



**CONCREWALL -
REINFORCED EPS
STRUCTURAL
PANELS
(RESP SYSTEM)**

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 NBP NIRMAAN BHARAT PANELS
209-210, BM Tower,
Sapna Sangeeta Road,
Indore (MP), Bharat - 201306
Website: www.nirmaanbharatpanels.com

Performance Appraisal
Certificate
PAC No.: **1070-S/2025**
Issue No.: **01**
Date of issue: **03/06/2025**



Building Materials & Technology Promotion Council
Ministry of Housing & Urban Affairs
Government of India

Core 5A, First Floor, India Habitat Centre, Lodhi
Road, New Delhi – 110 003


Tel: +91-11-2463 6705, 2463 8097; Fax: +91-11-2464 2849
E-mail: info@bmtpc.org Web Site: <http://www.bmtpc.org>

PERFORMANCE APPRAISAL CERTIFICATE
FOR
CONCREWALL - REINFORCED EPS STRUCTURAL PANELS
(RESP) SYSTEM

ISSUED TO

M/s NBP Nirmaan Bharat Panels

STATUS OF PAC NO: 1070-S/2025

S. No.	Issue No.	Date of Issue	Date of Renewal	Amendment		Valid upto (Date)	Remarks	Signature of Authorized Signatory
				No.	Date			
1	2	3	4	5	6	7	8	9
1	1	03/06/2025				02/06/2026		

PAC No. 1070-S/2025

Issue No. 01

Date of Issue: 03/06/2025

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PART 1: CERTIFICATION

1.1 Certificate Holder: **M/s NBP Nirmaan Bharat Panels**
HO: 209-210, BM Tower,
Sapna Sangeeta Road,
Indore (MP), Bharat - 201306
Mobile: 9826058300
Email: manoj.jain@nbpanels.com,
info@nbpanels.com
Website: www.nirmaanbharatpanels.com

Factory Address:
186/1/3, Nemawar Road, Hansakhedi, Indore
MP- 452016

1.2 Description of the System

1.2.1 Name of the System – Concrewall - Reinforced EPS Structural Panels (RESP) System

1.2.2 Brand Name – NBP NIRMAAN BHARAT PANELS

1.2.3 Brief Description

Concrewall is a building system based on factory produced reinforced Expanded Polystyrene (EPS) panels. These panels, consisting of undulated polystyrene sandwiched between electro-welded zinc-coated steel meshes, are inter-connected through cross connectors, thus creating three-dimensional hyperstatic reinforcement.

On-site, the panels are assembled and concrete is applied to form various structural elements, including vertical and horizontal walls, cladding, and internal walls. The use of galvanized steel and protective concrete layer, ensures resistance to environmental factors, corrosion, and fire.

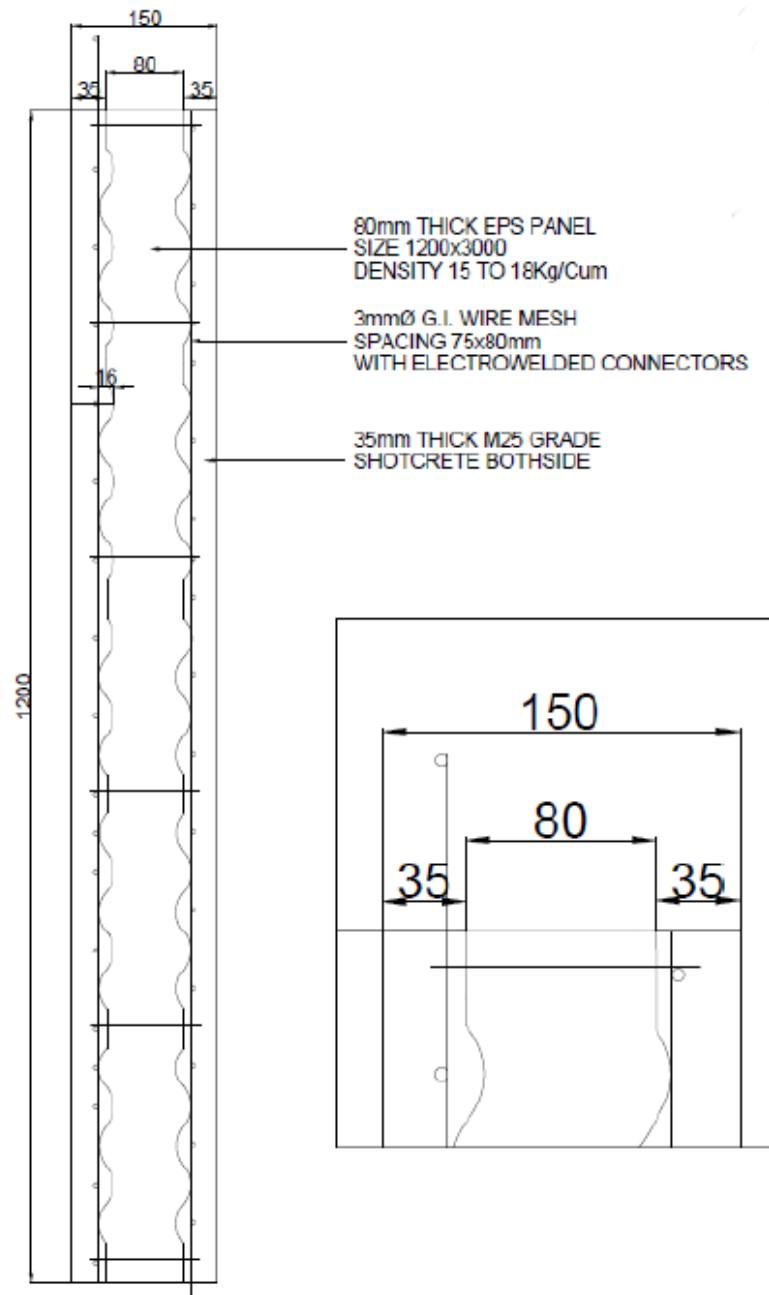


Fig. 1

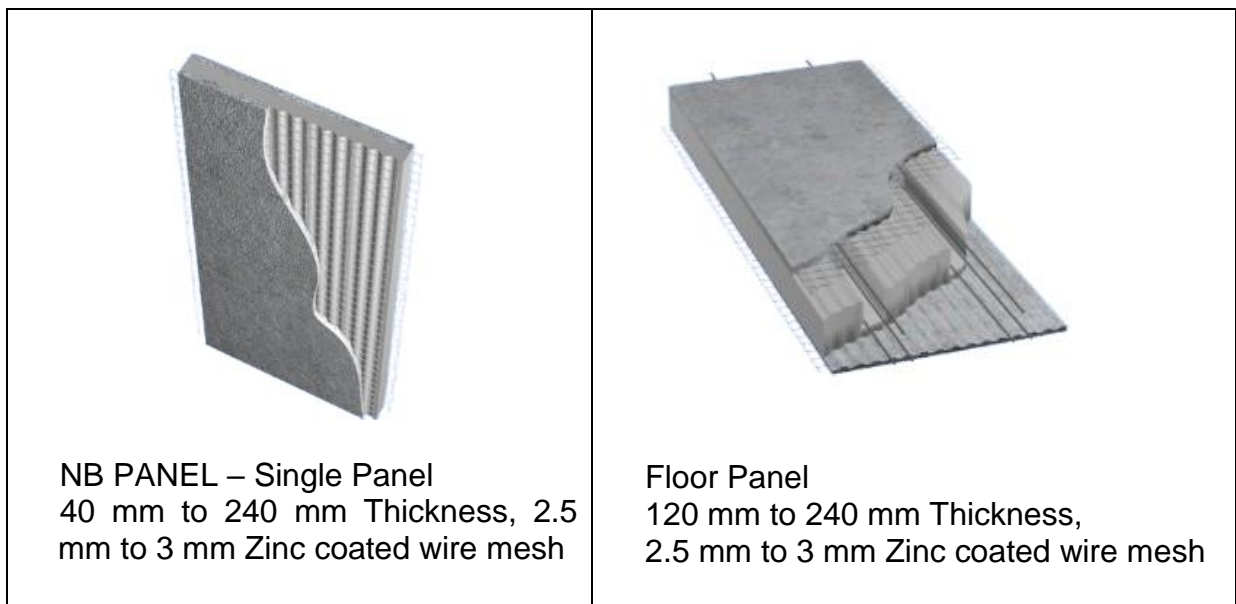


Fig. 2

Special feature of Concrewall panel system includes:

- i. The panels are made from chemically inert polystyrene and galvanized steel mesh, offering resistance to environmental factors, corrosion, and aging. The system helps in the construction of durable structure, with proper quality control measures.
- ii. The same type of panels allows the creation of vertical and horizontal structural elements, cladding, internal walls etc.
- iii. Self-extinguishing polystyrene is used for the panels, classified as Class 1 in fire safety. The material ceases to burn once the ignition source is removed.
- iv. The system provides high thermal insulation, & can be designed for required energy efficiency standards.

1.2.4 Types of Panel

- i. Single Load Bearing Panel
- ii. Single Non Load Bearing Panel
- iii. Single Floor /roof Panel

1.3 Assessment

1.3.1 Scope of Assessment

Scope of assessment included suitability of manufactured panel to the specified requirements for use in building construction as:

- i. Load bearing wall panel
- ii. Non-load bearing wall panel
- iii. Floor/ roof slab

The structural and water tightness design for each specific structure is the responsibility of the building designer.

1.3.2 Basis of Assessment

The assessment of the suitability of the Concrewall panels is based on the following:

- i. It is mentioned here that the Concrewall System of reinforced EPS structural Panel by M/s Schnell Home, Italy was awarded Performance Appraisal Certificate (PAC) by BMTPC in the Year 2017. During the course of evaluation under PAC, M/s Schnell submitted extensive testing reports on the reinforced EPS System such as compressive, axial & flexural strength of EPS Core panels, fire rating, stability against lateral forces (earthquake, wind etc.) by various International Organizations & Indian Institution also (primarily IIT, Roorkee). PAC awarded to Concrewall System may also be referred to at BMTPC Web-site in this context. M/s Schnell Home, Italy has certified the Applicant is authorized agency for manufacture of Concrewall –Reinforced EPS Structure panels using Schnell home innovative building solutions machines and technology.
- ii. Various Tests conducted by the Applicant on raw materials & products including expanded polystyrene, tensile strength of galvanized wire, and products such as;
 - a. Physical & Mechanical characteristics of EPS by EMES Laboratory Pvt. Ltd. , Bhopal
 - b. Test conducted on Galvanized Wire by M/s Kalitech Test & Research Centre Pvt. Ltd. , Indore
 - c. Thermal Transmittance (U-value) of EPS by Mahindra TERI Centre of Excellence ,Gurgaon, Haryana
 - d. Fire resistance test of concrewall panel by Electrical Testing Center, Vadodara
- iii. Assessment of quality assurance procedures implemented in the factory as per Quality Assurance Plan
- iv. Typical Erection Method Statement (Manual) giving details of work execution process, panel sizing, storage, installation of anchor bar etc. adopted for installation of panels.
- v. Inspection of the factory was carried out on April 22, 2025, which included the assessment of production process, quality control, manpower etc.

1.4 Uses of the Panel System

The panel may be used for various types of Building such as residential, commercial, Institutional, Industrial buildings etc., with applications as:

- i. As load bearing walling
- ii. Non Load bearing wall panels
- iii. As partition infill wall in multi-storey framed building
- iv. As floor/ roof slabs
- v. As cladding for industrial building, etc.

1.4.1 Special Aspects of Use/ Limitations

- i. The Concrewall panel shall be manufactured in accordance with the specifications prescribed in Technical Manual of Schnell Home. The building using concrewall panels shall be designed by competent structural Engineer, and constructed with technical support or supervision by qualified engineers and builders, based on structural designs complying with prevailing standards and specifications; this is applicable even for low- rise and affordable mass housing to provide safety of structures.
- ii. Plumbing and Electrical services shall be governed by the provisions & details given by the manufacturer. Good practices of plumbing & Electrical services shall be followed.
- iii. It is strongly recommended that structural engineers and building designers associated with Concrewall panel construction should be thoroughly familiar with the various structural aspects including requirements. It is also recommended that architects and construction Engineers who undertake Concrewall building design and construction gain familiarity with the properties of material, characteristics of Concrewall panels, and its application and construction system.

1.5 Conditions of Certification

1.5.1 Technical Conditions

- i. Raw materials and the finished product shall conform to the requirements of the prescribed specifications.
- ii. As part of technical condition while awarding PAC to M/s Schnell Homes, M/s Schnell is to provide full details of design, manufacture, Quality Control & erection of the panels to the applicant, and also provide necessary training to its technical persons. The Agency shall conform to all prescribed design & specifications.

1.5.2 Quality Assurance

The Certificate Holder shall implement & maintain a quality assurance system in accordance with the Scheme of Quality Assurance Plan (QAP) as per **Annex-1**.

1.5.3 Handling of User Complaints

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.

As part of PACS Certification, PAC holder shall maintain data on such complaints with a view to assess the complaint satisfaction and suitable preventive measures taken.

1.6 Certification

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 Parts 1 & 2 of this Certificate, the Concrewall System covered by this Certificate are fit for use set out in the Scope of Assessment.

PART 2: CERTIFICATE HOLDER'S TECHNICAL SPECIFICATIONS

2.1 General

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 of the System

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.

2.2.1 Raw Materials

1 Steel for both wire mesh and connectors

1.1 Zinc Coating– The zinc covering is variable with the diameter of the wire mesh. Standard wire mesh shall be of 2.5/3.0 mm dia and zinc coating galvanizing shall be of 60/90 gm/m² with a tolerance of ± 5 gm/m²

1.2 Mechanical characteristics

Tensile strength (2.5mm dia):	750 N/mm ²
Yield strength (2.5mm dia):	680 N/mm ²

Tensile strength (3.0mm dia):	700 N/mm ²
Yield strength (3.0mm dia):	600 N/mm ²
Elongation:	> 8%

1.3 Chemical characteristics

% C	: < 0.24
% P	: < 0.055
% S	: < 0.055
% Ceq	: < 0.52

2 Expanded Polystyrene – Self-extinguishing type EPS in accordance with IS 4671:1984 (UNI EN 13163:2013) having density not less than 15 kg/m³.

