



## Roof Insulation Tile-Insulla

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 Japeva Engineering Pvt. Ltd.**

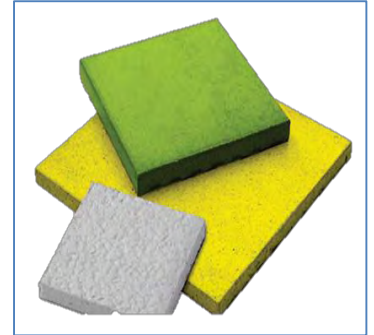
"Pink House", No. 6, 3<sup>rd</sup> Cross Street, Thirumurugan Nagar,  
Porur, Chennai- 600116  
(Tamil Nadu)

Performance Appraisal  
Certificate No.

PAC No **1016-P/2015**

Issue No. **01**

Date of Issue: **24.04.2015**



**Building Materials & Technology Promotion Council**  
**Ministry of Housing & Urban Poverty Alleviation**  
**Government of India**  
Core 5A, First Floor, India Habitat Centre,  
Lodhi Road, New Delhi – 110 003

Tel: +91-11-2463 8096, 2463 8097; Fax: +91-11-2464 2849

E-mail: [bmtpc@del2.vsnl.net.in](mailto:bmtpc@del2.vsnl.net.in) Web Site: <http://www.bmtpc.org>

# PERFORMANCE APPRAISAL CERTIFICATE


FOR

ROOF INSULATION TILE -- INSULLA

ISSUED TO

M/S JAPEVA ENGINEERING Pvt. LTD.

STATUS OF PAC 1016-P/2015

S.No.	Issue No.	Date of Issue	Date of renewal	Amendment		Valid up to (Date)	Remarks	Signature of authorized signatory
				No.	Date			
1.	2.	3.	4.	5.	6.	7.	8.	9.
1	1	24.04.2015	-----	-----	-----	23.04.2016	-----	

Dr. Shailesh Kr. Agarwal  
Chairman, TAC  
& Member Secretary, BMBA  
Building Materials and Technology Promotion Council  
Ministry of Housing & Urban Poverty Alleviation, (Govt. of India)  
Core 5A, 1st Floor, India Habitat Centre, Lodhi Road,  
New Delhi-110 003

PAC No. 1016-P/2015

Issue No. 01

Date of issue:

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**PART 1 CERTIFICATION**

**1.1 Certificate Holder: M/s Japeva Engineering Pvt. Ltd.**

“Pink House”, No. 6, 3<sup>rd</sup> Cross Street,  
Thirumurugan Nagar, Porur,  
Chennai – 600116 (Tamil Nadu)  
Phone No. 044-24766212/42816262  
Email: [info@insulla.com](mailto:info@insulla.com)

## 1.2 Description of Product

**1.2.1** *Name of the Product* – Roof Insulation Tile -- Insulla

### 1.2.2

*Brief Description* – Insulla roof insulation tiles shall be made using Phase Change Material (PCM) technology. PCM is an application of geo-inorganic products that shall be used for the effective storage of heat or cold and to mitigate the extremes of temperature. While PCMS store the heat, the surface of the roof remains cool. These tiles shall be made with cold grit granules. These granules absorb and store within them, the humidity from the air, cooling the tile and surface below it. As the temperature rises, these granules release the water vapour, ensuring that the heat is not transferred below. This process absorbs carbon oxide and neutralizes nitrogen oxide present in the air. These tiles reduces room temperature by about 5°C - 8°C. Insulla tiles are of white colour and these are good insulators. These tiles replace the conventional lime terracing laid over the concrete slab. These tiles also provide smooth surface finish and acts as a heat resistant, water resistant and anti-fungal on the roof surface.

### 1.2.3 Type and size

Insulla tiles are available in classification 'Lite' and are of standard size 225 mm x 225 mm and thickness 15 mm ( $\pm 1$ mm).

