

**No.1 in the World**  
Cement reinforced strongest insulation board

**marmox**

**External Thermal Insulation system**

*"Uniqueness is what makes you more beautiful"*



**ANNA**

INSULATIONS & CHEMICALS B.S.C.(C)

*Green Buildings Concept*

Certified By



Electricity & Water  
Authority



Bahrain  
Civil Defense



The British Board  
of Agrément



Conformité  
Européenne

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# AMNA Insulations & Chemicals B.S.C. ©

*GREEN BUILDINGS CONCEPT*

## COMPANY PROFILE

### Introduction

**AMNA Insulations & Chemicals B.S.C. (c) (AIC)** was established in 2014. It took loads of hard work, sheer determination, planning and strategic development that we built **AIC** from a single person's dream to a reality with a strong focus on energy saving green products and solutions for construction sector.

We strongly believe in innovation and are constantly on the look out to bring new innovative products and solutions to the market.

Our quest is to introduce new state-of-the-art technologies and products that will lead us to our diversification across different divisions and product lines. We want to provide our customers with more than just a product; we want to provide them with solutions.

### Our Vision

1. To improve the lifestyle of our customers by providing innovative and energy saving products and solutions.
2. To be the number one trader of innovative and green construction materials in the region.
3. To be the most preferred choice for its customers in the region.

### Our Mission

1. To achieve its vision:
2. By setting high standards in service, quality, safety and environment.
3. By serving our customers and community with quality products and services at unmatched prices to build their dream homes to reality
4. By providing environment friendly and innovative products and solutions to the construction industry.

### Our Values

1. Team Work
2. Service to customers and the society
3. Passion for excellence in everything we do
4. Respect and recognition of employees and customers

### Main Business

1. Trading of Green Construction Materials.
2. Importing Patented products for construction sector
3. Developing new building solutions as per the changing requirements of construction sector
4. Trading in different types of Thermal Insulation Systems, thermal & sound insulation products, construction chemicals, decorative plasters and paints and waterproofing

systems.

5. Trading and developing energy saving special products for construction sector.

### **Main Projects - Completed**

1. METIS Installation on 3 story building in Sitra.
2. METIS Installation on 2 story villa in Hamad Town.
3. METIS Installation on 21 story building in Juffair (Lift Shaft).
4. EIFS Installation on 2 story villa in Al Qariya.
5. EIFS Installation on 2 story villa in Sitra.
6. Supply and application of Politerm Concrete (lightweight thermal insulating concrete) for 3 story building in Sitra.
7. EIFS Installation on two 9 story buildings (Ministry of Housing) at Lawzi Lake.
8. METIS installation on 3 story school building in Budaiya
9. METIS Installation on 5 story building in Zinj.
10. METIS Installation on 7 story building in Guaidaibiya.
11. Waterproofing for villa in Sitra.
12. Roof Waterproofing and Insulation System on 3 story building, Sitra.
13. Roof Waterproofing and Insulation System on 2 story building, Sitra.

### **Main Projects – Ongoing**

1. METIS Installation on 7 story building in Um Al Hassam.
2. METIS Installation on 2 story commercial building in Sitra.
3. METIS installation on 2 story villa 1 in Sitra.

### **Future Projects:**

1. Supply and application of Politerm Concrete (lightweight thermal insulating concrete) for 7 story building in Um Al Hassam.
2. METIS installation on 2 story villa 2 in Sitra.
3. METIS installation on 7 story building in Hoora.
4. Pleko EIFS installation on 7 story building in Hidd.

### **Directors Message :**

“It’s our mission to introduce new technology to our audience for better future”.

Sulaiman Al Mezal  
Executive Director  
Al Mezal Holding Compony B.S.C. ©



Ref: 5410 / 5.903/ TIS W /568/201

Date: 21 /12/2015

**To: M/s. Al Mezal General Trading**  
**P.O. Box 70303**  
**Sitra**  
**Kingdom of Bahrain**  
**Fax: 17 260053**

**SUB: NEW SYSTEM APPROVAL: Marmox External Thermal Insulation System (METIS)**

Your request regarding the above wall system has been approved. This approval is granted after reviewing the documents pertinent to the specified system submitted to us to ensure its compliance with present thermal insulation regulation of buildings in Bahrain. This approval is being granted on the following conditions:

- The approval is limited to **Marmox External Thermal Insulation System** to be used for external walls, provided the overall U-value for the wall does not exceed  $0.75W/m^2^{\circ}C$ , with thermal conductivity value of  $0.037W/mK$  for the Marmox extruded polystyrene board, covered with a fiber mesh embedded in a polymerized cement mortar on both sides, to be used in the system.
- As the owner of this system, you are responsible to ensure that the system is carried out by an approved applicator, for supplying all the accessories associated with it to ensure that the integrity of the wall insulation system is maintained and for any consequences that may result from the use of this system.
- The approved system and the materials produced remain in compliance with the regulations of Bahrain and in accordance with the relevant standard specifications.
- The TIU reserves the right in future to request additional documents and to withdraw its approval of the above mentioned system if any variations are noticed.
- This approval is granted for thermal insulation part only. Any additional approvals / permissions required should be sought from the concerned authorities.
- The TIU should not be held responsible for any consequences that may result from the use of this system.

Regards



**THERMAL INSULATION UNIT**

Enc.

Thermal Insulation System Approval Form Including Applicant's Undertaking & Commitments

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Kingdom of Bahrain  
Ministry of Interior



مملكة البحرين  
وزارة الداخلية

PSD15/3/FP/9/1302

Protection and Safety Directorate  
Dated: 13<sup>th</sup> March 2016

**M/S. AL Mezal General Trading B.S.C**  
**P.O.Box No. 70303,**  
**SITRA**  
**Kingdom of Bahrain**

Dear Sir,

**"MARMOX" MULTI BOARDS**  
**(THERMAL INSULATION PRODUCT)**

Thank you for your submittal dated 3<sup>rd</sup> March, 2016, enclosing product sample, technical details and test report for the Thermal Insulation product make "Marmox" manufactured by Chemicals for Modern Building (CMB), Egypt.

As this product is tested in accordance with the DIN EN 13501 – 1:2007 by the following certification authorities:

1. MPA – Germany Test report No. K-3074/817/09-MPA BS. Dated: 1.9.2007.
2. Qai Laboratories – Egypt. Test report Nol. TJ 1234 –2 Dated: 14.5.2013.
3. British Board of Agreement (BBA) – UK Certificate No. 09/4687 Dated: 24.10.2013.

