

Name and Address of Certificate Holder: M/s Pioneer Precast Solutions Pvt. Ltd., Greenways Towers, 2nd Floor, No-119, St. Mary's Road Abhiramapuram, Chennai - 600018 Mob. <u>7397296585</u>, 7550032609 Email:crescenthousing@yahoo.com Performance Appraisal Certificate No. PAC No.:**1043-P/2019**

Issue No. 01

Date of Issue: 29.04.2019



K-WALL PANELS

pulbc

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

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





PERFORMANCE APPRAISAL CERTIFICATE

FOR

K-WALL PANELS

ISSUED TO

M/s PIONEER PRECAST SOLUTIONS PVT. LTD.

STATUS OF PAC: 1043-P/2019

S. No.	Issue No.	sue Date of o. Issue	Date of renewal	Amendment		Valid up to (Date)	Remarks	Signature of
				No.	Date			signatory
1.	2.	3.	4.	5.	6.	7.	8.	9.
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PAC No.:1043-P/2019

Issue No. 01

Date of issue: 29-04- 2019





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PART 1 CERTIFICATION

1.1 Certificate Holder: M/s PIONEER PRECAST SOLUTIONS Pvt. Ltd. Pioneer Regency Towers 132(old)-33 Nelson Manickam Road Chennai, Tamil Nadu -600029 Email: crescenthousing@yahoo.co.in

1.2 Description of Product

1.2.1 *Name of the Product:* K – Wall Panels

1.2.2 Brief Description: K- wall panels are factory produced hollow core wall panels using light weight concrete made of ordinary Portland cement, fly ash, perlite, foam, fevicol DDL, fiber-glass mesh, river sand and water. After manufacturing K-Walls are watered and cured properly for the further period of 7 to 8 days. After 15 days the panels are ready for transportation to site.

Panels have cylindrical hollow cores incorporated with 7 no. 60 mm dia voids in the 100mm thickness, 8 no. 50 mm dia. voids for the 80 mm thickness and 9 no.39mm dia voids for the 65mm thick panels. The corresponding nominal weight shall be 35 kg/m², 61 kg/m² and 102 kg/m² for 65mm, 80mm, and and100mm thick panels respectively Hollow cores are incorporated in K – wall panels to reduce weight, facilitate mechanical, electrical and plumbing services through hollow core, thereby increasing sound and thermal insulation properties. The sides of the panels are tongued and grooved to facilitate jointing.

K – Wall panels do not require stone or wood sills/frames to level surfaces for windows and openings. Lintels need not be cast as panels may be placed horizontally as lintels wherever required. Wash basins, cup-boards, mirrors, paintings etc. may be hanged with regular plug screws. Details of the wall panels showing hollow cores in figs.1, 2, 3 & 4.



Fig. 1











Fig.3





1.2.3 Type and size

K-Wall panels are produced in standard lengths, widths & thicknesses and in lengths to suit room height as per the details given below.

Wall width:	611 mm
Wall thickness:	65 mm, 80mm & 100 mm
Wall Height:	2900mm
Weight:	35 kg/m ^{2,} for 65mm, 61 kg/m ² for 80mm
	and 102 Kg/m ² for 100mm thick panels.





K-Wall Panel uses light weight concrete of density 675 kg/m³ to 750 kg/m³

1.2.4 Tolerances

The panels shall be produced in accordance with the following Tolerances:

Length	: ±3 mm,
Width	: ±2 mm,
Thickness	: ±1 mm,
Squareness of end	: ±3 mm

1.2.5 Applications of panels

K-Wall panels shall be used in residential and commercial buildings etc. according to thickness as given below.

- (i) 100 mm wall panels are Suitable for external walls and partitions.
- (ii) 80 mm wall panels are suitable for internal partition walls.
- (iii) 65 mm wall panels are Suitable for enteral walls and washroom partition walls.

