

## The Application of External Thermal Insulation Composite System, ETICS

### SLIDE 1

#### Introduction

The Energy efficiency of buildings has generated new requirements in the construction sector. The new directives clearly stated the need to improve building thermal insulation to meet the growing demands for improvements in building thermal comfort, associated with concerns about energy consumption and related environmental challenges. Properly insulated buildings minimize heat exchange with the outside, with a consequent reduction in heating and cooling needs and the associated operating costs.

External Thermal Insulation Composite System, ETICS, is one of the most efficient solutions to obtain façades with high thermal performance. It consists of applying a thermal insulator on the external wall in virtually any construction system, new or old, industrial, commercial or residential.

This training content has been produced in fulfilment of requirements of the PROGREEN project, financed by ERASMUS<sup>+</sup>, covers the basic application of the ETICS.

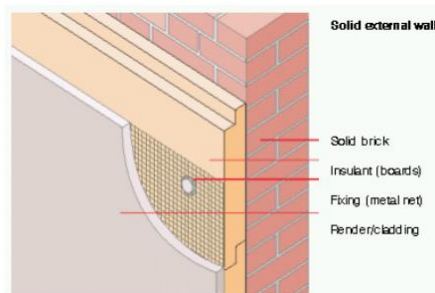
### SLIDE 2

#### External wall insulation

To reduce heat losses from solid walls, one of the available options is to use external insulation, which economically makes sense and the application of the insulation material is not considered difficult due to easy access. The severity of heat loss from the building can be substantially reduced and, to reduce costs, this intervention can be planned and executed whenever the building requires other repair work to the interior or external walls.

#### Requirements for the insulation material

Insulation thickness needs to be between 50mm and 100mm.



**Figure 1**

**Source: TRAINREBUILD – Intelligent Energy Europe**

### SLIDE 3

Preparing the substrate – Old buildings and/or existing rendered substrates

- Check the substrate to define which of the ETICS is to be applied.
- The check should also include the preparation of the substrate.
- Special care should be taken for wood substrates and lightweight building boards.
- Prior to the application phase, the substrate should be protected against moisture:
  - ✓ to avoid substrates from swelling,
  - ✓ to secure better strength,
  - ✓ to eliminate the probability of substrate damage.

## SLIDE 4

Preparing the substrate – New construction

- Evaluate the planimetry of the supports (masonry or concrete) using a 2 or 3m ruler.
- If there is irregularity greater than 1cm behind the ruler, the wall should be plastered before applying the insulating plates.
- Remove all dirt on the surface.

Preparing the substrate – New construction

- Carefully clean the substrates, eliminating dust, accumulated debris, biological contamination and loose materials.
- Evaluate and correct any existence of active cracks.

General recommendations:

Please check EN 13986, EN 771-4, EN 771-1, EN 771-3, EN 206-1 and EN 15498

The manufacturer's instructions (labelling on container, technical leaflets, safety data sheets) should be followed.

## SLIDE 5

Where to start – contact with the ground or floors

Waterproof the surface of the substrate against penetration of water originating from the ground, floors, balconies or terraces.

Where to start – boot profile application

- Level the starting point of the system.
- Install the starter profile fixed every 30cm with specific bushing and screw.
- Leave a 2mm joint between profile tops, leveling with suitable material.

## SLIDE 6

Collage of insulating plates – Placing the adhesive

- On irregular support, in masonry, for example, use perimeter cord in the arrangement of the bonding mortar.
- In the centre, use 3 spots of adhesive in the middle or cross strands.

