SungDu

GRP WATER TANK

ENGINEERED TO HOLD MORE.

TECHNICAL CATALOGUE

MODULAR DESIGN. MATERIAL CLARITY. DETAILED ENGINEERING REFERENCE.



DURABLE & LONG-LASTING

LEAK PROOF CONSTRUCTION

MODULAR & FLEXIBLE DESIGN

CORROSION RESISTANT

LOW MAINTENANCE

KOREAN BRAND IDENTITY / 2026 EDITION

01 / SUNGDU

THE WAY WE STORE WATER MATTERS.

SungDu presents modular glass-fibre fibre reinforced plastic (GRP) water tank tank systems, engineered around coordinated panels, reinforcement, sealing, insulation and installation interfaces.

MODULAR STORAGE

Standard panels allow flexible capacity and project configurations for water storage applications.

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02 / PRODUCT

WHY SECTIONAL GRP?

Modular storage systems formed from standardized wall, base, roof, manhole and drain panels.

Flexible capacity

Square, rectangular and tailored footprints using standardized panel dimensions.

Hygienic surfaces

GRP panel construction supports clean water storage with proper use and maintenance.

Water-tight joints

Purpose-selected sealing materials are compressed at connected panel flanges.

Durable panels

Hot-press moulded GRP panels resist hydrostatic loads through panel geometry.

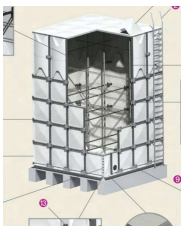
Thermal option

Insulated GRP panel configuration with a four-layer construction.

Controlled assembly

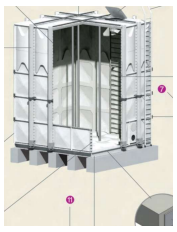
Bolted components integrate into prepared site supports and piping interfaces.

CONFIGURATION OPTIONS



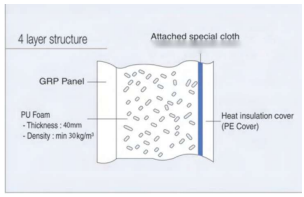
INTERNAL

Internally reinforced



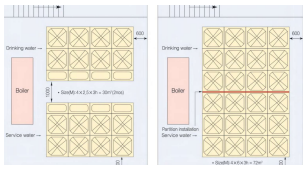
EXTERNAL

Externally reinforced



THERMAL

40 mm insulated option



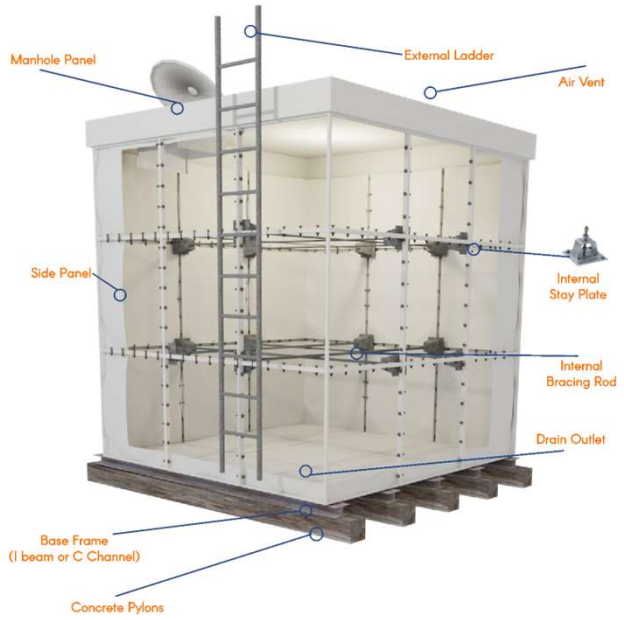
DIVIDED

Partitioned compartments

03 / PRODUCT ANATOMY

SYSTEM ARCHITECTURE & PANEL DIMENSIONS.

Panel geometry, connection hardware and a coordinated range of standardized modules.



Component locations and assembly anatomy



Wall / base / roof / drain / manhole panels

PANEL FAMILY / DIMENSIONS IN MILLIMETRES

PANEL TYPE	DIMENSIONS (mm)
Wall panels	1000 x 2000 / 500 x 2000 / 1000 x 1500 / 500 x 1500 / 1000 x 1000 / 500 x 1000 / 500 x 500 500 x 500
Bottom panels	1000 x 1000 / 500 x 1000 / 500 x 500
Roof panels	1000 x 2000 / 1000 x 1000 / 500 x 1000 / 500 x 500
Drain / manhole	1000 x 1000 illustrated