Therefore, the General Directorate of Civil Defence has no objections to the supply and installation of the subjected thermal insulation product in the Kingdom of Bahrain.

Installation is intended to be carried out by a competent experienced contractor.

Yours faithfully,

For Colonel   
Director Protection & Safety Directorate  
General Directorate of Civil Defence  
Colonel Sa'ad Hassan Al-Naimi



/sna.

PSD-PSB-D/02/V01





IT'S WHAT'S UNDERNEATH THAT COUNT

# MARMOX Board





## MARMOX MULTIBOARD

**“Unique Innovation which pays back”**

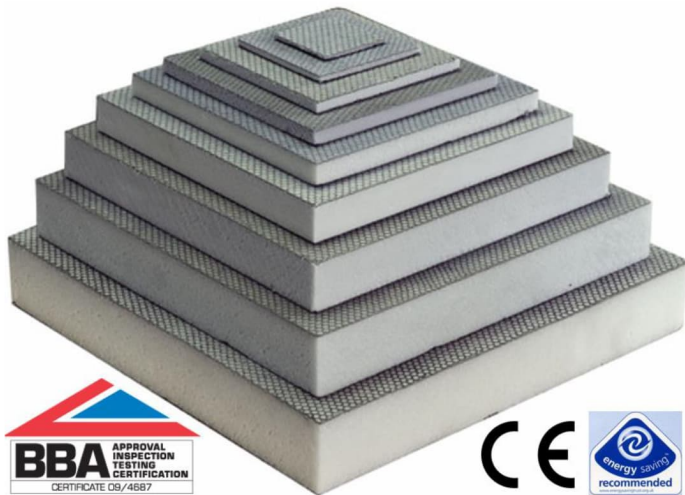
### No. 1 in the world

**“Cement Reinforced Strongest Construction Board”**

**The all-in-one solution for insulation and waterproofing.**

Marmox Multiboard is the all-in-one solution for insulation, waterproofing, and dry lining. It is lightweight, easy to cut to size and can be applied to floors, walls and ceilings as a surface ready for tiles or plaster.

There are various thicknesses available ranging from 4mm to 60mm and this gives the Multiboard many uses from external insulation envelop for buildings, lining walls, floors and ceilings to constructing vanity units and steam benches. With Curved Multiboard any feature-defining curve can be created.



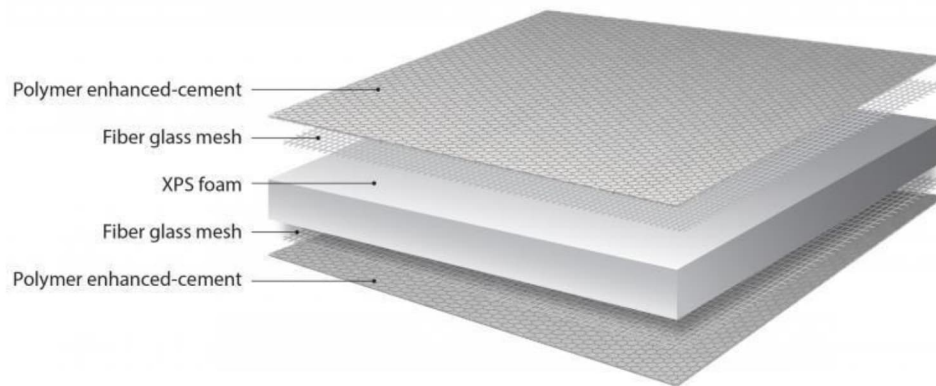
- Highly insulating
- Fully waterproof
- Fix to solid wall / timber
- Ready to tile or plaster
- Holds 62 kg/sqm on walls
- 30 tons/sqm on floors
- Light weight to handle
- Easy to cut

### What is Marmox Multiboard made of?

Marmox Multiboard comprises a core of XPS. This is not the white type of polystyrene commonly used for packaging, it is a closed cell structure known as extruded polystyrene that will not allow water or water vapour to pass through it.

The surface is coated on either side with a thin but robust layer of fiberglass reinforced polymer cement. This layer provides the perfect level of porosity to bond with tile adhesive and plaster.

XPS (extruded polystyrene) is one of the most effective insulation materials available and also has the benefit that its thermal insulation properties are not affected whatsoever by wet or damp conditions.



### High strength

Multiboard can hold a tile weight of 62kg per square meter, double that of standard lining board and with a high compressive strength of 30 tons/m<sup>2</sup> Multiboard can be used on virtually any tiled floor.

### Quality

All Marmox production is subject to the controls of ISO9001 and because our products are used globally they also conform to all European, United States and International standards where appropriate. For the UK market, Marmox Multiboard is BBA certified as a tile backer board, CE marked as an insulation board and recommended by the Energy Saving Trust. All Marmox products are guaranteed for ten years.

### Marmox MULTIBOARD

When building or renovating your home the use of tiles, marble or mosaic provides it with a personal touch, adding to its beauty. Much attention is paid to a careful choice of colours, dimensions and the installation itself. However, all those efforts could prove in vain if stress from outside (such as temperature changes, sun, frost, moisture or mechanical stress) cause the delamination of the tile adhesive, destroying the sub construction.

**"It's what's underneath that counts."** Being strong, Heat insulating and light, Marmox Board can be used as a structural element in the floor or wall.

**Marmox Multiboard can be used for all types of interior and exterior applications**

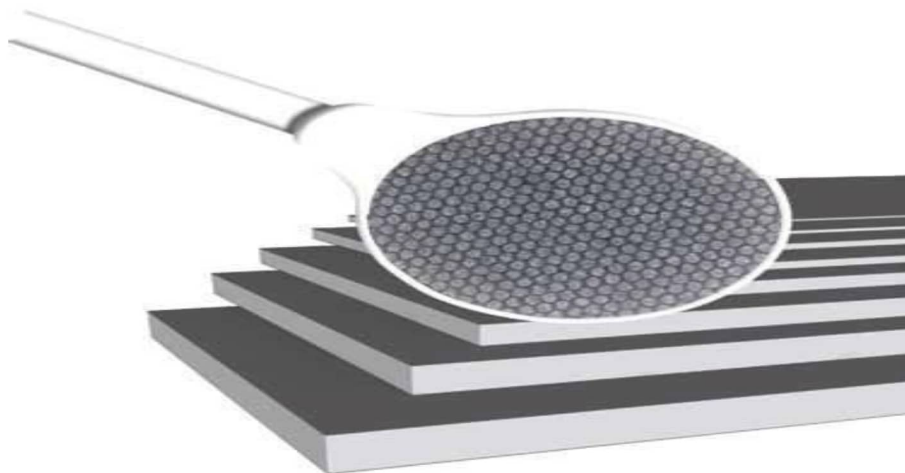
## Where Marmox Multiboards are used? ®

- Marmox Exterior Thermal Insulation System (METIS)
- Roof Insulation System
- Flooring underlay boards
- Wall cladding and Tile backing
- Steam and Sauna Rooms
- Hammams
- Pipe coverings
- Toilet Boxes
- Bath surrounds
- Bathroom Elements
- Under floor Heating
- Drylining & Partitioning

