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**European Technical Assessment** **ETA 16/0630**  
**of 29/11/2016**

*I General Part*

**Technical Assessment Body issuing the ETA:**  
Technical and Test Institute for Construction Prague

**Trade name of the construction product**

**MARMOLINE MONOSIS ENERGY SAVING SYSTEM ETICS - VALUE**

**Product family to which the construction product belongs**

Product area code: 4  
External Thermal Insulation Composite Systems with rendering on expanded polystyrene EPS or extruded polystyrene XPS for the use as external insulation to walls of buildings.

**Manufacturer**

NORDIA S.A.  
364, Kifissias Ave. & Delfon Str.  
152 33 Chalandri (Athens)

**Manufacturing plant(s)**

GREECE  
NORDIA S.A.  
Marmoline Plant  
1st km Country Road Markopoulou Oropou  
190 11 POLYDENDRI ATTIKIS  
GREECE

**This European Technical Assessment contains**

21 pages including 4 Annexes which form an integral part of this Assessment.

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

Annex No. 4 Control Plan contains confidential information and is not included in the European Technical Assessment when that assessment is publicly disseminated.

**This European Technical Assessment replaces:**

ETAG 004, edition 2013, used as European Assessment Document (EAD)

ETA-16/0630 valid from 29/08/2016

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## II Specific part

### 1 Technical description of the product

#### 1.1 Definition and composition of the kit

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

The ETICS kit comprises a prefabricated insulation product of expanded polystyrene (EPS) to be bonded or mechanically fixed onto a wall. The methods of fixing and the relevant components are specified in the table below. The insulation product is faced with a rendering system consisting of one or more layers (site applied), one of which contains reinforcement. The rendering system is applied directly to the insulating boards, 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, corners, parapets, sills ...). 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.

#### Composition of the ETICS

Table No. 1

	Components	Coverage (kg/m <sup>2</sup> )	Thickness (mm)
Insulation products with associated methods of fixing	<b>Bonded ETICS (fully or partially bonded) with supplementary anchors. National application documents shall be taken into account).</b>		
	<ul style="list-style-type: none"><li>Insulation product: EPS according to EN 13163 see Annex No. 1 for product characteristics</li></ul>	/	50 to 300
	<ul style="list-style-type: none"><li>Insulation product: XPS according to EN 13164 see Annex No. 2 for product characteristics</li></ul>	/	50 to 300
	<ul style="list-style-type: none"><li>Adhesives:<ul style="list-style-type: none"><li><b>Marmoline FK 201 VALUE</b></li><li>cement based powder requiring addition of water 0.27 l/kg</li></ul></li></ul>	3.0 to 4.0 (dry)	/

	Components	Coverage (kg/m <sup>2</sup> )	Thickness (mm)
<b>Insulation products with associated methods of fixing</b>	<b>Mechanically fixed ETICS with anchors and supplementary adhesive (see Cl. 3.3.5 and Annex No. 3 for possible associations EPS or XPS /anchors)</b>		
	<ul style="list-style-type: none"> <li>Insulation product: EPS according to EN 13163 see Annex No. 1 for product characteristics</li> </ul>	/	50 to 300
	<ul style="list-style-type: none"> <li>Insulation product: XPS according to EN 13164 see Annex No. 2 /for product characteristics</li> </ul>	/	50 to 300
	<ul style="list-style-type: none"> <li>Adhesives: <ul style="list-style-type: none"> <li><b>Marmoline FK 201 VALUE</b></li> <li>cement based powder requiring addition of water 0.27 l/kg</li> </ul> </li> </ul>	3.0 to 4.0 (dry)	/
	<ul style="list-style-type: none"> <li>Anchors see Annex No. 3 for individual product characteristics. In addition to the following list. Other anchors can be used provided that they comply with the requirements introduced in the Annex No. 3.</li> </ul>		
	<ul style="list-style-type: none"> <li><b>Ejotherm STR U, STR U 2G</b> plastic screw-in anchors</li> <li><b>fischer TERMOZ 8SV</b> plastic screw-in anchors</li> <li><b>Hilti SD – FV 8</b> plastic nailed-in anchors</li> </ul>	ETA-04/0023  ETA-06/0180  ETA-03/0028	
<b>Base coat</b>	<ul style="list-style-type: none"> <li><b>Marmoline FK 202 VALUE</b></li> <li>cement based powder requiring addition of water 0.25 l/kg</li> </ul>	About 3.0 to 5.0 (dry)	3.0 to 5.0
<b>Reinforcement</b>	<ul style="list-style-type: none"> <li>Standard mesh applied in single layer see Annex No. 4 for product characteristics: <ul style="list-style-type: none"> <li><b>R 131 A101</b></li> </ul> </li> </ul>	1.1 – 1.2 m <sup>2</sup> /m <sup>2</sup> of ETICS	/
<b>Key coat</b>	<ul style="list-style-type: none"> <li><b>Marmoline MST 11</b></li> <li>ready to use liquid</li> </ul>	0.1 l/m <sup>2</sup>	/
<b>Finishing coats</b>	<ul style="list-style-type: none"> <li>Ready to use paste - acrylic binder: <ul style="list-style-type: none"> <li><b>Marmoline SVR 1.5 VALUE</b></li> <li>floated structure</li> <li>(particle size 1.5 mm)</li> </ul> </li> </ul>	2.0 to 2.3	1.5
<b>Ancillary materials</b>	Remain under the manufacturer's 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 buildings' walls. The walls are made of masonry (bricks, blocks, stones ...) or concrete (cast on site or as prefabricated panels). The characteristics of the 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 is designed to give the wall to which it is applied satisfactory thermal insulation.

