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European Technical Assessment

ETA 14/0019
of 03/ 03/ 2014

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General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) Nº305/2011:	Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc)
Trade name of the construction product	**THERMUR® PF**
Product family to which the construction product belongs	External Thermal Insulation Composite System with rendering for use on building walls
Manufacturer	**CEMEX ESPAÑA OPERACIONES S.L.U.** C/ Hernández de Tejada 1, 28027 MADRID. España (Spain). www.cemex.es
Manufacturing plant(s)	- C/ Andalucía s/n. San Vicente del Raspeig, 03690 ALICANTE, Spain. - Ctra. De la base militar, s/n. 46163 Marines–Valencia. Spain - Pol. Ind de ABANILLA. 30.640 ABANILLA (Murcia).Spain.
This European Technical Assessment contains	11 pages including 2 Annexes which form an integral part of this assessment. Annex 3. Contain confidential information and is not included in the ETA when that assessment is publicly available.
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of	Guideline for European Technical Approval (ETAG) nº 004 ed. 2013, used as European Assessment Document (EAD)

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SPECIFIC PARTS OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of the product

The External Thermal Insulation Composite System (from now on, referred to as ETICS) "THERMUR® PF" is designed and installed in accordance with the manufacturer, design and installation instructions, deposited at the IETcc(1).

It is made up on site from these components. The manufacturer is ultimately responsible for the ETICS. THERMUR® PF is a bonded system with supplementary mechanical fixings used primarily to provide stability until the adhesive has dried and increase the adherence of the system reducing the risk of detachment.

This ETICS comprises the following components, which are factory produced by the manufacturer or a supplier.

	Components *(See clause 2.3 for further description, characteristics and performances)*	**Coverage** ([kg/m²)	**Thickness** [mm]
Insulation material with associated method of fixing	***BONDED ETICS*** with supplementary mechanical fixings Insulation material: ***CEMEX AISLAMIENTO THERMUR® PF*** *Adhesive*: ***CEMEX THERMUR® gris"// CEMEX THERMUR® blanco*** Minimum bonded surface: 75 %. (grey or white cement based mortar in powder requiring addition and mixing with 22,0 ± 1,0% water)	0,70-4,20 4,5-5,5 (powder)	20 to 120
Base coat	***CEMEX THERMUR® gris // CEMEX THERMUR® blanco*** (grey or white cement based mortar in powder requiring addition of 22,0 ± 1,0% water). Identical with the equally named adhesive given above	1,2-1,3 (powder, and per mm of layer thickness)	3,0-5,0 (in 2 layers)
Primer coat	***CEMEX FONDO ACRÍLICO****. Organic binder water based paint requiring addition of 0-25,0% weight in water foreseen to be used as primer coat for the CEMEX ACRILICO finishing coats*	0,19-0,26	0,1-0,2
Glass fibre mesh	***CEMEX MALLA THERMUR®*** applied in one or two layers.	0,14-0,18	0,5
	CEMEX MALLA THERMUR® **XL** applied in one layer.	0,34-0,36	0,9
Finishing coat	***CEMEX ACRÍLICO FINO.*** *Organic binder water based ready to use render (EN15824).*	1,6-2,6	1,0-1,5
	CEMEX ACRÍLICO. *Organic binder water based ready to use render (EN15824).*	2,6-4,4	1,5-2,5
	CEMEX ACRÍLICO RAYADO. *Organic binder water based ready to use render (EN15824).*	3,0-4,8	2,0-3,0
	CEMEX ACRÍLICO RUGOSO. *Organic binder water based ready to use (EN15824).*	0,8-1,2	0,5-0,7
	CEMEX ACRÍLICO SILOX *Organic binder water based ready to use render (EN15824).*	2,4-4,0	1,5-2,5
	CEMEX ACRÍLICO SILOX LISO *Organic binder water based ready to use render (EN15824).*	0,1-0,2	0,1-0,2
	CEMEX CAL THERMUR. Coloured rendering mortar type CR-LW-CSI-W2 (EN998-1), in powder form requiring the addition and mixing with 30,0 ± 1,0% water.	1,1-1,2 (powder, and mm of layer thickness)	6,0-10,0
	CEMEX MONOCAPA THERMUR. One coat rendering mortar type OC-LW-CSIII-W2, (EN998-1), in powder form requiring the addition and mixing with 27,0 ± 1,0% water.	1,0-1,1 (powder, and mm of layer thickness)	6,0-10,0
Ancillary elements	Supplementary fixings **(**anchors with sleeve made of plastic and expansion nail made of either plastic or metal, for insulation material with different lengths in relation with thickness of insulation board: **CEMEX ANCLAJE THERMUR BASIC** for mineral substrates class A, B and C, with ETAG 014. **CEMEX ANCLAJE THERMUR PREMIUM** for mineral substrates class A, B, C, D and E, with ETAG 014	Remain under the manufacturer responsibility	
	CEMEX PERFILES THERMUR Aluminium profiles: (base, corners, top and window sills) and its fixing devices		
	CEMEX SOPORTES THERMUR. PF or PU blocks for fixing loads onto ETICS layers		