### 1.3 Assessments

**1.3.1** *Scope of Assessment* – Suitability of Insulla tiles for use as Roof and deck tiles for insulation purpose.

### 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 used
- (iii) Assessment of quality assurance procedures implemented in the factory

- (iv) Tests got done in independent laboratories i.e. CSIR – National Metallurgical Laboratory Madras Centre, Chennai and BEPL, Centre for Environmental Planning and Technology, Ahmedabad by the manufacture of the product.
- (v) Thermal Performance Evaluation of the Insulla insulation tiles done by The Energy and Resources Institute (TERI) by the manufacture of the tiles
- (vi) Thermal Performance Assessment Report on Solar Heat reduction through roof using Insulla roofing tiles by Centre for Research, St. Xavier Catholic College of Engineering, Tamil Nadu by the manufacture of the tiles.
- (vii) Tests got done on the samples of the product collected by the IO during inspection of the plant from CSIR – National Metallurgical Laboratory Madras Centre, Chennai and BEPL, Centre for Environmental Planning and Technology, Ahmedabad.

**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 Process*** – The manufacturing process of Insulla Tiles is carried out as per the following stages:

**Stage 1:** Measuring the raw materials to required proportion in the form of White Cement, Blast furnace slag and other chemicals. Quality is checked at their end.

**Stage 2:** Dry mix the required material in dry mixer.

**Stage 3:** Feeding the mixed material to the wet mixer alongwith the required amount of water and to mix to the homogenous consistency.

**Stage 4:** Feeding the wet mixed material to the rubber mould and allowing it to pass over the vibrator table.

**Stage 5:** Levelling the mould and receive it on the pallets.

**Stage 6:** Received pallets to be stacked for drying not more than 24 hours.

**Stage 7:** Demoulding the tiles free from rubber mould and stocking it on curing clamber.

**Stage 8:** Allow the tiles to use for 24 hours.

**Stage 9:** Damages, size variation to be identified by Quality Checking department, approving the good quality for packing.

**Stage 10:** Packing the quality tiles in carbon box and strapping the same.

## **1.5 Use of the Insulla tile & Its Limitations**

### **1.5.1 Uses**

These tiles shall be used as Roof and deck tiles for insulation purpose in residential/commercial/industrial buildings.

### **1.5.2 Limitations of Use**

#### **1.5.2.1** These roof tiles may not be adequate to support heavy loads such as water tanks, movement of DG sets etc. on the terrace.

## **1.6 Conditions of Certification**

### **1.6.1** *Technical Conditions* – Raw materials and the finished product shall conform to the requirements of the prescribed specifications.

### **1.6.2** *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.

### **1.6.3** *Brochure/ Guidelines* – The Certificate holder shall provide detail instruction of laying of the tiles and subsequent maintenance, if any

### **1.6.4** *Handling of User Complaints*

#### **1.6.4.1** 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.

#### **1.6.4.2** 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.

## **1.7 Certification**

### **1.7.1** On the basis of assessment given in Part III 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, Insulla roof insulation tile 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 Insulla roof insulation tile 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 (See 2.2)

### 2.2 *Specifications of the Product and Performance Criteria*

#### 2.2.1 *Technical Specifications*

##### 2.2.1.1 *Raw materials*

- i) White cement shall conform to IS 8042:1989
- ii) Dolomite aggregate shall conform to manufacturer's specifications
- iii) Industrial slag shall conform to manufacturer's specifications
- iv) Oxides shall conform to manufacturer's specifications
- v) Other chemicals such as Silica as  $\text{SiO}_2$ , Iron as  $\text{Fe}_2\text{O}_3$ , Aluminium as  $\text{Al}_2\text{O}_3$ , Titanium as  $\text{TiO}_2$ , Calcium as Ca, Magnesium as MgO, Phosphorus as  $\text{P}_2\text{O}_5$ , Sulphate as  $\text{SO}_4$  and Sulphide as S shall conform to manufacturer's specifications

##### 2.2.1.2 *Roof tiles*

I. Physical Properties	
Solar Reflective Index	92 max.
Reflectance	0.74 max.
Emittance	0.93 min.
Abrasion Resistance	0.2 to 0.3 mm max.
Flatness	< 1 mm max.
Water absorption	< 6% (after 96 hrs)
Unit weight	31 kg/sqm
II. Mechanical Properties	
Flexural Strength (7 days)	45 kg/cm <sup>2</sup> min.

