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European Technical Assessment

ETA 22/0582 of 29/12/2022



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General Part

Technical Assessment Body issuing the European Technical Assessment:

Itecons - Instituto de Investigação e Desenvolvimento Tecnológico para a Construção, Energia, Ambiente e Sustentabilidade

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Trade name of the construction product	BC THERM
Product family to which the construction product belongs	External Thermal Insulation Composite Systems Product area code:4
Manufacturer	BEIRICOLA – Fábrica de Cimentos Cola da Beira Alta, Lda. Zona Industrial de Mortágua 3450-232 Mortágua Portugal
Manufacturing plant(s)	BEIRICOLA – Fábrica de Cimentos Cola da Beira Alta, Lda. Zona Industrial de Mortágua 3450-232 Mortágua Portugal
This European Technical Assessment contains	13 pages
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of	EAD 040083-00-0404 External Thermal Insulation Composite Systems (ETICS) with renderings

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Specific parts

1. Technical description of the product

This product is an ETICS (External Thermal Insulation Composite System) with rendering – a kit comprising components which are factory-produced by manufacturer or component suppliers. The ETICS manufacturer is ultimately responsible for all components of ETICS specified in this ETA.

The ETICS kit comprises a prefabricated insulation product of expanded polystyrene (EPS) to be bonded with supplementary mechanical fixings onto a wall. The methods of fixing and the relevant components of the ETICS are specified in Table 1. The insulation product is faced with a rendering system consisting of one or two layers (site applied), one of which contains reinforcement. The rendering is applied directly to the insulation panels, without any air gap or disconnecting layer.

The ETICS may include special fittings (e.g. base profiles, corner profiles ...) to treat details of ETICS (connections, apertures, corners, parapets, sills...). The assessment and performance of these components is not addressed in this ETA, however the ETICS manufacturer is responsible for adequate compatibility and performance within the ETICS when the components are delivered as a part of the kit.

Table 1: Components of the ETICS

Component	Descriptio	n	Coverage (kg/m²)	Thickness (mm)
Insulation product	EPS 100 TECNOVITE Expanded polystyrene (EPS 10	00) with CE marking.		40 - 100
Adhesive	BC THERM 30 Adhesive mortar composed o fillers, polymers and adjuvant		3.5 to 6.0	2.1 to 4.4
	BC THERM 30 Adhesive mortar composed	with standard glass fibre mesh		40.00
Base Coat	Base Coat of cement, mineral fillers, polymers and adjuvants, with CE marking.	with double glass fibre mesh	3.0 to 4.0	1.8 to 3.0
Key coat	BC PRIME Cement based primer.	0.2		
Finishing coat	BC CRIL Based on acrylic copolymers a watery dispersions	1.8 to 4.0	1.0 to 2.0	
Glass fibre mesh	JSC "Valmieras stikla šķiedra" Standard mesh (glass fibre me mm x 4.2 mm)			
Anchors (supplementary mechanical fixings)	LTX-10, LMX-10, LGX-10 (According to ETA 16/0509)			
Ancillary components	Remain under the ETA holder responsibility			

2. Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

2.1. Intended use

This ETICS is intended for use as external insulation of building walls. The walls are made of masonry (bricks and 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 it is applied satisfactory thermal insulation. The characteristics of walls shall be verified prior to use of the ETICS, especially regarding conditions for reaction to fire classification and for fixing of the ETICS either by bonding or mechanically.

The ETICS shall be designed and installed in accordance with ETA holder's installation instructions and this ETA. The kit consists of components defined by the ETA holder and manufactured either by the ETA holder or his supplier(s).

The ETICS is made of non-loadbearing construction elements. It does not contribute directly to the stability of wall on which it is installed, but it can contribute to durability by providing enhanced protection from the effect of weathering.

The 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.

The provisions made in this European Technical Assessment (ETA) are based on an assumed intended working life of at least 25 years, provided that the conditions laid down in the following sections 2.2 to 2.5 for the packing, transport, storage, installation are met and that the installed ETICS is subjected to an appropriate use, maintenance and repair as well. 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.