2 Specification of the intended use in accordance with the applicable EAD

This ETICS is intended to be used as external thermal insulation for building walls. The walls are made of masonry (bricks, blocks…), or concrete (cast on site or as prefabricated panels) with a reaction to fire classification A1 to A2-s2,d0 according to EN 13501-1 or A1 according to the EC decision 96/603/EC as amended. The ETICS is designed to give the wall to which is applied satisfactory thermal insulation.

This ETICS is made of non load-bearing construction elements. It does not contribute directly to the stability of the wall on which is installed, but it can contribute its durability by providing enhanced protection from the effect of weathering. The minimum thermal resistance of the ETICS shall be ≥ 1,0 m^2K/W.

(1) The technical documentation of this European Technical Assessment is deposited at the *Instituto de Ciencias de la Construcción Eduardo Torroja* (IETcc) and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure, is handed over to the approved bodies.

This ETICS can be used on new or existing (retrofit) vertical walls. It can also be used on horizontal or inclined surfaces which are not exposed to precipitation. The ETICS is not intended to ensure the airtightness of the building structure.

Design and installation of ETICS should take into account principles laid down in chapter 7 of ETAG 004 and shall be done in accordance with national instructions. This ETA covers application of bonded ETICS where the concrete for testing of bond strength is representative for masonry or concrete. For bonded applications onto other substrates (e.g. organic paints or ceramic tiles), testing on the job site is necessary.

The provisions made in this ETA are based on an assumed working life of 25 years as minimum, provided that the conditions laid down for the installation, appropriate use, maintenance and repair are met. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right product in relation to the expected economically reasonable working life of the works.

Installation. The ETICS is installed on site. It is the responsibility of the manufacturer to guarantee that the information about design and installation of this ETICS is effectively communicated to the concerned people. This information can be given using reproductions of the respective parts of this European Technical Assessment. Besides, all the data concerning the execution shall be clearly indicated on the packaging and/or the enclosed instruction sheets using one or several illustrations.

The wall on which the ETICS is applied shall be sufficiently stable and airtight. Its stiffness shall be large enough to ensure that ETICS is not subjected to deformations, which could lead to damage. The requirements given in ETAG 004, chapter 7 have to be considered.

*Design***.** In any case, the user shall comply with the national regulations and particularly concerning fires and wind load resistance. Only the components described in clause 1 with characteristics according to clause 3 of this ETA can be used for this ETICS.

The works including the details (connection, joint,.) shall be designed in order to avoid water penetration behind the system. To bond the ETICS, the minimal surface area and the method of bonding shall comply with the characteristics of the ETICS (see 2.2 of this ETA) as well as the national regulations. In any case, the minimal surface shall be at least 75 %.

Execution. The recognition and preparation of the substrate as well as the generalities about the execution of the ETICS shall be carried out in compliance with:

- Chapter 7 of the ETAG. 004, with imperative removal of any existing paint finish or renders which may difficult the bond resistance of the system.
- Corresponding national regulations.

The particularities in execution linked to the method of bonding and the application of the rendering system shall be handled in accordance with manufacturer prescriptions. In particular it is suitable to comply with the quantities of rendering applied, the thickness regularity and the drying periods between layers.

Use, maintenance and repair of the works. It is accepted that the finishing coats shall normally be maintained in order to fully preserve the system's performance. Maintenance will include at least:

- The repairing of localised damaged areas due to accidents
- The application of various products or paints, possibly after washing or ad hoc preparation.

Necessary repairs should be done rapidly. It is important to be able to carry out maintenance as far as possible using readily available products and equipment, without spoiling appearance.