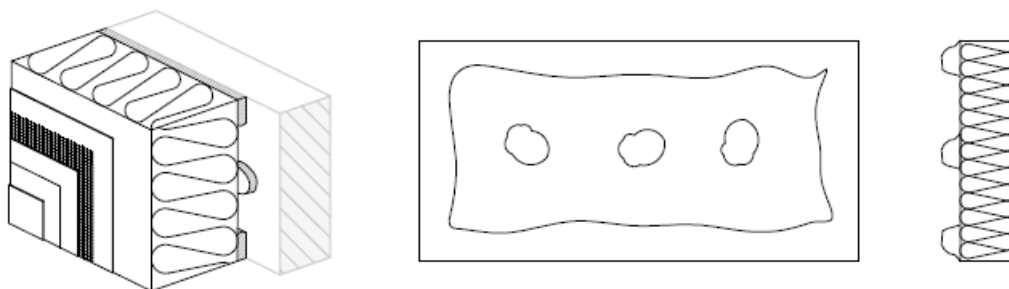


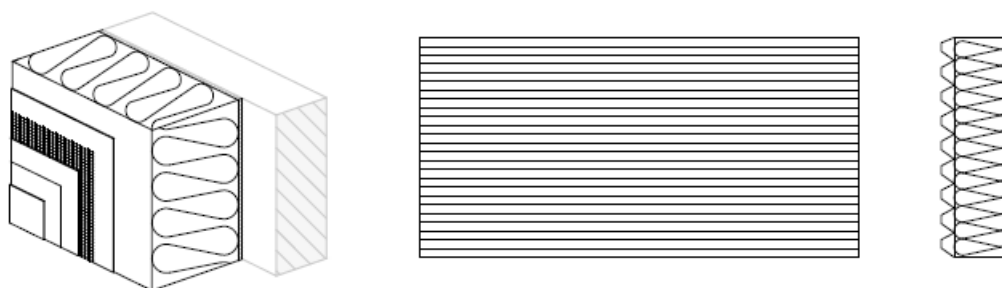
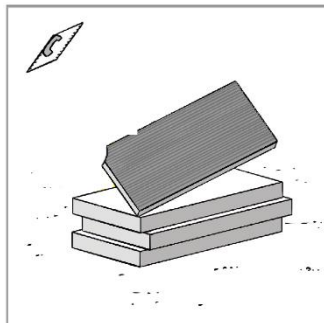
Figure 2

Source: TEAE European Guideline for the Application of ETICS

## SLIDE 7

Collage of insulating plates – Placing the adhesive

- On regularized support (plastering or in rehabilitation), apply glue to fully busbar.



*Figure 3*

*Source: TEAE European Guideline for the Application of ETICS*

- On rehabilitation support painted or ceramic coated, use specific glue, spread on combed busbar.
- Use trowel with teeth of at least 10mm.

## SLIDE 8

Collage of insulating plates – First row

- Fit the plate into the starter profile and press gently against the bracket to crush the glue.

Collage of insulating plates – Application of chain plate rows

- Install successive rows with the counter-clocked plates.
- The joints between plates should be tight and the surface aligned.
- Permanently check the verticality of the surfaces and the alignment of the plates in relation to the adjacent ones, using the 2 m level and ruler.

Collage of insulating plates – Corner

- Alternate the orientation of the tops of the boards in successive rows in the protruding corners and interior corners to improve system locking.
- Do not allow mortar on the backrest of the plates.

## SLIDE 9

Collage of insulating plates – Adjustments to the plates after adhesion

- Cut off excess material and adjust the surface by sanding, particularly in corners.
- Adjust surface flatness, namely joints between plates by sanding small irregularities in the areas required.

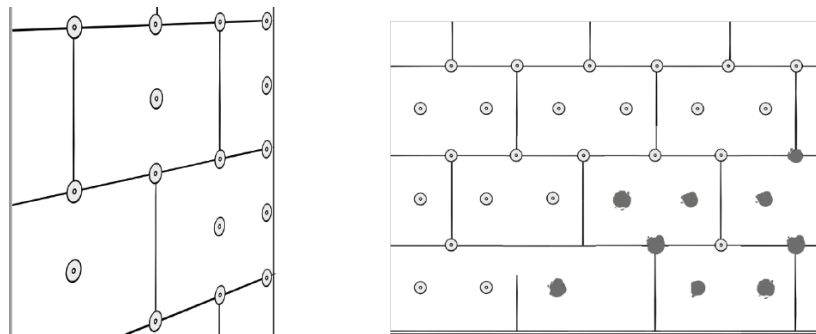
Geometric arrangement of anchorages

- Apply at least 6 fixings per m<sup>2</sup>, be 8 in case of very severe conditions in the insulation board outline.
- Reinforce around the corners along these.
- Always apply the anchors in areas with bonding mortar behind the board insulating.

## SLIDE 10

Mechanism fixing of insulation boards – Applying the anchors

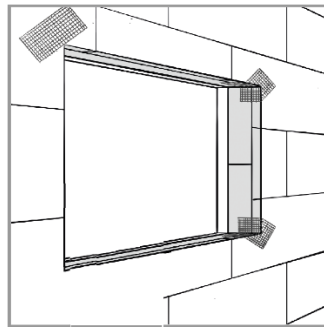
- Drill a hole with a drill bit of a diameter suitable for the anchors to be applied.
- Insert the anchor and hammer the pin.
- Cover with the coating mortar.