## Types of Marmox Boards:

- Marmox board Standard
  - Marmox board Standard HD1 (Heavy Duty)
  - Marmox Board Ultra [ Ultra light with high strength]
  - Marmox board SS-VBR (Single Sided - Vapor breathable boards)
  - Marmox board SS-VBR HD1
  - Marmox Jagged Board
- **More strength thanks to the extra bond between the cement mortar and the reinforcing fiber glass mesh**
  - **Better adhering properties**
  - **Better water proofing**

CHOOSING HONEYCOMB FINISHING MEANS CHOOSING A PROFESSIONAL SOLUTION



The new Honeycomb finishing, the finishing for professionals!!



## Characteristics

- High compressive strength (withstands 30 t/m<sup>2</sup>) at 10% deflection
- Rigid
- Very good water proofing properties
- Excellent heat insulation
- Easy to cut with a knife or saw
- Extruded polystyrene closed cell structure
- Light weight
- Marmox is environmentally friendly, it is CFC and HCFC free

| Property                            | Standard                     | Result                                   |
|-------------------------------------|------------------------------|--|
| Thermal conductivity (5 years)      | ASTM C 177:10                | 0.036 + 0.02 W/mK                        |
| Compressive strength                | ASTM D1621                   | 35 Tons/m <sup>2</sup> at 10% deflection |
| Water absorption (capillary)        | DIN 53428                    | Negligible                               |
| Water absorption (24 Hrs Immersion) | ASTM C-1763-14 (Procedure C) | 0.14%                                    |
| Flame spread & smoke develop        | ASTM E84-12                  | NFPA Class A                             |
| Fire Behavior                       | EN 13501                     | Class E                                  |
| Coeff. of thermal expansion         | ASTM D-696                   | 30 x 10 <sup>-6</sup>                    |

## Standard dimensions

| Reference | Thickness (mm) | Width (mm) | Length (mm) | U-value (W/m <sup>2</sup> K) |
|-----------|----------------|------------|-------------|------------------------------|
| 40MB250   | 40             | 600        | 1250/2500   | 0.7                          |
| 50MB250   | 50             |            |             | 0.57                         |

# Installation Procedure for MARMOX External Thermal Insulation System (METIS)

## Method Statement

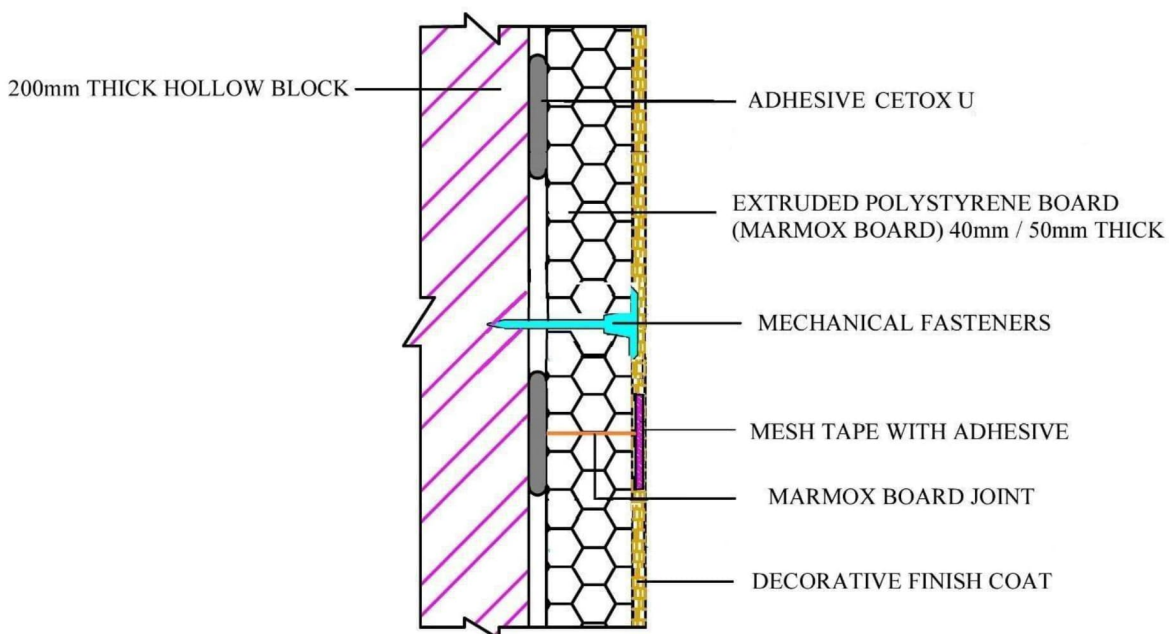
### **Introduction:**

The following guide contains instructions that are essential to good external thermal insulation system practice. Failure to adhere to these instructions could lead to problems with installation or untimely system failure. Follow the instructions of these TDS for all products used in Marmox External Insulation System.

### **General Requirements:**

1. For appropriate system design, Marmox-Bahrain should be advised with all project details, site conditions and special requirements (if any) during the early stages of negotiations.
2. A pre-installation survey of the property shall be carried out and recorded to confirm suitability of substrate for application of METIS including modifications/repairs needed.
3. Installation schedule of METIS must be coordinated with other trades on the project and signed by the main contractor.
4. At some cases, many flashings must be installed prior to proceeding with METIS installation such as windows, louvers, doors or other finishes intersections.
5. The consultant and the main contractor prior to commencing with the installation must approve installation procedure and different sections details.

6. Adjacent construction materials and/or fixtures that are likely to be soiled by the installation process must be appropriately protected.
7. Scaffolding and other necessary equipment must be in place prior to installation.
8. The main contractor should facilitate access to electrical power and clean water.
9. All METIS material should be protected from weather and other damages using proper storage and application.
10. Insulation material should be stored on a firm, clean, dry and level base, which is off the ground. The insulation material should be protected from exposure to direct sunlight by storing open packs under cover in dry condition or by covering with polythene sheets.
11. If any material is not mentioned in this guide and is to be used within the insulation system, a written approval must be granted by Marmox-Bahrain to ensure the compatibility of this material to the METIS.



