



FACTORY ASSEMBLED INSULATED SANDWICH PANELS USING MINERAL WOOL

User should check the validity of the Certificate by contacting Member Secretary, BMBA at BMTPC or the Holder of this Certificate.

Name and Address of Certificate Holder:
M/s Metecno (India) Pvt. Ltd.
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Performance Appraisal
Certificate No.
PAC No.: **1057-P/2021**

Issue No. **01**


Date of Issue: **10.02.2021**



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Ministry of Housing & Urban Affairs
Government of India
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PERFORMANCE APPRAISAL CERTIFICATE**FOR****FACTORY ASSEMBLED INSULATED
SANDWICH PANELS USING MINERAL WOOL****ISSUED TO****M/s Metecno (India) Pvt. Ltd., Chennai****STATUS OF PAC No: 1057-P/2021**

| S. No | Issue No. | Date of Issue | Date of renewal | Amendment | | Valid up to (Date) | Remarks | Signature of authorized signatory |
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PAC No. 1057-P/2021**Issue No. 01****Date of issue: 10.02.2021**

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PART 1 CERTIFICATION

1.1 Certificate Holder:

M/s Metecno (India) Pvt. Ltd.

No. 138/30, 2nd Floor, Florida Towers

Nelson Manickam Road, Chennai

Tamil Nadu, Pin -600029

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1.2 Description of Product

1.2.1 Name of the System – Factory Assembled Insulated Sandwich Panels using Mineral-wool.

1.2.2 Brief Description

The panels are factory assembled insulated sandwich panels consisting of an insulating layer ‘sandwiched’ between two layers of metal sheets. The panels are manufactured using mineral wool bonded between pre-coated steel sheets to produce profiled finish panels. The steel sheets can either be PPGI or PPGL, and, with a maximum thickness of 0.8 mm. An insulation core provides insulation and sturdy bonding for better structural stability and facilitates better load bearing capacity and wider spans for panels.

The system can incorporate all types of architectural features like coving, boxes, cantilevers, projections, infill walls, mezzanine floors etc. This system can also incorporate all types of services viz. electrical, gas and plumbing etc. The design and engineering of the structures is executed by following the norms & guidelines stipulated in relevant Indian Standards.

1.3 Size and profiles of Panels

1.3.1 Size of panels

Panels are available in thickness from 50 mm to 120 mm, with standard width of 1000 mm and length as per customer requirement.

1.3.2 Profiles of the Panels

1.3.2.1 Hipertec Roof

These panels are self-supporting insulation panels insulated with mineral-wool for roof and wall applications, requiring a high degree of resistance to fire, combined with sound absorption. The Hipertec roof panels are manufactured in accordance with a system patented by

Metecno and consists of a profiled external steel facing, an internal flat line with an insulation core of orientated fibre high density rockwool, arranged perpendicular to the plane of the panel and positioned in strips, laid longitudinally with off-set joints and transversally compacted, in such a way as to completely fill the void between the two metal facings. The ribs of the external metal sheet are filled with shaped mineral wool strips.

The Metecno patented mechanism ensures precise interlocking, dimensional accuracy and eliminates the risk of air gaps and thermal bridging and joints are covered with butyl tape, sealants and flashings.

Facing Options: Pre-painted galvanized steel/aluminium, stainless steel and craft paper and perforated metal sheet for inner skin.

Surface finish: Colour coated PPGI/PPGL with Regular Modified Polyester (RMP), Silicone Modified Polyester (SMP), Super Durable Polyester (SDP) and Polyvinylidene fluoride (PVDF) coating systems

Detail of this panel is shown below :



1.3.2.2 Hipertec Wall

These are self-supporting insulation panels with rockwool for wall and partition applications, which require a high degree of fire-resistance and acoustic insulation.

The Hipertec Wall panel, manufactured in accordance with a system patented by Metecno, consists of two micro-ribbed steel sheets, with an insulation core of oriented fibre high-density rockwool, arranged perpendicularly to the plane of the panel and positioned in strips, laid longitudinally with off-set joints and transversely compacted, in such a way as to completely fill the space between the two metal facings. The Metecno patented mechanism guarantees precise interlocking, dimensional precision and eliminates the risk of air gaps and thermal bridging as the joints are covered with butyl tape, sealants and flashings.

Facing Options: Pre-painted galvanized steel/aluminium, stainless steel and craft paper and perforated metal sheet for inner skin.

Surface finish: Colour coated PPGI/PPGL with RMP,SMP, SDP and PVDF coating systems, as per details below;

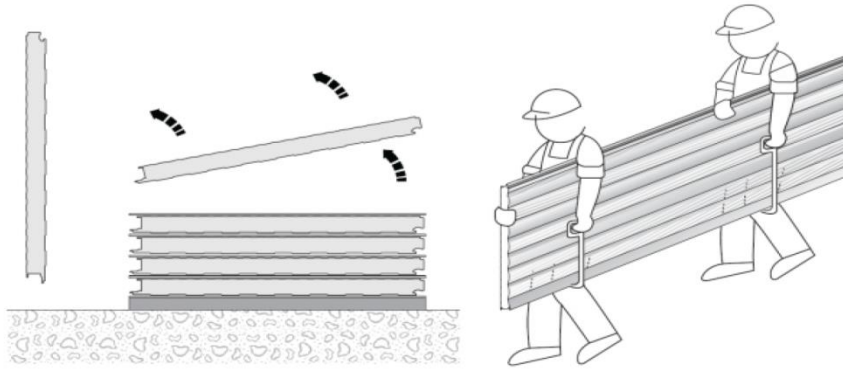


1.4 Applications and Precautions to be taken

1.4.1 These panels are factory assembled composite panels having high strength-weight ratio and ensuring structural stability on the building envelope. These are used for residential and commercial buildings, school & training centers, steel structures, modular & monolithic cabinets, management blocks & site offices, guard room/ porta cabins, etc.x`

1.4.2 Precautions to be taken while lifting panels:

- To prevent panels from damage while lifting, carefully pick up bundles one at a time. Sling the package by using a rocker arm and nylon belts. Insert wooden boards between the package and the belts. The wooden boards will have to be approximately 2cm longer than the package width.
- Do not store more than three packages one on top of another, and place spacers or boards between them.
- Place the package on a flat and rigid surface, and position polystyrene spacers or wooden boards at max. 1 m intervals.
- Panels will have to be stored slightly sloping in order to help possible condensation flow and to prevent backwater.
- Store packages under cover; if this is impossible, protect them with rainproof membranes. Make sure that the goods are appropriately aerated.
- Any protective film should not be exposed to direct sunbeams and, in any case, should be removed within 45 days after the date when the panels are prepared.
- Extreme care should be taken to avoid bumping and snatching of the bundles when lifting.
- When panels have to be moved one by one due to building yard needs, they should be always carried as shown in the illustration.



- While removing individual panel from bundle, never drag a panel from a bundle or across other surfaces. It will scratch and damage the panel coating / finish. Always lift panels when removing from bundle.

1.5 Basis of Assessment

1.5.1 Scope of Assessment

Suitability of factory assembled insulated sandwich panels produced on a continuous manufacturing line are for non-load bearing walling and roofing applications. These are used for various buildings types such as residential, industrial, commercial, school etc.

1.5.2 Assessment

1.5.2.1 Assessment of the suitability of the Sandwich Panels is based on:

- i. Typical Erection Method Statement (Manual) giving details of Work execution process, unloading, storage etc. of panels and Safety measures to be taken.
- ii. Achieved appreciation of works carried out for Kirby Hyderabad for the Power Grid project for achieving water and air tightness for Power Grid projects in 2 locations: Pugalur (Tamil Nadu) and Raigarh (Chhattisgarh) awarded *in* 2018.
- iii. Certified under ISO: 9001-2015 in 2018.
- iv. Approvals for supply of Mineral Wool panels from Power Grid Corporation of India Limited (PGCIL) for works carried out and for future works (till 2021) awarded *in* 2018.
- v. Test Report of test carried out on 80mm thick Hipertec panel for 2 hours as per ASTM E-119 and BS 476 (Part 20) by Spectro Lab, Noida *in* 2018.
- vi. Test Report of test carried out on 120 mm thick Hipertec panel for 4 hours as per ASTM E-119 and BS 476 (Part 20) by Spectro Lab, Noida *in* 2017.
- vii. Tests conducted on Hipertec panel closed joint system for air and water tightness on 80mm thick Mineral-wool panel as per

ASTM standards at Façade India Testing Inc, Mumbai *in* 2017.