#### 2.2.2 *Performance Criteria*

*Insulla Tile* shall meet the following performance criteria:

S. No	Properties	Test Method	Requirements as per relevant Standards
1.	Abrasion/Wear resistance (mm)	IS 1237:1980	<i>General purpose: 3.5 max. Heavy Duty: 2.0 max.</i>
2.	Water absorption (%)	IS 1237:1980	10.0 max.
3.	Specific gravity	IS 1237:1980	--
4.	Wet transverse/Flexural strength (N/mm <sup>2</sup> )	IS 1237:1980	3.0 min.
5.	Flatness (mm)	IS 1237:1980	1.0 max.
6.	Skid Resistance (BPN)	ASTM: E303	25.0 min.

## 2.3 Production & Inspection

**2.3.1 Production** -- These tiles are made with cold grit granules. These granules absorb and store within them, the humidity from the air, cooling the tile and surface below it. As the temperature rises, these granules release the water vapour, ensuring that the heat is not transferred below. This process absorbs carbon oxide and neutralizes nitrogen oxide present in the air.

**2.3.2 Inspection** -- Inspection is done at appropriate stages of manufacturing process. The packed tiles are stored properly to ensure that no damage occurs during transportation. As part of quality assurance regular in-process inspections are 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* – Insulla tile 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 Installation Procedure

- i) Cement mortar (1 cement: 3 fine sand) shall be placed on top of sloping concrete (1 cement: 2 sand: 4 coarse aggregate)
- ii) Insulla tiles shall be placed on the cement mortar with a min. gap of 6mm.



- iii) After laying of Insulla tiles, grouting shall be filled in the gaps.
- iv) After laying of Insulla tiles and grouting, curing shall be done for 3 days.

## **2.6 Sampling**

### **2.6.1** *Lot*

**2.6.1.1** In any consignment all the flooring tiles of the same type, shape, size and manufactured from the same raw materials under relatively similar conditions of production shall be grouped together to form a lot for inspection.

**2.6.1.2** Samples shall be collected and inspected from each lot separately to ascertain its conformity or otherwise to the requirement of the specification.

### **2.6.2** *Scale of Sampling*

**2.6.2.1** The number of samples to be selected for the sample from a lot shall depend upon the size of the lot and shall be in accordance with the col 1, 2 and 3 of Table given below.

**2.6.2.2** All the tiles in the sample shall be selected at random from the lot. In order to ensure randomness of selection, procedures given in IS 4905:1968 may be followed.

### **2.6.3** *Number of tests and criteria for conformity*

**2.6.3.1** The no. of tiles in the first sample shall first be subjected to the routine tests. If in the first sample the no. of defective tiles i.e. those failing to satisfy any one or more of the acceptance tests is equal to the corresponding acceptance no.  $a$  (col 5), the lot shall be considered as conforming to the requirements of the routine tests. If the no. of defective tiles in the first sample is more than or equal to the corresponding rejection no.  $r$  (col 6), the lot shall be considered as not conforming. If the no. of defective tiles in the first sample lies between the corresponding values of  $a$  &  $r$ , a second sample (col 2 & 3), shall be selected and subjected to the routine tests. If in the combined sample, the no. of defective tiles is less than or equal to the corresponding acceptance no.  $a$ , the lot shall be considered as conforming and if, the no. of defective tiles is more than or equal to the corresponding rejection no.  $r$ , the lot shall be considered as not conforming.