**METIS Wall Section Drawing**

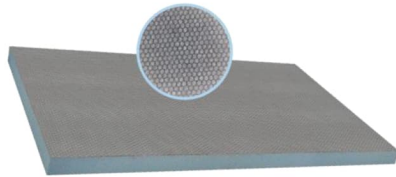


## System Components

The Marmox External Thermal Insulation System consists of a range of different components applied in a specific sequence.

A typical METIS System consists of the following components:

1. **Marmox Boards:** A METIS insulation material (Extruded Polystyrene rigid foam including a halogenated fire retardant, reinforced by polymer – cement – fiberglass composite), which is secured to the exterior wall surface.



2. **Adhesive:** Cetox U is used to glue the Marmox board to the exterior wall surface.



3. **Mechanical Fasteners:** Also, known as dowels, to fasten the Marmox board to the exterior wall surface.



4. **Joint Accessories:** Self-adhesive fiberglass mesh tape and flexible joint compound are used to treat the joints between two boards.



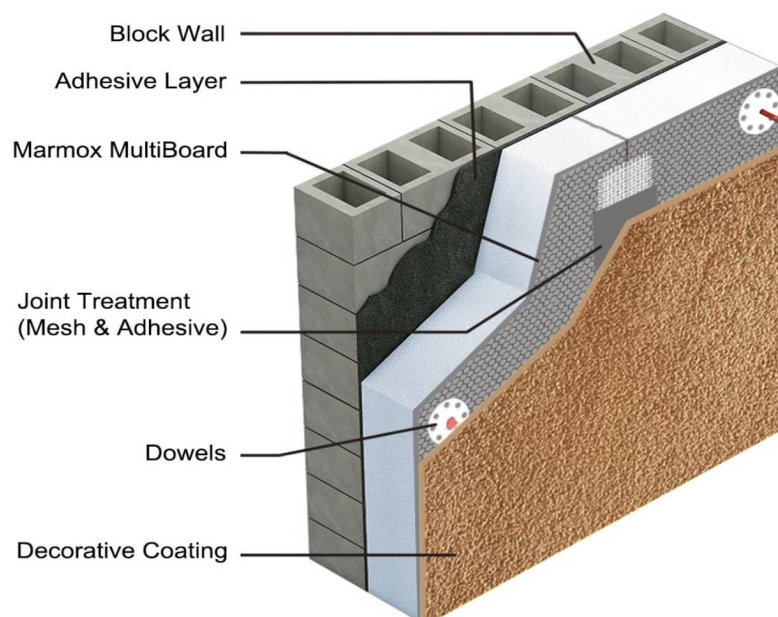
5. **System Profiles and Accessories:** These items are required for strengthening and finishing the system, such as around openings, corners, flashings.
6. **Decorative Finish Coats:** These Decorative Finish Coats are applied on top of the Marmox Board giving a decorative, durable, crack-resistant finish.

## Application and Installation Procedure:

### 1.1 Substrate Preparation:

The substrate for METIS should have the following requirements:

- 1.1.1 Remove projecting mortar burrs and fill render/plaster cavities to have smooth unified level.
- 1.1.2 Masonry, concrete or sound existing coatings must be clean, dry, adherent, sound/solid, stable and free from all substances that may prevent good adhesion.
- 1.1.3 Concrete/render/plaster should be allowed to cure properly. New surface should be at least 4 weeks old prior to installation.



## 1.2 Adhesive Application Method

Options of Applying adhesive layer to the back of the Marmox Multi Board based on walls surface condition

Option 1: For uneven surface

Apply adhesive to 6 inner spots on the back side of the Marmox board, ensuring it covers 40% of the surface area.

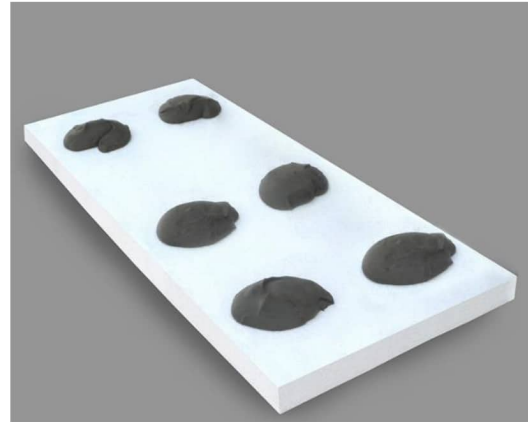


Fig. 1: Spot Method

Option 2: For Average uneven surface

Apply adhesive to the external edges and to 8 inner spots on the back side of the Marmox board, ensuring it covers 40% of the surface.



Fig. 2: Ribbon & Dab Method

Option 3: For perfectly even surface

Apply adhesive to the entire back surface of the insulation board using a notched trowel.

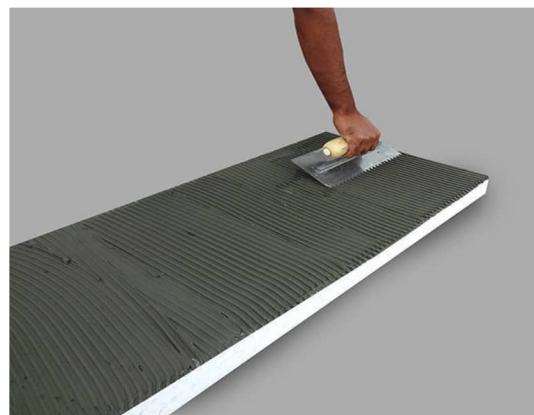


Fig. 3: Notched Trowel Method



### 1.3 Marmox Board Fixing

**1.3.1** Install boards horizontally, staggering the boards and overlapping substrate joints. Refer to fig 4 and fig 5. Ensure the entire surface of the Marmox boards is level prior to the application of the next step.

#### Corners

For corners board should be cut in V-Groove and bend from the middle at 90 degrees. So at corners there should be single board from either sides of the wall



Fig. 4

#### Openings

Marmox board joints should never align with openings such as windows or doors. Offset Marmox board joints 200mm or more from the corners of openings. The insulation material around windows must be cut from one piece. If the frame of the window or door flushes with the substrate surface, the reinforcing mesh should overlap the Marmox Board and should continue to the window seal at least 10cm.