1.6 Design Consideration

- 1.6.1 The system is intended for use where Architectural drawings are available and satisfy the various requirements. The Architect and Engineer designer team of the concerned developer/ owner (client) is responsible for the drawings and overall building design to comply with the various regulatory requirements applicable to the area.
- 1.6.2 The building to be constructed using Sandwich (Mineral Wool) Panels shall be designed by competent structural engineer in accordance with the specifications following relevant codal requirements, manufactured as per the details worked out in design and constructed by trained persons only with technical support or supervision by qualified engineers and builders, based on structural designs, seismic evaluation & wind forces and as per the details given in the Construction Manual and this PAC.
- 1.6.3 The structural engineers and building designers associated with such type of construction should be thoroughly familiar with the various structural aspects. It is also recommended that Architects and Construction Engineers who undertake such building design and construction gain familiarity with the properties and materials, characteristics of Sandwich (Mineral Wool) Panels and its applications.
- 1.6.4 The design engineer shall liaise with the engineer of the developer for design of the foundation.
- 1.6.5 The design assumptions, detailed calculations, references to necessary and detailed design drawings shall be made available on demand, if required. The structural design calculations should clearly demonstrate structural integrity and stability including connection details.
- 1.6.6 Any other requirement regarding safety against earthquake need to be ensured by the designer as per prevailing codal requirements.
- 1.6.7 In addition, the roof made with these panels should preferably be slanted & clearly be used as non-approachable roof.
- 1.6.8 The proper care for no breakage at the edges needs to be taken by the manufacturer & user both.

1.7 Conditions of Certification

1.7.1 Technical Conditions

Raw materials and the finished panels shall conform to the requirements of the prescribed specifications.

1.7.2 Erection Manual

Typical Erection Method Statement (Manual) giving details of Work execution process, unloading, storage etc. of panels and Safety measures to be taken need to be supplied by the manufacturer to the Client.

1.7.3 Quality Assurance

The Certificate Holder shall implement & maintain a quality assurance system in accordance with Scheme of Quality Assurance (SQA) given in Annex A attached with this Certificate.

1.7.4 Durability

Sandwich panels are typically single piece, prefabricated, modular, factory made units which consist of an insulating layer of Mineral wool between two layers of metals sheets. It provides effective insulation & long lasting strong bonding of insulation core which gives added structure stability to facilitate higher loading & wider span length.

1.7.5 Handling of User Complaints

1.7.5.1 The Certificate holder shall provide quick redressal to consumer/user complaints proved reasonable & genuine and within the conditions of warranty provided by it to customer/purchaser.

1.7.5.2 The Certificate holder shall implement the procedure included in the SQA. As part of PACS Certification he/she shall maintain data on such complaints with a view to assess the complaint satisfaction and suitable preventive measures taken.

1.8 Certification

1.8.1 On the basis of assessment given in Part 3 of this Certificate & subject to the conditions of certification, use & limitations set out in this Certificate and if selected, installed & maintained as set out in Part 1 & 2 of this Certificate, the sections covered by this Certificate are fit for use as set out in the Scope of Assessment.

PART 2 CERTIFICATE HOLDER'S TECHNICAL SPECIFICATION

2.1 General

2.1.1 The PAC holder shall manufacture these panels in accordance with the requirements specified in the relevant Standards (See Part 5). In addition it shall follow the Company standards specifying requirements of these sections for various materials used in the manufacturing of the panels.

2.2 Specifications for the System

2.2.1 Specification

The manufacturer shall only use the raw materials supplied with the relevant documents as laid down in the prescribed Quality Assurance Plan. The raw materials shall be subject to agreed controls and tests by the manufacturer before acceptance.

2.2.2 Technical Specifications

2.2.2.1 Raw materials

| Sr. No. | Description of raw materials | Name & address of the suppliers |
|---|--|---|
| 1 | Prepainted Steel | JSW/Bhushan/Asian |
| 2 | Rockwool Mineral | Roxul rockwool |
| GENERAL SPECIFICATION FOR PREPAINTED GALVANIZED STEEL SHEET COILS PPGI - STEEL COILS | | |
| Sr. No. | PARAMETERS | TECH. SPECIFICATIONS / STANDARDS |
| 1 | PRODUCT NAME | PPGI - STEEL SHEET COILS |
| 2 | REFERENCE STANDARDS | ASTM.A 755 |
| 3 | STRIP THICKNESS (TCT) -mm | 0.5 TO 0.8 |
| 4 | STRIP WIDTH - mm | 1060 TO 1220 |
| 5 | SUBSTRATE MATERIAL | Zinc coating as per ASTM A653/ A 653M with steel base as per ASTM Std. |
| 6 | SUBSTRATE COATING MASS Gms/m ² , SUBSTRATE COATING MASS CLASS | 90 TO 275 , Z90,Z120; Z150; Z180 & Z275 as per ASTM Std. or As mutually agreed |
| 7 | GRADE DESIGNATION | Gr 50/ Gr80 / CS Type A,B as per ASTM std. |
| 8 | MOISTURE ABSORPTION | BELOW 2% |
| 9 | PAINT TYPE | Regular Polyester / Silicon polyester / PVDF |
| 10 | PAINT COATING THICKNESS (DFT) | Top coat 18 to 22 microns (+5 microns primer), Back Coat 5 to 8 microns (Including Primer). |
| 11 | GLOSS | 15-80% at 60 degrees ASTM D 523 |

2.3. Inspections & Testing

Inspections & testing shall be done at appropriate stages of manufacturing process. The inspected panels shall be stored & packed to ensure that no damage occurs during transportation. As part of quality assurance, regular in process inspections shall be carried out by the trained personnel of the PAC holder.

2.4 Manufacturing Machinery & Equipment

As per the details supplied, the manufacturer has various machines and equipment of required capacities and specifications for manufacturing, testing and installation of the panels. Details of the machines are available with the manufacturer.

2.5 Manufacturing Process

Process Flow Chart is given in **Annex B**.

2.6 Installation Procedure

Panels with damaged side joints, surface dents or scratches shall be set aside. Excess foam (if any) shall be removed from panel joints to allow proper panel engagement. The first panel shall be installed plumb/level. A spirit level or transit shall be used on each panel. Adjoining panels shall be installed with overlapping rib/inserting tongue-in to the groove toward the last erected panel. Structural members shall be drilled, if required and fasteners installed at lapped rib. A chalk line shall be used to mark the girt location and maintain a straight line of screws, thus avoiding miss-drilling and possible leakage. The preferred procedure is to complete all wall sheeting before starting the roof sheeting.

2.6.1 Preliminaries

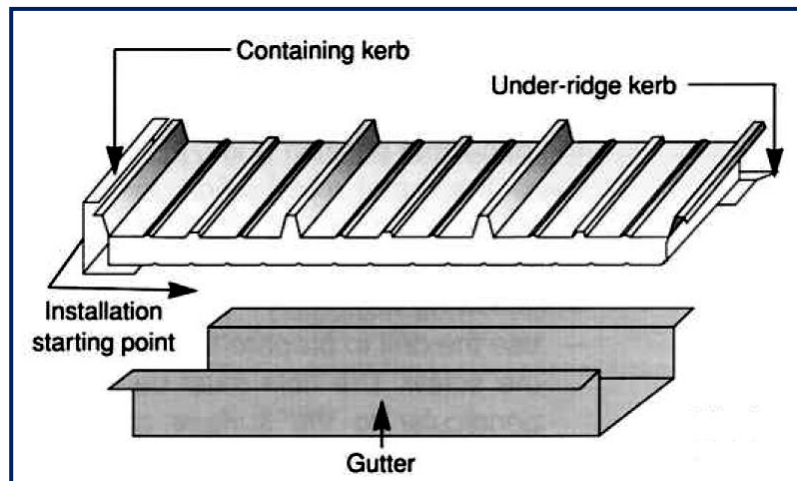
- a) Check that the storage has been carried out according to the directions in 1.3.2
- b) Check that the panel support structures are level.
- c) Position the packages of panels near the points of use.
- d) Prepare a fixed or cradle scaffold, according to the working height, 30/40 cm far from the external edge of the main columns and comply with the rules on safety in the workplace.
- e) Control that all workers are equipped with individual safety equipment according to current regulations.
- f) Prepare all the power supply lines for tools according to current regulations.
- g) Prepare the panel lifting vehicles.

- h) In addition to the traditional scaffolding, when assembling wall panels horizontally, automatic scaffolds with platform can be profitably used.
- i) These platforms may be either the type with masts starting from the ground or the self-propelled type with telescopic arms

2.6.2 Roof Panel

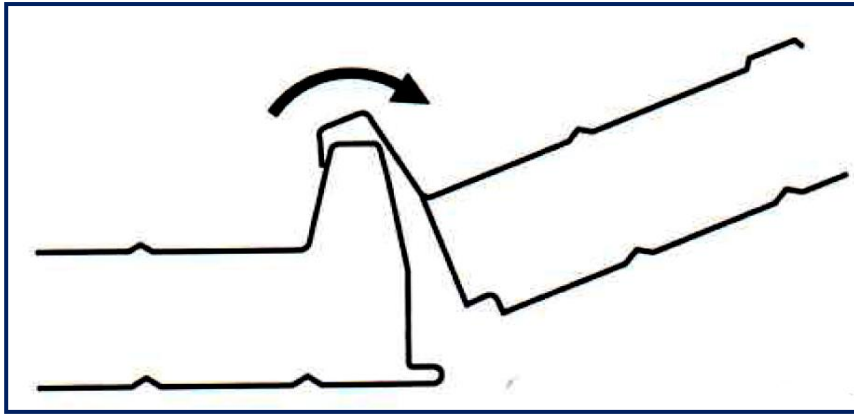
2.6.2.1 Fastener installation

It must be ensured that the fasteners are installed at locations indicated on the building drawings. It is easy to misjudge the location of the structural member, resulting in a fastener off the structural member or below the sealant at the end lap. The fastener shall be driven in until it is tight and the washer is firmly seated. A slight extrusion of neoprene around the washer is a good visual tightness check.