2.2 Various Types of Panels

2.2.1 Single Bearing Panel

Used as Typical Load Bearing Wall

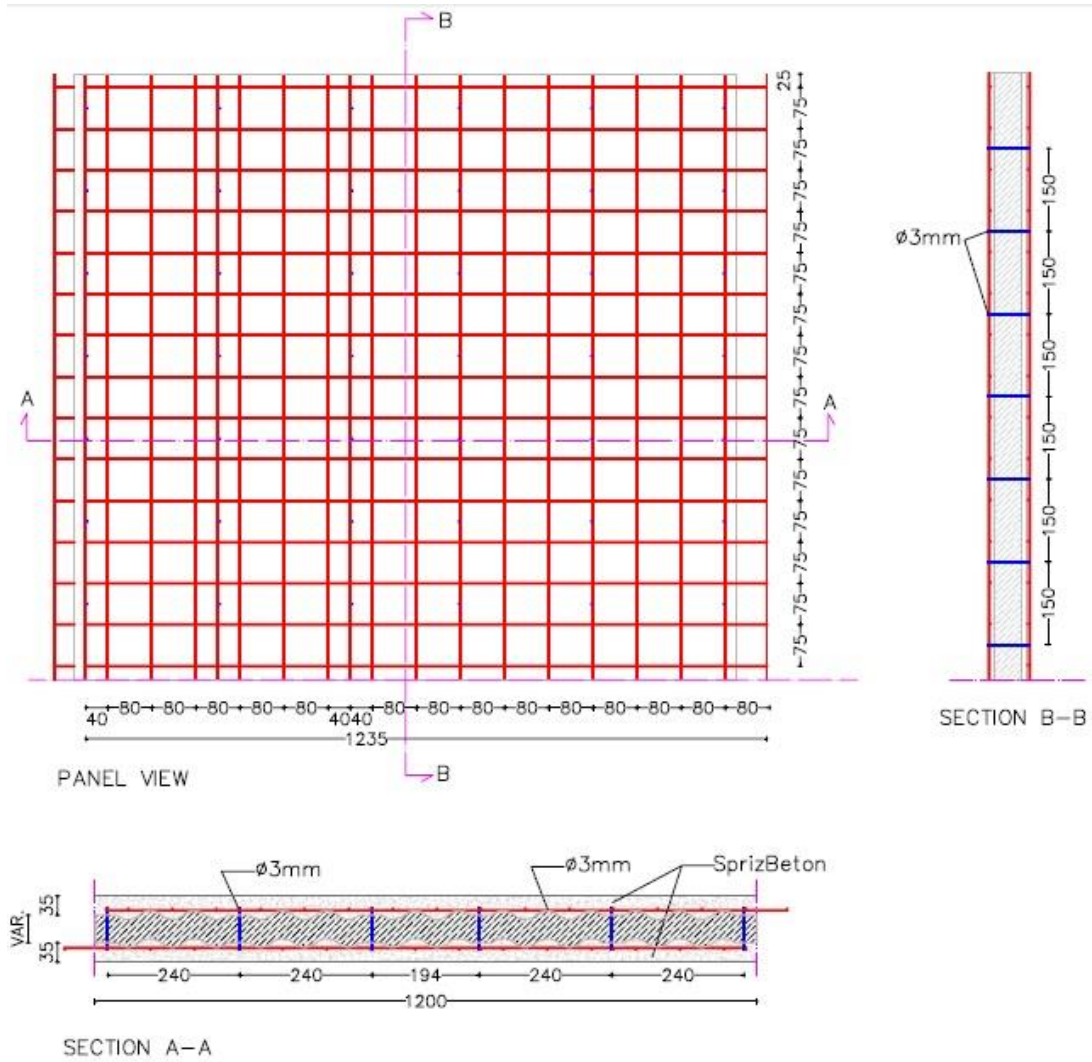


Fig. 3

Mesh

- Width : 1235 mm
- Longitudinal wires : $\phi 2.5/3.0$ mm @ 80 mm c/c (max)
- Transverse wires : $\phi 2.5/3.0$ mm @ 75 mm c/c (max)
- Connectors & cross wire : $\phi 3.0$ mm @ 150 mm c/c

EPS

- Density : ≥ 15 kg/m³
- Thickness : 40 mm to 240 mm
- Wave Depth : 15 mm

2.2.2 Typical Single Non Load Bearing Panel

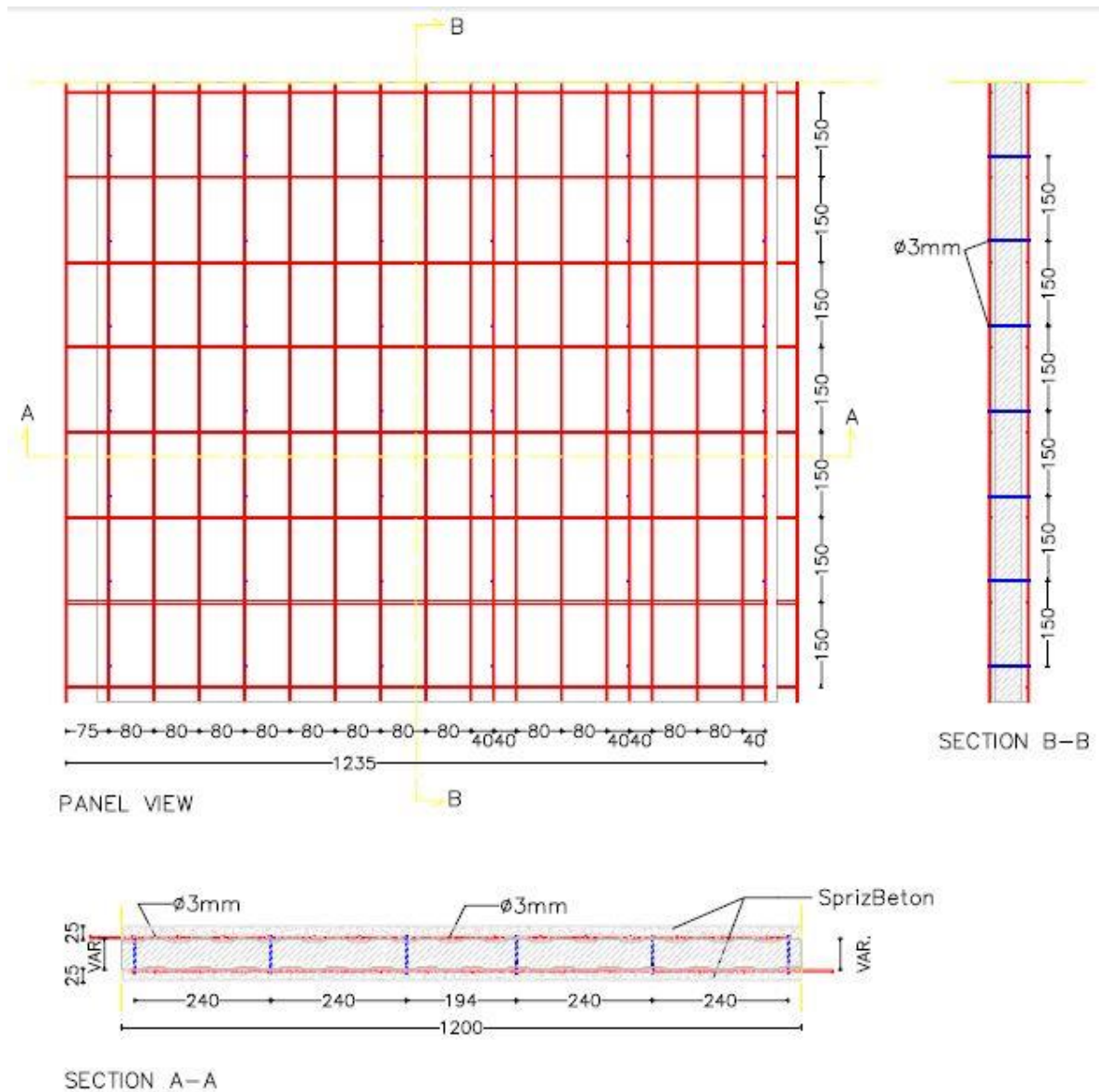


Fig. 4

Mesh

Width	: 1235 mm
Longitudinal wires	: ϕ 2.5/3.0 mm @ 80 mm c/c (max)
Transverse wires	: ϕ 2.5/3.0 mm @ 75 /150 mm c/c (max)
Connectors & cross wire	- : ϕ 3.0 mm @150 mm c/c

EPS

Density	-	: $\geq 15 \text{ kg/m}^3$
Thickness	-	: 40 mm to 280 mm
Wave Depth	-	: 5 /15 mm

2.2.3 Single Floor Panel

Used as floors or roofs span as per the design. The panels are finished on site by 50 mm of casted concrete in upper side and 30 mm of projected plaster in the lower side.