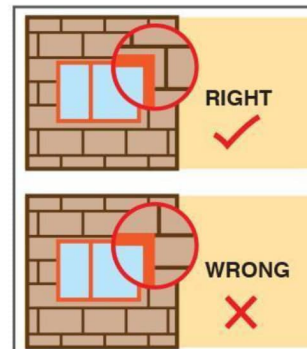


Fig. 5

**1.3.2** Allow for at least 1 day before installing the dowels, for better results allow for 3 days.

**1.3.3** Fix Dowels on Marmox boards by drilling, to ensure that 40mm of the dowel is inside the wall substrate, with minimum of 5 (five) dowels per square meter.

**1.3.4** Apply self-adhesive fiberglass mesh tape over the joints of Marmox Boards.

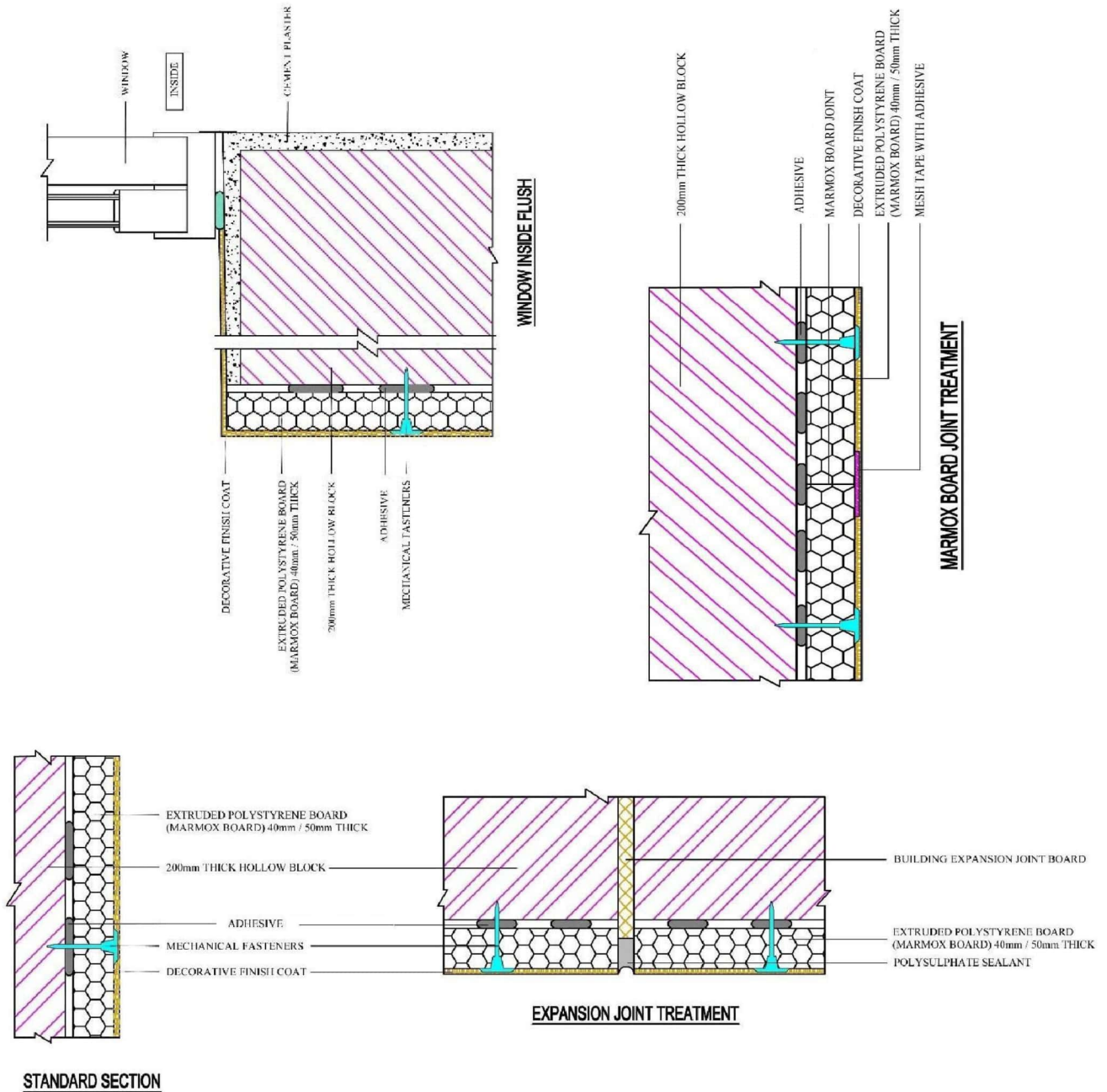
**1.3.5** Apply a thin layer of Joint compound on the top of mesh and dowels.

#### **1.4 Finishing Coat:**

Finishing coat should provide an excellent and appealing finishes while maintaining the functionality required for external renders for:

- Impact Resistant
- Weather Resistant
- Color Stability
- Vapor barrier

## Standard Shop Drawings





## **Finishing Coating Options**

### **Precautionary Measures**

Prior to the application make sure that:

- Adhesive mortar has cured and the mechanical fixing dowels are all in place
- Check the marmox board leveling. If there is irregularity or leveling problems, identify the areas that need to be fixed using a straight edge, do not attempt to compensate the level difference by building up finish coat thickness.
- Identify the location of any aesthetic grooves or reveals and make sure they are prepared before final coat application.

### **Coatings:**

Once the Marmox boards are fixed mechanically and all the precautionary measures are completed now the system is ready for the finish coating. Marmox GCC provides wide range of finish coating options for the customers according to their requirements.

### **Option NO.1: Acrylflex 200 (pleko)**

#### **1.1. Primer coat: Hanza Seal**

- 1.1.1. Prime plaster and porous substrates with one coat of Hanza seal of same color as coating.

#### **1.2. Secondary Coat: Acrylflex 200**

- 1.2.1. Acrylflex 200 is a tough elastic waterproof coating plaster based on elastomeric emulsion.
- 1.2.2. Exterior and interior finish for different surfaces.
- 1.2.3. Excellent adhesion properties Washable and highly resistant.
- 1.2.4. It is ready to use and applied just like a plaster coating with a plaster's trowel or spray.
- 1.2.5. It can be used directly on all sound and dry surfaces

## **Option NO.2: Acrylflex 200 (paint)**

### **2.1 Base coat: Putty**

- 2.1.1 Apply adhesive plaster coat like exterior based putty of minimum 2-3 mm thickness.
- 2.1.2 Application should be even and leveled to get good finish.
- 2.1.3 Apply by trowel or any of plaster tools.

### **2.2 Top coat: Acrylflex 200 (Paint)**

- 2.2.1 Acrylflex 200 is highly elastic waterproof coating with a vast range of attractive colors based on elastomeric acrylic emulsion with fine fillers.
- 2.2.2 Exterior and interior finish for different surfaces.
- 2.2.3 Abrasion, friction and fire resistant noncombustible natural paint.
- 2.2.4 It can be applied by brush roller or spray.