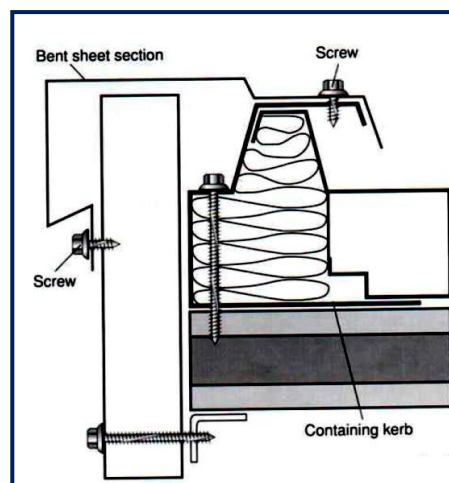
2.6.2.2 Orientation of panels before lifting

For maximum weather-tightness, start laying panels from the end of the building that will be in the lee of the worst-anticipated or prevailing weather. It is much easier and safer to turn panels on the ground than up on the roof. Before lifting panels on to the roof, it must be checked that this is the correct way up and the overlapping side is towards the edge of the roof from which side installation will start. Bundle of panels shall be placed over or near firm supports, not at mid span of roof members.



2.6.2.3 Roof paneling sequence

It is advised that both sides of the ridge of a building be sheeted simultaneously. When lifting panels onto the roof frame for laying and fastening, care should be taken to make sure all panels are the correct way up with the overlapping side towards the edge of the roof from which installation will commence.



2.6.2.4 Installation of the first roof panel

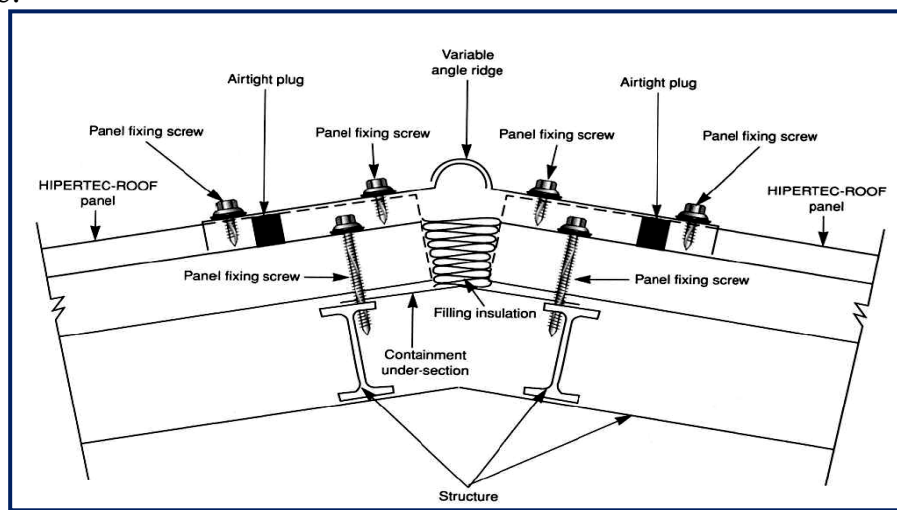
The roof panel shall be set in place over the inside closure ensuring the major ribs of the panel rest properly with the inside closure. The panel edge shall be aligned with the edge of the end wall roof line. With the panel properly placed, the line of panel shall be adjusted for squareness.

A nylon line projected from the eave strut by a certain distance shall be used to give correct distance and line. A chalk line shall be used to mark the location and maintain straight line of screws, thus avoiding

miss-drilling and possible leakage. The panel shall be secured to the structure with appropriate fasteners. The fasteners will be installed after the overlapping is installed.

2.6.2.5 Sealing the side laps

The side lap sealant shall be applied to the weather side edge of the lower major. The sealant should only be applied to clean, dry surfaces. Press firmly along the length of the sealant to insure proper adhesion. The adjoining panel shall be installed positioning the overlapping rib with care. Required size pilot holes for the lap fasteners shall be drilled at the centre of the clearance holes in the overlapping panel. The lap shall be stitched with the self-fastening fasteners supplied with the screw line. Sealant shall not be placed inside of the screw line.



2.6.2.6 Installation of remaining roof panels

With the first panel run installed & secured and side lap sealant applied, the second panel run may be started. The eave shall be prepared with an inside closure and sealant. The panel shall be positioned so that the overlapping ribs will rest properly. Proper overhang and panel coverage shall be checked. The major ribs of the two panels shall be stitched together and panels attached to the purlins.

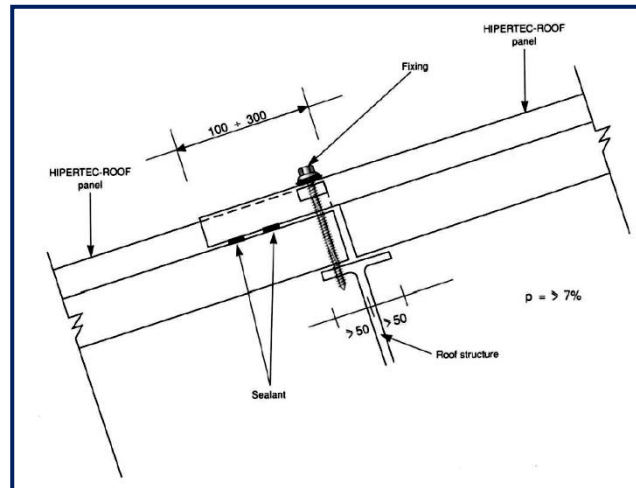
2.6.2.7 Sealing the end laps

At the panel end laps, sealant shall be placed across the full panel below the fastener line. The panel end laps shall have a minimum overlap located over a purlin as per respective erection drawings. The fasteners shall be located on the centre of the flange of purlins.

2.6.3 Wall Panel

2.6.3.1 Fastener installation

It must be ensured that the fasteners are installed at locations indicated on the building drawings. It is easy to misjudge the location of the structural member, resulting in a fastener off the structural member or below the sealant at the end lap. The fastener shall be driven in until it is tight and the washer is firmly seated. A slight extrusion of neoprene around the washer is a good visual tightness check. The fasteners shall be installed by drilling holes on the ridge and not on the valley.



2.6.3.2 Checking flatness and overhang

Before starting work it must be ensured that:

- The supports for cladding are truly in the same plane
- The overhangs of panels from the top and bottom supports shall not exceed the limit, whilst also overhanging at least 50 mm into gutters. Necessary adjustments shall be made before laying panels, because it will be difficult or impossible to rectify later.

2.6.3.3 Positioning first panel

First panel shall be positioned before fixing to ensure that it is correctly located in relation to other parts of the building.

It must be checked that the panel:

- Aligns with the end-wall (or its barge or fascia), the type of flashing or capping treatment to be used; and
- Aligns correctly at its ends in relation to the gutter and ridge (or parapet or transverse wall).

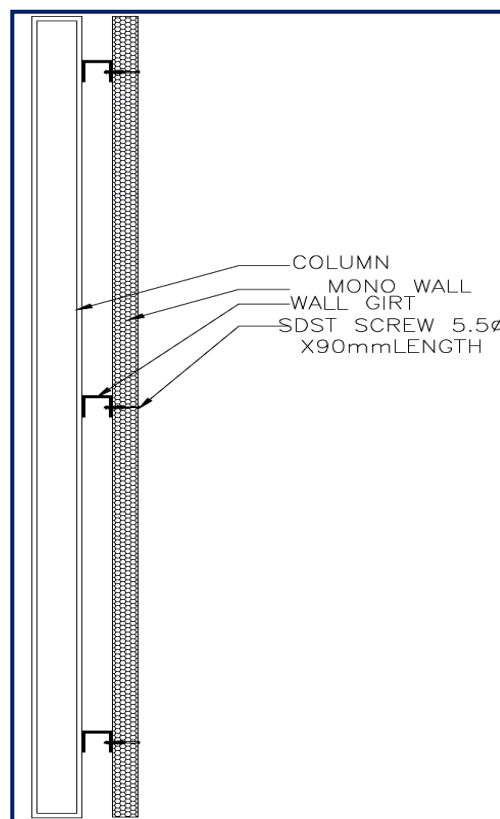
2.6.3.4 Positioning other panels

After fixing the first panel in position, other panels shall be aligned using:

- The long edge of the previous pane;
- A measurement from the end of the panel to the fascia or purlin at the gutter. Gutter-end of all panels shall be kept in a straight line.
- Each panel shall be fixed completely before laying the next; or
- The panel shall be fixed tightly to ensure it can't move, all panels shall be laid completely and then all the intermediate fasteners shall be placed later.

