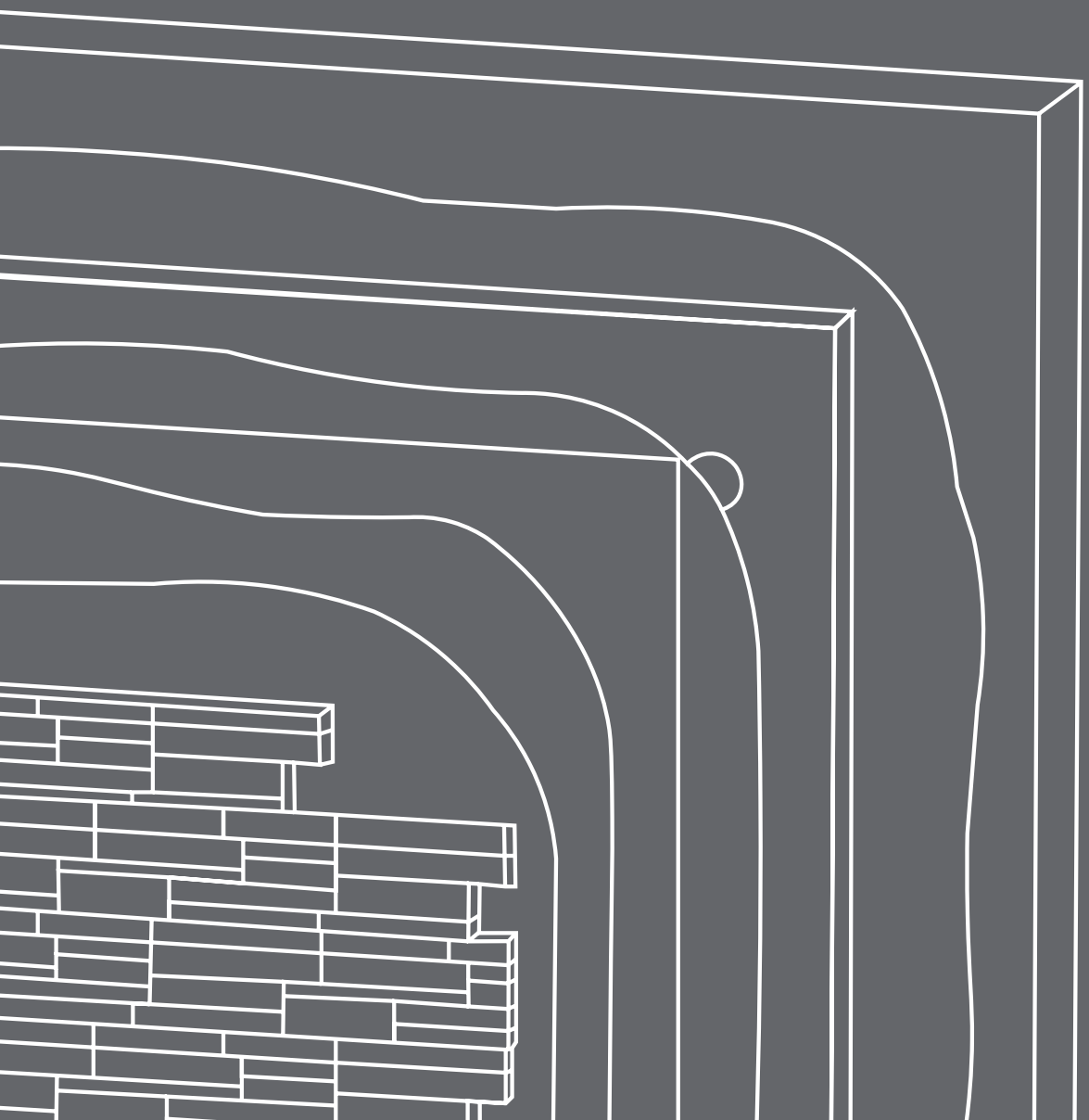
STONE PANEL
by CUPA GROUP

EXTERNAL THERMAL INSULATION SYSTEM

ETICS



ETICS SYSTEM

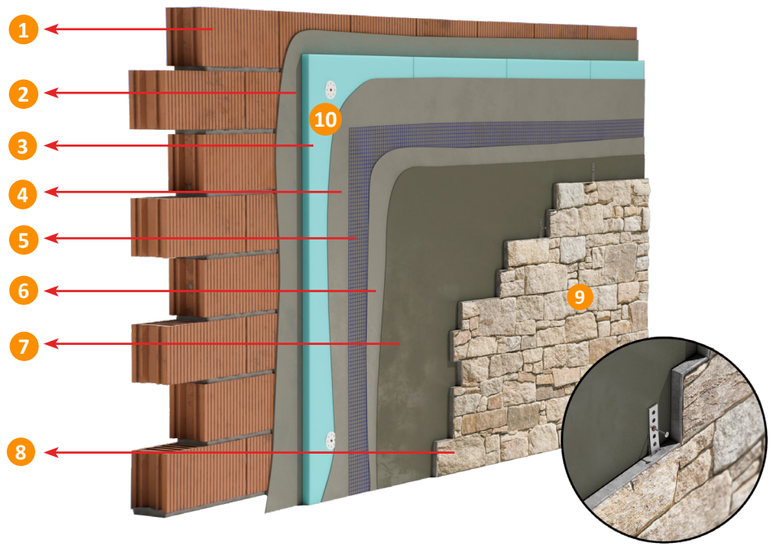
SYSTEM DEFINITION

The ETICS system with Stonepanel™ is intended for use as external thermal insulation for building walls, both for new construction projects and for renovation of existing buildings, and their use aims to give the wall on which it is installed a satisfactory thermal insulation.

The system is based on a panel attached to the insulation of the wall with adhesive and mechanical fastening. The insulation is protected with a continuous coating, consisting of one or more layers of adhesive. Between them a mesh reinforcement is placed. The final layer of Stonepanel™, a natural stone panel, is installed directly on the insulation with a coat of mortar and mechanical fastening.

SYSTEM COMPONENTS

The external thermal insulation system with Stonepanel™ is carried out on the construction site with the following components:



1 Substrate or wall support.

Suitable substrates for the application of external insulation system with StonepanelTM, both for new construction and renovations, are as follows: cellular concrete blocks and thermoclay blocks.

Cellular concrete block	Thermoclay blocks
	

* To install the system on other substrates, consult with the adhesives supplier.

2 Waterproof adhesive

We recommend the application of ARDEX 8+9 or a similar product, as a waterproof adhesive which consists of two components: ARDEX 8, an acrylate dispersion, and ARDEX 9, cement-based powder. The function of this adhesive is to fix the insulation board to the support.

