

CSI SPECIFICATION

Smart Wall (SW) Panel Insulation System

OVERVIEW

PART 1 – GENERAL

1.01. Summary

A. System description

Smart Wall Panel is an energy-efficient rigid foam insulation panel comprising an insulation core sandwiched between two lightweight facer boards. It is primarily used as an insulation board for newly built houses with block walls. It can also be used as a retrofit solution to improve the thermal performance of existing block walls. The panels are finished with suitable render. The panels are available in various thickness with thermal conductivity value (K) of 0.025 W/mK as per ASTM C518. The system is installed using mechanical fasteners and adhesive (CT 85).

B. Section description

Section includes the Smart Wall Panel system and the accessories needed to install this panel – starter trac, adhesive, mechanical fixing plug and finishing renders.

C. Products

1. Smart Wall Panel (**SWP 50**) - for existing structure and columns.
2. Adhesive (**CT 85**) - adhesive to be applied for bonding to existing structure.
3. Starter Trac (**SWT 50**) - to be used for the first layer of panel installations. It is a starting level termination fixture for the system.
4. Reinforcing mesh (**SWM 160**) - used for reinforcing joints and terminations.
5. Smart Wall Corner Beads (**SWCB 50**) – used for corners.
6. Mechanical plugs fixing plugs (**SWP 100**) - for fixing onto existing structure.
7. Backer rod and sealant – used for expansion joints.
8. Smart Wall Finish Coat (**SW FC**) is applied as per architects choices.

D. Related sections

1. Section 03 30 00: cast-in-place concrete
2. Section 03 40 00: pre-cast concrete
3. Section 04 20 00: Unit masonry
4. Section 07 62 00: Sheet metal flashing and trim
5. Section 07 90 00: Joint Protection
6. Section 09 90 00: Painting & coating

1.02. Submittals

A. Samples

1. Submit a complete built-up section showing the Smart Wall Panel system and its composition.
2. All samples should be labeled to indicate the different layers used with their brand name and manufacturer's details.

B. Product data

1. Technical data sheets with full system description.
2. Standard work specifications/method statement sheet issued by the manufacturer.
3. Complete system compliance certificates to the specifications are needed.
4. Details of cross-section drawings for all starting/ending points, joint, windows-insulation link, or any other details present in the original drawings and applicable to the insulation system.

C. Reports and certificates

1. "Approved applicator" certificate issued by the manufacturer is needed.
2. Thermal transmittance "U" value calculation sheets.
3. Submit when requested selected test reports by independent laboratories verifying the performance of Smart Wall Panel system.

D. Shop drawings

Different wall sections need to be detailed with openings termination, joints details, thicknesses, installation details, and instructions.

1.03. Quality assurance

A. Insulation Manufacturer:

1. Obtain insulation board from a single manufacturer.
2. Obtain secondary materials from a source acceptable to the primary insulation manufacturer.

B. Contractor requirements:

1. Should be accredited by the manufacturer as an approved applicator.
2. Knowledge in proper use of Smart Wall Panel systems and its installation process.

C. Regulatory requirements:

Smart Wall Panel systems should conform to applicable code requirements for exterior insulation and finishing system.



D. Mockups

1. If requested by a consultant, after the initial approval of insulation system, a strip of the system and the actual finish needs to be showcased.
2. This on-site sample and its system components, details and finishing can be verified by the consultant.
3. The areas and size for the sample should be designated by the consultant.
4. The same material and installation methods should be utilized as required for the final work in compliance with the manufacturers' recommendation.
5. Consultant approval of sample is necessary before starting the installation of the work.
6. Approved samples should serve as the standard for work throughout the project.

D. Pre-installation conference

Conduct conference at project site to comply with requirements in Division01, Section – “Project Management and Coordination.”

E. Testing

Test	Method	Criteria		Results
Impact resistance	ASTM E2486 / E2486M-13	Temperature	21 ± 2 °C	No failure was observed up to 150 mm height of the impact tester
		R. Humidity	50 ± 5%	
		Mass of cylindrical weight	1.82 Kg	
		Diameter of plunger head	13 mm	
		Drop height	150 mm	
Tensile adhesion	ASTM E2134	Adhesive used	Epoxy glue	Tensile adhesion strength = 0.145 N/mm ²
		Type of specimen	Type C	
		Test Position	Vertical	
		Max Load applied	363 N	
Accelerated weathering (300 hours)	ASTM G154-12a	Type of lamp	UVA - 340	No significant changes observed
		Conditioning Procedure	8 hours UV at 60 °C and 4 hours condensation at 50 °C	
Freeze-Thaw	ASTM C2485	No significant effect observed after 10 cycles		Satisfactory
Water Penetration	ASTM E331	Test Duration	2 hours	Satisfactory
		Test Pressure	137 Pa	
Fire Propagation Characteristics of exterior wall assemblies	NFPA 285	Conducted by UL (certificate – 20170601-R3910)		Pass
Ignitability characteristics of exterior wall assemblies	NFPA 268	Conducted by UL (Report No. R38778-2010306)		Pass
Standard test method for potential heat of building materials	NFPA 259	Southwest Research Institute (SWRI Project No. 01.23236.18.303)		Potential heat of combustion of Smart Wall Panel to be 3540 Btu/lb.
Surface burning characteristics	ASTM E 84 / UL 723	Conducted by UL (Report No. R39181-20180206)		Flame spread <25 (Class A)
				Smoke developed from core foam <450 (SDI = 0)
Compressive strength	ASTM D1621			25 psi (272 kPa Grade 3)
Thermal conductivity	ASTM C 518			0.025 W/mK
Density (PIR core)	ASTM D 1622			35 - 40 kg/m3