3 Performance of the product and references to the methods used for its assessment

The identification tests and the assessment for the intended use of this ETICS according to the Essential Requirements were carried out in compliance with the ETA Guidance n. 004: External Thermal Insulation Composite Systems with Rendering- edition February 2013 (called ETAG 004, in this ETA).

3.1 ETICS Characteristics

Mechanical resistance and sability (BWR 1). No relevant.

Safety in case of fire ((BWR 2)

Reaction to fire. Euroclass according to EN 13501-1:2002. F without testing (no performance determined). A European reference fire scenario has not been laid down for façades. In some Member States, the classification (F) of the ETICS according to EN 13501-1:2002 might not be sufficient for the use in facades. An additional assessment of the system according to the national provision (e.g. on the basis of a large scale test) might be necessary to comply with Member State Regulations, until the existing European classification system has been completed.

Hygiene, health and environment (BWR 3)

Water absorption

Base Coat	Rendering	Water absorption (Kg/m^2)	
		After 1h	After 24h
CEMEX THERMUR (4mm thickness) with the following CEMEX top coat	without rendering	< 1,0	< 0,5
	CEMEX ACRÍLICO FINO		
	CEMEX ACRÍLICO		
	CEMEX ACRÍLICO RAYADO		
	CEMEX ACRÍLICO RUGOSO		
	CEMEX ACRÍLICO SILOX		
	CEMEX ACRÍLICO SILOX LISO		
	CEMEX CAL THERMUR		
	CEMEX MONOCAPA THERMUR		≥ 0,5

Hygrothermal behaviour. It has been assessed on two rigs including the two thermal isolation and all top coat. During heat rain and heat – cold cycles, none of the following defects occurs during testing:

- Blistering or peeling of any finishing.
- Failure or cracking associated with joints between insulation product boards or profiles fitted with system.
- Detachment of render.
- Cracking allowing water penetration to the insulation layer.

This system is therefore assessed as resistant to hygrothermal cycles.

Freeze / thaw behaviour. The water absorption of the base coat and of rendering system is less than 0.5 kg/m^2 after 24 hours and so the system can be assessed as freeze/thaw resistant without any further testing, except for the system composition made of base coat and finished coat with CEMEX MONOCAPA THERMUR. This configuration was submitted to freeze-thaw tests following the simulated method. None of the defects described at above point were observed.

Impact resistance. The resistance to hard body impacts (3 and 10 Joules) tests carried out on samples of systems compositions lead to the following categories:

Rendering system base coat + finishing coat	**Single** *CEMEX MALLA THERMUR®*	**Double** *CEMEX MALLA THERMUR* **Single** *CEMEX MALLA THERMUR / XL*
CEMEX ACRÍLICO FINO	Category I	Category I
CEMEX ACRÍLICO		
CEMEX ACRÍLICO RAYADO		
CEMEX ACRÍLICO RUGOSO		
CEMEX ACRÍLICO SILOX		
CEMEX ACRÍLICO SILOX LISO		
CEMEX CAL THERMUR		
CEMEX MONOCAPA THERMUR		

Water vapour permeability

Rendering system	Equivalent air thickness (≤ 2 m)	
base coat (4 mm) + primer + fininsing coat	*CEMEX THERMUR® gris*	*CEMEX THERMUR® blanco*
CEMEX ACRÍLICO FINO (1,5mm)	0,4	0,3
CEMEX ACRÍLICO (2 mm)	0,2	0,4
CEMEX ACRÍLICO RAYADO (3 mm)	0,1	-----
CEMEX ACRÍLICO RUGOSO (0,7 mm)	0,13	-----
CEMEX ACRÍLICO SILOX (2,5 mm)	0,2	0,2
CEMEX ACRÍLICO SILOX LISO (0,2 mm)	0,2	-----
CEMEX CAL THERMUR (10 mm)	0,5	-----
CEMEX MONOCAPA THERMUR (10 mm)	0,5	-----

Dangerous substances. This system complies with the provisions of Guidance Paper H[(2)]. A declaration of conformity in this respect was made by the manufacturer. In addition to the specific clauses relating to dangerous substances contained in this ETA, there may be other requirements applicable to the ETICS falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Regulations 305/11, these requirements need also to be complied with, when and where apply.