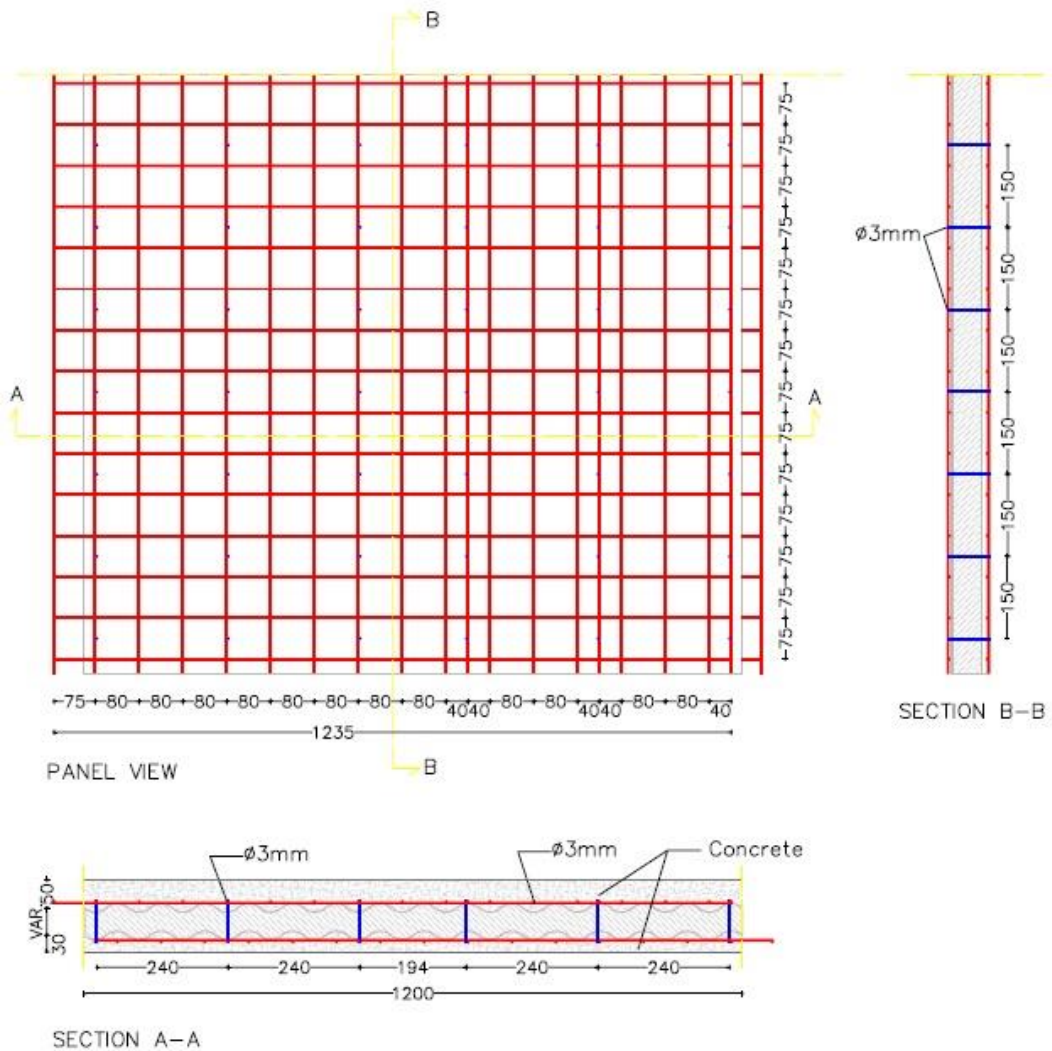


Fig. 5

EPS
 Width : 1200 mm
 Thickness : 80 to 200 mm
 Density : $\geq 15\text{Kg/m}^3$

Mesh

Width : 1235 mm
 Longitudinal wires : 2.5 / 3.0 mm ϕ @ 80 mm c/c
 Transverse wires : 2.5 / 3.0 mm ϕ @ 75 mm c/c
 Connectors & cross wire : ϕ 3.0 mm @ 150 mm c/c

The additional reinforcement as per the structural design requirement/ Codal Provisions shall be provided.

2.2.4 Floor Panel with Joists



Fig. 6

Galvanized steel wire mesh

Longitudinal wires: 2.5 mm dia. every 70 mm

Transversal wires: 2.5 mm dia. every 70 mm

Cross steel wire: 3.0 mm dia. (approx. 68 per m²)

Polystyrene slab density: $\geq 15 \text{ kg/m}^3$

This panel is used for the floor and the roof system and it is reinforced in the joists with concrete casting on the site. The reinforcement of the panel is integrated during the panel assembly by additional reinforcing bars inside the joists as per the design.

These are suitable for slabs having higher spans as per the design.

2.3 Concrete Application

After placing of panels the Concrete/ mortar with equivalent Grade of concrete not less than M25, of appropriate thickness not less than 35 mm are applied on both sides.

Further, for improving the impermeability of concrete, the water cement ratio shall be kept minimum, and admixtures shall be used to improve the workability & smoothness of mortar to maintain flow rate during shotcreting.

2.4 Manufacturing Process of Concrewall Wall Panel

The plant has the capability of producing various types of CONCREWALL panels in different dimensions using two primary raw materials: polystyrene blocks (PSE) and steel wire coils. The process can be broken down into the following stages:

i. Galvanized Wire Processing

a) Wire Straightening and Cutting:

The steel wire is perfectly straightened and cut to the required lengths.

- b) Mesh Assembly:
Wires of different diameters are assembled into meshes of pre-determined lengths using electrical welding.

ii. Polystyrene (PSE) Processing

- a) Shaping and Cutting:
Dried polystyrene blocks are shaped and cut into sheets of specific dimensions, depending on the final product type.
- b) Scrap Recycling:
Any leftover material can be ground and recycled into new PSE blocks, provided it is clean and free of foreign substances, with special attention given to the removal of dust.

iii. Assembly of the CONCREWALL Panel

- a) Panel Construction:
The assembly involves electro welding six wires (positioned transversely and perpendicularly to the panel surface) with two meshes. This forms a "sandwich" structure, where the PSE sheet is placed between the meshes. The insertion of the PSE sheet is done manually by operators.

Off-Line Operations

iv. External Mesh Modification:

Additional operations outside the main production line include cutting and bending the external overlapping meshes as required.

2.5 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.

2.6 Erection & Installation of Panels

The erection & Installation process details in the form of various Steps are attached at **Annex-2**.