1.04. Work scope

<Based on project, the consultant can fill this section>

Basic scope: These Smart Wall Panel systems are designed for exterior wall use in commercial, residential and metal building applications. They can be used as a retrofit option as well in existing buildings to improve the thermal insulation of walls.

1.05. Delivery, storage, and handling

- A. Deliver, store and handle products as per manufactures guidelines.
- B. Protect Smart Wall Panels during transportation and installation to avoid physical damage
- C. Store materials in a cool and dry place protected from exposure to moisture
- D. Stack insulation board flat, a minimum of 30.5 cm (12”) above the ground, and protected from the sun.

1.06. Project/site conditions

- A. Do not install the system in ambient temperatures below 4°C/40°F.
- B. Do not install the system to frozen surfaces.
- C. Protect materials from rain for 24 hours or until dry.

1.07. System guarantee

Subject to the terms outlined in this guarantee, GPI hereby guarantees the performance of Smart Wall Panel system for a period of 10 (ten) years from the date of installation. The product(s) however must be properly applied, using approved materials and applicators as per the manufacturer’s recommendations and applicable building code regulations or applicable industry standards. Product(s) should be used within their shelf life and be installed in accordance with written guidelines and specifications provided at the time of installation. For valid claims presented under this warranty, GPI shall replace and/or repair over the life of this Guarantee up to an aggregate amount equal to the amount paid for the supply.

EXCLUSIONS GPI is not responsible for the following acts, conditions or circumstances or any damage, which may arise from there:

- 1. For structural failure or workmanship not in accordance with manufacturer’s instructions and the applicable industry standards.
- 2. Normal wear and tear resulting from usage.
- 3. Loss due to delays or any other consequential damages.
- 4. Any new installation, repairs or other maintenance or construction on or through the Smart Wall Panel system.
- 5. Damage caused due to falling objects.
- 6. Any adjacent or abutting buildings structure, improved or unimproved property or any component thereof including but not limited to structural failure or damage, leakage or drainage.
- 7. Damage due to Vandalism.
- 8. Any deliberate or negligent acts omissions by the owner or any third party, either before, during or after installation of the Smart Wall Panel system.
- 9. Exposure to any chemical or solution, fire, radiation.
- 10. Settlements, distortion, failure or cracking of the building deck, walls or foundations of the building.
- 11. Improper installation or failure of any material used over which the Smart Wall Panel system is installed.
- 12. Infiltration or condensation of moisture in, through or around the walls, copings, buildings structure, or underlying or surrounding materials.

1.08. Maintenance

At the completion of installation, provide manufacturers operations and maintenance instructions for the system installed.

Periodic maintenance should include thorough checking of the flashing and sealing to ensure that the building envelope remains watertight. Damaged or missing flashing should be repaired or replaced immediately; likewise, cracked or deteriorated sealants should quickly be repaired, or removed and replaced.

Manufacturers provide procedures for cleaning specific systems. Periodically the finishes may need to be cleaned to remove dirt, algae (usually green stains on the surface of the finish), or mildew (generally black stains that look like dirt) that can accumulate on the surface. Basically, mild cleaning detergents, and low water pressure cool water, and a soft bristle brush. DO NOT USE cleaner that is solvent based; high water pressure; hot water; or wire brushes.

PART 2 – PRODUCT

2.01. Approved manufacturers

The Smart Wall Panel system is manufactured by:

Green Products Industries Ltd.,
PO Box 10266, Manama,
Kingdom of Bahrain



2.02. Material description

A. Principal system

1. Smart Wall Panel **(SWP 50/75/100)**
 PIR core board with aerated facer boards used as thermal insulation.
 Thickness can be varied according to the application. The higher the thickness, the better the insulation value.
2. Adhesive Mortar **(CT 85)**
 Mineral based thin layer application mortar that is used to laminate Smart Wall Panel boards to appropriate substrate.
3. Mechanical Fixing Using Anchors **(SWP 100)**
 These are mechanical plugs (dowels) used to fix the Smart Wall Panel boards to the substrate for negative wind load resistance. The dowels can be fixed by either drilling or shooting. Refer to manufacturers recommendation for fixing method.
4. Finish Coat **(SW FC)**
 SW Finish coat is used for making thin-layer plasters on concrete substrates, traditional plasters, gypsum substrates and chipboards, gypsum cardboards, etc. This is recommended to be used as facade plaster on the Smart Wall panels.
5. Reinforcing Mesh **(SWM 160)**
 Fiber glass mesh reinforcement is a coated alkaline resistant fiberglass fabric used for Smart Wall rendering system. It is used in conjunction with CT 85 adhesive mortar and work as a reinforcement for both vertical and horizontal joints of Smart Wall panels.
6. Corner Bead **(SWCB 50)**
 Fibreglass angle profile.

