



# Expanded Clay Aggregate (ECA) – INSULATION MORTAR

## For Roof Top Thermal Insulation

1<sup>st</sup> time in India

Temperature Difference Up to 11°C ( subject to standard conditions applicable )

### MIXING METHODOLOGY



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**Expanded Clay Aggregate (ECA)** with 2-15 mm pellet size in the quantity of 300 liters (50 liters Bag X 6 Nos) mixed with 20 liters of water. This mix is kept for 25 minutes.

Then 50 kgs cement is mixed in the above mixture for 1 minute and then 10 liters of water is added and blended for 1 minute.

**Note:** Cement Miller should be used for preparation of **Expanded Clay Aggregate (ECA) Insulation Mortar**.

### INSULATION MORTAR

INSULATION MORTAR is ready to apply

### APPLICATION METHODOLOGY

P.S.: Prior to the application of **Expanded Clay Aggregate**

**(ECA) INSULATION MORTAR** waterproofing must be carried out. Values of square meters and square feet are approximate.

**Expanded Clay Aggregate (ECA) INSULATION MORTAR** is made from **Expanded Clay Aggregate (ECA)** and cement with proper mixing of water. The mixture is surface mounted thoroughly.

### TEST CERTIFICATE OF Expanded Clay Aggregate (ECA) Cemented mortar

### AREA COVERED BY 300 LITERS BATCH OF MORTAR

INSULATION MORTAR THICKNESS	Square Meters	Square Feet
50 mm / 2 inch	6	64
75 mm / 3 inch	4.5	49
100 mm / 4 inch	3	32

Crushing Strength	Density	Thermal Conductivity at 10.3 °C mean temperature	Thermal Resistance For 50mm thickness	Overall Heat Transfer Coefficient ( U Value )	Temperature Drop
630.356 N/m <sup>2</sup>	750.37 Kg/m <sup>3</sup>	0.1188 W/mk	0.4209 m <sup>2</sup> K/W	1.75 W/m <sup>2</sup> K	20.5 °c

Test method : Guarded Hot Plate Method as per ASTM C177 and ISO 8302



## Expanded Clay Aggregate (ECA) – INSULATION MORTAR For Roof Top Thermal Insulation

**Expanded Clay Aggregate (ECA)** mixed mortar is poured on the floor and levelled ( As per desired thickness and slope correction in the range of 50 mm to 100 mm ). For prevention of immediate drying and to allow curing, the mounted layer needs to be covered with plastic material for at least 24 hrs. Post this process, We need to cure with regular spraying of water. Lay any tiles or China Mosaic on the top of the laid **Expanded Clay Aggregate (ECA) INSULATION MORTAR**.

### KEY FEATURES

- Light in Weight and Strong.
- Application of the above mortar dramatically improves the thermal and acoustic insulation.
- Protects from the thermal cycling effects and enhances the building life.
- Saves electricity.
- Easy application and maintenance free.



### TEST CERTIFICATE OF Expanded Clay Aggregate (ECA) Cemented mortar

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**National Laboratory for Testing and Development of Thermal Insulations**

*A Project under the National Facilities in Engineering and Technology with Industrial Collaboration (NAFETIC) Scheme of AICTE*

**TEST CERTIFICATE**

*Name of industry* : M/s Rivashaa Eco Design Solutions Pvt. Ltd.  
3<sup>rd</sup> Floor, Royale Manor, Near Rangwala Tower, Law Garden,  
Ellis Bridge, Ahmedabad - 380006, Gujarat, India

*Kind Attn:* **Mr. Udeet J. Banker**, Director


*Test* : Determination of thermal conductivity


*Test method* : Guarded Hot Plate Method as per ASTM C177 and ISO 8302

*Specimen details* : Expanded Clay Aggregate Cemented Mortar based Thermal Insulation

*Test Results* :

Density ( <i>as tested</i> )	750.37 kg/m <sup>3</sup>
Thermal conductivity at 10.3°C specimen mean temperature	0.1188 W/mK
Thermal Resistance for 25 mm thickness	0.2105 m <sup>2</sup> K/W
Thermal Resistance for 50 mm thickness	0.4209 m <sup>2</sup> K/W
Thermal Resistance for 75 mm thickness	0.6313 m <sup>2</sup> K/W
Thermal Resistance for 100 mm thickness	0.8418 m <sup>2</sup> K/W

  
**Professor  
Incharge**

  
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Date: 23/02/2018

Institute of Technology, Nirma University



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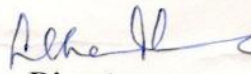
*Test* : Determination of crushing strength

*Specimen details* : Expanded Clay Aggregate Cemented Mortar based Thermal Insulation

→ *Test Results* : Crushing Strength : 650.356 N/ m<sup>2</sup>

  
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*Kind Attn:* **Mr. Udeet J Banker**, Director
- Test* : Determination of overall heat transfer coefficient
- Test method* : It is calculated using reference data for inside and outside heat transfer coefficient, measured data of thermal conductivity (measured using ASTM C177 or ISO 8302) and wall thickness
- Specimen details* : Expanded Clay Aggregate Cemented Mortar based Thermal Insulation  
(Density : 750.37 kg/m<sup>3</sup>)  
Moisture content: Nil (Sample preheated at 70 °C in oven for 24 hours before testing for thermal conductivity)

*Test Results* :

⇒ **Overall Heat Transfer Coefficient (U value)**

⇒ **1.75 W/m<sup>2</sup>K**


Note: Over all heat transfer coefficient (U) is calculated using below mentioned equation.

$$U = \frac{1}{\frac{1}{h_i} + \frac{\Delta x}{k} + \frac{1}{h_o}}$$

here  $h_i$  is inside heat transfer coefficient,  $\Delta x$  is thickness of material,  $k$  is thermal conductivity of material and  $h_o$  is outside heat transfer coefficient.

Using Guarded Hot Plate Method (ASTM C177 or ISO 8302) thermal conductivity is found as 0.1188 W/mK for 50 mm thick material. The value of inside heat transfer coefficient is taken as 9.26 W/m<sup>2</sup>K for horizontal position of surface assuming it is having non reflective surface properties. The value of outside heat transfer coefficient is taken as 22.7 W/m<sup>2</sup>K for summer season when wind velocity is 3.4 m/s. The data of both heat transfer coefficient is taken from the table number 10, chapter 26, ASHRAE Hand Book Fundamentals, 2017.

  
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*Test* : Determination of temperature drop across the insulation

*Test method* : The bottom surface of the specimen is kept at 70° C whereas the upper surface is exposed to the atmosphere. Side walls are insulated. Once the steady state is reached, the temperature of the upper surface is measured. The temperature drop is calculated as a difference of the bottom and upper surface temperature.

*Specimen details* : Expanded Clay Aggregate Cemented Mortar based Thermal Insulation

*Test Results* :

**Temperature drop : 20.5 °C**

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Date: 05/06/2018