Safety in use (BWR 4)

Bond strength: Base coat onto PF board. The tests were performed on samples of PF insulation boards faced with base coat, and were subjected to the following tests, and in all cases breakage location was 100% on PF:

Bond Strength results (MPa)		
Initial state	After hygrothermal cycles (on the rigs)	After free/thaw cycles (on the samples)
0,06	0,04	------

Bond strength: Adhesive onto PF board. The tests were performed on samples of PF-N and PF-G insulation boards faced with base coat, and were subjected to the following tests, and in all cases breakage location was 100% on PF:

Bond Strength results (MPa)		
Initial state	Immersion 48 h and 2 h drying	Immersion 48 h and 7 d drying
0,06	0,05 ≥ 0,03	0,05

Bond strength: Adhesive onto concrete

Bond Strength results on concrete (MPa)		
Initial state	Immersion 48 h and 2 h drying	Immersion 48 h and 7 d drying
≥ 0,25	≥ 0,08	≥ 0,25

The minimal bonded surface S, which shall exceed 75 %, is calculated as follows: S (%) = [0,03 * 100] / B Where: B: minimum mean failure resistance of the adhesive to the insulation product in dry conditions expressed in MPa and 0,03 MPa correspond to the minimum requirements.

Protection against noise (BWR 5). NPD

Energy economy and heat retention (BWR 6)

Thermal resistance. The additional thermal resistance R_{ETICS} provided by the ETICS to the substrate wall is calculated in accordance with EN ISO 6946 from the nominal value of the insulation product´s thermal resistance R_D given accompanied to the CE marking and from the thermal resistance of the rendering system R_{render} which is about 0,02 m²K/W.

$$R_{ETICS} = R_D + R_{render}$$

The thermal bridges caused by mechanical fixing devices influence the thermal transmittance of the entire wall and shall be taken into account using the following calculation:

$$U_c = U + \Delta U \ (W/m^2K),$$

(2) *Guidance Document H:* "A harmonized approach related to dangerous substances under the Construction Products Directive".

U_c: Corrected thermal transmittance (W/(m².K)) of the entire wall,, including thermal bridges.
U: thermal transmittance of the entire wall, including ETICS, without thermal bridges) (W/(m².K):

$$U = \frac{1}{R_i + R_{render} + R_{substrate} + R_{se} + R_{si}}$$

R_i: thermal resistance of the insulation product // **R_{render}**:thermal resistance of the render (about 0,02 (m².K)/W).
$R_{substrate}$: thermal resistance of the substrate of the building (concrete,brick…)((m².K)/W) //
R_{se}: external superficial thermal resistance ((m².K)/W). // **R_{si}**: internal superficial thermal resistance ((m².K)/W).

ΔU: Correction term of the thermal transmittance for mechanical fixing devices

$$\Delta U = X_p * n,$$

n: number of anchors (through insulation product) per m² // X_p:point thermal transmittance value of the anchor (0.002 W/K).

Aspect of durability and serviceability

Bond strength after ageing. In all cases breakage location was 100% on PF.

Rendering system (base coat + fininsing coat)	**After Hygrothermal cycles** (rigs)	**After freeze/thaw cycles** (samples)
CEMEX ACRÍLICO FINO	0,04 MPa	-------
CEMEX ACRÍLICO		
CEMEX ACRÍLICO RAYADO		
CEMEX ACRÍLICO RUGOSO		
CEMEX ACRÍLICO SILOX		
CEMEX ACRÍLICO SILOX LISO		
CEMEX CALTHERMUR		
CEMEX MONOCAPA FLEX		0,04 MPa (failure of insulation)

The rendering system (base coat with each finishing coat indicated in table above) has also proofed its bond strength after ageing by experience on site.

3.2 Characteristics of the components

Detailed information on the chemical composition and other identifying characteristics of the components, following Annex C of ETAG 004, has been deposited at the IETcc. Further information can be observed from the product data sheets, which are part of the Technical Documentation for this ETA.