1.3 Assessments

1.3.1 Scope of Assessment – Suitability of K-wall panels for use as non-load bearing wall in buildings.

1.3.2 Basis of Assessment –

The assessment is based on the results & reports of

- (i) Inspection of the factory
- (ii) Inspection of the manufacturing equipment'sP used
- (iii) Assessment of quality assurance procedures implemented in the factory
- (iv) Tests got done in independent laboratories viz Structural Engineering Division IIT, Madras & National Test House (SR) Chennai.
- (v) Test Report of Thermal Conductivity "K-Value" got done by Department of Mechanical Engineering IIT, Madras.
- (vi) Tests got done for Sound Transmission Loss on 100 mm light weight hollow core precast wall panel by The Automotive Research Association of India, Pune.
- **1.3.3 Scope of Inspection** Scope of inspection included the verification of production, performance and testing facilities at the factory





including competence of technical personnel and status of quality assurance in the factory.

1.4 Manufacturing Machinery & Equipment

- 1. Inclined Screw Conveyor (3HP): Handles cement and fly ash manually to put into the mixing unit, handles 5 tons for 3 batches a day approximately.
- 2. Mixing Tank Unit: Capacity 2.5 Cubic Meter (Volume) with agitator and powered by 5HP motor. It takes about 45 minutes to complete mixing cycle.
- 3. Foam Generator Machine: Generates foam for precast wall panels in 1:10 ratio of foaming agent and water mixing to generate foam.
- 4. Wall Panel Molding Machine: Casts three sizes of K- wall panels (65mm, 80mm, 100mm thickness each with 2900mm length and 611mm width), casts 3 batches (19 panels per batch) daily, totaling to 19 x 3 = 57 panels.
- 5. Hydraulic Power Back: Open and close of shetter in casting and removal of wall panels. Works with two hydraulic cylinders.
- 6. Pipe Pilling Machine: Removing of pipes from precast panels after setting time. It requires light to heavy load released from panels.
- 7. One Ton EOT Crane: It handles slurry bucket and removal of finished panels from moulding machine.

1.5 Manufacturing Process

The manufacturing process of K - wall panels is as follows:

1.5.1 Raw Materials

River Sand shall be supplied to the plant by supplier, where it shall be weighed, sieved & Silt Content checked as per the quality assurance norms. Cement shall be supplied in bags, for which manufacturer will submit the test report along with the load. Fly Ash shall be supplied in closed bulkers directly from the thermal power plant. Cement and Fly Ash can be conveyed directly to the Mixer by using Screw Conveyor. Foaming Agent shall be supplied by the Manufacturer directly to the plant. Manufacturer will submit the test Certificate for the Foaming Agent supplied to the plant.

1.5.2 *Preparatory Works*

The Moulding machine is first made ready by placing the bottom mould of required thickness with relevant key and lock plates which move the panel plates on a guided rail operated by twin hydraulic jacks placed at the bottom of the panels.





Then Pipes of required diameter are inserted for the hollow core. The Fiber or GI mesh as per customer's requirement are placed on either side of the Pipes in each mould. Now the Mould is ready to take the light weight concrete mix.

1.5.3 Concrete Mixing

Concrete required shall be batched and mixed at batching and mixing plant. Water quantity required for a batch shall be loaded in the mixer chamber and then perlite shall be added.

The foaming agent shall be mixed with water to the right proportion as per manufacturer recommendation. Afterwards Fly Ash and Cement shall be added gradually into the mixture. The mixer shall run till a homogeneous mix is obtained. Required quantity of river sand shall be added at the end of the process and allowed to mix properly before pouring in to the panel mould.

1.5.4 *Pouring of Light Weight Concrete*

After mixing, the concrete mix which is in the form of slurry is poured into the special moulds and left to dry naturally.

1.5.5 *Removing of Pipes*

The pipes are then pulled out by winches from the moulds after initial setting and before hardening.

1.5.6 Stacking

When the lightweight hollow core panels have hardened in the moulds, they are released by moving the mould plates using jacks. The Light weight hollow core wall panels are then lifted with the help of special attachment in the hoist for stacking.

1.5.7 Pre - curing

The stacks shall stay 12 to 24 hours in the pre-curing indoor storage area where natural pre-curing occurs for each stock which is covered with tarpaulin to stop any evaporation and moisture loss.

1.5.8 Restacking

After pre-curing the products are strong enough to stand automatic handling. The products shall be restacked.

1.5.9 Curing

Curing is followed for 24 to 48 hours by stacking. The panels are watered and cured for a further period of 7 to 8 days. After 15 days the panels are ready for transportation to site.