2.2. Manufacturing

The European Technical Assessment is issued for the ETICS on the basis of agreed data/information, deposited with the Itecons - Instituto de Investigação e Desenvolvimento Tecnológico para a Construção, Energia, Ambiente e Sustentabilidade, which identifies the ETICS that has been assessed and judged. Changes to the ETICS or production process, which could result in the deposited data/information being incorrect should be notified to Itecons before changes are introduced. The Itecons will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA, shall be necessary.

2.3. Design and installation

The installation instruction including special installation techniques and provisions for the qualification of the personnel are given in the manufacturer's technical documentation.

2.4. Packing, transport and storage

The information on packing, transport and storage is given in the manufacturer's technical documentation. It is the responsibility of the manufacturer to ensure that this information is made know to the concerned people.

2.5. Use, maintenance and repair

The finishing coat shall be normally maintained in order to fully preserve the ETICS performance. Maintenance includes at least:

- visual inspection of the ETICS;
- the repairing of localized damaged areas due to accidents;
- the aspect maintenance with products adapted and compatible with the ETICS (possibly after washing or ad hoc preparation).

Necessary repairs should be performed as soon as the need has been identified.

It is important to be able to carry out maintenance as far as possible using readily available products and equipment, without spoiling appearance. Only products which are compatible with the ETICS shall be used.

The information on use, maintenance and repair is given in the manufacturer's technical documentation. It is the responsibility of manufacturer(s) to ensure that this information is made know to the concerned people.

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 the Essential Requirements were carried out in compliance with the with the EAD 040083-00-0404, "External Thermal Insulation Composite Systems (ETICS) with Renderings" — edition January 2019 (hereinafter referred to as "EAD").

3.1. ETICS characteristics

3.1.1. Mechanical resistance and stability (BWR 1)

Not relevant.

3.1.2. Safety in case of fire (BWR 2)

3.1.2.1. Reaction to fire

3.1.2.1.1. Reaction to fire of ETICS

The reaction to fire was tested according to ISO 11925-2:2020 and EN 13823:2020 and classified according to EN 13501-1:2018.

The BC THERM system meets the requirements of class B-s2, d0.

Note: A European reference fire scenario has not been laid down for facades. In some Member States, the classification of ETICS according to EN 13501-1:2018 might not be sufficient for the use in facades. An additional assessment of ETICS according to national provisions (e.g. on the basis of large scale test) might be necessary to comply with Member State regulations, until the existing European classification system has been completed.

3.1.2.1.2. Reaction to fire of thermal insulation material

The reaction to fire classification of thermal insulation product EPS is class E, according to EN 13501-1:2007+A1:2009.

3.1.2.2. Façade fire performance

No performance assessed.

3.1.2.3. Propensity to undergo continuous smouldering of ETICS

No performance assessed.

3.1.3. Hygiene, health and environment (BWR 3)

3.1.3.1. Content, emission and/or release of dangerous substances

No performance assessed.

3.1.3.2. Water absorption

3.1.3.2.1. Water absorption of the base coat and the rendering system

The results of the water absorption test of the base coat (system without finishing) and the rendering system, presented in Table 2, and verify the following conditions:

- Water absorption after 1 hour < 1 kg/m²;
- Water absorption after 24 hours < 0.5 kg/m².

The system is therefore judged to have satisfactory performance concerning water absorption.

Table 2: Water absorption (capillary test)

System specimens	Water absorption after 1 h (mean value) [kg/m²]	Water absorption after 24 h (mean value) [kg/m²]
EPS + base coat + standard mesh	0.21	0.34
EPS + base coat + standard mesh + key coat + finishing coat	0.02	0.13

3.1.3.2.2. Water absorption of thermal insulation product

The value of water absorption of thermal insulation product, determined by partial immersion according to EN 1609, method A, is 0.09 kg/m².

3.1.3.3. Watertightness of the ETICS: Hygrothermal behaviour

Hygrothermal cycles have been performed on a rig.

The ETICS is assessed resistant to hygrothermal cycles, it means ETICS passed the test without defects.

3.1.3.4. Watertightness of the ETICS: Freeze-thaw behaviour

The ETICS is freeze-thaw resistant if the water absorption of both reinforced base coat and the rendering system are less than 0.5 kg/m^2 after 24 hours (see 3.1.3.2.1).

3.1.3.5. Impact resistance

The resistance to hard body impact (3 and 10 Joules) tests carried out on samples of system composition led to the use categories presented in Table 3.