Insulation product. Factory–prefabricated, coated boards made of phenolic foam (PF), having the description, characteristics and performances (as minimum) defined in the table below (EN 13166):

Characteristics		**CEMEX AISLAMIENTO THERMUR PF**
Reaction to fire Euroclass (EN 13501-1)		C-s2-d0
Thickness (EN 823) (mm)		20- 160
Length (EN 822) (mm)		120
Width (EN 822) (mm)		40
Thermal resistance (m^2 K/W) (EN 13163)		Defined at CE
Dimensional stability under	Laboratory conditions (EN 1603)	-------
	Temperature and humidity specific conditions (EN 1604)	DS (70,90)
	-20ºC	DS (-20)
Short-term water absorption under partial immersion (EN 1609) (kg/m^2)		WS 3
Long-term water absorption under partial immersion (EN 12087) (kg/m^2)		npd
Water vapour diffusion (EN 12086) (μ)		35
Tensile strength perpendicular to the faces in dry conditions (EN 1607) (kPa)		TR100
Shear strength (EN 12090) (N/mm²)		≥ 0,02
Shear modulus (EN 12090) (N/mm²)		≥ 1,00
Density (EN 1602) (kg/m^3)		35

Render. Render strip tensile resistance: No Performance Determined

Glass fibre mesh. CEMEX MALLA THERMUR y CEMEX MALLA THERMUR XL Tearing strength after ageing of the glass fibre mesh was tested according to the ETAG 004:

Status	Units	Tearing strength	
		Warp direction	Weft direction
Initial	N / mm	≥ 20	≥ 20
After ageing	N / mm	≥ 20	≥ 20
	%	≥ 50	≥ 50

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

System of attestation of conformity. According to the decision 97/556/EC of the European Commission [3] amended by 2001/596/EC [4] the system of assessment and verification of constancy of performance (see Annex V to Regulation (EU) nº 305/2011) given in the following table applies.

Product	Intended uses	Level or Classes	System
THERMUR® PF	External Thermal Insulation Composite System with rendering for use on building walls	Any	2+

This system of attestation of conformity +2 is defined as follows:

Tasks for the manufacturer: Initial type-testing of the product, Factory production control and Testing of samples taken at the factory in accordance with a prescribed test plan.

Tasks for the notified body: Certification of factory production control on the basis of:

- Initial inspection of factory and of factory production control.
- Continuous surveillance (annual), assessment and assessment of factory production control.

5 Technical details necessary for the implementation of the AVCP system, as provided for the applicable EAD

The ETA is issued for this kit on the basis of agreed data/information, deposited at IETcc, which identifies the product that has been assessed and judged. It is the manufacturer's responsibility to make sure that all those who use the kit are appropriately informed of specific conditions according to sections 1, 2, 4 and 5 including the annexes of this ETA. Changes to the ETICS or the components or their production process, should be notified to the IETcc before the changes are introduced. IETcc will decide whether or not such changes affect the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

5.1 Tasks of the manufacturer

Factory production control. The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall ensure that the product is in conformity with this ETA.

The manufacturer may only use components stated in the technical documentation of this ETA including Control Plan. The incoming raw materials are subjected to verifications by the manufacturer before acceptance.

For the components of the ETICS which the manufacturer does not manufacture by himself, he shall make sure that factory production control carried out by the other manufacturers gives the guarantee of the components compliance with the ETA.

The factory production control shall be in accordance with the Control Plan[5] which is part of the Technical Documentation of this ETA. The Control Plan has been agreed between the manufacturer and the IETcc and is laid down in the context of the factory production control system operated by the manufacturer and deposited at the IETcc. The results of factory production control shall be recorded and evaluated in accordance with the provisions of the Control Plan.

(3) Official Journal of the European Communities L229/14 of 20.08.1997
(4) Official Journal of the European Communities L209/33 of 02.08.2001
(5) The control plan is a confidential part of this European Technical Assessment and only handed over to the notified body involved in the procedure of attestation of conformity. See section 3.2.2.

Other tasks of manufacturer. The manufacturer shall, on the basis of a contract, involve a body which is notified for the tasks referred to in section 4 in the field of ETICS in order to undertake the actions laid down in this clause. For this purpose, the control plan shall be handed over by the manufacturer to the notified bodies involved.

For initial type - testing of the ETICS and the components the results of the tests performed as part of the assessment for the ETA shall be used unless there are changes in the production line or plant. In such cases the necessary initial type- testing has to be agreed with the IETcc.

The manufacturer shall make a declaration of conformity, stating that the ETICS is in conformity with the provisions of this ETA.

5.2 Tasks of notified bodies. The notified body shall perform:

Initial inspection of factory and of factory production control. The Notified Body shall ascertain that, in accordance with the Control Plan, the factory (in particular the employees and the equipment) and the factory production control are suitable to ensure continuous and orderly manufacturing of the components according to the specifications mentioned in clause 2 of this ETA.