Manufacturing Process flow chart is given in Annex II.





1.6 Use of K- walls & Its Limitations

1.6.1 Uses

These walls shall be used as non-load bearing walls/partition walls and compound/ boundary walls in residential/ commercial/ industrial/ institutional buildings.

1.6.2 *Limitations of Use*

For non-load bearing walls only. Not to be used as load bearing walls.

1.7 Conditions of Certification

- **1.7.1** *Technical Conditions* Raw materials and the finished product shall conform to the requirements of the prescribed specifications.
- **1.7.2 Quality Assurance** The Certificate Holder shall implement & maintain a quality assurance system in accordance with Scheme of Quality Assurance (SQA) given in the Annex I attached with this Certificate.
- **1.7.3 Brochure/ Guidelines** The Certificate holder shall provide detail instructions for laying of the walls.

1.7.4 Handling of User Complaints

- **1.7.4.1** The Certificate holder shall provide quick redressal to consumer/user complaints proved reasonable & genuine and within the conditions of warranty provided by the customer/ purchaser.
- **1.7.4.2** The Certificate holder shall implement the procedure included in the SQA. As part of PACS Certification he 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, K- wall panels covered by this Certificate is fit for use set out in the Scope of Assessment.





PART 2 CERTIFICATE HOLDER'S TECHNICAL SPECIFICATIONS

2.1 General

2.1.1 The PAC holder shall manufacture the K- wall panels in accordance with the requirements specified in relevant Indian and other Standards. In addition, it shall follow Company standards specifying requirements of various materials used in the manufacture of the product.

2.2 Specifications of the Product and Performance Criteria

2.2.1 Technical Specifications

2.2.1.1 Raw materials

- OPC 43/53 grade cement shall conform to IS 12269:1987
- River sand shall conform to IS 383:1970 IS 2386:1963
- Fly ash shall conform to IS 3812 (Part 1):2003
- Water shall conform to IS 10500:2012
- Perlite
- Fiber Glass Mesh

2.2.2 Performance Criteria

K- Wall panels shall meet the following performance criteria:

S.No	Properties	Test Method	Criteria
1.	Average density (kg/m ³)	IS 516:1959	729
2.	Flexural strength N/mm ²	IS 516:1959	0.71
3.	Compressive strength N/mm ²	IS 516:1959	7.31
4.	Impact strength (Falling weight) (N)	IS 2380(10)- 1977	182
5.	Drying shrinkage (%)	IS 2185 (Part 1):1979	0.022
6.	Thermal conductivity (W/m ² ⁰ C)	IS 3346:1980	0.631
7.	Sound transmission Class (dB)	IS 9901:1981	38





2.3 Production & Inspection

2.3.1 *Production:* K - Wall panels shall be machine made from light weight perlite, river sand, 53 grade Portland cement, Fly ash, Adhesive, Water and Fiber Glass Mesh. These shall be as per required specification. Panels have smooth rectangular faces with sharp corners and shall be uniform in color.

Precast light weight hollow core wall panels shall be manufactured in dry casting method. The units shall be made with tongue and groove joint. Section of the tongue rebate shall be 20 mm (top) x 30mm (bottom) x 15mm (deep) on one end of the panel and on other end of the panel, the size of groove rebate shall be of the size 35mm (top) x 25mm (bottom) x 15mm (deep). Panels shall have cylindrical hollow core incorporated with 7 No 60mm dia voids for 100mm thickness, 8 No. 50mm dia. voids in 80mm thickness and 9 no 39mm dia. voids for 65mm thickness. Faces of panels shall be flat, rectangular and smooth.

The concrete cube crushing strength shall not be less than7.31 Mpa. The average moisture absorption shall not be more than 12.50% by weight. Necessary tests for crushing strength and water absorption etc. shall be carried out as per relevant IS. The density of the light weight concrete shall not be less than 650 kg/cum.

2.3.2 Adhesive

High strength and tensile adhesion non-shrink cementations grout premixed property compound/void filling expanding polyurethane foam (PU) shall be used for vertical and horizontal joints of precast hollow core wall panels. U shaped G.I cleat shall be fixed in top and bottom surface of the panel and anchored with self-expansion screws.