3 Insulation board

There are several types of insulation on the market, such as expanded polystyrene (EPS) and extruded polystyrene (XPS). The thickness of the insulation is dimensioned according to the requirements of each project, according to the official regulations.

The external thermal insulation system with Stonepanel™ is valid for expanded polystyrene (EPS) of minimum density 20 kg/m^3 and maximum thickness 50 mm, and extruded polystyrene (XPS) for thicknesses up to 160 mm. We recommend the use of DOW extruded polystyrene sheets (XPS): STYROFOAM™ IBF-A, with a density of 32kg/m^3, or a similar product with equivalent characteristics. .

4 5 6 Waterproof adhesive and fiberglass mesh

The same adhesive ARDEX 8 + 9 or a similar one, used for fixing the insulation boards to the wall is also used for coating, as an outer membrane. The application is made in two layers, between which the fiberglass mesh is placed.

We recommended the application of fiberglass mesh 5x5 ADIMESH ARDEX 55, or equivalent. Its function is to reinforce the adhesive, thus giving the system the ability to withstand shocks and movements due to temperature fluctuations or shrinkage phenomena.

7 Cementitious adhesive

It is recommended the application of ARDEX FLEX X7G FLEX, C2-type cementitious adhesive, or a similar one.

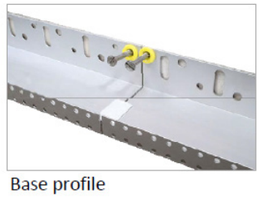
8 STONEPANEL™

This panel is composed of natural stone mounted on a reinforced mortar base with a fiberglass mesh. Each piece has a Z shape to avoid visible joints. Stonepanel™ has a self-anchoring system, whereby each individual panel must be anchored to the support.