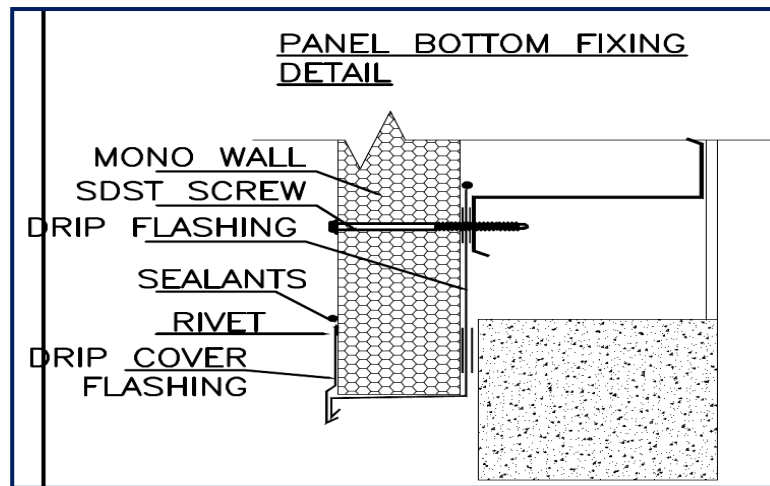
2.6.3.5 Checking alignment

It must be checked that each panel is parallel with the adjacent panel and gap is within the allowed limit.



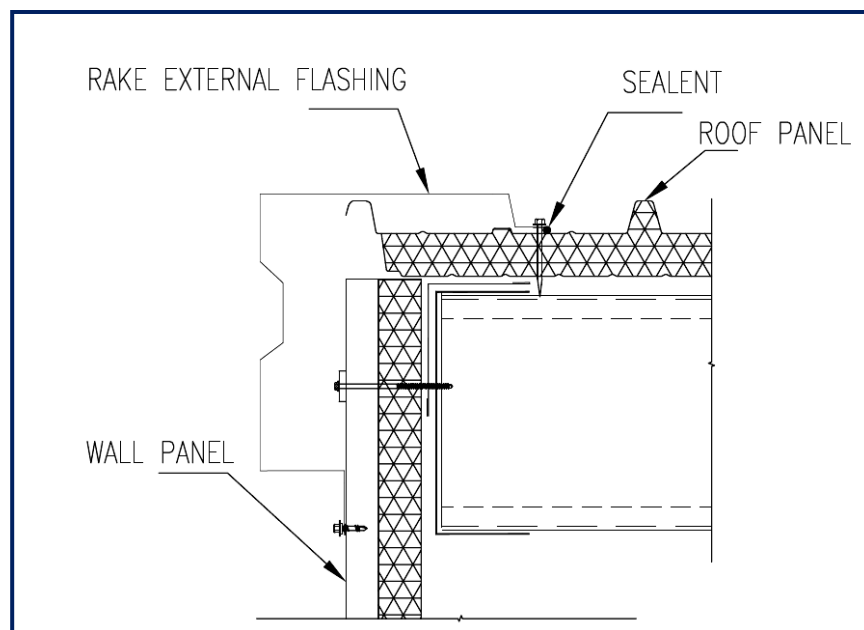
2.6.4.5 Wall panel fixing with floor

Wall panel of 80 mm for outer wall shall be fixed with U-channel of size 40x82x40x1.2mm on floor. U-channel shall be fixed with M6x65mm dash fastener at 300mm c/c spacing.



2.6.4.6 Wall panel fixing with slab

Wall panel of 80 mm for outer wall shall be fixed with self-drilling screw of 12-14x120x4.8mm at 300mm c/c spacing using L-Angle of 50x50x2mm above slab.



2.7 Wall partition panel fixing with slab top & bottom

Wall partition panel of 80 mm shall be fixed over RCC slab by PVC gitti screw of 35mm and pop rivet at 200mm c/c spacing using L-Angle of 50x50x1.2mm on both side of panel above slab.

2.7.1 Vertical corner closer

Vertical corner shall be closed using pop rivet at 300mm c/c spacing by using L-Angle of 50x50x0.5mm.

2.7.2 Ceiling Panel

2.7.2.1 Fastener installation

It must be ensured that the fasteners are installed at locations indicated on the building drawings. It is easy to misjudge the location of the structural member, resulting in a fastener off the structural member or below the sealant at the end lap. The fastener shall be driven in until it is tight and the washer is firmly seated. A slight extrusion of neoprene around the washer is a good visual tightness check.

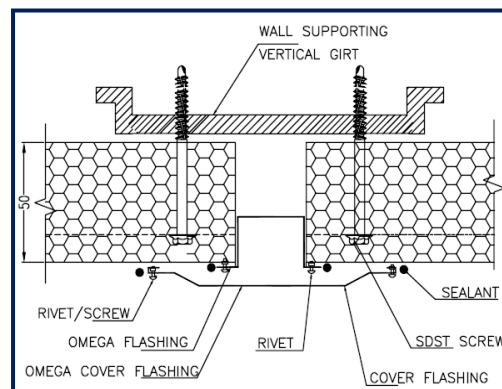
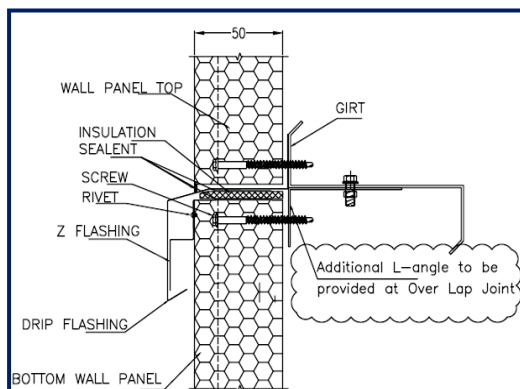
2.7.2.2 Orientation of panels before lifting

For maximum weather-tightness, start laying panels from the end of the building that will be in the lee of the worst-anticipated or prevailing weather. It is much easier and safer to turn panels on the ground than up on the roof. Before lifting panels on to the roof, it must be checked that this is the correct way up and the overlapping side is towards the edge of the roof from which side installation will start. Bundle of panels shall be placed over or near firm supports, not at mid span of roof members.

2.7.2.3 Fixing of Aluminium 'T'

Aluminium 'T' shall be marked on the structural members and holes shall be drilled in the structural members. Sag rod connector shall be assembled on ground for longer drop length. After that Aluminium 'T' shall be assembled on ground with all accessories and erected one by one at specified locations.

The level and alignment of 'T' line shall be checked before fixing the panels. Bottom level of the 'T' shall be adjusted for roof ceiling by adjusting nut. Coupling plates shall be erected to connect adjacent 'T' members. Same procedure shall be repeated in case of multiple lines.



2.7.2.4 Ceiling panel installation

Ceiling panel must be sheeted on both sides of the 'T' simultaneously. Proper coverage shall be checked frequently during progress. When lifting panels for laying and fastening, it must be ensured that all the panels are in the correct way up.

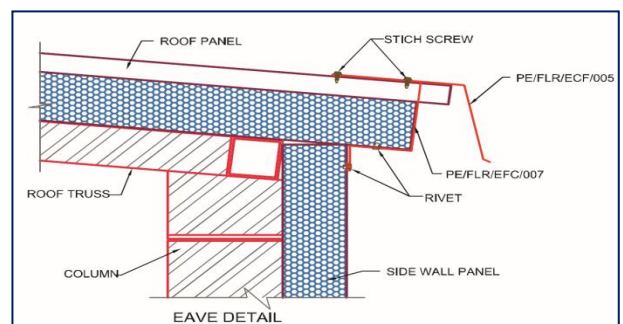
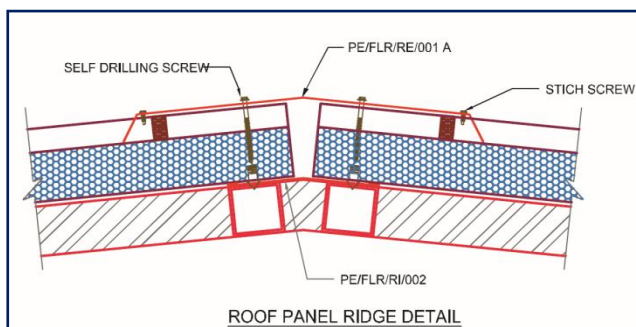
For panel installation steps given below shall be followed:

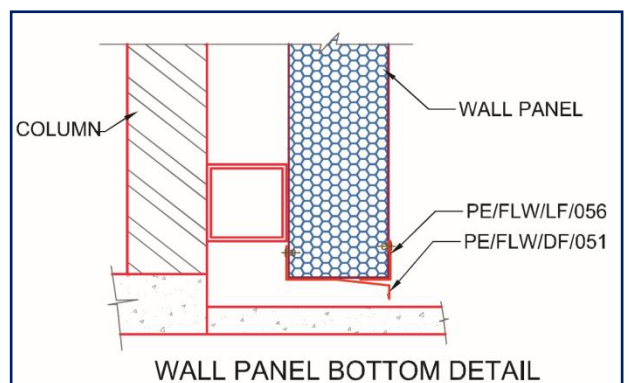
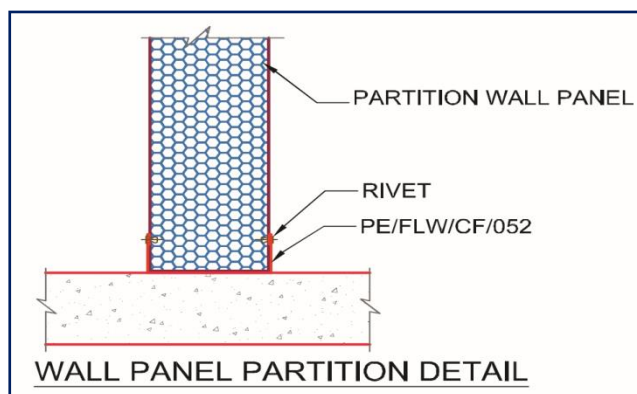
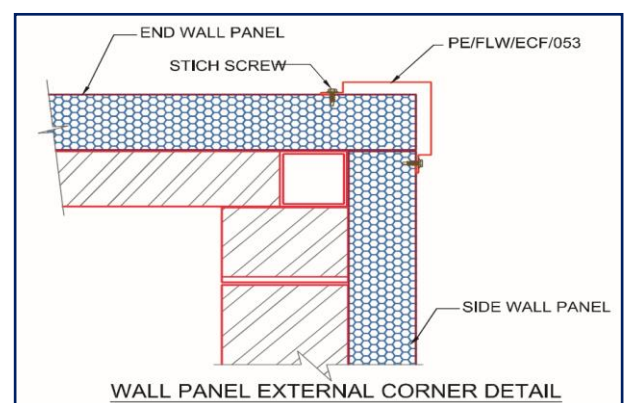
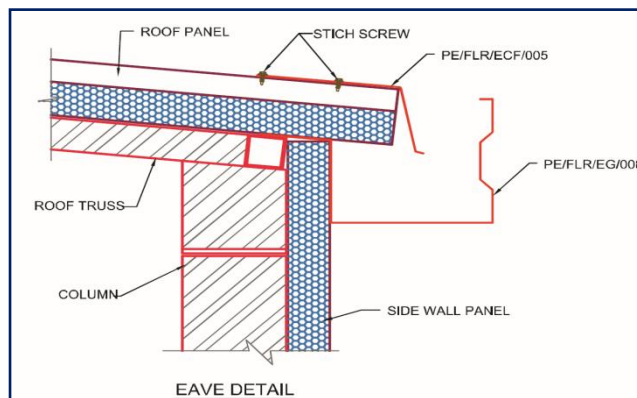
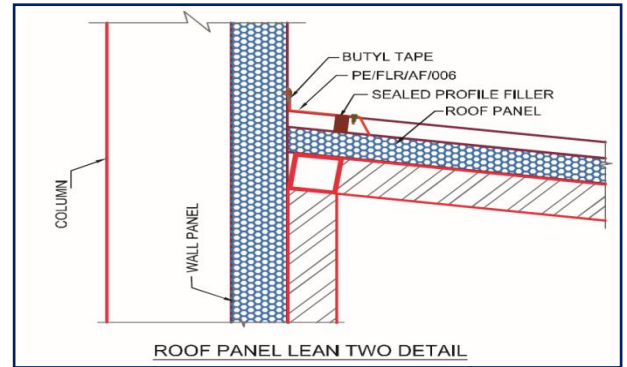
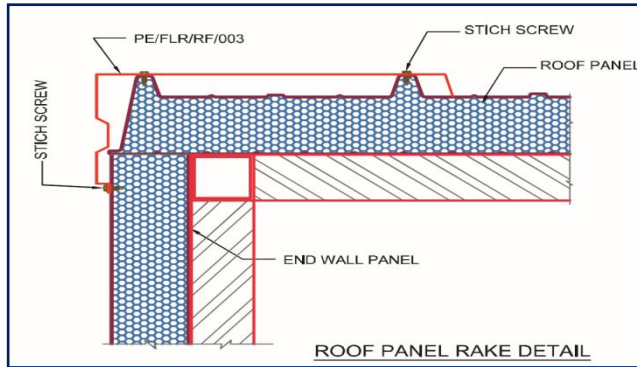
- Layout on the floor shall be marked as per the drawings.
- U Track/ base angle shall be installed in water level.
- Step cutting at wall panels shall be made to make provision for ceiling panel resting.
- Then wall panels shall be installed starting from one end wall and one side wall.
- Plumb and alignment of each panel shall be checked for starting the ceiling panels.
- Inner and outer flashings shall then be installed to give temporary hold at wall panels.
- Partition/other side wall panel shall also be installed with inner and outer flashings.
- Ceiling panels shall then be lifted to the location after checking the orientation as per the drawings before lifting.
- Strip flashing shall be installed on top of the ceiling panel after checking the alignment.

The chamber shall then be completed by following the above steps. Silicon accessories shall be installed as shown in the drawings. After that chemical filling shall be done as per the specifications.

2.7.2.5 Sealing the side laps

Apply the side lap sealant to the weather side edge of the lower edge of the crest. The sealant should only be applied to clean, dry surfaces. Press firmly along the length of the panel to ensure proper adhesion. Install the adjoining panel positioning the overlapping/side-lapping rib with care. Drill, at the centre of the clearance holes in the end-lapping panel, required size pilot holes for the lap fasteners. Stitch the lap with the self-fastening fasteners supplied with the screw line. Sealant shall not be placed inside of the screw line.





2.8 Skilled /Training Needed for Installation

The panels shall be installed under the direct supervision of trained personnel of the manufacturer or by manufacturer's authorized personnel only.

2.9 Guarantees/Warranties Provided by the PAC Holder

PAC holder shall furnish various performance warranties as required for project specifications.

The items covered by these warranties include weather tightness, corrosion and finish performance. Weather tightness warranties are subjected to the use of manufacturer's authorized contractors under its technical Engineer's supervision and periodic inspection.

The manufacturer shall ensure that all specifications and shop drawings are reviewed prior to warranty issuance.

In addition, warranties are limited to materials supplied by the manufacturer.

2.10 Services Provided by the PAC Holder to the Customer

The PAC holder shall take full care of after sales services such as leakages, repairing etc.

2.11 Manuals

Installation Manual, Quality Control Manual and a Manual for Health & Safety shall be provided for each project incorporating the Continuous Sandwich (Rockwool) Panels.

2.12 Responsibility

- Specific design using Continuous Sandwich Rockwool Panels is the responsibility of the designer with the instructions, supervision and guidance of the PAC holder.
- Quality of installation of the system on site is the responsibility of the trade persons engaged by the agency
- Quality of maintenance of the building is the responsibility of the building owner.
- Providing necessary facilities and space for movement of cranes and vehicles is the responsibility of the building developer.

PART 3 BASIS OF ASSESSMENT AND BRIEF DESCRIPTION OF ASSESSMENT PROCEDURE

3.1 Assessment

3.1.1 The technical assessment was done as per provisions of the Standards listed in Part 5 of this Certificate.

3.2 Visit to Manufacturing Plant

The manufacturing plant at SIPCOT Industrial Complex, Sripermbadur, Kanchipuram, TN was inspected by the Officers of the Council and members of TAC via video conferencing in prevailing scenario of Covid -19. The firm has got necessary manufacturing and test facilities to produce the components as per the required design and specifications. It has Quality Assurance system in the factory to produce the components conforming to the specified requirements. The manpower were found to be conversant with manufacturing process & testing procedures required for the quality control of the system.

3.3 Tests referred for Assessment

3.1.1 Performance Appraisal Certificate (PAC) for Factory assembled insulated sandwich panels using Mineral wool.

Test Results Summary:

a. Air Tightness Test for Hypertec Rockwool Panel closed joint system fixed window and door

Panel Thickness : 80mm
 Date of Sample Received : 04/02/2017
 Standard Specification : As per ASTM standards
 Laboratory :

| Test | As Per Standard | Test Pressure | Permissible Limit | Measured Value | Inference |
|------------------|-----------------|---------------|--------------------------|------------------------|-----------|
| Air Infiltration | ASTM E 283 | 600 Pa | 30.97 m ³ /hr | 9.1 m ³ /hr | Pass |
| Air Exfiltration | ASTM E 283 | -600 Pa | 30.97 m ³ /hr | 7.1 m ³ /hr | Pass |

b. Fire Resistance Report of the following Hypertec Panel

- 1) Rockwool Core Thickness : **80 mm**
 Dimensions of each Specimen : 3000 x 1000 x 80 mm
 Outer Sheet : 0.50 mm GI Pre-painted galvanized sheet
 Inner Sheet : 0.50 mm GI Pre-painted galvanized sheet
 Density of Rockwool : 100±15 Kg/m³
 Laboratory : Spectro Lab, Noida

Fire Resistance test carried out on 80mm thick Hipertec panel for 3 hours as per BS 476 (Part 20 & 22) by Spectro Lab, Noida in March, 2017 was passed in Integrity, Insulation and Stability test for 180 minutes.