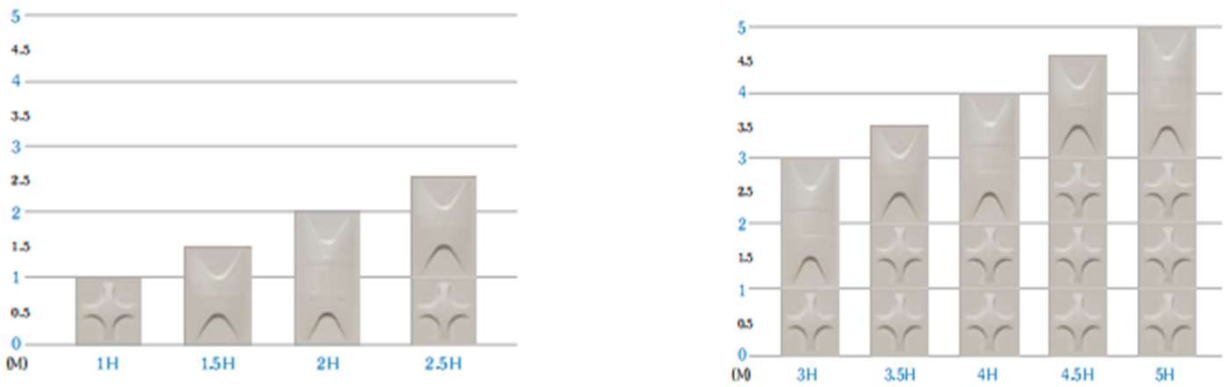
Coordinated interfaces

Sealing tape, sockets, flanges, ladders, gauges, manhole access and support frames are selected with the tank configuration.

04 / PANEL DESIGN

HEIGHT SERIES & PHYSICAL PROPERTIES.

Panel grade combinations follow the tank height, panel position and design loads.



Panel composition by nominal tank height

HEIGHT SERIES

1.0 m to 5.0 m

PANEL GRADING

Arrangements vary by panel location and load

GRP PANEL PHYSICAL PROPERTIES / KS F 4811:2016

PROPERTY	UNIT	STANDARD	RESULT	TEST METHOD
Tensile strength	MPa	> 60	91.4	KS F 4811:2016
Bending strength	MPa	> 80	200	KS F 4811:2016
Elastic modulus, bending	MPa	> 6000	15,287	KS F 4811:2016
Glass fibre content	%	> 25	31	KS F 4811:2016
Barcol hardness	-	> 30	61	KS F 4811:2016
Water absorption	%	< 1.0	0.05	KS F 4811:2016
Hydrostatic pressure	-	> 4 times	4 times	KS F 4811:2016

05 / MATERIAL SCHEDULE

COMPONENT MATERIALS & OPTIONS.

GRP envelope components, stainless steel internal elements, hot-dip galvanized structural items and sealing systems.

GRP	Panels, manhole, internal ladder
STS304 / 316	Tie rods, brackets, fasteners & washers
SS400 (HDG)	External ladder, frames, brackets
PVC / EVA / Butyl	roof pipe, Joint-sealing media

PARTS 01 - 16

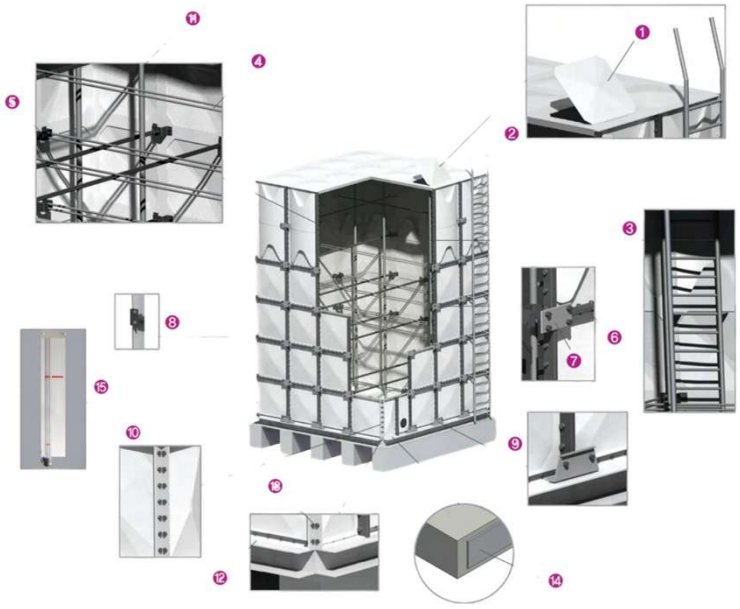
NO.	COMPONENT	MATERIAL / OPTIONS
01	Manhole panel	GRP
02	External ladder	SS400 (HDG)
03	Internal ladder	GRP (pultrusion)
04	Internal tie rod	SS316 (A4 Grade)
05	Internal bracket	SS304 / SS316
06	Flange bar / flat bar	SS400 (HDG)
07	External bracket	SS400 (HDG)
08	Corner bracket	SS400 (HDG)
09	Bottom bracket	SS400 (HDG)

NO.	COMPONENT	MATERIAL / OPTIONS
10	Corner frame	SS400 (HDG)
11	Roof support pipe	GRP (pultrusion) / PVC
12	Base frame	SS400 (HDG)
13	Internal fasteners	Bolts / nuts: SS304 or ST316
13	Roof panel fasteners	SS304 / 316
13	External fasteners	SS304 / 316
13	Connection fasteners	SS304 / 316; M10 / M12
14	Sealing tape	PVC sealant + Butyl; or EVA sealant
15	Water level gauge	GRP / aluminum case + PE clear tube
16	Name plate	Aluminum; water tank safety management instructions

06 / INTERNAL SYSTEM

INTERNALLY REINFORCED WATER TANK.