9 Screw

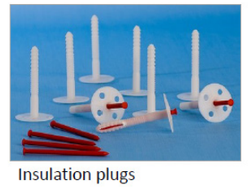
Security screw in stainless steel, with a polyamide covering to avoid thermal bridges. Screws recommended are HILTI-HRD-UGT 8X140/90 or equivalent. The screw length depends on the thickness of the insulation used; it must penetrate the wall support a minimum depth of 40 to 50 mm. The type of wall plug will be the one recommended by the supplier for each type of wall.

10 Accessories (base profile, insulation plugs, reinforcement mesh for the corners)



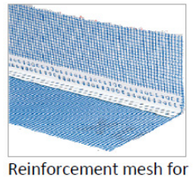
Base profile

Base profile that serves as a guide to align the insulation panels.



Insulation plugs

Insulation plugs that ensures a perfect fixing of the plates to the support.



Reinforcement mesh for the corners

Reinforcement mesh for the cornes

APPLICATION RECOMMENDATION

1. Wall preparation

The wall on which the Stonepanel™ external insulation system is to be installed should be firm, with sufficient strength to withstand the weight of the system and with grip. It must present a flat surface without significant unevenness or irregularities. The cracks should be treated, and any paint or other material must be removed.

2. Base profile installation

At the bottom of the area to be coated, and on top of gaps such as windows or doors, a base profile should be placed horizontally, properly leveled and anchored to the wall, with dimensions adapted to the thickness of the insulation. A safe distance between the profiles must be kept to prevent contact caused by the thermal expansion.

3. Adhesive application

First, a continuous layer of adhesive waterproofing will be applied. The application is done with a spreader or roller, on the insulation as well as on the wall.

(See recommendations and drying times on the manufacturer's data sheet)

4. Insulation board placement

Insulating boards are supported on the base profile and are placed on the wall exerting sufficient pressure on the entire surface to prevent gaps in the adhesive and to ensure their perfect adhesion. The boards will be placed with mismatched sides, so that two boards never coincide with adjacent sides, either in flat zones or in the corners of the wall. When placing insulation boards, special care must be taken to remove excess material between them and to avoid gaps that could cause thermal bridges.

Important: ***The thickness of the insulation must be achieved using one piece, avoiding the adhesion of two thinner boards.***

5. Mechanical fixing of the boards

To fix the insulation boards to the wall, besides the adhesive, plastic plugs with circular top must be used as mechanical fixing. Contact the manufacturer to find out more about the proper placement of fasteners, the size recommended according the thickness of the insulation, and the application mode.

6. Application of the outer layer and reinforcement with fiberglash mesh

After fitting the insulation boards, we proceed to apply the outer membrane. The same waterproof adhesive used to glue the boards to the wall, is used for coating them. The application is carried out in two layers, between which the fiberglass mesh is placed to perform the reinforcement of the adhesive and give the system the capacity to withstand movements due to thermal or shrinkage phenomena.

While the base of this layer is fresh, the mesh is placed, applying pressure to embed it without folds. In adjacent sections, overlapping the mesh is recommended at least 10 cm. At the edges or corners should turn at least 25 cm.

A second layer of the same adhesive will be applied immediately, covering the fiberglass mesh completely. (See recommendations and drying times on the manufacturer's data sheet).

7. Installing the STONEPANEL™ with cementitious adhesive

The next step will be to apply a thin layer of cementitious adhesive on both the substrate and the STONEPANEL™.

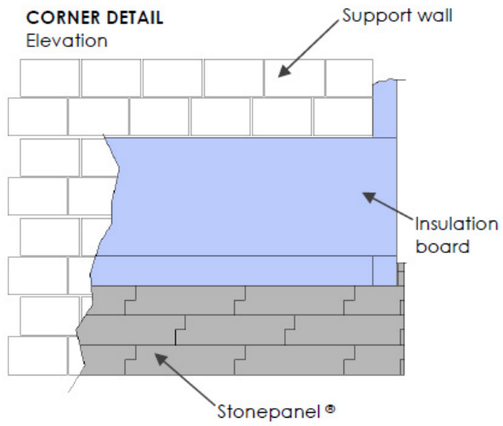
The adhesive must be applied in such amount that when the piece is pressed into place, the adhesive oozes out on the joints. The working area should not exceed the area which allows the pieces to be placed on a wet bed for 10 minutes (see recommendations and drying times on the manufacturer's data sheet). Finally, the panel will be settled with the help of a rubber mallet.