Integrity : 180 min.
 Insulation : 180 min.
 Stability : 180 min.

- 2) Rockwool Core Thickness : **120 mm**
 Dimensions of each Specimen : 3000 x 1000 x 120 mm
 Outer Sheeting : 0.5mm GI pre-painted galvanized sheet
 Inner Sheeting : 0.5mm GI pre-painted galvanized sheet
 Density of Rockwool : 100±15 kg/m³

Fire Resistance test carried out on 120 mm thick Hipertec panel for 4 hours as per BS 476 (Part 20 & 22) by Spectro Lab, Noida in May, 2017 was passed in Integrity, Insulation and Stability test for 240 minutes.

Integrity : 240 min.
 Insulation : 240 min.
 Stability : 240 min.

PART 4 STANDARD CONDITIONS

This certificate holder shall satisfy the following conditions:

- 4.1** The certificate holder shall continue to have the product reviewed by BMBA.
- 4.2** The product shall be continued to be manufactured according to and in compliance with the manufacturing specifications and quality assurance measures which applied at the time of issue or revalidation of this certificate. The Scheme of Quality Assurance separately approved shall be followed.
- 4.3** The quality of the product shall be maintained by the certificate holder.
- 4.4** The product user should install, use and maintain the product in accordance with the provisions in this Certificate.
- 4.5** This certificate does not cover uses of the product outside the scope of this appraisal.
- 4.6** The product is appraised against performance provisions contained in the standards listed in Part-V. Provisions of any subsequent revisions or provisions introduced after the date of the certificate do not apply
- 4.7** Where reference is made in this Certificate to any Act of Parliament of India, Rules and Regulations made there under, statutes, specifications, codes of practice, standards etc. of the Bureau of Indian Standards or any other national standards body and the International Organization for Standardization (ISO), manufacturer's company standards, instruction/manual etc., it shall be construed as reference to such publications in the form in which they were in force on the date of grant of this Certificate (and indicated in Part V to this Certificate)
- 4.8** The certificate holder agrees to inform BMBA of their distributors / licensees whenever appointed by him and agrees to provide to BMBA a six monthly updated list thereof.
- 4.9** The certificate holder agrees to provide to BMBA feedback on the complaints received, the redressal provided, and the time taken to provide redressal on complaint to complaint basis as soon as redressal is provided. BMBA agrees to provide the certificate holder the user feedback received by it, if any.
- 4.10** If at any time during the validity period, PACH is unable to fulfill the conditions in his PAC, he should on his own initiative suspend using

the PAC and notify Chairman, TAC the date from which he has suspended its use, the reason for suspension and the period by which he will be able to resume. He shall not resume without the prior permission of BMBA. He shall also inform, simultaneously, his agents, licensees, distributors, institutional, government, public sector buyers, other buyers and all those whom he has informed about his holding the PAC. He shall also inform all those who buy his product(s) during the period of suspension. He shall provide to BMBA at the earliest the list of who have been so informed by him.

4.11 In granting this Certificate, BMBA takes no position as to:

- (a) The presence or absence of patent or similar rights relating to the product;
- (b) The legal right of the Certificate holder to market, install or maintain the product;
- (c) The nature of individual installations of the product, including methods of workmanship.

4.12 BMTPC and the Board of Agreement of BMTPC (BMBA) take no position relating to the holder of the Performance Appraisal Certificate (PACH) and the users of the Performance Appraisal Certificate (PAC) respecting the patent rights / copy rights asserted relating to the product / system / design / method of installation etc. covered by this PAC. Considerations relating to patent / copy rights are beyond the scope of the Performance Appraisal Certification Scheme (PACS) under which this PAC has been issued. PACH and users of this PAC are expressly advised that determination of the Claim / validity of any such patent rights / copy rights and the risk of infringement of such rights are entirely the responsibility of PACH on the one hand and that of the users on the other.

4.13 It should be noted that any recommendations relating to the safe use of the product which are contained or referred to in this Certificate are the minimum standards required to be met with when the product is installed, used and maintained. They do not purport in any way to restate or cover all the requirements of related Acts such as the Factory Act, or of any other statutory or Common Law duties of care, or of any duty of care which exist at the date of this Certificate or in the future, nor is conformity with the provisions of this Certificate to be taken as satisfying the requirements of related Acts.

4.14 In granting this Certificate, BMTPC and BMBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the use of this product.

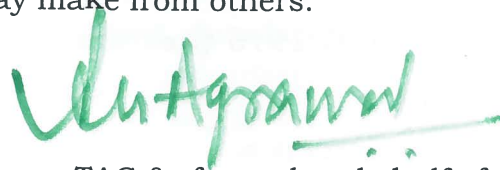
4.15 The certificate holder indemnifies BMBA, its officers and officials involved in this assessment against any consequences of actions

taken in good faith including contents of this certificate. The responsibility fully rests with the certificate holder and user of the product.

- 4.16** The responsibility for conformity to conditions specified in this PAC lies with the manufacturer who is granted this PAC. The Board (BMBA) will only consider requests for modification or withdrawal of the PAC.
- 4.17** The PAC holder shall not use this certificate for legal defense in cases against him or for legal claims he may make from others.

Place: New Delhi

Date of issue 10.2.21



Chairman TAC & for and on behalf of
Member Secretary, BMBA

Dr. Shailesh Kr. Agrawal
Chairman, TAC
& Member Secretary, BMBA
Building Materials and Technology Promotion Council
Ministry of Housing and Urban Affairs, Govt. of India
Core 5A, 1st Floor, India Habitat Centre
Lodhi Road, New Delhi-110003

PART 5 LIST OF STANDARDS & CODES USED IN ASSESSMENT

5.1 These Standards are referred for carrying out particular tests only and do not specify the requirement for the whole product as such.

5.1.1 IS 277:2018 – Specifications for galvanized steel sheets (Plain & corrugated)

5.1.2 IS 801:1975 (Reaffirmed 2010) – Code of practice for use of cold formed light gauge steel structural members in general building construction

5.1.3 IS 875 (Parts 1 to 3):1987/2015 – Code of Practice for design loads (other than earthquake) for buildings & structures

5.1.4 IS 3346: 1980 (Reaffirmed 2017) – Method of determination of thermal conductivity of thermal insulation materials

5.1.5 IS 8183 :1993- Bonded mineral wool –specification

5.1.6 IS 3144:1990 Mineral wool thermal insulation material—method of test

5.1.7 IS 14246:2013 -- Specifications for continuously pre-painted galvanized steel sheets and coils

5.1.8 BS 476 (Parts 20) -- Fire Tests on Building Materials & Structures

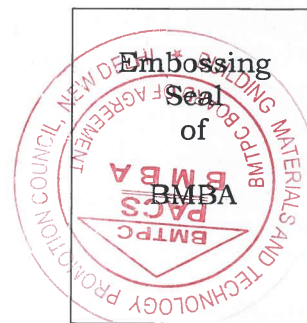
5.2 Company Standards of the PAC holder – The branded design & specifications of the raw materials and finished product are as submitted by the manufacturer. The PAC holder has to make available the company standards to the consumers according to which testing have been done.

CERTIFICATION

In the opinion of Building Materials & Technology Promotion Council's Board of Agreement (BMBA), **Factory Assembles Insulated Sandwich Panels using Mineral Wool** bearing the mark manufactured by M/s Metecno (India) Pvt. Ltd., Chennai is satisfactory if used as set out above in the text of the Certificate. This Certificate PAC No.: 1057-P/2021 is awarded to **M/s Metecno (India) Pvt. Ltd., Chennai.**

The period of validity of this Certificate is as shown on Page 1 of this PAC. This Certificate consists of a cover page and pages 1 to 36.

V. A. Agrawal



On behalf of BMTPC Board of Agreement, Chairman, Technical Assessment Committee (TAC) of BMBA & Member Secretary, BMTPC Board of Agreement (BMBA) Under Ministry of Housing and Urban Affairs, Government of India

Place: New Delhi, India

Date: 10.2.21

PART 6 ABBREVIATIONS

Abbreviations

| | |
|-------|---|
| BMBA | Board of Agreement of BMTPC |
| BMTPC | Building Materials and Technology Promotion Council |
| CPWD | Central Public Works Department |
| ED | Executive Director of BMTPC |
| IO | Inspecting Officer |
| MS | Member Secretary of BBA |
| PAC | Performance Appraisal Certificate |
| PACH | PAC Holder |
| PACS | Performance Appraisal Certification Scheme |
| SQA | Scheme of Quality Assurance |
| TAC | Technical Assessment Committee (of BMBA) |

Performance Appraisal Certification Scheme –A Brief

Building Materials & Technology Promotion Council (BMTPC) was set up by the Government of India as a body under the Ministry of Housing & Urban Poverty Alleviation to serve as an apex body to provide inter-disciplinary platform to promote development and use of innovative building materials and technologies laying special emphasis on sustainable growth, environmental friendliness and protection, use of industrial, agricultural, mining and mineral wastes, cost saving, energy saving etc. without diminishing needs of safety, durability and comfort to the occupants of buildings using newly developed materials and technologies.