2.3.3 Plumbing & Electrical

K - Wall panels shall have hollows of 60mm dia. in 100mm thick wall, 50mm dia. in 80mm thick wall and 74mm dia. in 120mm thick wall to allow the passage of water pipes, electrical wiring, HVAC and hydraulic installations without making holes/chases. Plumbing and Electrical service fittings shall be pre-planned and shall be passed through hollow portions of the wall panels.

2.3.4 Painting, Tiling and Cladding

Painting shall be done directly or after applying a 2mm wall putty coat. Texture paint coat shall be directly applied to external surface for decorative effect.





All tiling and cladding shall be directly fixed using regular cement mortar or tile adhesive.

2.3.5 Inspection

Inspection shall be done at appropriate stages of manufacturing process as given in Clause 1.5. The K - Wall panels shall be stored properly 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 Selection & Installation

- **2.4.1** The user is responsible for the proper use of the product at site. PAC holder shall provide required guidance and instructions for usage of the product at site.
- **2.4.2** Good practice for installing the product at site. K Wall panels shall be used at site in accordance with the applicable specifications, instructions and guidelines of the manufacturer. The user shall also follow the Brochure of the product supplied by the manufacturer.

2.5 Storage and Transportation

- i. Concrete panels shall be stored and stacked properly in such a way as to avoid any contact with moisture at site.
- ii. Panels shall be stored up to two stacks on levelled ground or planks or other supports free from contact with ground and covered to protect against wetting.
- iii. The panel stacks shall always be lifted from under pallet to other floor level with a lifting device.
- iv. To move full panel around installation site, trolley or other device shall be used.
- v. In case of single panel movement, simple wheel or wheel barrow shall be allowed.





2.6 Installation procedure:

Proper preparatory works are required before erection of K-Wall Panel to ensure quality, handling and installation.

Preparatory work items and checklists

- Check the site accessibility for the delivery of the Panel.
- Check delivery checklist for correct size and quantity of Panel.
- Check the adequacy of crane capacity and working clearance for hoisting of Panel.



- Check the location and condition of lifting and hoisting of panels.
- Check the accessibility of unloading point and storage area.
- Check the storage area for its level, cleanliness and well drained dry ground
- Store the Precast panels according to the delivery schedule and erection sequence.
- Panels stacks shall always be lifted from under wooden pallet with a lifting fork or belt.
- The Panel stacks shall be moved by forklift or trolley to construction site.
- Panels can also be moved manually. Panels should always be transported sideways.

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1. Setting Out - Set reference line and offset line to determine the position of the K-Wall Panel to be installed. The line of wall is marked to the floor and ceiling before the start of installation.



2. Guiding boards shall be fixed on the floor and ceiling. The guiding support will automatically align the wall when lifting the panels straight into upright position.



- 3. The height of headroom needs to be checked for each individual panel before fixing, the same method shall be followed for all panels.
- 4. The floor, tongue and groove portion of panels shall be cleaned properly for firm fixing.
- 5. The 600mm side of panel shall be lifted & kept parallel to the floor. The groove side of panel shall be kept towards the wall or column end.
- 6. Cement based adhesive shall be spread on side of already installed panel.









7. Fix the G.I "U" Shaped Cleat in hollow core holes to lift the panels straight upright position using Machine or Manually.



- 8. Before the panel is lifted to upright position, it should be moved so that the panel bottom is as close as possible to its correct position.
- 9. Check the alignment before fixing of Panels. If required, adjust it to achieve the level and position of the Panel





10. The G.I "U" Cleats shall be fixed with self-expansion screws in columns.





11. Cement Based Adhesive shall be applied along entire length of tongue and groove of panels.







- 12. Before the Panel is lifted to upright position it should be moved to its correct position for fixing. After that panel is positioned manually or mechanically.
- 13. The Panels should be pushed against the previous Panel (and move up and down) so that tongue and groove is carefully positioned against each other. Correct thickness of joint between two panels is 1-2mm.
- 14.K-Wall Panel is positioned to correct level by using wooden wedges at the bottom and top of the Panel erected earlier. The height of the panel should be about 10 20mm lesser than free room height.





15. The bottom, top and side joints of panel are filled with Adhesive. The surplus Adhesive is removed from the joints, right after installation.