**Sample size**  
(Clause 2.6.3.1)

No. of tiles in the lot (1)	Sample (2)	Sample size (3)	Cumulative Sample size (4)	Acceptance Number (5)	Rejection Number (6)
Up to 300	First	13	13	0	2
	Second	13	26	1	2
301 to 500	First	20	20	0	2
	Second	20	40	1	2
501 to 1000	First	32	32	0	3
	Second	32	64	3	4
1001 to 3000	First	50	50	1	4
	Second	50	100	4	5

## **2.7 Packing, Handling and Marking**

**2.7.1** *Packing* – The tiles shall be packed in proper bag by the supplier. Label giving the packing details shall be made available on the polybag.

**2.7.2** *Handling* -- The instructions given by the manufacturer for handling of these tiles shall be followed.

**2.7.3** *Marking* -- The following information shall be legibly marked on each package:

- a) Name of manufacturer
- b) Batch No.
- c) Tile and packing size
- d) Weight of package

## **2.8 Critical Details for Using Insulla Tile**

**2.8.1** *Precautions to be taken* — Following precautions shall be taken while using these tiles on the roof:

- i) Base of the roof slab/ wall shall be smooth for proper adhesion of the tiles, else air-pockets can lead to poor and uneven insulated surface
- ii) A minimum gradient of 1:12 shall be provided in the screed laid over the roof in order to avoid water logging which may lead to seepage and cracks on the roof.

iii) Due to leaking water pipes / tanks etc. on the roof, rain water outlets shall not be allowed to be blocked in order to avoid water logging which may lead to seepage and cracks on the roof.

iv) Proper grouting shall be laid in order to avoid damage to roof and structure due to loose tiles.

v) Tiles of lower density than specified by the manufacturer shall not be used as these may not be adequate to support heavy loads such as water tanks, movement of DG sets etc. on the terrace.

**2.9 Skills /Training needed or Installation** – No special skills other than normal skills of a mason as required for fixing of tiles shall be required for this material also. However, the PAC holder shall provide on request necessary guidance to the users at site, if required

**2.10 Guarantees/ Warranties Provided by the PAC Holder-** The manufacturer shall furnish a warranty for a period of 10 years from the date of completion of installation work to the owner of the building/structure over which these tiles are to be installed, provided these tiles are installed strictly in accordance with the applicable specifications, instructions and guidelines of the manufacturer. Further, in case the need arises, the manufacturer shall replace the tiles or repair a damaged structural surface under which material was installed. A brochure giving relevant warrantee details shall be made available to the client.

**2.11 Services Provided by the PAC Holder to the Customer**

**2.11.1** 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.

**2.11.2** 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 Insulla tile have been carried out by CSIR – National Metallurgical Laboratory Madras Centre, Chennai and BEPL, Centre for Environmental Planning and Technology, Ahmedabad on samples of the product collected by the IO during inspection of the plant. The samples conform to the tests as per the performance characteristics and specifications given by the manufacturer.

### 3.2.1.1 CSIR – National Metallurgical Laboratory Madras Centre, Chennai

S.No	Properties	Test Result	Test Method
1.	Abrasion/Wear resistance (mm)	2.46 ( $\pm 0.01$ )	IS 1237:1980
2.	Water absorption (%)	6.28 ( $\pm 0.01$ )	IS 1237:1980
3.	Specific gravity	2.06	IS 1237:1980
4.	Wet transverse/Flexural strength (N/mm <sup>2</sup> )	4.60 ( $\pm 0.01$ )	IS 1237:1980
5.	Flatness (mm)	<1.0	IS 1237:1980
6.	Skid Resistance (BPN)	58.0	ASTM: E303

### 3.2.1.2 BEPL, Centre for Environmental Planning and Technology, Ahmedabad

I. Solar Direct Reflectance				
Measurement 1	Measurement 1	Measurement 1	Average	Test Method
0.7002	0.7017	0.7025	0.7015	EN 410:2011
II. Emissivity				
Measurement 1	Measurement 1	Measurement 1	Average	Test Method
0.931	0.931	0.931	0.931	EN 673:2011
III. Solar Reflectance Index (SRI) under different wind conditions				
Low width ( $h_c=5Wm^{-2}K^{-1}$ )	Medium width ( $h_c=12Wm^{-2}K^{-1}$ )	High width ( $h_c=30Wm^{-2}K^{-1}$ )		Test Method
86	87	87		ASTM E 1980-11
IV. Surface Temperature (Ts) under different wind conditions				
Low width ( $h_c=5Wm^{-2}K^{-1}$ )	Medium width ( $h_c=12Wm^{-2}K^{-1}$ )	High width ( $h_c=30Wm^{-2}K^{-1}$ )		Test Method
56.9	49.6	43.4		N A