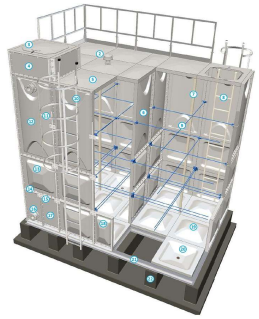
Connecting members, brackets and GRP access components within the tank envelope.



Internal reinforcement / indexed components



Internal tie rods and brackets



Internal system perspective

COMPONENT FUNCTIONS

No.	Name	Material
1	Manhole panel	GRP
2	External ladder	SS400 (HDG)
3	Internal ladder	GRP (Pultrusion)
4	Internal tie rod	SS304/316
5	Internal bracket	SS304/316
6	Flange bar, Flat bar	
7	External bracket	SS400 (HDG)
8	Corner bracket	
9	Bottom bracket	SS400 (HDG)
10	Corner frame	SS400 (HDG)

No.	Name		Material
11	Roof Support		PVC / GRP
12	Skid		SS400 (HDG)
13	Bolts and nuts	Inside SS	Bolt/Nut(304, 316), Washer(316)
		Roof panel	SS304/316
		Outside	SS304/316
		Connection	SS304/316
		Size	(M10, M12)
14	Sealing tape		PVC Sealant + Butyl or EVA Sealant
15	Water level gauge		GRP Aluminium case + PE Clear tube

TANK CONNECTION SYSTEM

Bolted GRP panels rely on seals, aligned frames and a properly coordinated reinforcement system.

07 / EXTERNAL SYSTEM

EXTERNALLY REINFORCED WATER TANK.

External frames and bracing support a clean interior; materials are scheduled to their component locations.



External frame and panel layout



External reinforcement detail

EXTERNAL COMPONENTS / MATERIALS

No.	Name	Material
1	Manhole panel	GRP
2	External ladder	SS400 (HDG)
3	Internal ladder	GRP (Pultrusion)
4	Internal Corner Angels	SS 316
5	External support	SS400 (HDG) thread rods / Pipes
6	External Support	I beam / C Channels SS400 (HDG)
7	Frame and flat Bars	SS400 (HDG)
8	Corner bracket	SS400 (HDG)
9	Roof Support	PVC / GRP
10	Skid	SS400 (HDG)

No.	Name		Material
11	Bottom bracket		SS400 (HDG)
12	Sealing tape		PVC Sealant + Butyl or EVA Sealant
13	Water level gauge		GRP Aluminium case + PE Clear tube
14	Bolts and nuts	Inside SS	Bolt/Nut(304, 316), Washer(316)
		Roof panel	SS304/316
		Outside	SS304/316
		Connection	SS304/316
		Size	(M10, M12)

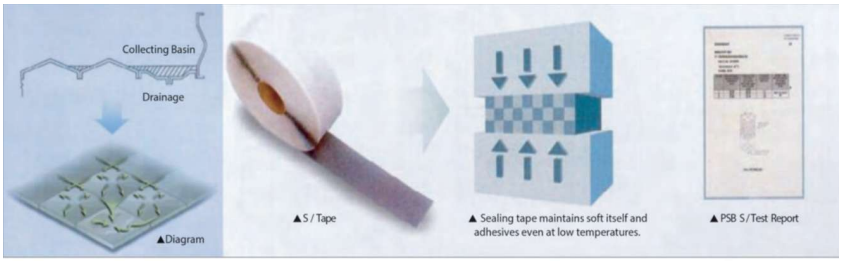
STRUCTURAL INTERFACES

Base frame, anchor points, steel section sizes and connections are coordinated with each project configuration.

08 / JOINTS & LOADS

SEALING SYSTEMS & DESIGN CRITERIA.

Compression seals, concave draining and resistance to operating conditions.