2.7 Manufacturing Machinery & Equipment

The manufacturer has various machines and equipment of required capacities and specifications for manufacturing, testing and installation of the panels, as per the details provided. The details of the machines are given below;

Table 1

S. No.	Machine Name	No. of Units	Company
1	Wire Straightening Machines	75/50 ton	Schnell Home, Italy
2	EPS Panel Designing and Cutting Machine	Each 01 No.	
3	Wire Mesh Making Machine – 01 No.		
4	Sandwich Panel Making Machine – 01 No.		
5	Quality Check with Hand Held Electro Welding Machine		
6	6 Mesh Cutting Machines		
7	Mesh Folding Machines		
8	Pneumatic Compression System with distributed Lines Set.	01 Set	
9	Weighing Machines –Nos.	02	
10	Panel towing Machines	06 nos.	

The functioning of Plant & machineries are given at **Annex-3**.

2.8 Handling, Storage and Identification of the Components

- i. The panels should be stored on a clean, flat hard surface area on the site. The panels should not be laid down directly on the ground to prevent them from getting dirty, which could lead to problems of plaster adhesion. Preferably, panels should be stored on timber battens approx. 2 m apart.
- ii. The panels should not be exposed to sunlight for not more than 1 month either in storage or during construction in order to prevent changing the polystyrene appearance. The panels should be bound carefully to make sure these are not accidentally blown by the wind.
- iii. Long term storage of the panels shall be done in a covered, protected, dry environment so that corrosion of the reinforcement does not occur and the panels do not get damaged.
- iv. Panels shall be stored and transported to site in a manner that prevents damage, buckling or sprawling of the polystyrene or bending of the mesh reinforcement. Operatives should place the panels in position and tie them down to starter bars of adjoining panels and slabs in the manner described in the Operational Manual.
- v. Panels should be properly braced to provide rigid temporary support to the walls during erection and concrete spraying and placing of concrete in slabs. Propping of walls and slabs should be in accordance with Schnell Operational Manual.
- vi. The panels shall be delivered to the site with an identification issued by the manufacturer that reports the element height.
- vii. The panel layout shall provide instructions for laying the components correctly.

2.9 Skills /Training Needed for Installation

Workers shall be trained/ oriented on handling of panel and its erection, support system, clamping system, infilling of reinforcement and concrete etc.

with all required safety measures taken including heavy hats, protective shoes etc.

2.10 Guarantee/Warranties provided by the PAC holder to the customer

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

2.11 Services Provided by the PAC Holder to the Customer

The PAC holder shall take full care of after sales services based on agreed terms & conditions.

2.12 Manuals

PAC holder shall provide Construction & Installation Manuals showing necessary diagrams, drawings, detailing to the customers and / or their structural designer.

2.13 Responsibility

- Specific design using Concrewall System is the responsibility of the designer with the instructions, supervision and guidance of Manufacturer as per Schnell Home Guidelines
- Quality of installation/construction with the system on site is the responsibility of the trade persons engaged by the building owner
- Quality of maintenance of the building is the responsibility of the building owner under the guidance of the manufacturer.
- Providing necessary facilities and space for movement of cranes and vehicles is the responsibility of the building developer.

PART 3: BASIS OF ASSESSMENT & BRIEF DESCRIPTION OF ASSESSMENT PROCEDURE

3.1 Assessment

The assessment has been done as per provisions of the standards listed in Part V of this Certificate.

3.2 Tests Performed

Assessment of the suitability of the Concrewall Panels is based on various tests conducted on the raw materials/ products by the Agency as per the details below. However, due considerations have also been given to the credentials of M/s Schnell home, Italy, (Reference has been made in Part-1 above & covered in details in PAC issued to M/s Schnell Home), which is the machinery & technology provider to the Applicant. The Agency as informed has submitted the concrewall panel samples at IIT, Roorkee for conducting its load carrying capacity. In this regard, the agency is advised that once the test reports are available, the same would be shared with BMTPC.

3.2.1 Test Conducted: Expandable Polystyrene

Table 2

Name of Laboratory		EMES Laboratory Private Limited, Bhopal	
Duration of Test		11.02.2024 - 18.02.2024	
Description of sample		Polystyrene Insulation Foam/Board	
S. No.	Properties	Results	Reference
1.	Bulk Density (Kg/m ³)	15.00	IS 3346: 1960 (±5%)
2.	Thermal Stability, %	0.88	IS 4671:1984 Annex D (Maximum 1%)
3.	Moisture Absorption,%	1.47	IS 4671: 1984 Annex E (2%)
4.	Compressive Strength at 10% Deformation, in kg/cm ²	0.94	IS 4671: 1984 Annex A (Min. 0.7 kg/cm ²)
5.	Cross Breaking Strength, in kg/cm ²	1.65	IS 4671: 1984 Annex B (Min. 1.4 kg/cm ²)
6.	Water vapour Permeance, in g/m ² at 24 Hour	46	IS 4671: 1984 Annex C (Max. 50)
7.	Test for Flammability	The material found self-extinguishing in nature	IS 4671: 1984 Annex F (Mentioned as per procedure F-4.1 and all the 5 no. test sample not burned beyond second mark of 75 mm)

3.2.2 Test Conducted: Galvanized Wire

Table 3

Name of Laboratory		Kalitech Test & Research Centre Pvt. Ltd., Indore		
Duration of Test		06.08.2024		
Description of Sample		Galvanized Wire		
S. No.	Parameters	Results		Reference
		2.5 mm	3 mm	
1.	Mass of Zinc Coating (g/m ²)	111	137	IS 6745: 1972
2.	Carbon as C (%)	0.14	0.08	IS 8811: 1998
3.	Sulphur as S (%)	0.013	0.013	
4.	Phosphorus as P (%)	0.016	0.029	
5.	Manganese as Mn (%)	0.60	0.35	
6.	Silicon as Si (%)	0.06	BDL < 0.05	By Calculation
7.	Carbon Equivalent (%)	0.24	0.14	
8.	Tensile Strength (N/mm ²)	765	691	
9.	Yield Stress (N/mm ²)	708	603	
10.	Elongation on Gauge Length 250 mm (%)	12.6	14.8	

3.2.3 Test Conducted: Thermal Transmittance

Table 4

Name of Laboratory		Mahindra TERI Centre of Excellence, Gurgaon, Haryana	
Duration of Test		16.05.2024 - 23.05.2024	
Description of Sample		Concrewall- Reinforced EPS Structural Panels (RESP System) Sample Dimensions: 500 mm x 500 mm x 150 mm	
S. No.	Test Parameters	Results	Reference
1.	Thermal Transmittance (W/m ² K) U-value	0.59	ASTM C 1363-19

3.2.4 Test Conducted: Fire Resistance

Table 5

Name of Laboratory		Electrical Testing Center, Vadodara	
Duration of Test		26/06/24 to 29/06/24	
Description of Sample		Concrewall – Reinforced EPS Structural Panels (RESP System) Assembly unit of EPS panels with plaster (100 mm EPS sheet + 2.5 mm GI mesh both sides + Mortar 35-35 mm both sides Sample Dimensions: 1000 mm x 1000 mm x 170 mm	
S. No.	Tests	Results	Reference
1.	Fire Resistance test – 2 hrs	A flame of approximately 850 °C applied vertically at the bottom side of the specimen for durations of 2 hours and 4 hours The maximum temperature observed on the top surface was 57 °C during the 2-hour test and 63 °C during the 4-hour test <u>Fire effect on surface:</u> No burning or fire spread observed on the surface during either test <u>Smoke & smell:</u> No smoke or smell observed during either test <u>Physical Test:</u> No physical displacement in the plaster layer observed in either test <u>Surface cracks:</u> Hairline cracks observed near the flame application spot after the 2-hour test, while cracks observed on the surface after the 4-hour test	No Codal Reference has been provided
2.	Fire Resistance test – 4 hrs		

3.3 Inspection of the factory

The inspection of the factory was carried out by on April 22, 2025. During the inspection, the production process, quality assurance plan were reviewed & technical persons were interacted.