8. STONEPANEL™ mechanical anchoring

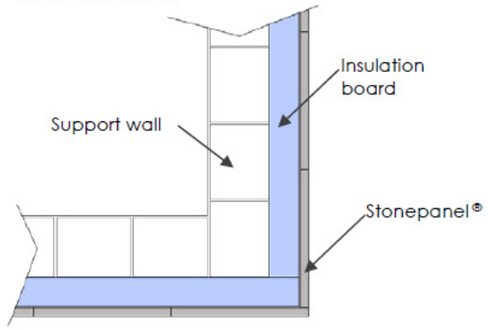
Each STONEPANEL™ is anchored mechanically by a perforated stainless steel tape or a similar mechanism and a screw with a nylon sleeve, which pierce the insulation to reach the wall support. The choice of the screw should be made depending on the selected insulation thickness and the type of substrate on which the system will be installed, with the requirement that it must penetrate the wall support a minimum depth of 40 to 50 mm.

- The content of this guide is a simple recommendation of the Stonepanel™ application on an Exterior Insulation System.
- The recommendations expressed herein are based on internal tests, whereby the system has been subjected to vertical strength, applying loads on each insulated panel with a safety factor Fs> 13 on its own weight, and measuring vertical displacements of the systems lower than 1.5 mm, thus determining perfect stability of the system.
- The perforation of the insulation layer with the screws of the Stonepanel™ will not cause moisture infiltration problems or significant thermal bridges, according to the estimations and statements of DOW, XPS panel manufacturer. (See page 10)
- Since the application and installation conditions are not controllable by the manufacturer, Cupamat is excluded from any responsibility in the implementation and installation of the system described in this document.
- Cupa Stone is only responsible for the quality of STONEPANEL™.

