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DE LA CONSTRUCCIÓN
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Member of



European Technical Assessment

ETA 23/ 0892
22/ 12/ 2023

English translation prepared by IETcc. Original version in Spanish language

General Part

Technical Assessment Body issuing the European Technical Assessment:
Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc)

Trade name of the construction product

DANOTHERM CERAMIC

Product family to which the construction product belongs

External Thermal Insulation Composite System with discontinuous claddings as exterior skin

Manufacturer

DERIVADOS ASFALTICOS NORMALIZADOS, S.A (DANOSA)
c/ La Granja n.º 3. 28108 ALCOBENDAS
MADRID, Spain.

Manufacturing plant(s)

Planta de morteros DANOSA-ARGOS
A44 salida 144,
18640 PADUL (GRANADA), Spain

DERIVADOS ASFALTICOS NORMALIZADOS, S.A (DANOSA)
Pol. Ind. Sector 9
19290 FONTANAR (GUADALAJARA), Spain

This European Technical Assessment contains

7 pages.
Annex 1 contains confidential information and is not included in the European Technical Assessment when that assessment is publicly disseminated

This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of

040287-00-0404:
Kits for external thermal insulation composite system (ETICS) with panels as thermal insulation product and discontinuous claddings as exterior skin

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Specific parts

1 Technical description of the product

The External Thermal Insulation Composite System (from now on, referred to as ETICS) DANOTHERM CERAMIC 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.

DANOTHERM CERAMIC is defined as “bonded system with supplementary mechanical fixings” with is used with EPS / XPS panel. The minimum number of fasteners per square metres are 6 for EPS / XPS and an additional fixing per m2 on the glass mesh.

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

	Components (trade names)	Coverage Aprox ([kg/m ²)	Thickness Aprox [mm]				
Insulation material with associated method of fixing	Danotherm placa EPS. Insulating board of Expanded polystyrene (EPS) with CE marking (EN 13163) with supplementary mechanical fixings (minimum 6 fasteners/m ²) With a water absorption, Wp ≤ 1 kg/m ² (EN ISO 29767:2020)	0.8 – 4,0	40 - 200				
	DANOPRENFS. <i>Bonded</i> Board of Extruded polystyrene (XPS) (CE marking EN 13164) with supplementary mechanical fixings (minimum 6 fasteners/m ²) With a water absorption, Wp ≤ 1 kg/m ² (EN ISO 29767:2020)	1,4 - 7,0	40 - 200				
Adhesive	Argotec fixtherm Netzero. Minimum bonded surface: 80 % for EPS/XPS. Cement based mortar in powder requiring addition and mixing with 18,0 ± 1.0 % water	1-2 (powder/mm thickness)	3,0 - 5,0				
	Argotec Fixtherm élite. Minimum bonded surface: 80 % for EPS. Cement based mortar in powder requiring addition and mixing with 18,0 ± 1.0 % water						
Base coat	Argotec fixtherm Netzero. + Danotherm malla 160 FV (glass fibre mesh) Argotec Fixtherm élite +Danotherm malla 160 FV (glass fibre mesh)			3,0 – 5,0 (two hands)			
Glass fibre mesh	Glass fibre mesh resistant to the alkalis.		---	≤ 1			
	Characteristics		Values				
	Mesh size (mm)		3 - 6				
	Tensile strength (N/mm)		30 - 60				
	Elongación after ageing (%)		≥ 1.5				
	Mass per unit area (g/m ²)		≥ 140				
	Thickness (mm)		≤ 1				
	Organic content		≤ 23				
Adhesive for tile	Argocola élite 600 C2TES2 (EN 12004) Cement based mortar in powder requiring addition and mixing with 22,0 ± 2,% water.	6	5				
Discontinuous cladding	Tiles Group I, according to EN 14411.						
	Characteristics		Values				
	Maximum dimensions		2400 cm ²				
	maximum weight		40 kg/m ²				
Grout	Arjunt universal. The thickness of the grout joint is between 3 mm to 15 mm.		0.75				
Fasteners	Plastic anchors (expansion element and sleeve) for insulation material with different lengths in relation with thickness of insulation board				Remain under the manufacturer responsibility		
	Fasteners		ETA n.º	Diameter Plate (mm)		Stiffness (kN/mm)	Minimum tension load (N)
	Danotherm anclaje mecánico clavo mixto acero poliamida		14/0130	60		0,9	500*
	*These values show the minimum pull out of the fastener in the weakest support (enclosed in its ETA). Other higher values appear in their ETAs.						
	Other plastic fasteners can be used with CE marking (EAD 330196-00-0604, they have to have a plate dimension ≥ 60 mm diameter and Stiffness ≥ 0,9 kN/mm						
Ancillary elements	Base, corners, top and window sills, and its fixing devices						

(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 notified bodies involved in the attestation of conformity procedure, is handed over to the notified bodies.



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

2.1 Intended use(s)

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.