## **Option NO.3: Kemagrano**

### **1. Primer coat: Hanza seal**

- 1.1. Prime plaster and porous substrates with one coat of Hanza seal of same color.

### **2. Secondary Coat: Kemagrano**

- 3.2.1 Kemagrano is a tough elastic coating plaster based on synthetic resins.
- 3.2.2 Exterior and interior finish for different surfaces.
- 3.2.3 Excellent adhesion properties Washable and highly resistant.
- 3.2.4 It is ready to use and applied just like a plaster coating with a plaster's trowel.
- 3.2.5 It can be used directly on all sound and dry surfaces

## Kemagrano 300



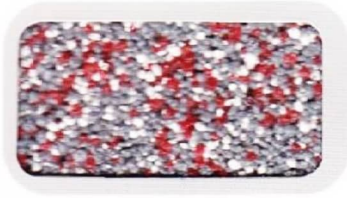
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## Kemagrano 600



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## Kemagrano 600



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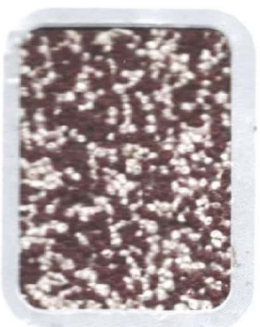
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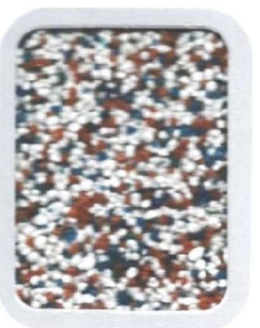
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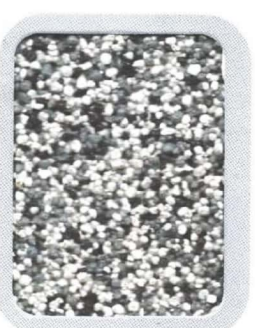
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## **Option NO.4: Kemstone**

### **4.1 Primer coat: Hanza seal**

4.1.1 Prime plaster and porous substrates with one coat of Hanza seal of same color.

### **4.2 Secondary Coat: Kemstone**

4.2.1 Kemstone is a ready to apply decorative plaster based on modified acrylic binder.

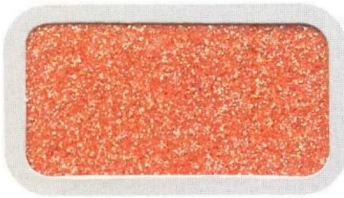
4.2.2 Exterior and interior finish for different surfaces.

4.2.3 It is ready to use and applied just like a plaster coating with a plaster trowel. It can be used directly on all sound and dry surfaces.

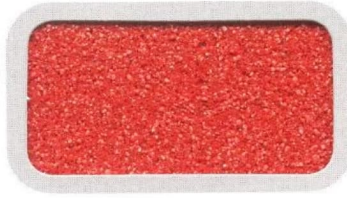
4.2.4 Plaster trowel can be used. Sprayer should be used for some kinds of this product.



## Kemstone 3000



**3503**



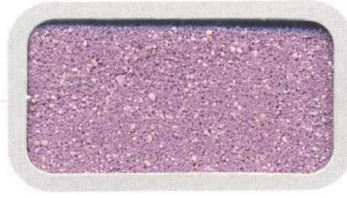
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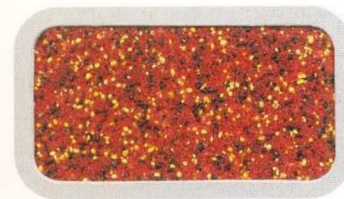
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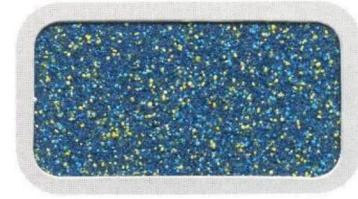
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## Kemstone 2000



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## Kemstone 2000



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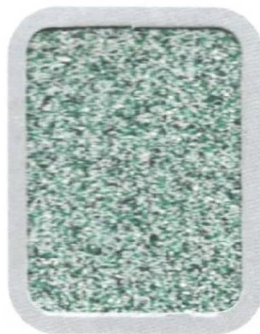
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## Kemstone 1000



**1501**



**1502**



**1503**



**1504**



**1505**



**1506**



**1507**



**1508**



**1509**



**1510**



**1511**



**1512**



## Kemstone 1000



**1501**



**1502**



**1503**



**1504**



**1505**



**1506**



**1507**



**1508**



**1509**



**1510**



**1511**



**1512**



## Kemstone 1000



1513



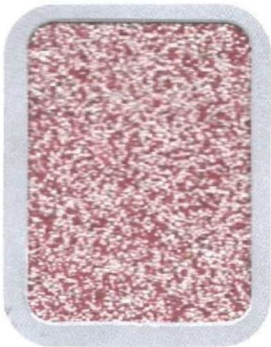
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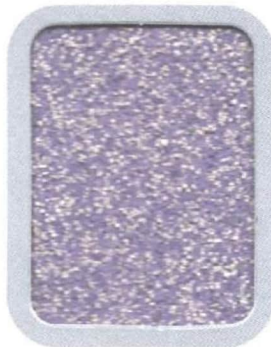
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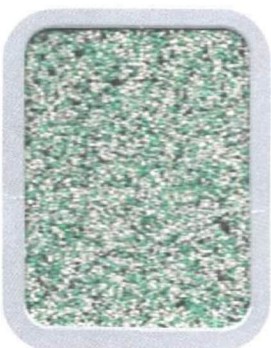
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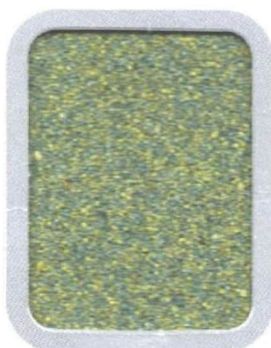
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## **Option NO.5: Kempleko**

### **5.1. Primer coat: Hanza seal**

5.1.1 Prime plaster and porous substrates with one coat of Hanza seal of same color.

### **5.2. Secondary Coat: Kempleko**

- 5.2.1 Kempleko is colored multi shaping textured paint made of a modified vinyl acrylic co-polymer
- 5.2.2 Resists the effects of atmospheric conditions.
- 5.2.3 Available in different sizes, fine, medium and coarse.
- 5.2.4 Apply Kempleko by putty knife or sprayer or roller (cotton, wool, sponge) according to required shape and texture