Sealing tape / joint compression / drain geometry

EVA + PVC

Application to 50 C (source comparison)

Butyl + PVC

Resists separation of PVC tape from GRP surface

Schedule choice

PVC + Butyl, or EVA + PVC sealant

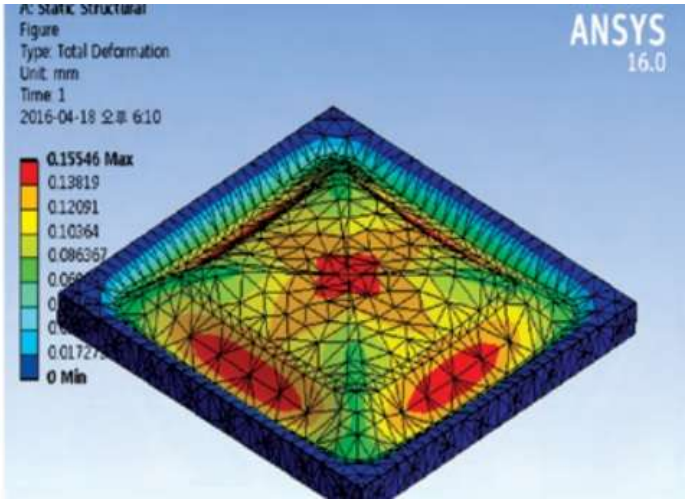
STRENGTH, DURABILITY & OPERATING LIMITS

DESIGN CONDITION	TECHNICAL VALUE
Hydrostatic pressure	Strength > 4 times hydrostatic pressure; full-tank strain < 1% of tank height
Wind force	Less than 60 m/s
Seismic resistance	Intensity 5.0; additional reinforcement at 5.0 or higher
Snow load	60 kg/m2; snow depth less than 30 cm
Light transmission	Below 0.1%
Fitting / out-fit force	No leakage at 100 kg vertical load, 100 A fitting, 70 mm support span
Water temperature	Usable below 30 C; maximum limited to 70 C
Water service	Tap / well water: chlorine < 50 mg/L; seawater external system max 4 m high

09 / ENGINEERING

FEM STRESS ANALYSIS & FRAME EVALUATION.

Finite-element illustrations demonstrate the influence of formed panel geometry and structural members.



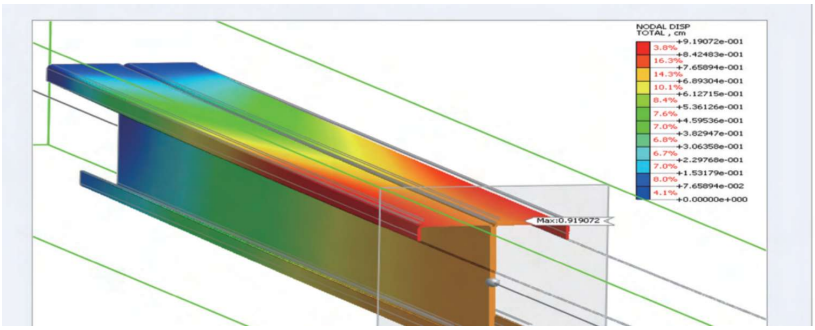
Panel stress and deformation response

PANEL DESIGN

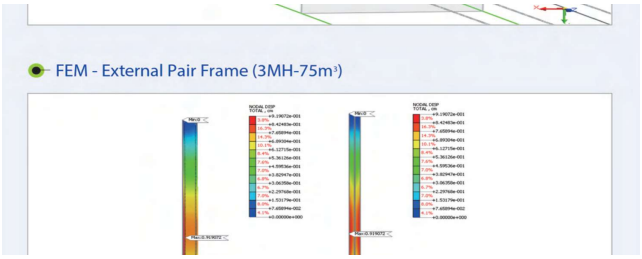
Panel geometry spreads hydrostatic stress and improves deformation resistance.

PRODUCTION

Hot-press moulding under temperature and pressure forms the shaped GRP panel.



FEM - water tank / external frame configuration



FEM - external pair frame

STRUCTURAL REVIEW

Skid base check

Safety factor 2.0

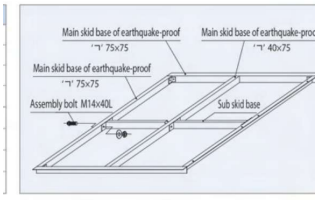
10 / SEISMIC DESIGN

EARTHQUAKE-RESISTANT STRUCTURAL SYSTEMS.

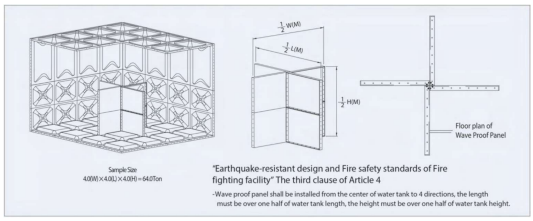
Skid-base evaluation at 2.5 m and 4.0 m tank height, 85% fill condition, seismic strength level 5.0 and safety factor 2.0.