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.

This ETA covers application of ETICS:

- on supports of masonry or concrete.
- on substrates with a tensile strength > 0.5 N/mm²
- with ceramics with an absorption < 3%.
- with a ceramic grout > 3 mm and analysis of the movement joints.

2.2 Relevant general conditions for the use of the kit

The provisions made in this European Technical Assessment are based on an assumed working life of 25 years from installation in the works, according to EAD 040287-00-0404, provided that the conditions lay down for the installation, packaging, transport and storage as well as appropriate use, maintenance and repair are met. In this respect.

The indications given on the working life cannot be interpreted as a guarantee given neither by the product manufacturer nor by EOTA nor by the Technical Assessment Body issuing this ETA, but are 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 ETA. 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.

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. The minimal surface area for the bonded ETICS, and the method of bonding shall comply with the characteristics of the ETICS as well as the national regulations. In any case, the minimal surface shall be at least 80 % for EPS / XPS.

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 the manufacturer prescriptions and the 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 and the dimensions of the cladding.

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 Basic Work Requirements (BWR) were carried out in compliance with EAD 040287-00-0404, The characteristics of each system shall correspond to the respective values laid down in following tables of this ETA, checked by IETcc.

Methods of verification and of assessing and judging are listed afterwards.

3.1 Safety in case of fire (BWR 2)

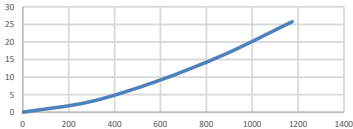
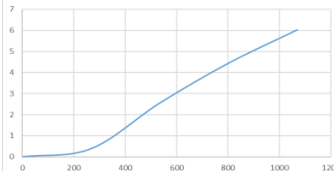
Basic requirement for construction works 2: Safety in case of fire		
Essential characteristic	Relevant clause in EAD	Performance
Reaction to fire	2.2.1	Euroclass
With EPS		B-s1,d0
With XPS		B-s1,d0
Façade fire performance	2.2.2	NPA

3.2 Hygiene, health and environment (BWR 3)

Basic requirement for construction works 3: Hygiene, health, and the environment				
Essential characteristic	Relevant clause in EAD	Performance		
Water absorption by capillarity	2.2.3	Rendering	After 1h (kg/m ²)	After 24h (kg/m ²)
		ARGOTEC FIXTERM NETZERO	0.16	0.6
		ARGOTEC FIXTERM ELITE	0.13	0.8
		Whole ETICS with the cladding top	0.05	0.2
Water vapour permeability	2.2.4	Adhesive, base coat, grout, $\mu = 10$ (EN ISO 10456)		
		Cladding according the DoP (CE marking)		
		EPS, $\mu = 30 - 70$		
		XPS, $\mu \geq 50$		
		The whole system: NPA Where appropriate, the resistance to diffusion of equivalent water vapour for the entire ETIS may also be indicated. This value can be obtained by calculation according to the method given in Annex D (using the water vapour permeability of each component) or by testing according to EN ISO 12572.		
Accelerated ageing behaviour	2.2.5	No detect of any damage		
- Hygrothermal behaviour	2.2.5.1	The values of bond strength in point 2.2.8		
- Water tightness of the ETICS: Freeze-thaw behaviour	2.2.5.2	The whole system is lower than 0.5 kg/m ² after 24 hours and so the system can be assessed as freeze/thaw resistant without any further testing.		
- Alternative test with combined hygrothermal and freeze-thaw cycles	2.2.5.3	NPA		



3.3 Safety and accessibility in use (BWR 4)

Basic requirement for construction works 4: Safety and accessibility in use					
Essential characteristic	Relevant clause in EAD	Performance			
Impact resistance	2.2.7	XPS	EPS		
		I (Category)	*these results was obtain on individual samples I (Category)		
Bond strength	2.2.8	between the external layers (skin and reinforced base coat) and the insulation panel (minimum /mean value) (kPa)			
		Thermal insulation	Initial state	After hydrothermal cycles (rigs)	Individual samples after 9 days in water immersion
		EPS	150	NPA	136
		XPS	260	200	-----
		Thermal insulation	Immersion 48 h and 2 h drying	Immersion 48 h and 7 d drying	After freeze-thaw cycles
		EPS	90	150	----
		XPS	150	305	-----
		between the insulation panel and the base adhesive (minimum /mean value) (kPa)			
		Thermal insulation	Initial state	Immersion 48 h and 2 h drying	Immersion 48 h and 7 d drying
		EPS	150	90	150
		XPS	260	150	305
		between the base adhesive and the substrate (minimum /mean value) (kPa)			
		ARGOTEC FIXTERM	Initial state	Immersion 48 h and 2 h drying	Immersion 48 h and 7 d drying
		NETZERO	1122	360	1600
		ELITE	1197	338	1411
		The rupture is cohesive of the EPS and adhesive on the XPS and cohesive of the adhesive on concrete support			
Tensile strenth of the thermal insulation panel	2.2.9	Thermal Insulation	Dry condition	7d at 70 °C 95%HR	28d at 70 °C 95 %HR
			kPa		
		EPS	150	139	148
		XPS	850	640	420
Shear strength and shear modulus of the thermal Insulation panel	2.2.10	Thermal Insulation	Dry condition	7d at 70 °C 95 %HR	28d at 70 °C 95 %HR
			kPa		
		EPS	90 / 5600	60 / 4700	70 / 5300
		XPS	200 / 5200	200 / 5600	200 / 5900
		Shear strength ≥ 0.02 MPa / Shear modulus ≥ 1.0 MPa			
Dead load behavior	2.2.11	ARGOTEC FIXTERM NETZERO		ARGOTEC FIXTERM ELITE	
		Maximum Load (N)	Maximum Displacement (mm)	Maximum Load (N)	Maximum Displacement (mm)
		XPS	XPS	EPS	EPS
		1175	9.3	1070	6.02
		Deflection curves Load (N) / displacement (mm)		Deflection curves Load (N) / displacement (mm)	
					