Table 3: Impact resistance to hard body impacts

System specimens	Hard body impact	Impact zone – diameter (maximum value) [mm]	Use categories ¹	
Test specimens tested on the rig				
EPS + base coat + standard	10 J	61.10 Cracks reaching the insulation product	111	
mesh + key coat + finishing coat	3 J	39.07 Cracks without reaching the insulation product	III	

System specimens	Hard body impact	Impact zone – diameter (maximum value) [mm]	Use categories ¹
EPS + base coat + double standard mesh + key coat	10 J	38.47 Superficial damages without cracks formation	III
+ finishing coat	3 J	26.84 Cracks without reaching the insulation product	1//

¹ Use categories:

Category I – zones readily accessible at ground level to the public and vulnerable to hard impacts but not subjected to abnormally rough use;

Category II – zones liable to impacts from thrown or kicked objects, but in public locations where the height of system will limit the size of impact; or at lower levels where access to the building is primarily to those with some incentive to exercise care;

Category III – zones not likely to be damaged by normal impacts caused by people or by thrown or kicked objects.

3.1.3.6. Water vapour permeability

3.1.3.6.1. Water vapour permeability of rendering system

Table 4 presents de resistance to water vapour diffusion of rendering system (base coat and finishing coat) for the system configuration, expressed by the equivalent air thickness and verify the condition $S_d \le 2$.

Table 4: Equivalent air thickness

System specimens	Thickness of the rendering system (mean value) [mm]	Water vapour diffusion resistance factor (mean value) μ [-]	Equivalent air thickness (mean value) Sd [m]
Base coat + standard mesh + key coat + finishing coat	4.1	44.2	0.2

3.1.3.6.2. Water vapour permeability of thermal insulation product

No performance assessed.

3.1.4. Safety and accessibility in use (BWR 4)

3.1.4.1. Bond strength

3.1.4.1.1. Bond strength between the base coat and the thermal insulation products

Tests were performed on the system BC THERM, at initial state and after hygrothermal cycles. The results are summarized in Table 5 and Table 6 and verify the condition of bond strength after each conditioning \geq 80 kPa.

Table 5: Bond strength between base coat and insulation product at initial state

	Bond strength (Initial state)		
System	Minimum value [kPa] (Failure pattern)	Mean value [kPa]	
EPS + base coat + standard mesh	150 (cohesive failure, 100% rupture in the insulation product)	160	

Table 6: Bond strength between base coat and insulation product after hygrothermal cycles

Contain	Bond strength (after ageing)		
System	Minimum value [kPa] (Failure pattern)	Mean value [kPa]	
EPS + base coat + standard mesh + key coat + finishing coat	131 (cohesive failure, 100% rupture in the insulation product)	150	
EPS + base coat + double standard mesh + key coat + finishing coat	145 (cohesive failure, 100% rupture in the insulation product)	166	

3.1.4.1.2. Bond strength between the adhesive and the thermal insulation product

Tests were performed on samples of insulation products with base coat. The results are summarized in Table 7 and verify the following conditions:

- Bond strength in dry condition ≥ 30 kPa;
- Bond strength after 2 hours after removing the samples from water: no requirement;
- Bond strength 7 days after removing the samples from water: no requirement.

Table 7: Bond strength between adhesive and insulation product

	Bond strength							
	Ini	tial state			After cond	litioning		
Specimen	Tested	Minimum		immersion in wat 2 h 23 °C/50% RH			immersion in wa days 23 °C/50%	
thicl	adhesive thickness [mm]	hesive value ckness [kPa]	Tested adhesive thickness [mm]	Minimum value [kPa]	Mean value [kPa]	Tested adhesive thickness [mm]	Minimum value [kPa]	Mean value [kPa]
EPS + adhesive	3.5	121 (cohesive failure, 100% rupture in the insulation product)	4.5	136 (cohesive failure, 100% rupture in the insulation product)	141	3.5	91 (cohesive failure, 100% rupture in the insulation product)	118

3.1.4.1.3. Bond strength between the adhesive and the substrate

Tests were performance on samples of substrate (concrete) faced with adhesive product. The results are summarized in Table 8 and verify the following conditions:

- Bond strength in dry condition ≥ 250 kPa;
- Bond strength after 2 hours after removing the samples from water ≥ 80 kPa;
- Bond strength 7 days after removing the samples from water ≥ 250 kPa.