SKID FRAME STRENGTH REVIEW

HEIGHT	FRAME	DURATION	BENDING / LIMIT (kg/cm2)	DEFLECTION / LIMIT (cm)
2.5 m	Main skid	Long	1170 < 1600 OK	0.15 < 0.25 OK
2.5 m	Main skid	Short	1340 < 2400 OK	0.17 < 0.33 OK
2.5 m	Sub skid	Long	1590 < 1600 OK	0.21 < 0.25 OK
2.5 m	Sub skid	Short	1830 < 2400 OK	0.25 < 0.33 OK
4.0 m	Main skid	Long	790 < 1600 OK	0.06 < 0.25 OK
4.0 m	Main skid	Short	900 < 2400 OK	0.27 < 0.33 OK
4.0 m	Sub skid	Long	1540 < 1600 OK	0.15 < 0.25 OK
4.0 m	Sub skid	Short	1750 < 2400 OK	0.17 < 0.33 OK



Seismic skid base construction



Wave-control panels and cross-bracing

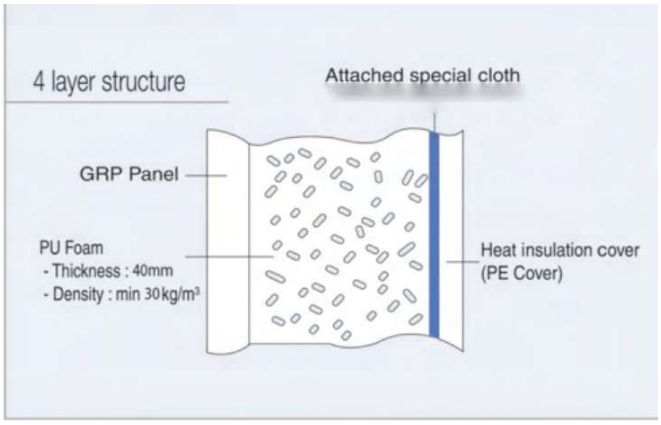
WAVE-PROOF INTERNAL BAFFLE / DESIGN PRINCIPLES

FACTOR	ARRANGEMENT
Orientation	Crossing panels can extend from the centre in four directions
Length	More than one-half of overall tank length
Height	More than one-half of water-tank height
Illustrated configuration	4.0 x 4.0 x 4.0 m

11 / INSULATED PANELS

FOUR-LAYER THERMAL SYSTEM & JOINTS.

GRP envelope with polyurethane thermal insulation, special fabric and an external PE cover.