## Kempleko 700



757



758



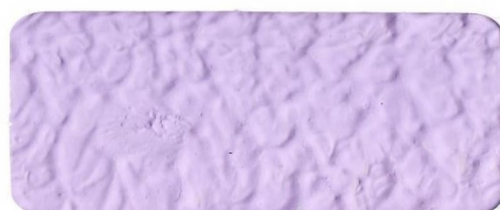
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756

## Kempleko 800



**851**



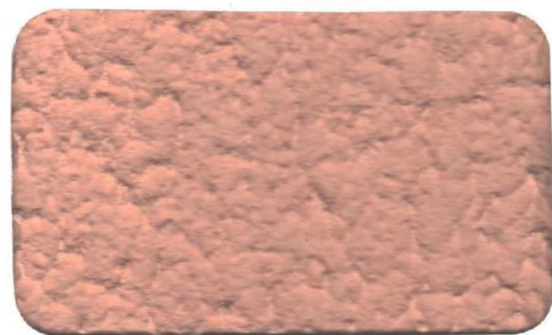
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**853**



**854**



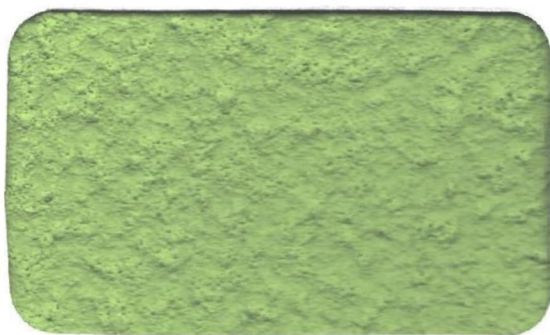
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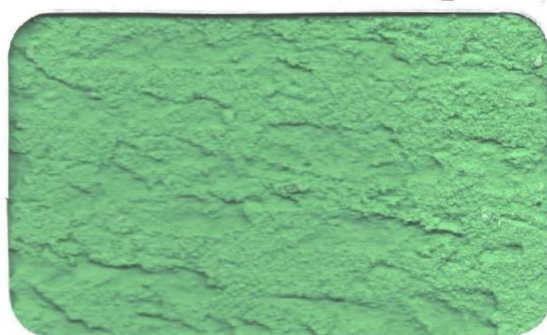
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## Kempleko 800



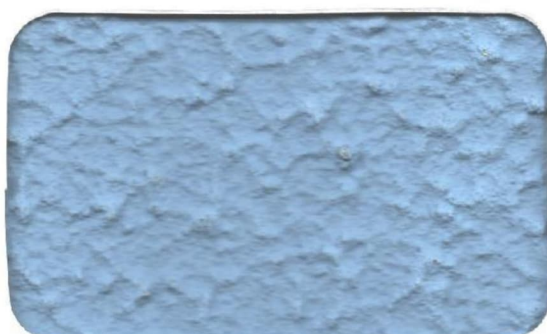
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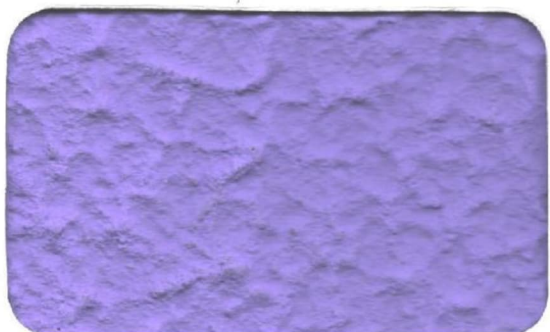
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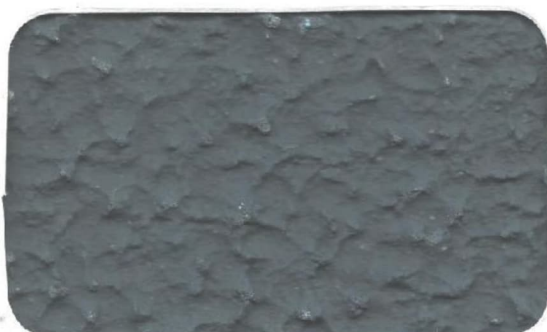
**859**



**860**



**861**



**862**

## Option NO.6. : Slice Stone

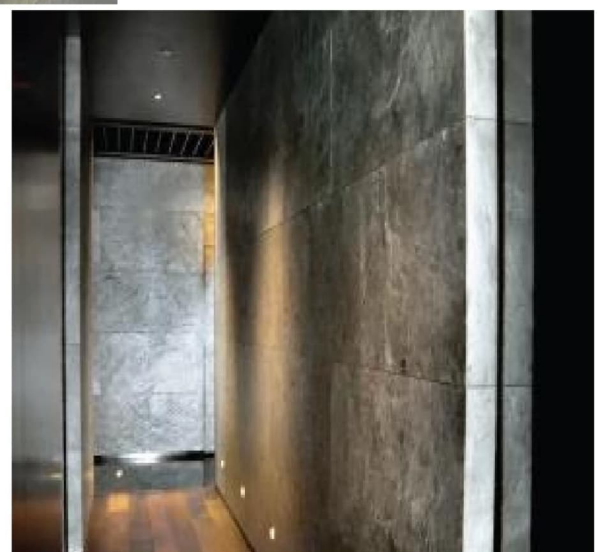
### 6.1. Finishing:

6.1.1. Slice stone is a special type of natural flexible stone processed with flees packing.

6.1.2. Slice stone comes in different sized sheets (as per customer requirement)

6.1.3. Slice stone is applied with cementitious tile adhesive. Same as marble.





(any type of stone or granite with the weight less than 60kg /m2 can be applied in METIS system as a final finishing).