Table 8: Bond strength between adhesive and substrate

	Bond strength							
	Ini	tial state	After cond			itioning		
Specimen	Tested	D. G. Landerson		48 h immersion in water + 2 h 23 °C/50% RH			immersion in wa	
	adhesive thickness [kPa]		Tested adhesive thickness [mm]	Minimum value [kPa]	Mean value [kPa]	Tested adhesive thickness [mm]	Minimum value [kPa]	Mean value [kPa]
adhesive + Substrate	2.1	400 (cohesive failure, 100% rupture in the adhesive)	2.2	248 (cohesive failure, 100% rupture in the adhesive)	267	2.6	1233 (cohesive failure, 100% rupture in the adhesive)	1321

3.1.4.1.4. Minimal bonded area S for bonded ETICS

The minimal bonded area S for bonded ETICS for BC THERM system is 25% and is calculated as follows:

$$S = (30 \times 100)/B$$
 in %

Where:

- S minimal bonded area, expressed in %
- B minimum single failure resistance of the adhesive to the thermal insulation product in dry condition for all failure modes, expressed in kPa
- 30 bond strength between adhesive and thermal insulation product in kPa corresponding to minimal requirement on bonded ETICS

3.1.4.2. Render strip tensile test

No performance assessed.

3.1.4.3. Mechanical and physical characteristics of the mesh

See Table 11.

3.1.5. Protection against noise (BWR 5)

3.1.5.1. Airborne sound insulation of ETICS

No performance assessed.

3.1.6. Energy economy and heat retention (BWR 6)

3.1.6.1. Thermal resistance and thermal transmittance of ETICS

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 products thermal resistance R_D given accompanied to the CE marking and from the thermal resistance of the rendering system R_{render}.

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

The value of thermal resistance of the render system (R_{render}) was considered as equal to 0.02 (m².K)/W according to clause 2.2.23 of the EAD 040083-00-0404.

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:

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

U_c: corrected thermal trnsmittance (W/m²K) of the entire wall, including thermal bridges.

U: thermal transmittance of the entire wall, including ETICS, without thermal bridges (W/m²K):

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

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].

 Δ U: 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)¹.

Table 9 presents the values of thermal resistance calculation for BC THERM with EPS thickness equal to 40 mm, 50 mm, 60 mm, 70 mm, 80 mm, 90 mm and 100 mm.

Table 9: Thermal resistance values for BC THERM system

EPS thickness [mm]	R _D [(m².K)/W]	R _{ETICS} [(m².K)/W]
40	1.10	1.12
50	1.35	1.37
60	1.65	1.67
70	1.90	1.92
80	2.20	2.22
90	2.50	2.52
100	2.75	2.77

3.1.7. Sustainable use of natural resources (BWR 7)

No performance assessed.

3.2. Characteristics of the components

3.2.1. Insulation product

Factory-prefabricated uncoated panels made of expanded polystyrene (EPS) complying with the requirements of EN 13163.

Table 10: EPS characteristics

Component	Trade name	Characteristics	Declared values and classes
		Reaction to Fire / EN 13501-1	E (Thickness: 20 to 200 mm; Density: 20kg/m³)
	Insulation TECNOVITE product EPS 100	0.036	
		1-11-0-0	
		Water absorption by partial immersion (kg/m²) / EN 1609	$W_p = 0.08$
		Shear strength (kPa) / EN 12090	$\tau_{(min. value)} = 110$ $\tau_{(mean value)} = 120$

¹The thermal bridge effect of the anchor is smaller than 0.0005 W/K and can therefore be neglected in the calculation.

Component	Trade name	Characteristics	Declared values and classes
		Shear modulus (kPa) / EN 12090	G (min. value) = 2400
		Water vapour diffusion resistance factor (-) / EN 13163	$\mu = 30 - 70$

3.2.2. Glass fibre meshes

The characteristics of the glass fibre mesh are presented in Table 11.