Continuous surveillance, assessment and assessment of factory production control, in accordance with the provisions laid down in the control plan, at least one per year.

The notified body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report. The notified certification body involved by the manufacturer shall issue an EC Certificate of factory production control stating the conformity of the provisions of this ETA.

In cases where the provisions of the ETA and its control plan are no longer fulfilled the notified certification body shall withdraw the certificate of conformity and inform to IETcc without delay.

Issued in Madrid on 03/ 03/ 2014
by

Instituto de Ciencias de la Construcción Eduardo Torroja

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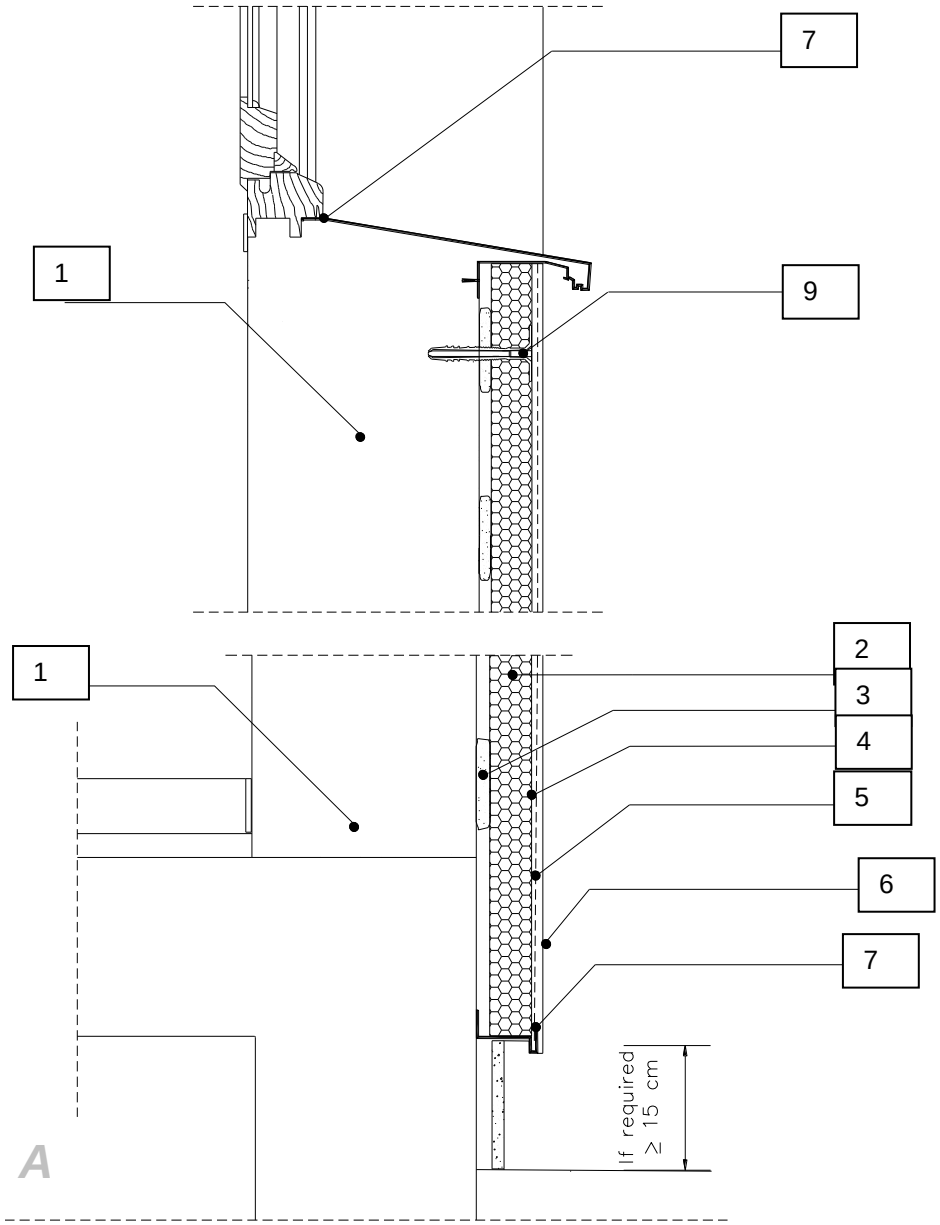
On behalf of the Instituto de Ciencias de la Construcción Eduardo Torroja