3.4 Execution of Projects

The list of the executed projects as submitted by the Agency is as below;

Table 6

S. No.	Name & Location of the project	Panel description	Storey / height per Storey	Year of Installation
1.	Prestige Institute of Engineering Management & Research, Indore (MP). Contractor - M/s Kalsi Brothers, Bhopal, (Architects – Mr Sanjay Puri, Mumbai)	75 mm wall panels for Fins & 130 mm panels for external walls.	G+4, Average height: 4 mtr each floor.	2024-25
2.	KEF Hospitality – Tulah Clinical Wellness Centre at Mallapuram) Calicut, Kerala. Contractor – Concrewall Construction	120 mm panels used for walls & 200 mm panels for slabs/roofs	Wall Height – 8 mtr	2023-24
3.	NTPC Renewable Energy Limited, Solar Farm Project Building at Khavda, Gujrat. Contractor – KEC International Ltd Mumbai	Internal & External walls – 100 mm panels	Multiple Buildings/ Average height – 2.9 m, External wall of height – 6mtr.	2024-25
4.	Stonex, Near Peeragadi Metro Station, Delhi	100 mm panels used for walls & cladding Signage	Building Height – 40 mtr /Average Height – 5.5mtr	2024-25
5.	Yashwant Keshav Patil Charitable Trust School, Virar, Mumbai Building structure. Contractor – Concrewall Construction	80 mm panels and 60 mm used for All internal and external walls	G+9 floor/ Average height – 2.85 mtr	2024-25
6.	Vyas Medical College and Hospital, Jodhpur. Contractor – Concrewall Construction	80 mm panels used for partition walls (All internal walls)	G+2 floor/ Average height – 2.9 mtr	2023-24
7.	Waves Resort, c/o Vijay Restaurant, Mandasaur (MP)	100mm & 130mm Panels for curved roof structure.	Versatile design with semi-circle curved roof structure.	2024-25
8.	Ambi Wines, Ratlam (MP)	120 mm panels used with truss & shotcrete both sides up & down	Ground only, Drum shape building.	2023-24
9.	Skye Luxeria, opp. Hotel Golden View, Bypass, Indore	Used 80 mm panels for Entry Gate		2024-25
10.	RSR Industries “Shri Hasti Vihar”, Gotan, Rajasthan	Used 80 mm panels for wall & 120 mm	Load bearing House with EPS Panels	2023-24

S. No.	Name & Location of the project	Panel description	Storey / height per Storey	Year of Installation
		panels for roof with water tank	walls and roofs.	
11.	Eraya Royals of International School of Bombay, Indore	Used 120 mm panels for inclined walls and Signage.	Tilted wall upto 4mtr height.	2023-24
12.	Shri Krishna Divine, Marimata Squar, Indore	50 mm panels used for office partition wall	Average height – 2.9 mtr .	2023-24
13.	Patel's Lotus Villa, Mhow, Indore (MP)	80mm load bearing panels, 160mm Panels, 130mm for walls and roof	G+1, Average height – 3mtr, RCC Frame structures with EPS Panel walls, EPS Walls and roof panels for round shape with slopping roof structure as load bearing, MS Frame structure with EPS Roof.	2025-26
14.	Dheeraj ji Katariya Sajan Nagar, Indore (MP)	120 mm Panels for walls and Curve slab	Curve slab with MS Frame and support walls.	2024-25
15.	Ak Shukla Ji, Scheme No 114 opp. Apollo hospital Indore (MP)	130 mm Panels for external walls, 80mm Panels for internal walls & 120mm Panels for roof	Average height 3 mtr with Load bearing structure and water tank.	2025-26

The photographs of the projects are given at **Annex-4**.

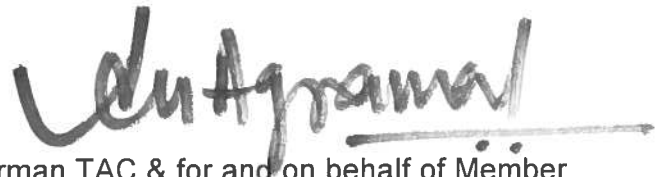
PART 4: STANDARD CONDITIONS

The certificate holder shall satisfy the following conditions:

- 1 The certificate holder shall continue to have the product reviewed by BMBA.
- 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.
- 3 The quality of the product shall be maintained by the certificate holder. The complete testing facility shall be installed for in-process control.
- 4 The product user should install, use and maintain the product in accordance with the provisions in this Certificate.
- 5 This certificate does not cover uses of the product outside the scope of this appraisal.
- 6 The product is appraised against performance provisions contained in the standards listed in Part-5. Provisions of any subsequent revisions or provisions introduced after the date of the certificate do not apply.
- 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 5 to this Certificate).
- 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.
- 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.
- 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.
- 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.

- 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/copyrights asserted relating to the product/system/design/method of installation etc. covered by this PAC. Considerations relating to patent/copyrights are beyond the scope of the Performance Appraisal Certification Scheme (PCS) 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/copyrights 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.
- 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.
- 14 In granting this certificate, BMTPC and BMBA does not accept any 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.
- 15 The certificate holder indemnifies BMBA, its officers and officials involved in the 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.
- 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.
- 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: 03rd June, 2025



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

PART 5: LIST OF APPLICABLE STANDARDS & CODES

5.1 Standards - 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 456:2000 - Code of practice for plain and reinforced concrete

5.1.2 IS 875:1987 - Code of practice for design loads for buildings and Structures

5.1.3 IS 1893 (Part 1):2002 – Criteria for Earthquake Resistant Design of Structures

5.1.4 IS 4671:1984 (Reaff. 2004) – Specifications for expanded polystyrene for thermal insulation purposes

5.1.5 IS 4326:1993 – Code of Practice for Earthquake Resistant Design and Construction of Buildings

5.1.6 BS 476(Part 22):1987 – Fire resistance

5.1.7 Thermal Transmittance ASTM C 1363-19 IS 1608 (Part 1): 2022: Metallic materials - Tensile testing - Part 1: Method of test at room temperature

5.1.8 IS 8811: 1998 (Reaff. 2018) – Method for Emission Spectrometric Analysis of Plain Carbon and Low Alloy Steels Point to Plane Technique

5.1.9 IS 6745: 1972 (Reaff. 2021) – Method for determination of mass of zinc coating on zinc coated iron and steel articles

5.1.10 IS 1608 (Part 1): 2022 – Mechanical testing of metals – Tensile

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

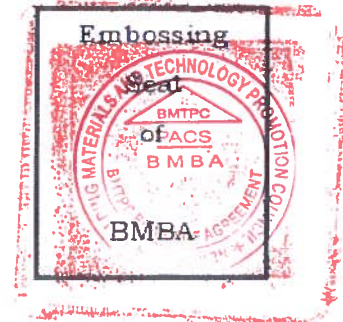
In the opinion of Building Materials & Technology Promotion Council's Board of Agreement (BMBA), **Concrewall - Reinforced EPS Structural Panels (RESP System)** is satisfactory if used as set out above in the text of the Certificate. This **Certificate PAC No. 1070-S/2025** is awarded to **M/s NBP NIRMAAN BHARAT PANELS, Indore, Madhya Pradesh.**

The period of validity of this Certificate is for a period of one year i.e. from 03/06/2025 to 02/06/2026 as shown on Page 1 of this PAC.