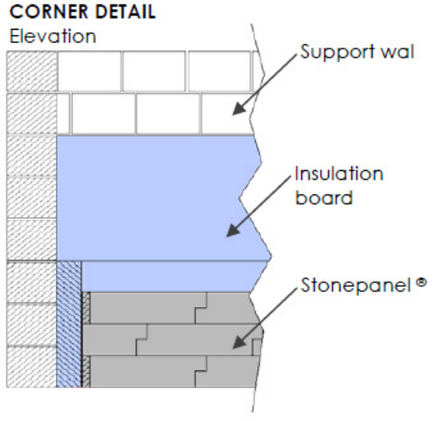
CORNER DETAIL
Elevation



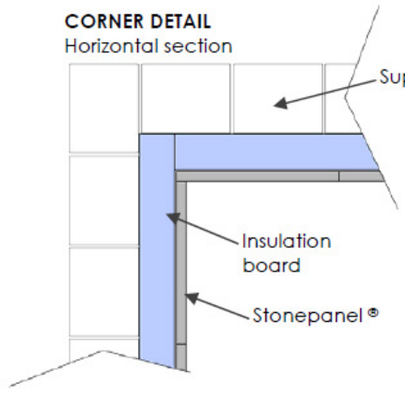
CORNER DETAIL
Horizontal section



CORNER DETAIL
Elevation

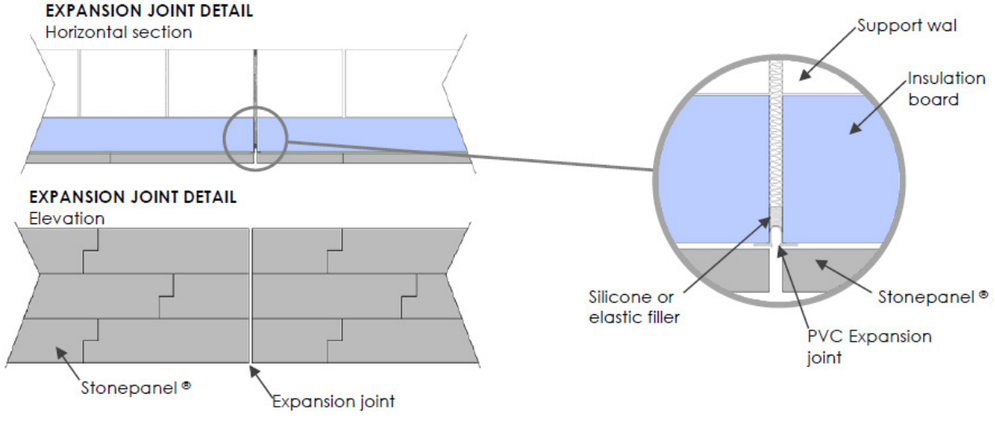


CORNER DETAIL
Horizontal section

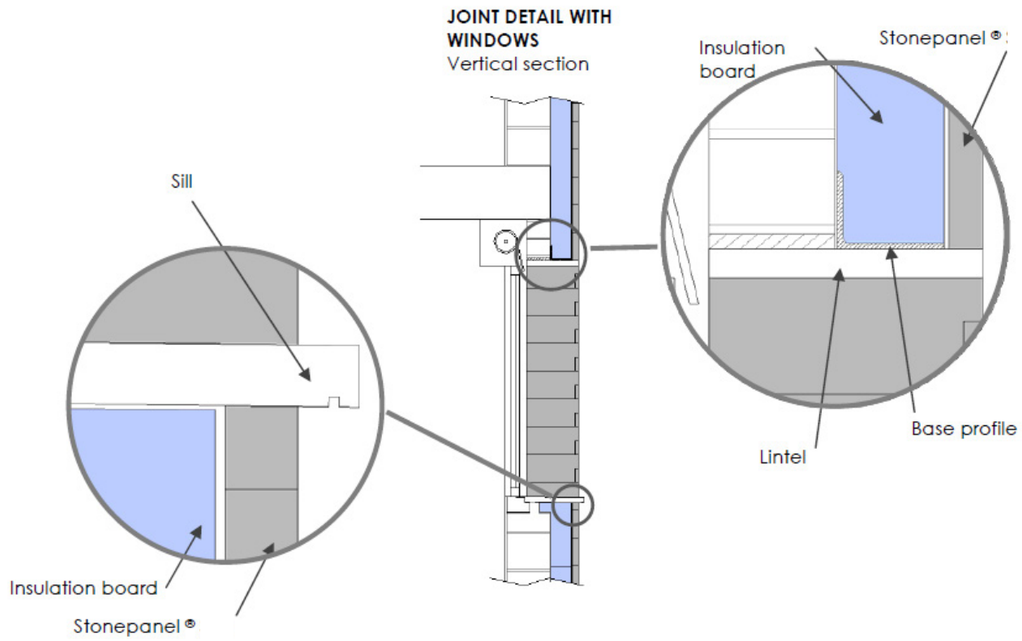


EXPANSION JOINT DETAIL
Horizontal section

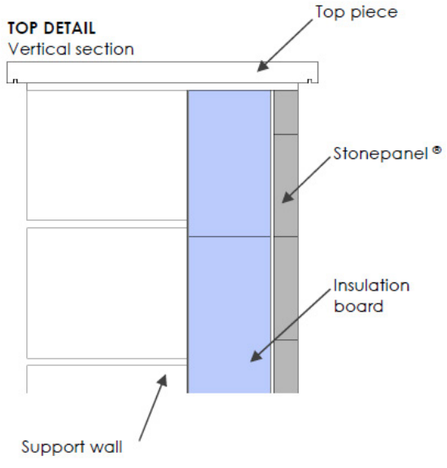
EXPANSION JOINT DETAIL
Elevation



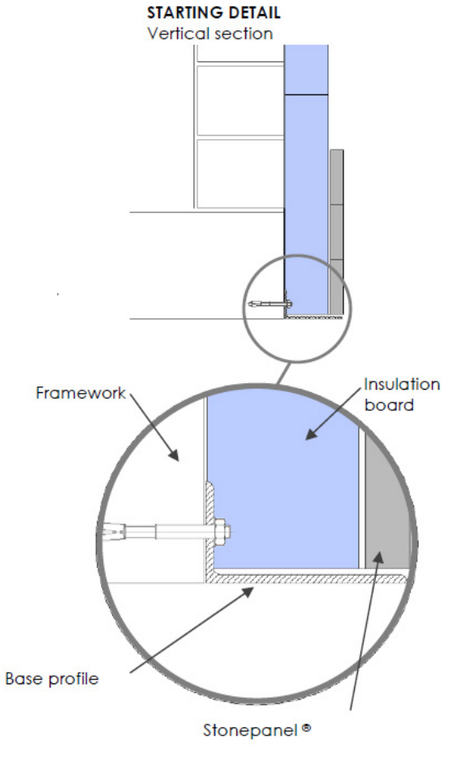
JOINT DETAIL WITH WINDOWS
Vertical section



TOP DETAIL
Vertical section



STARTING DETAIL
Vertical section



Declaration on Dow XPS boards fitness for use in STONEPANEL™ façade system.