During the years government, public and private sector organizations independently or under the aegis of BMTPC have developed several new materials and technologies. With liberalization of the economy several such materials and technologies are being imported.

However, benefits of such developments have not been realized in full measure as understandably the ultimate users are reluctant to put them to full use for want of information and data to enable them to make informed choice.

In order to help the user in this regard and derive the envisaged social and economic benefits the Ministry of Housing & Urban Poverty Alleviation has instituted a scheme called Performance Appraisal Certification Scheme (PACS) under which a Performance Appraisal Certificate (PAC) is issued covering new materials and technologies. PAC provides after due investigation, tests and assessments, amongst other things information to the user to make informed choice.

To make the PACS transparent and authentic it is administered through a Technical Assessment Committee (T AC) and the BMTPC Board of Agreement (BMBA) in which scientific, technological, academic, professional organizations and industry interests are represented.

The Government of India has vested the authority for the operation of the Scheme with BMTPC through Gazette Notification No. 1-16011/5/99 H-II in the Gazette of India No. 49 dated 4th December, 1999.

Builders and construction agencies in the Government, public and private sectors can help serve the economic, development and environmental causes for which the people and Government stand committed by giving preference to materials and technologies which have earned Performance Appraisal Certificates.

Further information on PACS can be obtained from the website:
www.bmtpc.org

ANNEX A

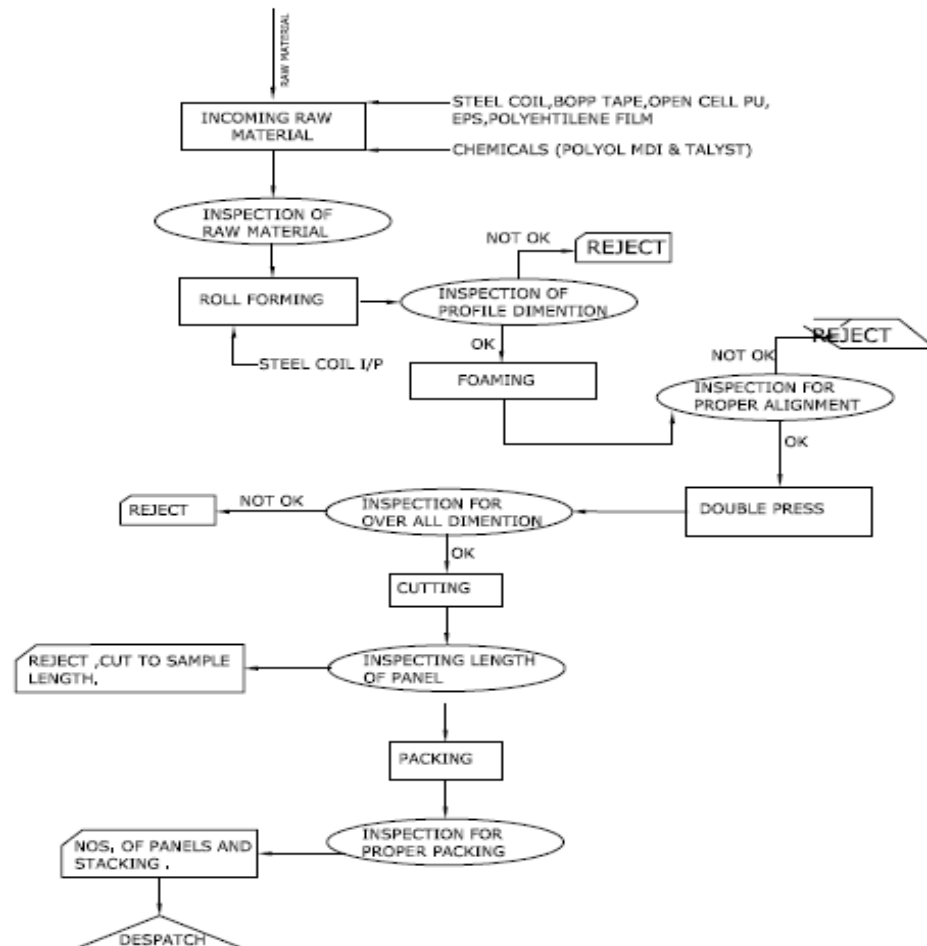
QUALITY ASSURANCE PLAN FOR CONTINUOUS SANDWICH (ROCKWOOL) PANELS

| QUALITY PLAN FOR ROCKWOOL SANDWICH PANELS | | | | | | | |
|---|--|------------------------|---------------------------|---|--------------------------|---|------------------|
| FINISHED PRODUCT | | | | | | | |
| SL.NO. | PRODUCT | CHARACTERISTICS | UNITS | SPECIFICATION | EQUIPMENTS | TEST STATUS | FREQUENCY |
| 1 | SANDWICH PANEL WITH CORE OF ROCKWOOL | BULK DENSITY (AVERAGE) | Kg/m ³ | 100+15% | Wt. M/C, MEASURING SCALE | TEST CONDUCTED | BATCH / LOT WISE |
| | MOISTURE CONTENT | % | BELOW 2% | NA | MTC REVIEWED | BATCH / LOT WISE | |
| | ALKALINITY | PH | 7 TO 10 | NA | MTC REVIEWED | BATCH / LOT WISE | |
| | RECOVERY AFTER COMPRESSION | % | ABOVE 90% | NA | MTC REVIEWED | BATCH / LOT WISE | |
| | MOISTURE ABSORPTION | % | BELOW 2% | NA | MTC REVIEWED | BATCH / LOT WISE | |
| | HEAT RESISTANCE/INTERNAL SELF HEATING AT 750°C FOR 16HRS | - | NO DETERIORATION OF FIBRE | NA | MTC REVIEWED | BATCH / LOT WISE | |
| | INCOMBUSTIBILITY (%MASS LOSS) | % | BELOW 5% | NA | MTC REVIEWED | BATCH / LOT WISE | |
| | THERMAL CONDUCTIVITY | W/m K | 0.040 | NA | MTC REVIEWED | BATCH / LOT WISE | |
| | NON-COMBUSTIBLE GRADE | - | A1 | NA | MTC REVIEWED | BATCH / LOT WISE | |
| | DIMENSIONAL INSPECTION & SAMPLING PLAN | mm (AS PER TOLERANCE) | ANNEXURE | MEASURING TAPE, VERNIER CALIPER, SCALE ETC. | INSPECTION CONDUCTED | RANDOMLY FOR EACH SIZE & TYPE OF PANELS | |