This Certificate consists of a cover page and pages 1 to 46.



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



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: 03rd June, 2025

PART 6: LIST OF 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 BMBA
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 year's 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 (TAC) 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

QUALITY ASSURANCE PLAN

I. Quality Assurance plan for raw material

Stage	Check Description	Features to check			Special req. customer	Methods						Reaction plan in case of NC*	
		N.	Product	Process		Specifications / Tolerances	Measure -ment means	Sampling		Check method	Charged to		Doc. Rif.
								Dimension	Frequency				
Acceptance of the new raw material (steel)	Control of the amount of material	1.	Quantity			Qty (nr. Coils) as ordered Qty (kg) as weighed	Visual	The whole lot	Every lot	Order compared with Delivery Note DN compared with the quantity weighed	Production		Stop the lot + inform the supplier
	Visual inspection of the load	2.	Appearance and completeness/ brand and label			Absence of damages/ Presence of brand and label	Visual	The whole lot	Every lot	Order compared with material	Production		Stop the lot + inform the supplier
	Verification of the annexe documentation (qualification certificate and ironworks test certificate)	3.	Compliance of the material			Validity of the qualification certificate and presence of indication of weldability and ref. to DN	Visual	The whole lot	Every lot	Order compared with the qualification certificate	Production	UNI EN 10016	Stop the lot + inform the supplier
	Dimensional controls	4.	Section of the diameter			Diameter of the wire: tolerance for section $\pm 4\%$	Vernier caliper	1 rotolo ogni 5 (o frazione di 5) per ogni diametro	Every lot	Direct measurement	Production		Stop the lot + inform the supplier
		5.											
Acceptance of the new raw material (polystyrene)	Control of the amount of material	6.	Quantity			Qty (nr. blocks) as ordered	Visual	The whole lot	Every lot	Order compared with DN	Production		Stop the lot + inform the supplier
	Visual inspection of	7.	Appearance and completeness/br			Absence of damages/	Visual	The whole lot	Every lot	Order compared with	Production		Stop the lot + inform

	the load		and and label			Presence of brand and label				material			the supplier
	Specifications Verification	8.	Compliance of the material			Density as ordered	Visual	The whole lot	Every lot	Order compared with DN	Production		Stop the lot + inform the supplier
	Dimensional controls	9.	Length x Depth x Height			Dimensions (L x P x H) as ordered: tolerance: ± 2 cm	Tape measure	1 block each 5 (or fraction of 5) for every density	Every lot	Order compared with material	Production		Stop the lot + inform the supplier

II. Quality assurance plan for panels production process

The plant allows producing many types of CONCREWALL panels of different dimensions, starting from two raw materials: polystyrene blocks and steel wire in coils.

A- Processing of the galvanized wire. It includes the following phases:

A1- Perfect straightening and cutting of the requested wires.

A2- Assembly by electrical welding of the wires of different diameter to make meshes of pre-established length.

B- Process of the PSE;

B1- Shape of the dried blocks and cut in sheets of a specific form and dimension, according to the final type of product. The possible scraps can be ground and recycled, within certain limits, in the production of the PSE blocks, on the condition that they are first cleaned and without foreign substances, with particular attention to the presence of dust.

C- Assembly of the CONCREWALL panel

The assembly of the CONCREWALL panel is made by electrowelding wires (in transversal and perpendicular position with respect to the panel surface) with two meshes, forming a “sandwich” including the PSE sheet in between, which is previously inserted by the operators.

D- Operations “out of line” The production line is completed with some operations made out of it, which includes cutting and bending of the external overlapping meshes.

Erection & Installation Process







STEP 1 – MARKING ON EXISTING FOUNDATION

- Identify the location for panel installation, either on the left, right or the centre of the beam and columns.
- Using proper measuring tape, props and markers, draw 2 lines at the distance of Panel thickness.

STEP 2 - MARKING FOR ANCHOR LOCATION & DRILL FOR DOWELLS

- Using proper measuring tape and other props and markers, draw X at equal distances of 60cm on both sides with a difference of starting point – 30cms (start from 30 cm away from object/wall).
- Marking should be done along the line.
- Use 8mm drill bars and drill up to 80 mm depth on the marked location.

STEP 3 - PANEL SIZING

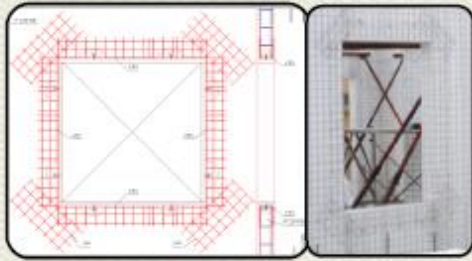
- Cut the panels to size after measurement.
- Cut windows and doors as per drawings before start panel installation.

STEP 4 - INSTALL ANCHOR BAR

- Min. 600 mm long x 8mm dia RE-BARS & hammered min. 80mm deep.

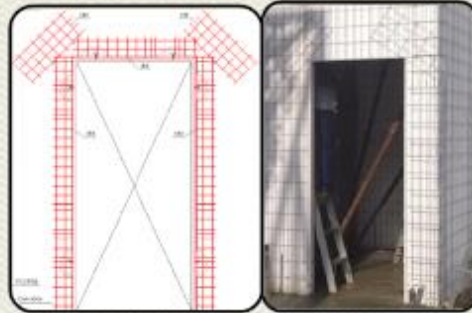
STEP 5 - ERECT PANELS

- Install panels on 8mm REBARS and bind with binding wire.



STEP 6 - REINFORCEMENT OF OPENINGS FOR WINDOWS

- BIND U-mesh on all 4 edges, maintaining 30mm gap with the edge of Panels. Install flat mesh min. 235mm wide and 600mm long on all 4 corners and on both sides (total 8 pcs).



STEP 7 - REINFORCEMENT OF DOOR OPENINGS

- BIND U-mesh on all 3 edges, keeping 10mm gap with the edge of Panels. Install flat mesh 235mm x 600mm on 2 corners in top & on both sides.
- 8 mm dia bar on both side on the U-Mesh to be fixed for extra reinforcement for doors/windows frames, and consider holdfast provisions.



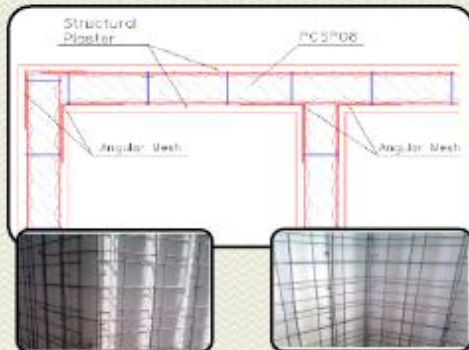
STEP 8 - INTERNAL MEP / AC & OTHER LINES

- All Internal Plumbing / MEP / AC & other lines shall be fixed under the guidance. EPS should be melted using 'Hot Air Gun' only.
- If Mesh cutting is required for any MEP work, Flat Mesh is to be fixed accordingly.



STEP 9 - ERECT SCAFFOLDING, ALIGNMENT AND PLUMB

- Tie 2 Horizontal square pipes on one side at a gap of 1-1.2m from each other for a wall 3-4m high. Achieve plumb using adjustable props tied perpendicularly to the scaffolds and with U-jacks pressing the horizontal square pipe.