16. The partition shall be completed by joining panel by panel as per the above procedure.









- 17. Keep the installed panels undisturbed for at least 8 hours.
- 18. After final setting of the adhesive applied in tongue and groove joints, fiber mesh of size 5mmx5mm 140 GSM shall be glued on both sides of the Panel.
- 19. The hollow cores may be used for access of the electrical conduits and water supply services.
- 20.K-Wall Panel need only a very thin coat (1-2mm) of putty for smooth finishing.
- 21. Necessary tools required for installation shall be hammer, saw, screw driver drilling machine, trolley, concrete cutter machine, lifting rods etc.









K-WALL PANEL INSTALLATION DETAILS (100mm TK. HOLLOW CORE K- WALL PANEL)

ALL DIMENSIONS ARE IN "MM"

SHEET- A5















- 2.7 Skills /Training needed for Installation No special skills other than normal skills of a mason shall be required for installation of these wall panels also. However, the PAC holder shall provide on request necessary guidance to the users at site, if required.
- 2.8 Guarantees/ Warranties provided by the PAC Holder- The manufacturer shall furnish a guarantee up to installation of the wall panels, if it is in the scope otherwise the guarantee shall be up to delivery of the wall panels. A brochure giving relevant warrantee details shall be made available to the client.

2.9 Services Provided by the PAC Holder to the Customer

- **2.9.1** The PAC holder shall provide pre-sale advisory regarding the product. Customer/user may obtain from the PAC holder details of the advice that may be provided to him.
- **2.9.2** Users/Customers should ascertain from the PAC holder the type of service, the PAC holder is prepared to provide.





PART 3 BASIS OF ASSESSMENT AND BRIEF DESCRIPTION OF ASSESSMENT PROCEDURE

3.1 Basis of Assessment

3.1.1 Factory Inspection

The factory was inspected by the technical representative of the Council. During inspection the entire manufacturing process along with the equipment was inspected. The in-process inspection and the inspection of the finished product were in accordance with the SQA approved as a part of the requirements for grant of this PAC.

3.2 Laboratory Tests Done for Assessment

3.2.1 Testing of samples - The performance tests for K-wall panels have been carried out by The Automotive Research Association of India, Chennai and IIT Madras conform to the tests as per the performance characteristics and specifications given by the manufacturer.

S.	Parameters	Test Method	Test Result
No			
1.	Dry density (kg/m ³)	IS 516:1959	674
2.	Compressive strength (N/mm ²)	IS 516:1959	7.31(avg.)
3.	Flexural strength (N/mm ²)	IS 516:1959	0.71(avg.)
	Longitudinal Transverse		2.34 (avg.)
4.	Moisture content (%)	IS 516:1959	6.40 (avg.)
5.	Impact strength (N)	ISO 179-2:1997	8
6.	Drying shrinkage (%)	IS 2185 (P-	0.022
		1):1979	
7.	Thermal conductivity	IS 3346:1980	0.631
	(m².k/W)		
8.	Sound transmission	IS 9901:1981	38
	Class (dB)		





3.3 Supply of the K- Wall Panels by Pioneer Precast Solutions Pvt. Ltd.

Date of erection	Client Name	Contractor	Qty of materials
25/4/2017	Global Hospital	JPJ Civil Works & Supplies	240Sqft
9/6/2017	Global Hospital	Kirishantini Foundation	242Sqft
20/6/2017	Green Tech Structural	Client	1,035sqft
1/7/2017	Anir Tech Park	Client	100Sqft
23/8/2017	House Holding Pvt Ltd	Client	11,816Sqft
25/10/2017	MK Prasath	Client	21Rft
1/11/2017	Creations	Client	350Sqft
14/11/2017	Mr. Kombian	Client	99Rft
26/12/2017	J P Traders	Rane Automotive Factory	138Sqft
13/1/2018	Sripal Exports	Client	1,700Sqft
20/3/2018	Dr. V Ramadas	Client	254Sqft
20/3/2018	Dr. V Ramadas	Client	167Sqft
31/3/2018	Anir Tech Park	Client	13,836Sqft
3/5/2018	True Value Homes	Client	962Sqft
26/6/2018	Mr. Murali	Client	146Sqft
3/7/2018	Goodrich Gaskets Pvt Ltd	Client	1,103Sqft





PART 4 STANDARD CONDITIONS

The 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 Organization national standards body and the International 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.