### 3.2.2 Thermal Performance Evaluation of Insulla Roofing Tile by TERI.

TERI has studied two public buildings in Chennai namely Vivekananda Culture Centre located at Marina Beach and Chennai Corporation Building located at Parrys along with conventional roof with 30 mm cement mortar.

Air temperature and relative humidity were monitored inside the three assemblies as well as outside using thermohygro data loggers. Surface temperatures both over the deck and under the deck were monitored at half an hour interval for all three assemblies.

The report gives the following conclusion:

The peak ceiling temperature of the Insulla tiled roof was observed to be 33°C. It is therefore understood that indoor thermal comfort could be maintained in naturally ventilated buildings with Insulla tiles covered on the roofs. Insulla tiles would benefit the buildings by reducing annual cooling energy consumption by almost 13% in air conditioned office buildings. The TPI calculated for Insulla tiled roof was 38.75 and for the conventional roof was 96.25 whereas the recommended value for the good performing roof should be less than 75. Integrate Degree Hours IDH for Insulla tiled roof was 21.15 whereas for the conventional roof was 49.3. Thus the study concludes that Insulla tile would benefit the buildings by reducing air-conditioning load in conditioned buildings and by improving thermal comfort in unconditioned buildings.

**3.2.3**      *Thermal Performance Assessment Report on Solar Heat Reduction through roof using Insulla Tiles by Centre for Research, St. Xavier's College of Engineering, Nagercoil, Tamil Nadu.*

The findings of the report are as follows:

- By adopting this new innovation Insulla thermal Insulation tiles, average heat flux entering into the roof is reduced by 56% compared to conventional RCC roof without insulation.
- This new installation will reduce the roof bottom surface temperature by 7°C in comparison to RCC roof without insulation.
- The cost of energy in an air conditioner building will reduce and Solar Reflectance Index SRI as per ASTM E 1980-11”.

**3.2.4**      *Uttar Haryana Bijli Vitran Nigam*

Uttar Haryana Bijli Vitran Nigam has listed Insulla insulation tile as one of the accepted heat resistant tiles for construction of their Head Office Building at Panchkula.

### 3.3 Supply of the Insulla Tiles

Details of the tiles supplied by the manufacturer are given below:-

<b>S.No.</b>	<b>Customer and Location</b>	<b>When supplied</b>
1.	Kgeyes Residency Pvt. Ltd., Chennai	April 2012
2.	KPM Constructions, Chennai	May 2012
3.	Tamil Nadu Real Estates Pvt. Ltd., Chennai	June 2012
4.	Malan Narayanan, Chennai	June 2012
5.	SRM Engg. Const. Corporation, Chennai	August 2012
6.	Bhaggyam Construction, Chennai	September 2012
7.	Doshi Housing Pvt. Ltd., Chennai	September 2012
8.	Sri Ramakrishna Mission, Natrampalli	November 2012
9.	Navin Housing Properties Pvt. Ltd., Chennai	December 2012
10.	V Cube Building Solutions, Madurai	December 2012
11.	Sri Ramakrishna Mission, Kanchipuram	February 2013
12.	Kirtan Urban Living, Bangalore	April 2013
13.	Amaravathi Pro-tech Pvt. Ltd., Bangalore	April 2013
14.	Madhu Agencies, Ananatpur	April 2013
15.	Gokulkrishnan Enterprises, Pondicherry	May 2013
16.	Tilestone Pvt. Ltd., Karnataka	June 2013
17.	Maptrade & Co., Dubai	August 2013
18.	Ripon Building—The Chennai Corporation, Chennai	August 2013
19.	Kanchi Kamakchi Amman Temple, Kanchipuram	January 2014
20.	Swami Vivekananda Illam, Chennai	March 2014
21.	Shri Hanuman Sewa Trust, Manimanglam	March 2014
22.	AVM Studios, Chennai	April 2014