The fitness of Dow extruded polystyrene (XPS) insulation boards, in thicknesses of 100 mm and above, for use in your stone façade system currently under development, we declare their fitness for use in relation to the following aspects:

- Dow XPS boards high water pick-up resistance in case there were any moisture infiltration through the perforations caused by the system steel fasteners. Under no circumstances this will cause infiltration or any moisture problem.
  REMARK: what may be critical is to use an anti-corrosion treatment for the steel fasteners.

- Influence of the thermal bridge formed by the steel fasteners. This issue, although not related to any degradation of the insulation itself as such, is related to the thermal performance of the building system. In this case, according to the information you kindly sent us, it is easy to check the thermal bridge effect introduced by the fasteners using an average U-value:

  - The original built-up, without fasteners and, for example, with 10 cm insulation thickness, is the following:

Exterior	h1 [W/m²K]: 25.0000		
Layer	thickness [m]	λ [W/mK]	R [m²K/W]
1 Stone	0.0350	3.000	0.0117
2 Cement adhesive	0.0020	0.220	0.0091
3 XPS	0.1000	0.031	3.2258
4 Cement adhesive	0.0020	0.220	0.0091
5 Brick work	0.2350	0.284	0.8275
6 Gypsum	0.0150	0.700	0.0214
Interior	h2 [W/m²K]: 25.0000		

U = 0.234 W/m²K

  - If the U-value for the built-up that includes a steel fastener is calculated, then:

Exterior	h1 [W/m²K]: 25.0000		
Layer	thickness [m]	λ [W/mK]	R [m²K/W]
1 Stone	0.0350	3.000	0.0117
2 Cement adhesive	0.0020	0.220	0.0091
3 Steel fastener	0.1450	50.000	0.0029
4 Brick work	0.1920	0.284	0.6761
5 Gypsum	0.0150	0.700	0.0214
Interior	h2 [W/m²K]: 7.6920		

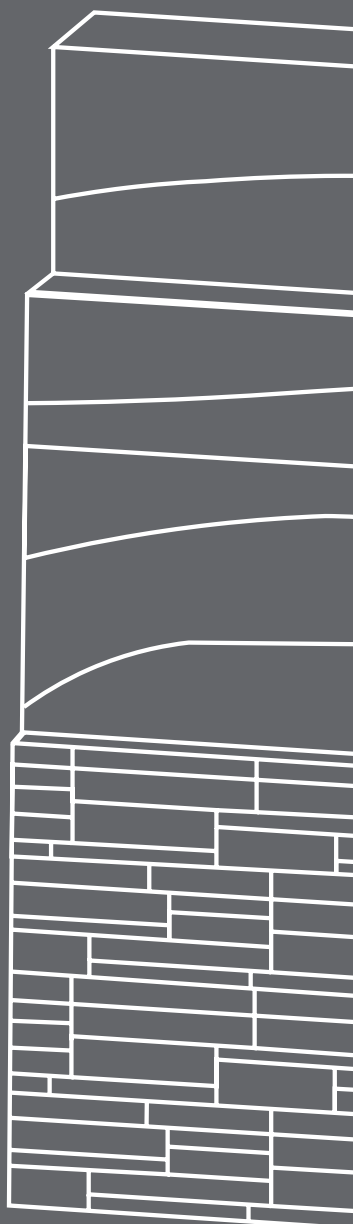
U = 1.122 W/m²K

  - According to the input got from you, the surface occupied by the fasteners represents an area of 0.056% of the total façade area.
  - Therefore the U-value can be averaged as follows:
    - U_{system} = [(0.056 x 1.122) + (99.944 x 0.234)] / 100 = **0.2345 W/m²K.** This new U-value, taken for a uniform thickness XPS layer without thermal bridges, equals 97-98 mm, instead of 100 mm. So almost negligible (and, by the way, less than the XPS product thickness tolerance).

  - According to this, and given the fact that the U-value (as it happens to the R-value) is rounded up (or down, in the case of the R-value) with two decimals, in both cases there will be a final U-value = 0.24 W/m²·K.

CUPASTONE

The experts in Natural Stone



contact@cupastone.com

www.cupastone.com