Four-layer insulation cross-section

40 mm

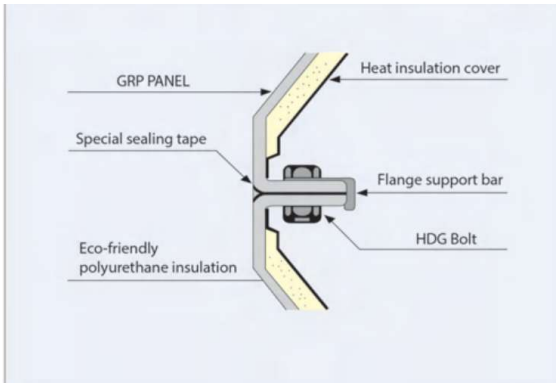
Insulation thickness

30 kg/m3

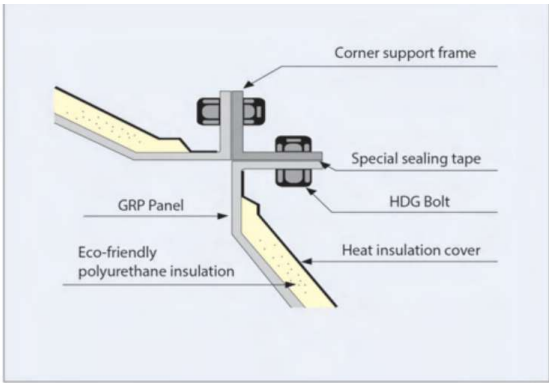
Minimum stated PU density

4 layers

Composite assembly



Straight GRP panel / flange seal



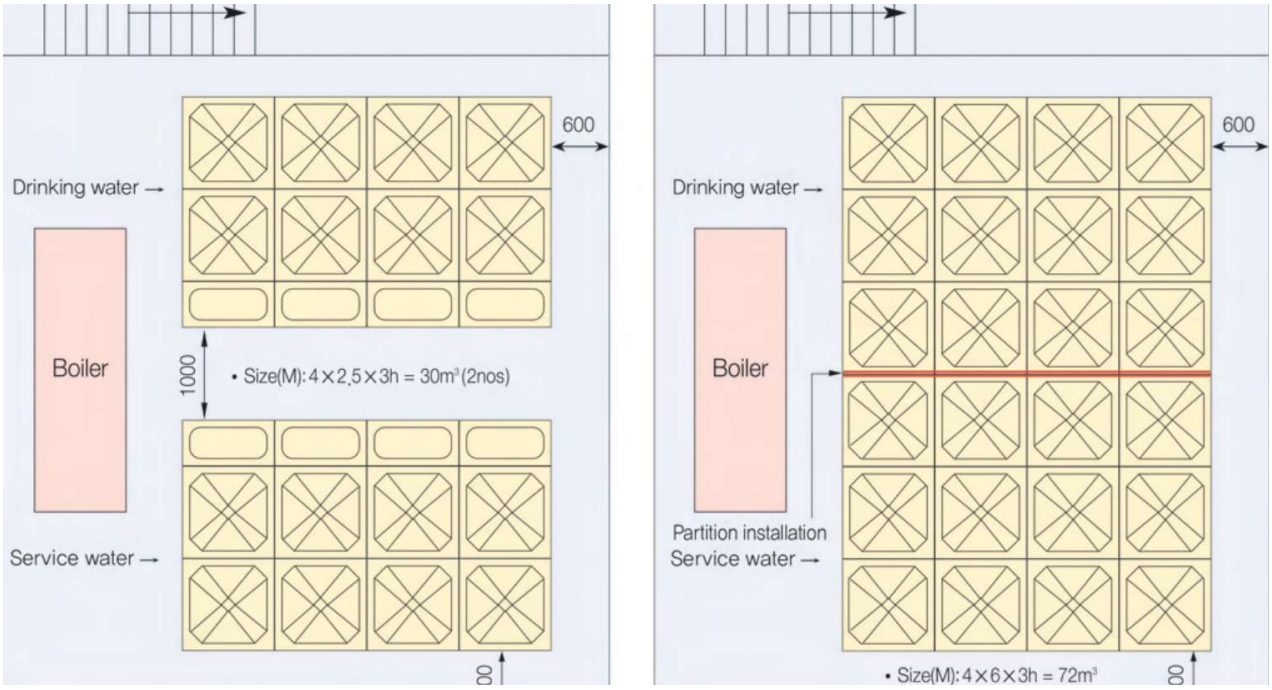
Insulated corner / support arrangement

COMPONENT	CONSTRUCTION
GRP panel	Hot-pressed composite section
PU insulation	40 mm core in illustrated system
Flange support	Structural steel support where shown
Joint sealant	Special compressible sealing tape
Fasteners	HDG bolts in illustrated source detail
Cover	External thermal cover / protective layer

13 / MULTI-COMPARTMENT

PARTITIONED WATER TANK SYSTEMS.

Shared sectional GRP envelopes can incorporate separate compartments for different permitted water services.



Partition arrangement and comparative layouts

UTILIZATION

Makes more efficient use of constrained space.

MAINTENANCE

Separate compartments offer operational flexibility.

APPLICATIONS

Divisions for drinking and service / fire water.

ECONOMY

May reduce overall footprint and duplicated envelopes.

SPACE-EFFICIENCY EXAMPLE

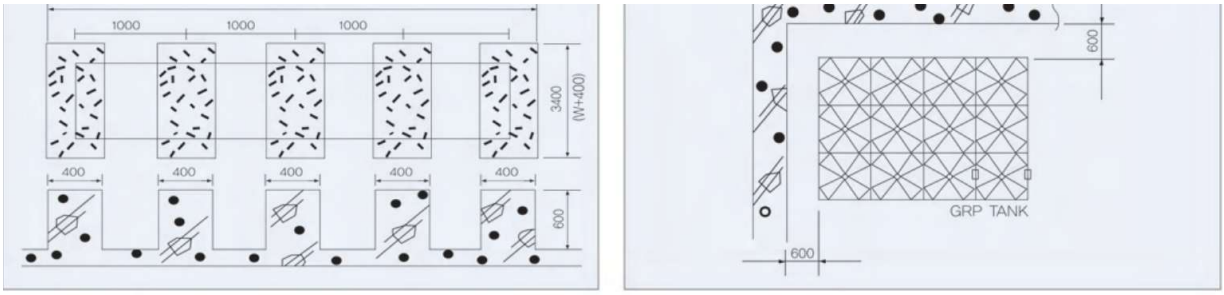
72 m3	Partitioned / 36 + 36 m3
60 m3	Two separate / 30 + 30 m3

Example assumes limited floor area and approximately 1 metre clearance between individual tanks.

14 / SITE PREPARATION

FOUNDATION PAD & SITE READINESS.

Adequate access, prepared supports and verified panel alignment are essential for installation.