23	Neotech Agencies, Kerala	September 2014
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#### **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 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

Chairman TAC &

for and on behalf of

Date of issue\_24.04.2015

Member Secretary, BMBA

  
Dr. Shailesh Kr. Agarwal  
Chairman, TAC  
& Member Secretary, BMBA  
Building Materials and Technology Promotion Council  
Ministry of Housing & Urban Poverty Alleviation, (Govt. of India)  
Core 5A, 1st Floor, India Habitat Centre, Lodhi Road,  
New Delhi-110 003



## **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.

**5.1.1 IS 1237:1980** – Specifications for cement concrete flooring tiles

**5.1.2 IS 3792:1978** – Guidelines for heat insulation of non-industrial buildings

**5.1.3 IS 8042:1989** – Specifications for white Portland cement

**5.1.4 ASTM C 518:2010** – Standard test method for Steady state Heat flux measurements and thermal transmission properties

**5.1.5 ASTM E 303 -93:2013** – Standard test method for measuring surface frictional properties

**5.1.6 ASTM E 1980 -11** – Standard practice for calculating solar reflective index

**5.1.7 EN 410:2011** – Method of determination of luminous and solar characteristics of glazing

**5.1.8 EN 673:2011** – Method of determination of thermal transmittance (U) value

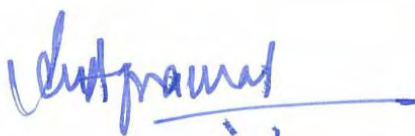
**5.1.9 ISO 9050:2003** -- Method of determining light and energy transmittance of solar radiation for glazing in buildings.

**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), **Insulla Roof Insulation Tile** bearing the mark manufactured by M/s Japeva Engineering. Pvt. Ltd. is satisfactory if used as set out above in the text of the Certificate. This Certificate **PAC No. 1016-P/2015** is awarded to **M/s Japeva Engineering. 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 20.



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 Poverty Alleviation, Government of India

Place: New Delhi, India

Date: ...**24.04.2015**

### **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 (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](http://www.bmtpc.org)

## **ANNEX A**

(Clause 1.6.2)

**BUILDING MATERIALS & TECHNOLOGY PROMOTION COUNCIL**

**QUALITY ASSURANCE PLAN FOR INSULLA TILE**

<b>S. No.</b>	<b>Parameters to be inspected</b>	<b>Requirement Specified</b>	<b>Test Method</b>	<b>Frequency of Testing</b>
<b>I. Insulla Tile</b>				
1.	Visual inspection for defects	Shall be in order	Visual	Each lot#
2.	Inspection for molding parameters and for thickness	As per in-process inspection report format	Height gauge	Each lot#
3.	Water absorption (%)	10.0 max.	IS 1237:1980	Once in a six months
4.	Specific gravity	--	IS 1237:1980	--Do--
5.	Wet transverse/Flexural strength (N/mm <sup>2</sup> )	3.0 min.	IS 1237:1980	--Do--
6.	Flatness (mm)	1.0 max.	IS 1237:1980	--Do--
7.	Abrasion/Wear resistance (mm)	General purpose: 3.5 max. Heavy duty: 2.0 max.	IS 1237:1980	--Do--
8.	Skid Resistance (BPN)	25.0 min.	ASTM E303-93 :2013	Once in a year or when composition changes
9.	Solar Direct Reflectance	0.74	ISO 9050:2003 / EN410:2011	--Do--
10.	Emissivity	0.93	EN 673:2011	--Do--
11.	Solar Reflectance Index (SRI)	92	ASTM E 1980-2011	--Do--

# Note: Each lot shall comprise of 3000 tiles manufactured in a shift