**Figure 4**  
*Anchoring the insulation panels*

## Slide 11

Mechanism fixing of insulation boards – Reinforcing the corners

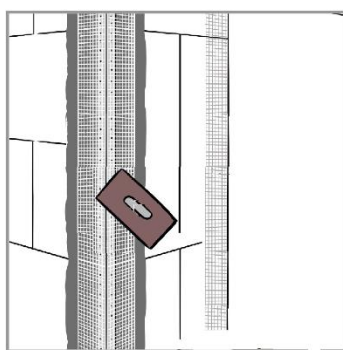


**Figure 5**  
*Reinforcing the corners*

## Slide 12

Mechanism fixing of insulation boards – Reinforcing the corners and protection against impact

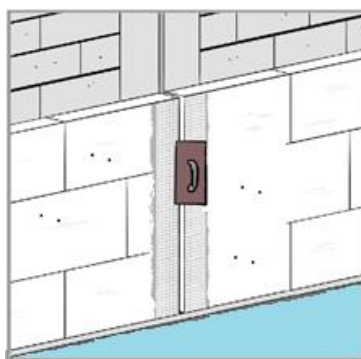
Spread the mortar with spoon or lyre, position and crush the profile to fit the corner, and eliminate excess mortar.



*Figure 6*  
*Corners protection*

### Slide 13

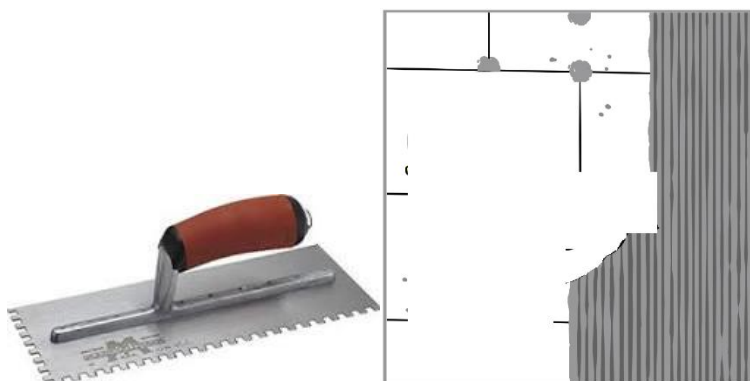
Break insulating plates into expansion joints, leaving a joint opening of at least 15 mm wide. Finish the joint applying proper expansion joint profile. At the end of the work, after applying the decorative finish, seal the interior space of the profile with polyethylene foam cord.



*Figure 7*  
*Finish the joint*

### Slide 14

Coating insulation plate - Spread the mortar on the surface of the plates using 6mm tooth notched trowel.

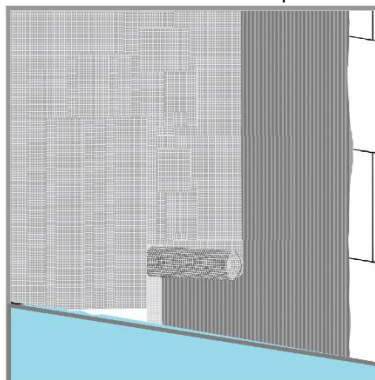


*Figure 8*  
*Spreading the mortar*

## Slide 15

Coating insulation plate – Applying the first layer.

With the fresh mortar, stretch the mesh fiberglass and smooth smoothly with trowel smooth by fixing it to the surface of the mortar. Lateral overlap the network lanes in at least 10cm.



*Figure 9*  
*Applying the first layer*

## Slide 16

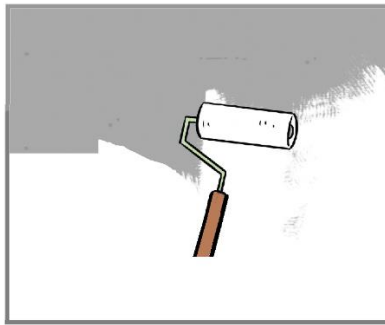
After hardening of the first layer, the second layer of mortar can be spread. The applied second layer must fully hide the grid and leave a uniform and flat surface.



*Figure 10*  
*Applying the second layer*

## Slide 17

After 3 days of drying the mortar of coating of the plates, apply primer for finishing, to regulate absorption from the surface. Apply one or more coats with anti-roll roller.



*Figure 11*  
*Applying primer*

### Slide 18

After drying the primer, for at least 15 hours, apply the finishing. Remove excess material. Finish with plastic trowel performing gentle circular motions to get the texture you want.

The mineral based coloured finish lime can be applied in two layers. Wet the holder well before the first layer and apply the second as soon as the first hardened enough. Finish can be sanded with sponge or smoothed with stainless steel trowel after grinding.