SANGWON GRP WATER TANK

Foundation base pad and installation clearance diagrams

600 mm Minimum wall clearance

1,000 mm Minimum ceiling clearance

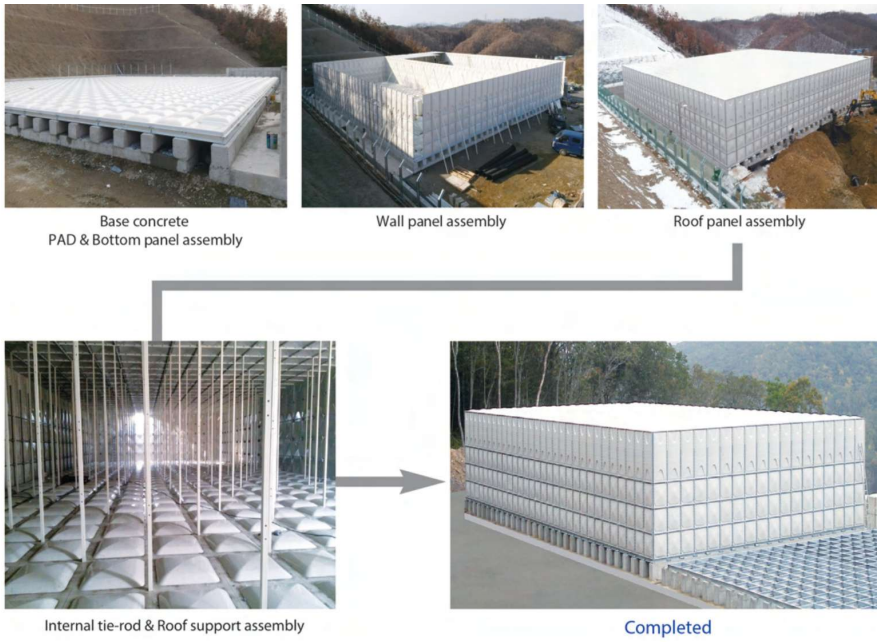
PRE-ASSEMBLY AND COMPLETION CHECKS

01 Verify foundation strength and detailed specification.	**02** Confirm pad levelness and alignment of supports.
03 Inspect external steel for corrosion and damage.	**04** Inspect fasteners and tightening procedures.
05 Check ladders and installed water-level gauge.	**06** Verify wall, roof and base assembly and joints.
07 Confirm fittings, openings and nozzle locations.	**08** Inspect joint sealing before completion.
09 Confirm roof supports, access and manholes.	**10** Inspect final tank condition before water filling.

15 / ASSEMBLY

INSTALLATION PROCESS & HANDLING CAUTIONS.

The sequence progresses from a prepared base to final assembly, reinforcement, roof closure and inspection.



GRP tank assembly from support preparation to completion

01	BASE	Level structural support / pads	02	PANELS	Bottom and wall panel assembly
03	SUPPORT	Internal braces and roof supports	04	CLOSE	Roof enclosure and final inspection

SITE SAFETY AND HANDLING

FOUNDATION

Use approved pad thickness, anchor arrangement and bearing capacity.

PANEL HANDLING

Avoid impact loads and protect GRP panels against sling damage.

CONNECTED PIPING

Do not apply pipe weight or unbalanced loads to tank nozzles.

HOT WORK

Protect tank assemblies during welding and other heat-producing operations.

WATER SERVICE

Use only with permitted liquids and specified operating conditions.

ACCESS

Keep service space open for ladders, manholes and maintenance.

16 / INSPECTION & CARE

PLANNED MAINTENANCE & OPERATING PRACTICES.

Regular inspection, cleaning and access control support hygienic performance.

PERIODIC INSPECTION SCHEDULE

INSPECTION ITEM	INTERVAL	ACTION
Clean inside of tank	2 x / year	Soft cloth or sponge; avoid rough materials and wire brushes.
Main bolts / nuts	2 x / year	Retighten loose bolts; do not use an impact wrench.
Water-level control	Monthly	Check level-control valve operation.
Air vent / overflow	Monthly	Remove debris and confirm passage is unobstructed.
Manhole cover	Monthly	Keep completely closed and locked.
Turbidity	Monthly	Examine interior, outlet and other points.
Leakage / deformation	Monthly	Investigate promptly and engage service personnel.
Abnormal external pressure	Monthly	Remove pressure source; restore normal tank state.
Ladder fasteners	Annually	Tighten, clean corrosion, replace degraded items.

OPERATING PRACTICES

01 Avoid external shock to GRP panels.

02 Do not store chemicals or unapproved liquids.

03 Do not dismantle internal supports without authorization.

04 Use approved components and fittings only.

05 Maintain the required operating water level.

06 Clean with soft and compatible materials.

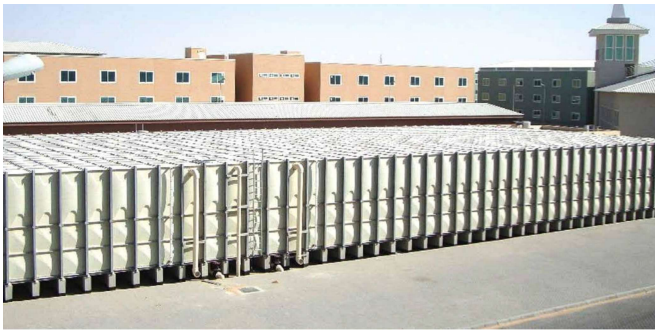
07 Avoid solvent or corrosive cleaning agents.

08 Inspect and ventilate tank regularly.

17 / FIELD APPLICATIONS

DESIGN AT DIFFERENT SCALES.

GRP sectional tanks in large-capacity storage applications and varying footprints.









TECHNICAL INFORMATION PACKAGE

01	**Project geometry**	Dimensions, capacity and final selected panel grades.
02	**Materials & fasteners**	GRP, stainless steel, HDG and sealing component schedule.
03	**Test documentation**	Certificates and laboratory report documentation.
04	**Structural engineering**	Site-specific supports, load and seismic calculations.
05	**Operation & performance**	Insulation, water tightness, inspection and service limits.

CERTIFICATES & TEST DOCUMENTS.