ANNEX B

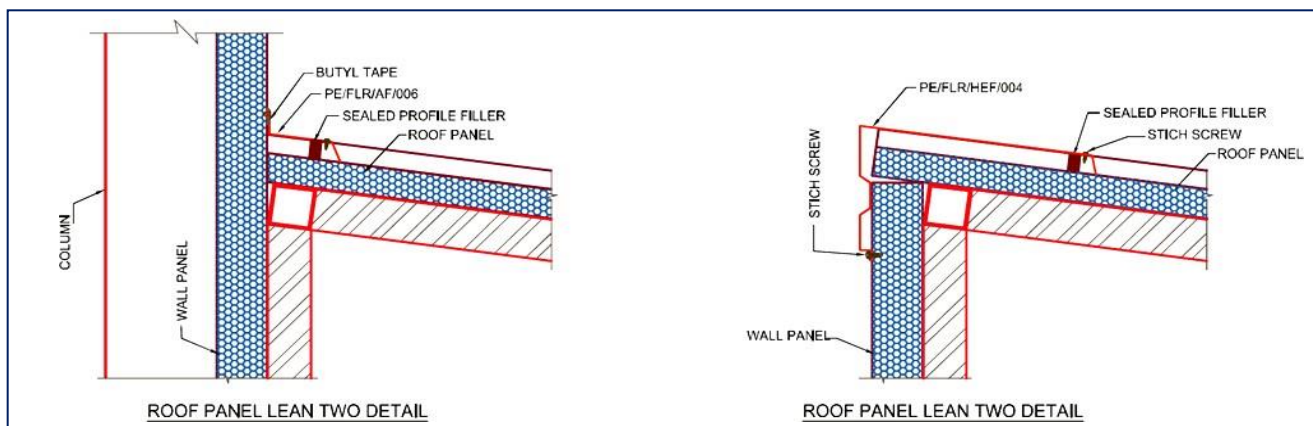
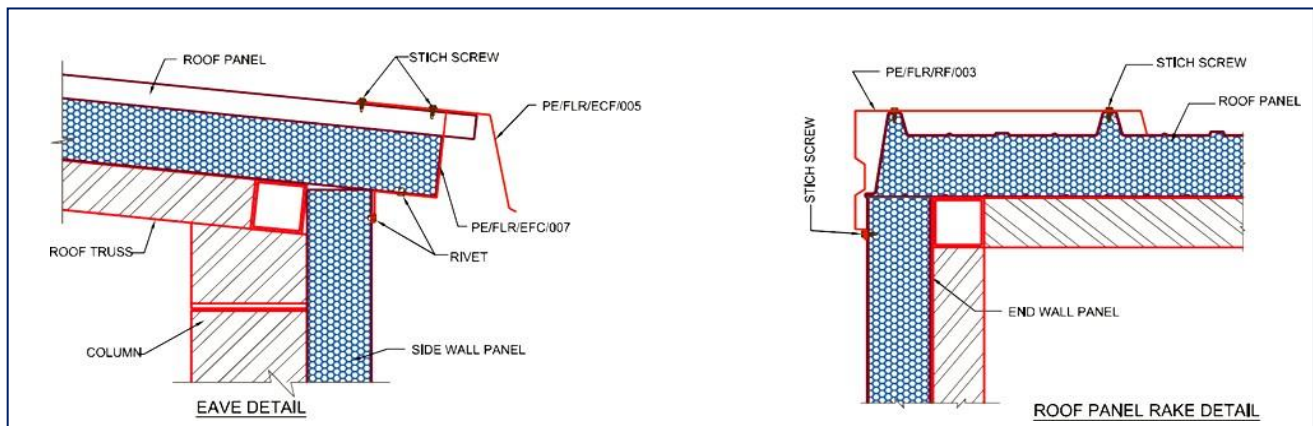
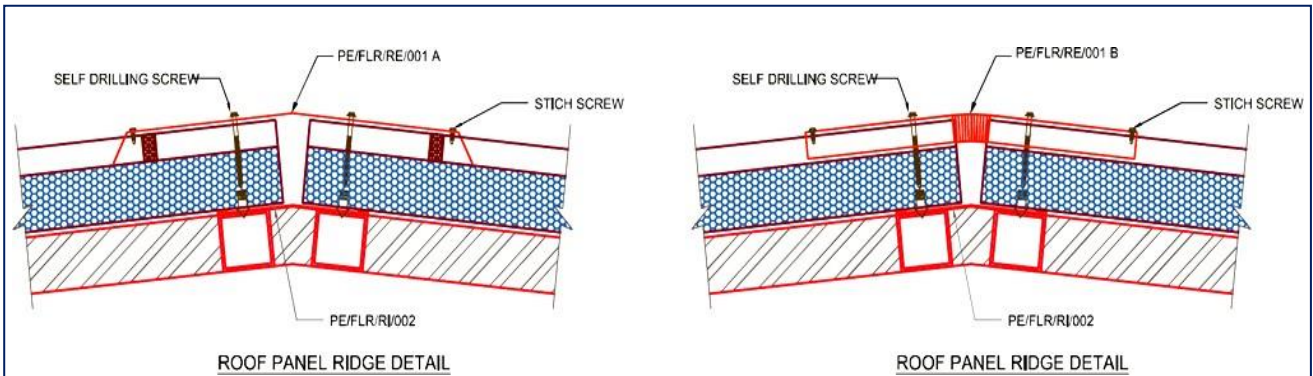
MANUFACTURING PROCESS FLOW CHART

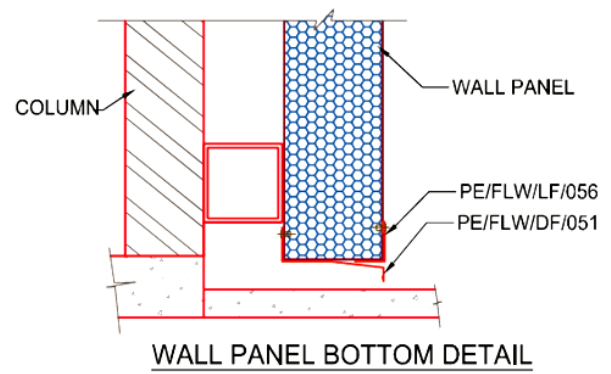
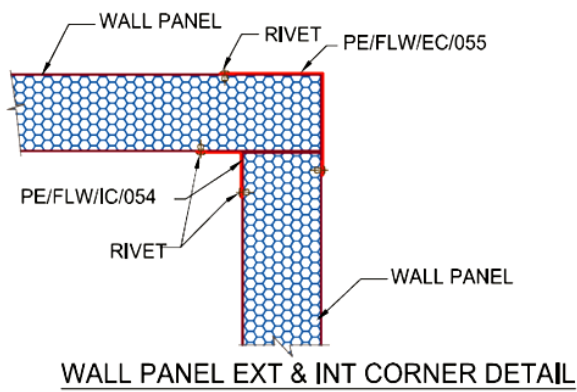
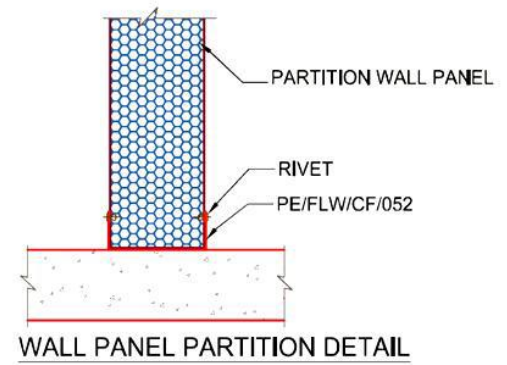
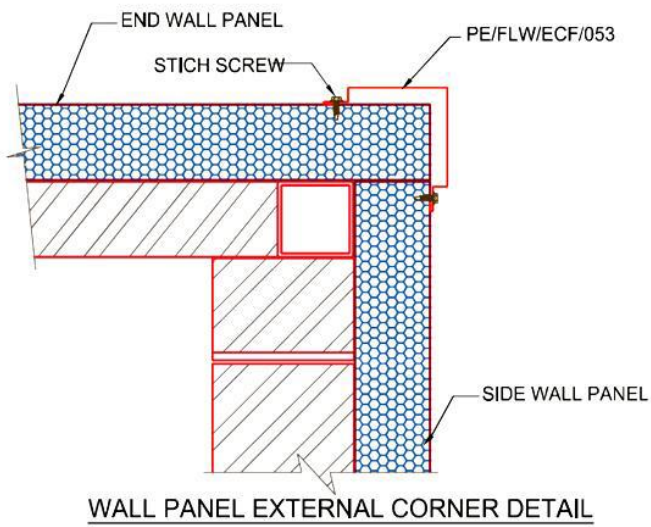
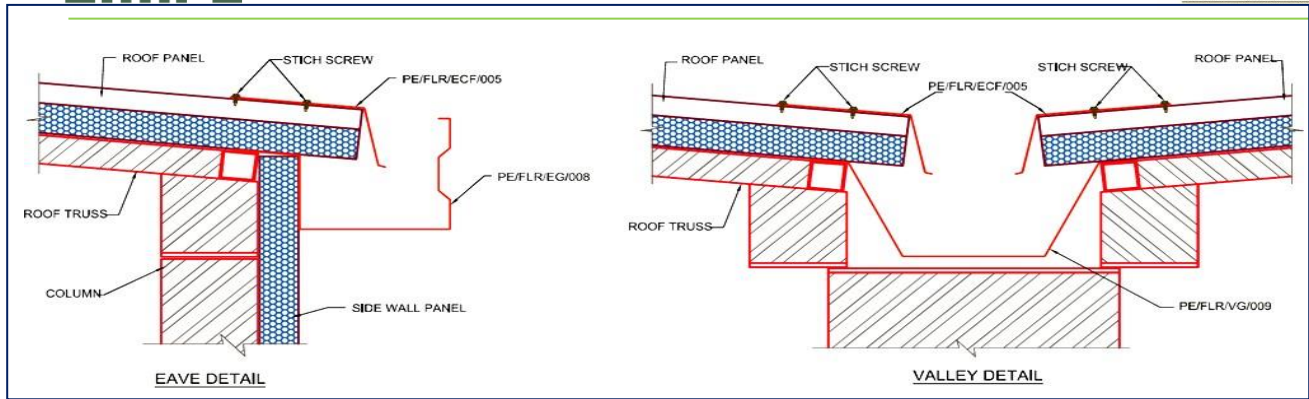
Process Flow for Rockwool Insulated Panel



ANNEX C

TYPICAL FLASHING DETAILS:





ANNEX D

PHOTOGRAPHS





Client: M/s.Mars International India Pvt. Ltd.

Hipertec Wall .



Client : Keppel Seggers,Singapore

Hipertec Wall panels



Client: SEPCO (Orissa)

Hypertec Wall