B. Accessories

1. Starter Trac **(SWT 50)**
 These are used at the base of the wall and is used to support the Smart Wall Panel at the bottom. It has a face return flange with striations which provide a strong physical bond for the base coat and perforations for bonding the base to the substrate.

2.03. General requirements

- A. Unless otherwise indicated, provide ready to use material.
- B. Always use recommended materials by the manufacturer when it comes to adhesives, fasteners, starter tracs and spray plaster.

PART 3 – APPLICATION/ EXECUTION

3.01. Manufacturer's instructions

Comply with manufacturer's instructions (guidelines provided in the method statement) for installation of Smart Wall Panel system.

3.02. Examination and preparation

A. Substrate examination

1. Before installation of Smart Wall Panel system ensure that the substrate meets the conditions as mentioned in the guidelines provided by the manufacturer. The substrate must be load-bearing, dry and free from any substances that may weaken adhesion such as grease, shuttering oil, curing compounds, bitumen or dust.

B. Flashings examination

1. All flashings are provided by others and must be installed in accordance with specific manufacturer's requirements. Where appropriate, end-dams must be provided.
2. Windows and openings shall be flashed according to design and Building Code Requirements.
3. Individual windows that are ganged to make multiple units require continuous head flashing and/or the joints between the units must be fully sealed.

C. Correction of the unsatisfactory conditions of substrates installed by other trades shall be the responsibility of the main contractor.

D. Advise contractor of any discrepancies preventing installation of system with manufacturer's warranty.

3.03. Installation

A. Installation should conform to this specification and manufacturer's method statement and project drawings.

B. Installation of Smart Wall Panels

1. Install starter track, back-wrap (reinforcing mesh) according to manufacturer's instructions.
2. Apply CT 85 Adhesive to back of the panels using the "Ribbon and Dab" method or using notched trowel to cover 60% of the surface when glued to substrate.
3. Install these panels as instructed in the method statement.
4. Mechanical plugs are used as well to fix the panel into position.

C. Apply base coat (CT 85 adhesive) and reinforcing mesh

1. Apply the base coat to the surface of the insulation board to the thickness required for the specified reinforcing mesh to be applied in a given area.
2. Immediately embed the SWM 160 reinforcing mesh into the wet base coat with a trowel, working from the center toward the edges, until the mesh is fully covered and a smooth surface is achieved.
3. Lap mesh 2.5" (64mm) minimum on all sides.
4. Reinforcing Mesh shall be continuous through all interior and exterior corners extending beyond the corner a minimum of 12" from both directions creating a minimum of two layers of SW M 160 reinforcing mesh on all interior and exterior corners.
5. Reinforcing mesh can be applied in a single layer.
6. Allow the base coat to cure a minimum of 12 hours prior to additional base coat or finish coat applications.

D. Corner beads/profiles

1. Install corner beads at corners.
2. Cut corner beads to workable lengths or as required.
3. Apply CT 85 Adhesive to insulation panels at outside corners using a stainless steel trowel.
4. Immediately place corner beads against the adhesive and embed the mesh into the adhesive by troweling from the corner; butt edges and avoid wrinkles.

E. Windows and doors

1. Smart Wall Panels are easily cut to fit around windows and doors. Refer to manufacturers drawings for details.
2. Sealant joints are required at all penetrations through the Smart Wall Panels.

F. Applying finish coat

1. Apply finish coat (SW FC) to match specified finish type, texture, and color.

G. System joints

1. Expansion joints in the system are required at building expansion joints, at prefabricated panel joints, floor lines of wood frame construction, where substrates change, terminations at dissimilar materials and where structural movement is anticipated. It is the sole responsibility of the project design team, including the architect, engineer, etc., to ultimately determine specific expansion joint placement, width, and design. Detail specific locations in construction drawings.
2. Sealant joints are required at all penetrations through the Smart Wall Panels (windows, doors, etc.)
3. Specify compatible closed cell backer rod and acceptable sealant.
4. The system must be properly terminated (back-wrapped a min. of 2", properly sealed, flashed) at all penetrations, lighting fixtures, electrical outlets, hose bibs, dryer vents, etc.

3.04. Protection and Cleaning

A. Protection

1. Protect all surrounding areas and surfaces from damage and staining during application of Smart Wall Panel systems.
2. Protect finished work at the end of each day to prevent water penetration.

B. Cleaning

Remove excess and waste materials from job site. Clean, Smart Wall Panel surfaces and work area of excess materials, droppings and debris.