## How energy is lost without proper thermal insulation?

# ENERGY INEFFICIENT HOME



### METIS U-Value Calculations

#### Heat insulation calculation of METIS WITH 60 mm acc. DIN 4108

| S. No. | Layer from inside to outside  | Thickness (m) | Thermal conductivity k- value (W/mK) | Thermal resistance R-value (m <sup>2</sup> . k/w) |
|--------|---|---------------|--------------------------------------|---|
| 1      | Room temp. inside   |               |                                      | 0.130   |
| 2      | Interior plaster  | 0.0200        | 0.720                                | 0.028   |
| 3      | Hollow concrete block   | 0.2000        | 1.173                                | 0.171   |
| 4      | Adhesive  | 0.0050        | 0.714                                | 0.007   |
| 5      | Polymerised cementitious fiber glass mesh reinforcement             | 0.0005        | 0.700                                | 0.001   |
| 6      | <b>Marmox XPS foam</b>  | <b>0.0600</b> | <b>0.036</b>                         | <b>1.666</b>                                      |
| 7      | Polymerised cementitious fiber glass mesh reinforcement             | 0.0005        | 0.700                                | 0.001   |
| 8      | Decorative Plasters   | 0.0040        | 0.700                                | 0.006   |
| 9      | Surface temp. outside   | -             | -                                    | 0.040   |
|        | <b>1/U in m<sup>2</sup>K/W</b>                                      |               | =                                    | <b>2.045</b>                                      |
|        | Air to air heat transfer coefficient <b>U</b> in W/m <sup>2</sup> K |               | =                                    | <b>0.48</b>                                       |

**Note:** No precise data about the thermal and humidity characteristics of the existing wall materials were available. Therefore, the computation was based on empirical or average values according to technical regulations.

### METIS U-Value Calculations

#### Heat insulation calculation of METIS WITH 50 mm acc. DIN 4108

| S. No. | Layer from inside to outside  | Thickness (m) | Thermal conductivity k- value (W/mK) | Thermal resistance R-value ( m2. k/w) |
|--------|---|---------------|--------------------------------------|---------------------------------------|
| 1      | Room temp. inside   |               |                                      | 0.130                                 |
| 2      | Interior plaster  | 0.0200        | 0.720                                | 0.028                                 |
| 3      | Hollow concrete block   | 0.2000        | 1.173                                | 0.171                                 |
| 4      | Adhesive  | 0.0050        | 0.714                                | 0.007                                 |
| 5      | Polymerised cementitious fiber glass mesh reinforcement             | 0.0005        | 0.700                                | 0.001                                 |
| 6      | <b>Marmox XPS foam</b>  | <b>0.0500</b> | <b>0.036</b>                         | <b>1.389</b>                          |
| 7      | Polymerised cementitious fiber glass mesh reinforcement             | 0.0005        | 0.700                                | 0.001                                 |
| 8      | Decorative Plasters   | 0.0040        | 0.700                                | 0.006                                 |
| 9      | Surface temp. outside   | -             | -                                    | 0.040                                 |
|        | <b>1/U in m<sup>2</sup>K/W</b>                                      |               | =                                    | <b>1.77</b>                           |
|        | Air to air heat transfer coefficient <b>U</b> in W/m <sup>2</sup> K |               | =                                    | <b>0.56</b>                           |

**Note:** No precise data about the thermal and humidity characteristics of the existing wall materials were available. Therefore, the computation was based on empirical or average values according to technical regulations.



## Project references

### Bahrain

1. 7 Story Building Gudaibiya

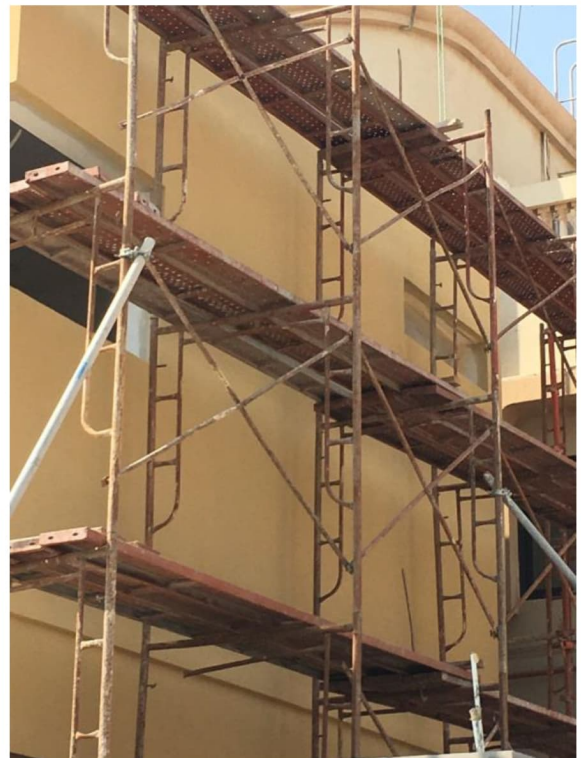


2. 21 Story Building Juffair.





### 3. 2 story villa Hamad Town





#### 4. 5 Story Building Zinj



#### 5. Bahrain Indian School Budaiya.



6. 7 Story Building at Umalhasham.



7. 3 story Building Sitra.





## Marmox Egypt



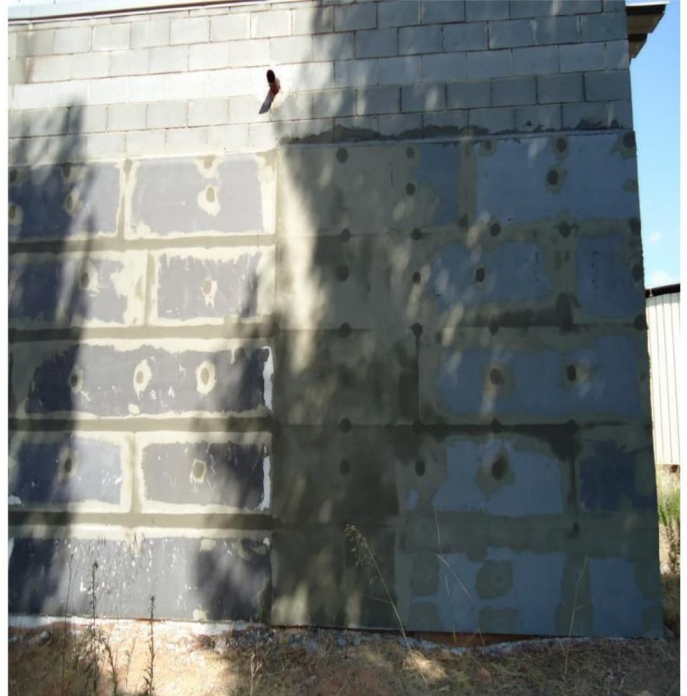


## Marmox UK





## Marmox Spain





## Marmox Spain





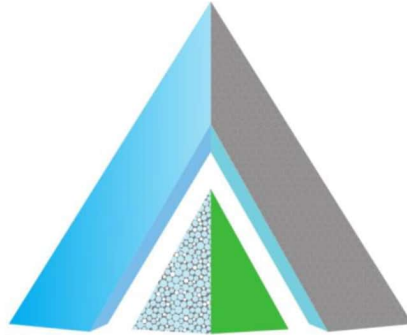
## Marmox Greece







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