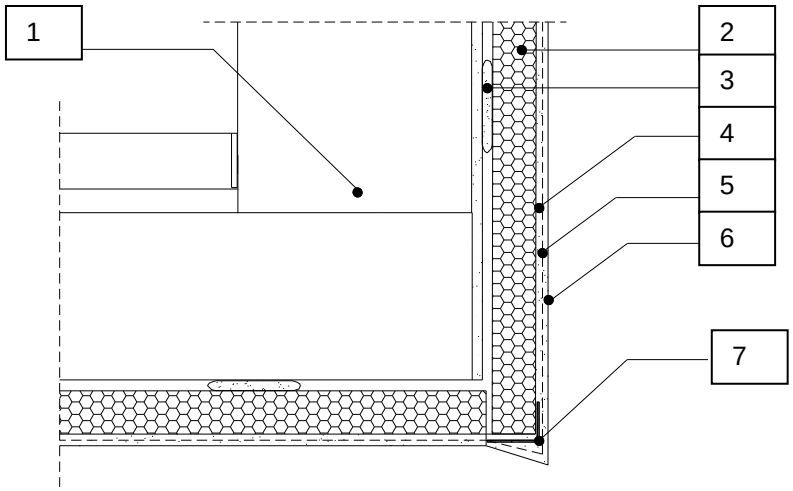
Ángel Arteaga Iriarte
Director



1. Substrate
2. *CEMEX AISLAMIENTO THERMUR® PF*
3. Adhesive *"CEMEX THERMUR®" gris/blanco*
4. Base coat *"CEMEX THERMUR®" gris/blanco (first and second layer)*
5. Glass fibre standard mesh *"CEMEX MALLA THERMUR®"* (one or double layer)
6. Finishing coat
7. Aluminium base profile
9. Supplementary fixing

External thermal insulation composite system THERMUR® PF	**Annex 1** of European Technical Assessment

DETAIL A: VERTICAL SECTION OF BASE AND APERTURE (WINDOW)	ETA 14/0019



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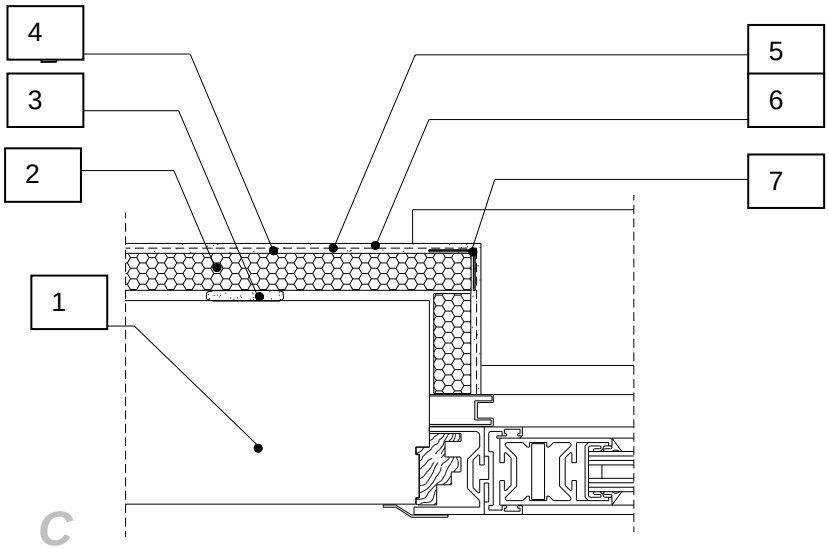

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1. Substrate
2. ***CEMEX AISLAMIENTO THERMUR® PF.***
3. Adhesive *"CEMEX THERMUR®"*
4. Base coat *"CEMEX THERMUR®" (first and second layer)*
5. Glass fibre standard mesh *"CEMEX MALLA THERMUR®" (one* or double layer)
6. Finishing coat
7. Aluminium corner profile

External thermal insulation composite system THERMUR® PF	**Annex 2** of European Technical Assessment ETA 14 /0019
DETAIL B: VERTICAL SECTION OF APERTURE (WINDOW) **DETAIL C: HORIZONTAL SECTION OF APERTURE (WINDOW)**	