3.4 Protection against noise (BWR 5)

Basic requirement for construction works 5: Protection against noises		
Essential characteristic	Relevant clause in EAD	Performance
Improvement of airborne sound insulation	2.2.14	NPA



3.5 Energy economy and heat retention (BWR 6)

Basic requirement for construction works 6: Energy economy and heat retention		
Essential characteristic	Relevant clause in EAD	Performance
Thermal conductivity and thermal resistance	2.2.23.1	PANEL EPS $\lambda_D = 0.037$ W/mK
		PANEL XPS $\lambda_D = 0.033$ W/mK

The additional thermal resistance provided by the ETICS (R_{ETICS}) to the substrate wall is calculated from the thermal resistance of the thermal insulation product ($R_{insulation}$), determined in accordance with 2.2.15, and from either the tabulated R render value of the render system (R_{render} is about 0.02 m²K/W) or R_{render} determined by test according to EN 12667 or EN 12664 (depending on expected thermal resistance).

$$R_{ETICS} = R_{insulation} + R_{render} [(m^2 \cdot K)/W]$$

as described in EN ISO 10456.

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:

$$U_c = U + \Delta U [W/(m^2 \cdot K)]$$

With: U_c corrected thermal transmittance of the entire wall, including thermal bridges
 U thermal transmittance of the entire wall, including ETICS, without thermal bridges

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

$R_{substrate}$ thermal resistance of the substrate wall [(m²·K)/W]
 R_{se} external surface thermal resistance [(m²·K)/W]
 R_{si} internal surface thermal resistance [(m²·K)/W]
 ΔU correction term of the thermal transmittance for mechanical fixing devices
= $\chi_p \cdot n$ (for anchors) + $\sum \psi_i \cdot \ell_i$ (for profiles) (formula x)
 χ_p point thermal transmittance value of the anchor [W/K]. If not specified in ETA for anchors, the following values apply:
= 0.002 W/K for anchors with a plastic screw/nail, stainless steel screw/nail with the head covered by at least 15 mm plastic material, or with a minimum 15 mm air gap at the head of the screw/nail.
= 0.004 W/K for anchors with a galvanized carbon steel screw/nail with the head covered by at least 15 mm a plastic material or a minimum 15 mm air gap at the head of the screw/nail.
= 0.008 W/K for all other anchors (worst case)
 n number of anchors per m². In case n is more than 16, the formula (x) is not applied.
 ψ_i linear thermal transmittance value of the profile [W/(m·K)]
 ℓ_i length of the profile per m².

The influence of thermal bridges can also be calculated as described in EN ISO 10211.
It shall be calculated according to this standard if there are more than 16 anchors per m² foreseen. The declared χ_p -values do not apply in this case.

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

According to the decision1997/556/EC the system of assessment and verification of constancy of performance (see Annex V to Regulation (EU) n.º 305/2011) given in the following table applies.

Product	Intended uses	Level or Classes	System
DANOTHERM CERAMIC	External Thermal Insulation Composite System with discontinuous claddings as exterior skin	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 in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan which is deposited at IETcc⁽²⁾.

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.

The factory production control shall be in accordance with the Control Plan. The results of factory production control shall be recorded and evaluated in accordance with the provisions of the Control Plan.

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.

Initial type-testing of the product. The initial type-testing have been conducted by the IETcc to issued this ETA in accordance with the EAD 040083-00-0404 "External thermal insulation composite systems (ETICS) with renderings". The verifications underlying this ETA have been furnished on samples from the current production.

Other tasks of 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 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.

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

5.2 Tasks of notified bodies

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 a 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 22 of December 2023

By

Director

on behalf of Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc – CSIC)

⁽²⁾ The Control Plan is a confidential part of the ETA and only handed over to the notified certification body involved in the assessment and verification of constancy of performance.