Table 11: Glass fibre mesh characteristics

Component	Trade Name	Characte	Results			
Standard mesh	SSA-1363- 160	Mass per unit area (g/m²)		165		
		Organic content (%)		18.8		
		Ash content at 625 °C (%)		82.4		
		Loss on ignition at 625 °C (%)		16.6		
		Tensile strength and elongation		Warp direction	Weft direction	
		In the as-delivered state	Tensile strength (N/mm)	43	45	
			Elongation ε (%)	3.6	3.9	
		After alkalis conditioning	Tensile strength (N/mm)	26	29	
			Elongation ε (%)	2.3	2.3	
		The average value of the tensile strength after alkalis conditioning shall be at least 20 N/mm and at least 50% of the strength in the as-delivered state (residual strength): passed: \geq 20 N/mm after alkalis conditioning and residual strength \geq 50 % of the strength in the as-delivered state: passed				
		Mesh size (mm)		5.1 x 4.2		
		Mesh opening (mm)		4.0 x 3.9		

¹Percentage of the strength in the as-delivered state

3.2.3. Anchors

Anchors for insulation product act as a supplementary fixing if required. The characteristic resistances of anchors were evaluated according EAD 330196-00-0604. The test results are presented in Table 12.

Table 12: Anchors description of individual product characteristics contained in the ETA

Trade name	Plate diameter (mm)	Characteristic resistances in the substrate
LTX10, LMX10, LGX10	60	See ETA-16/0509

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

According to the Decision 97/556/EC of European Commission as amended by the European Commission Decision 2001/596/EC, the AVCP systems (further described in Annex V Regulation (EU) No 305/2011) 1 and 2+ apply.

Table 13: AVCP Systems

Product(s)	Intended use(s)	Levels(s) or class(es) (Reaction to fire)	System(s)
	In external wall subject to fire regulations In external wall not subject to fire regulations	A1 ⁽¹⁾ , A2 ⁽¹⁾ , B ⁽¹⁾ , C ⁽¹⁾	1
External thermal insulation composite		A1 ⁽²⁾ , A2 ⁽²⁾ , B ⁽²⁾ , C ⁽²⁾ , D, E, (A1 to E) ⁽³⁾ , F	2+
systems/kits with rendering (ETICS)		any	2+

⁽¹⁾ Products/materials for which as clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material).

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

The ETA is issued on the basis of agreed data/information, deposited at Itecons, 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 laid down in this ETA.

Changes to the ETICS or the components or their production process should be notified to the Itecons before the changes are introduced. Itecons 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

5.1.1. Factory production control

The manufacturer shall exercise permanent internal control of production of concerned product. 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 component's compliance with the ETA.

The factory production control shall be in accordance with the Control Plan which is a part of technical documentation of this European Technical Assessment. The control plan has been agreed between the manufacturer and Itecons and is laid down in context of the factory production control system operated by the manufacturer and deposited within Itecons. The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

5.1.2. Other tasks for the 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.

⁽²⁾ Products/materials not covered by footnote 1.

⁽³⁾ Products/materials that do not required to be tested for reaction to fire (e.g. products/materials of Classes A1 according to Commission Decision 96/603/EC).

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 testing has to be agreed with Itecons.

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

Changes to the ETICS or the components or their production process should be notified to Itecons before the changes are introduced. Itecons will decide whether or not such changes affect the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

5.2. Tasks for the Notified Body (bodies)

5.2.1. Initial inspections 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 this ETA.

5.2.2. Continuous surveillance, assessment and evaluation of factory production control

Within the scope of continuous surveillance, assessment and evaluation of factory production control, the Notified Body (bodies) shall visit the factory at least once a year for surveillance. It has to be verified that the factory production control is maintained in suitable conditions.

These tasks shall be performed in accordance with the provisions laid down in the control plan.

The Notified Body (bodies) shall retain the essential points of its (their) actions referred to above and state the results obtained and conclusions drawn in a written report. The Notified Body involved by the manufacturer shall issue a certificate of conformity of the factory production control stating the conformity with the provisions of this ETA.

In cases where the provisions of the ETA and its control plan are no longer fulfilled, the Notified Body shall withdraw the certificate of conformity and inform Itecons without delay.

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By Technical Assessment Unit of

Itecons – Instituto de Investigação e Desenvolvimento Tecnológico para a Construção, Energia, Ambiente e Sustentabilidade

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Validated document