STEP 10 - ANGULAR MESH REINFORCEMENT WHERE NECESSARY



STEP 11 - ERECT SCAFFOLDING, ALIGNMENT AND PLUMB

- Tie 2 Horizontal square pipes on one side at a gap of 1-1.2m from each other for a wall 3-4m high. Achieve plumb using adjustable props tied perpendicularly to the scaffolds and with U-jacks pressing the horizontal square pipe.



STEP 12 - PLASTERING PROCESS ON REINFORCED EPS STRUCTURAL PANELS

- Method 1- Mortar spraying by Compressor with bucket.
- Method 2- Mortar spraying by Shotcrete machine.
- The contractor can use method 1 for smaller size project and method 2 for the bigger size of project to just manage the work efficiency and completion time.



STEP 13 - FIRST LAYER PLASTER

- Mix mortar as per the design mix specified and Spray it using Plaster spraying machine to cover the mesh, i.e. about 15mm thickness.
- Curing to be carried out 4-5 hours after mortar spray.



STEP 14 - THICKNESS DOTS

- Prepare thickness dots with reference of the 25mm metal tubes.
- Remove the metal tubes and spray in the gap left behind.
- Curing to be carried out thrice a day until 2nd layer is applied.



STEP 15 - SECOND LAYER PLASTER

- Within 36 hours of spraying 1st layer, 2nd layer must be spread 10 mm thick to achieve total 25 mm thickness.
- Curing to be carried out 4-5 hours after mortar spray.



STEP 16 - FIX GLASS - FIBRE MESH

- Fix Glass-Fibre Mesh at every Wall and Column / Beam joints carefully embedding it in a thin bed of mortar just before final finish plastering.



STEP 17 - FINAL FINISH PLASTERING

- Within 36 hours of spraying 2nd layer, final finish plaster of thickness ~10 mm must be applied, levelled and smoothed (Total thickness shall not be less than 35 mm each side).
- If the required thickness is more than 35 mm, we can increase the plaster layer with applying Fiber mesh/GI mesh for more thickness.
- Curing to be carried out 4-5 hours after



STEP 18 – CURING

- Cure thrice a day for min. 10 days after finish plastering.

(USE TREATED WATER - MAINTAINING FLORIDE CONTENT)

MACHINES AND ACCESSORIES**1) ELECTRONIC POLYSTYRENE CUTTING MACHINE**

It has been projected to shear - starting from standard polystyrene blocks - (1200mm), moulded sheets of various thickness apt to make all the components of the constructive system.

A movable frame, equipped with hot wires (resistances) placed equidistantly along the frame, moves towards the polystyrene block which is positioned on the bench making the pre-established and pre-selected control cuts.

The portal motorization is obtained with motors at changeable speed (axis X) as well as the vertical movement of the wires (axis Y).

**2) Wires Straightening Machine**

Machine to straighten and cut smooth and corrugated metallic wires, which are made to measure.

The machine is equipped with a collecting bench for transversal and longitudinal cut bars.



3) Automatic Welding Mesh Machine

The automatic welding machine is necessary to produce mesh obtained from pre-straightened wire, both longitudinal and transversal.

The machine is composed of a loading bench and an unloading one, with, in the middle, a welding bench that includes pneumatic pincers with a double effect for the longitudinal wires docking, the pneumatic welding units with double push and the transformers.

A modular welding control board and a PLC to run the machine cycle check both the welding parameters and the movement.



4) Automatic Welding and Panels Assembling Machine

The machine has got the function to assemble the panel, welding the vertical connectors to the two mesh sheets, positioned horizontally on the welding bench, including between them the polystyrene sheet already molded by the polystyrene cutting machine. In this way panels of different thickness can be produced.



5) Automatic Mesh Cutting Machine

The machine has got the function to cut the electro welded mesh.



6) Automatic Mesh Bending Machine

The machine has got the function to produce the bending meshes for site panels fixing (corners, windows and doors reinforcements).



Project Photographs



Prestige Institute of Engineering Management & Research, Indore (On-going)



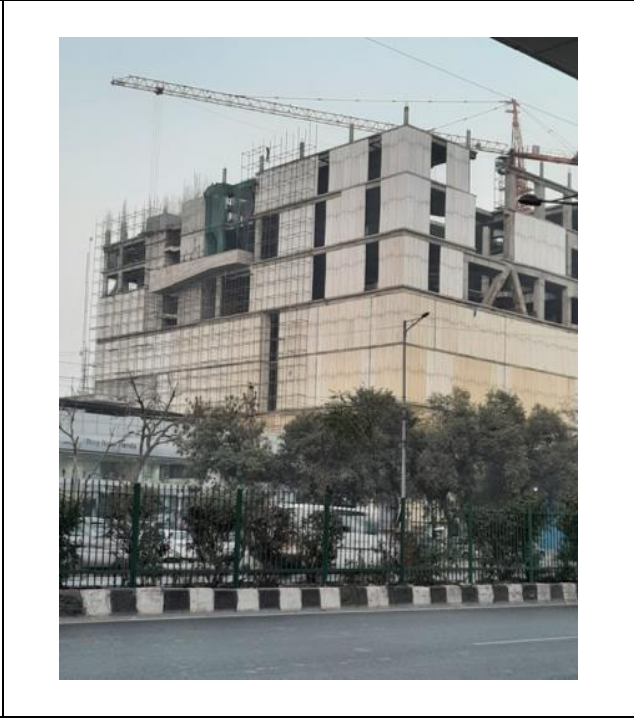
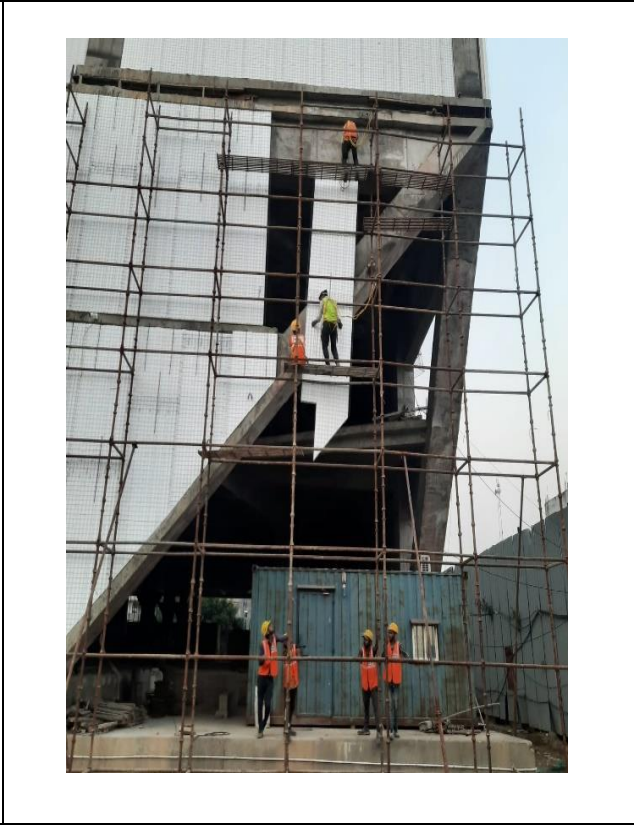
Architectural 3 D View



Wellness Centre at Mallapuram, Calicut, Kerala



NTPC Renewal Energy Ltd Solar Farm Project Khavda, Gujarat



Stonex, Delhi



Virar School, Virar, Mumbai



Vyas Medical College, Jodhpur



Hostel building at Chitra Durg



Ambi Wines, Ratlam



Waves Resort, Mandasaur (MP)



Sky Luxeria (Gate), Indore



RSR Industries "Shri Hasti Vihar, Gotan, Rajasthan