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

Place: New Delhi Date of issue 29.04.19

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 AND CODES USED IN ASSESSMENT

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

IS 383:2016	:	Specifications for coarse and fine aggregates for concrete
IS 516:1959 (Reaffirmed 2013)	:	Method of test for strength of concrete
IS 2386(Part 1& 1963 (Reaffirmed 2016)	:	Method of tests for aggregates for concrete
IS 3346:1980 (Reaffirmed 2017)	:	Method of determination of thermal conductivity of thermal insulation materials
IS 3812 (Part 1):2013	:	Specifications for pulverized fuel ash for use as pozzolana in cement, cement mortar and concrete
IS 9103:1999 (Reaffirmed 2013)	:	Specifications for concrete admixtures
IS 9142:1979 (Reaffirmed 2011)	:	Specifications for light weight aggregate
IS 9901:1981 (Reaffirmed 2007)	:	Measurement of sound insulation in buildings and building elements
IS 10500:2012	:	Specifications of drinking water
IS 8112:2013 / 12269:2013	:	Specifications for 53 grade ordinary Portland cement
IS 15916:2011	:	Code of practice for building design and erection using prefabricated concrete

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), **K-WALL-PANEL** bearing the mark manufactured by M/s Pioneer Precast Solutions Pvt. Ltd. is satisfactory if used as set out above in the text of the Certificate. This Certificate **PAC No.: 1043-P/2019** is awarded to **M/s Pioneer Precast Solutions Pvt. Ltd., Chennai (TN).**

The period of validity of this Certificate is for a period of one year i.e. from 29-04-2019 to 28-04-2020 as shown on Page 1 of the PAC.

This Certificate consists of a cover page and pages 1 to 33.



Dr. Shailesh Kr. Agrawal Chairman, TAC & Member Secretary, BMBA

On behalf active BMITPON Boardotof Capteement, Chairman, Technical Assessment Comparise Tracit, of BMBA & Member Secretary, BMTPC Board of Agreement BMBA to conder Ministry of Housing and Urban Affairs, Government of India

Place: New Delhi, India Date: 29.04.19



PART 6 ABBREVIATIONS









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 Affairs 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 (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





ANNEX I

(Clause 1.6.2)

QUALITY ASSURANCE PLAN FOR K -WALL HOLLOW-CORE WALL PANELS

S.	Parameters to be	Requirement Specified	Test Method	Frequency of		
No.	inspected			Testing		
I. Raw Materials						
1.	O P Cement 53 Grade	OPC 53 as per IS12269:1987	Manufacturers test report	If required or if bulker not sealed		
2.	Sand	Sieve Analysis Silt Content Specific Gravity Water Absorption	IS 383:1970 IS 2386:1963	Every truck		
3.	Perlite			Every truck		
4.	Flyash	As per IS 3812 (P-1): 1979	IS 3812 (P- 1):2003	If required		
5.	Water	As per IS 10500:2012	IS 10500:2012	Yearly		
	II. K-Wall HOLLOW-CO	ORE WALL PANEL	-			
1.	Wall Width (mm)	611 ± 3	Manually	Daily		
2.	Wall Thickness (mm)	100 ± 3, 80 ± 3, 65±3	Manually	Daily		
3.	Wall Height (mm)	2900 mm ± 10	Manually	Daily		
4.	Wall Weight (kg/m ²)	35, 80 and 102	Weigh bridge	Monthly or at change of mix design		
5.	Density (kg/m ³)	675 to 750	Batching plant report	Daily		
6.	Water Absorption	8% max	IS 516:1959	Quarterly		
8.	Wall Compressive Strength (Mpa) at 28 days	7 min.	IS 516:1959	Half yearly or at change of mix design		
9.	Wall Flexural Strength	.71 min.	IS 516:1959	Half yearly or at change of mix design		
10.	Thermal Conductivity	0.631 min.	ls 3346:1980	Half yearly or at change of mix design		





ANNEX II

(Clause 1.6)

MANUFACTURING PROCESS FLOW CHART







ANNEX III

(Clause 2.7)





















