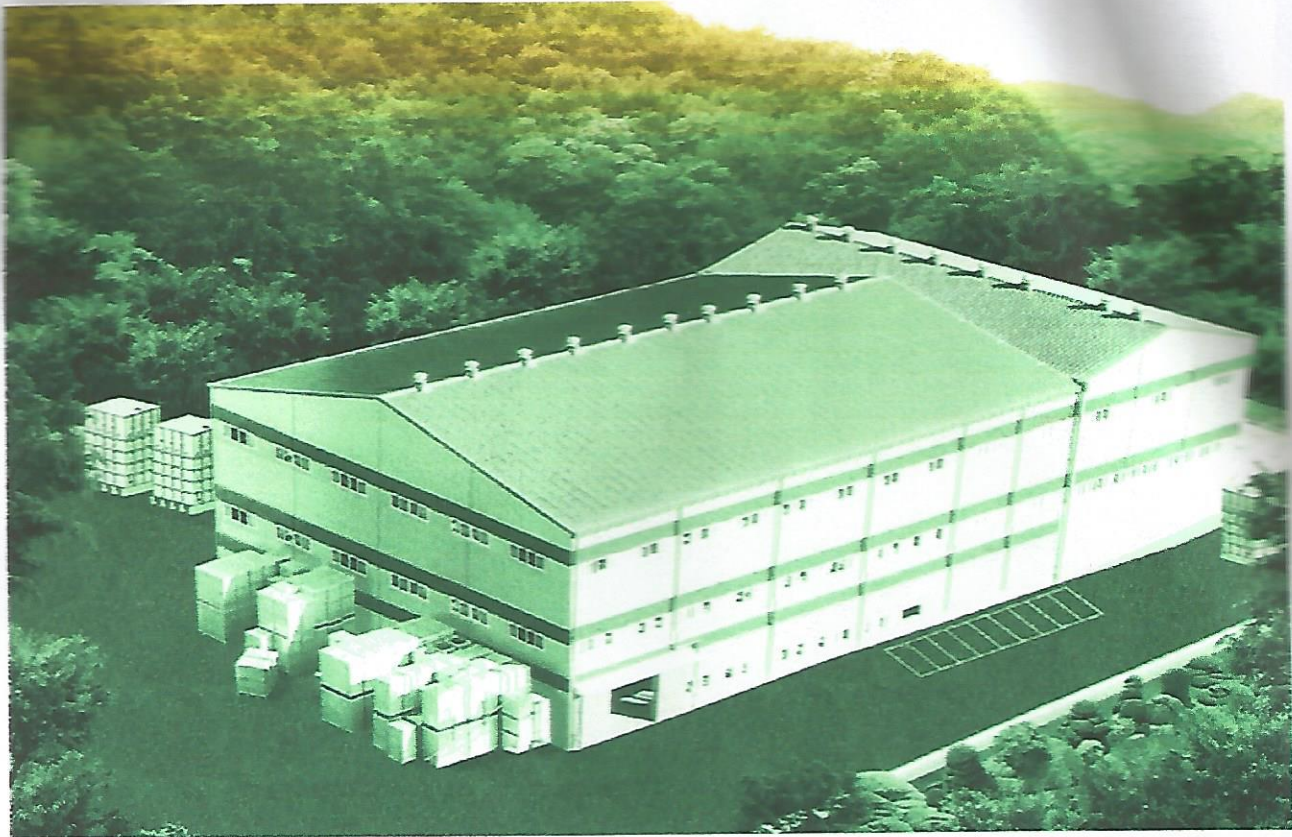
ISO 9001



ISO 14001



ISO 18001



Head Office View



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