Documented testing, material approvals and quality-system records.


GERMAN CERT
Environmental Management System Certificate

SANGWON ENG CO.,LTD.

ISO 14001:2004

GERMAN CERT
ENVIRONMENTAL MANAGEMENT SYSTEM

ISO SYSTEM CERTIFICATE


WRAS
Water Regulations Advisory Scheme

Our Ref: HLM100238

11th August 2010

Sangwoneng Co. Ltd.
726 Sincheon-ri,
Hanlim-myeon,
Gimhae-Si,
Gyeongsangam-do.
621-873.
South Korea

Dear Sir

WATER REGULATIONS ADVISORY SCHEME
"ITEMS WHICH HAVE PASSED FULL TESTS OF EFFECT ON WATER QUALITY - BS 6920"

GLASS REINFORCED PLASTICS (GRP) - MATERIAL ONLY 5125

Sangwon GRP. Beige coloured, press moulded GRP material. For use with water up to 45°C.

Test Report: MA4109/S

1008500 SANGWONENG CO. LTD.

Hannah Lewis
WRAS Approvals Administrator

WRAS MATERIAL DOCUMENT


TEST CERTIFICATE

This Certificate is issued to
Conic Engineering and Trading Pte Ltd
421 Tagore Industrial Ave
#02-16 Tagore 8
Singapore 787805

FOR

Product: GRP Panel Type Water Tank

Brand/Model: SANGWON

Detail: -

Specification: SS245 : 2014 "Specification for Glass Reinforced Polyester Sectional Water Tanks".

Test Report: 7191135418-MEC15-LAS, 7191135418-MEC15-01A-DL, 7191135418-MEC16-01B-DL, 7191135418-CHM16-06-LSM, 7191135418-CHM16-4A-EO, 7191135418-CHM16-4B-EO, 7191135418-CHM16-01-LYP, 7191135418-CHM16-02-LYP, 7191135418-CHM16-03-LYP, 7191135418-CHM16-04- LYP & OL002065

Date of Test Report : 18 MAR 2016, 28 APR 2016, 30 MAY 2016, 16 MAY 2016, 15 JUN 2016, 15 JUN 2016, 27 JUL 2016, 27 JUL 2016, 27 JUL 2016, 27 JUL 2016 & 14 JUN 2016.

Summary

A sample of product submitted was tested and was found to comply with the test requirements of the above standard(s).

Certificate No: 03604 Date of Original Issue: 24 AUG 2016 Date of Last Revision: - Date of Expiry: 23 AUG 2018

PSB TYPE TEST DOCUMENT


LESEN PENSIJILAN BARANGAN
Product Certification Licence

FIBREGLASS REINFORCED POLYESTER (FRP) SECTIONAL WATER TANKS

Please refer to detail in the SCHEDULE

BS EN TEST DOCUMENT

GRP CYLINDRICAL TYPE TANKS

STORAGE TANK, SEPTIC TANK & SEWAGE HOLDING TANKS

SHAPE	Attractive Cylindrical Horizontal shape, specially designed to suit the capacity and long life.
SURFACE	Smooth and shining Isophthalic white Gelcoat finishing for inner surface and waxed gel coat coating for external surface in white color.
ANTIFUNGUS LAYER	A middle layer is provided with advised chemical to prevent fungus and Ultra violet Rays.
STRUCTURE	1 mm. Thick white gel coat Interior Layer finishing. A surface Mat is provided to protect inner coating. Adequate layers of fiber mat and woven roving layers will be applied according to the capacity of the tank using required Resin and chemicals to suit the usage of tank. The middle layer will be for Anti Fungus Treatment. The over coat will be given with waxed white coating to get a clear look.
EXTRA FITTINGS	Inlet, Outlet, Drain and over flow connection



GRP Cylindrical Septic Tank



GRP Cylindrical Holding Tank



Fiber Glass Water Tank



GRP Cylindrical Water Tank

POLYETHYLENE HORIZONTAL & CYLINDRICAL TYPE TANKS (PVC)

Polyethylene is a high quality thermoplastic that has outstanding resistance to both physical and chemical attack. The overall general toughness and excellent chemical resistance to a wide array of wet and dry industrial chemicals and food products make polyethylene ideally suited for storage tanks and containers.

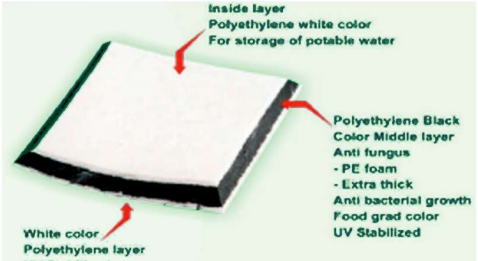
This layer provides the following values:

- Thermal Insulation
- Improving Stiffness
- Prevent formation of fungus
- Prevent the bacterial growth

In addition to UV stabilizer added to the raw material, the black color is naturally acts as an additional UV Stabilizer and naturally food grad color.







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