The ETICS is made of non load-bearing construction elements. It does not contribute directly to the stability of the 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 choice of the method of fixing depends on the characteristics of the substrate, which may need preparation (see cl. 7.2.1 of the ETAG 004) and shall be done in accordance with the national instructions.

The ETICS belong to Category S/W2, according to EOTA Technical Report No 034.

### **2.2 Manufacturing**

The European Technical Assessment is issued for the ETICS on the basis of agreed data/information, deposited with the Technical and Test Institute Prague, which identifies the ETICS that has been assessed and judged.

### **2.3 Design and installation**

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

Design, installation and execution of ETICS are to be in conformity with national documents. Such documents and the level of their implementation in Member States' legislation are different. Therefore, the assessment and declaration of performance are done taking into account general assumptions introduced in the chapters 7.1 and 7.2 of ETAG 004 used as EAD, which summarize how information introduced in the ETA and related documents is intended to be used in the construction process and gives advice to all parties interested when normative documents are missing.

### **2.4 Packaging, transport and storage**

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

## **2.5 Use, maintenance and repair**

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

- visual inspection of the ETICS,
- 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 the 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 performances of the kit as described in this chapter are valid provided that the components of the kit comply with Annexes 1 - 4.

#### 3.1 Safety in case of fire (BWR 2)

##### 3.1.1 Reaction to fire (ETAG 004 - clause 5.1.2.1, EN 13501-1)

Table No. 2

Configuration	Organic content / heat of combustion	Flame retardant content	Euroclass according to EN 13501-1
Adhesive	- / -0.24 MJ/kg	No flame retardant	<b>B – s1, d0</b>
Boards of expanded polystyrene EPS or extruded polystyrene XPS Maximal density of 33 kg/m <sup>3</sup>	/	In quantity ensuring Euroclass E according to EN 13501-1	
Base coat render	- / 0.04 MJ/kg	No flame retardant	
Glass fibre mesh	- / 8.17 MJ/kg	No flame retardant	
Finishing coats with acrylic binder	- / 1.42 MJ/kg	No flame retardant	

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 might not be sufficient for the use in facades. An additional assessment of ETICS according to national provisions (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.

### 3.2 Hygiene, health and environment (BWR 3)

#### 3.2.1 Water absorption (ETAG 004 - clause 5.1.3.1)

- Base coat **Marmoline FK 202 VALUE**:

Water absorption after 1 hour < 1 kg/m<sup>2</sup>

Water absorption after 24 hours < 0.5 kg/m<sup>2</sup>

- Rendering system:

Table No. 3

		Water absorption after 24 hours	
		< 0.5 kg/m <sup>2</sup>	≥ 0.5 kg/m <sup>2</sup>
<b>Rendering system:</b> Base coat <b>Marmoline FK 202 VALUE</b> + finishing coats as indicated here:	<b>Marmoline SVR 1.5                      VALUE</b>	X	

#### 3.2.2 Watertightness (ETAG 004 - clause 5.1.3.2)

##### 3.2.2.1 Hygrothermal behaviour

Pass (without defects).

##### 3.2.2.2 Freeze–thaw behaviour

Freeze-thaw resistant - according to the water absorption test result.

### 3.2.3 Impact resistance (ETAG 004 - clause 5.1.3.3)

Table No. 4

<b>Render coating:</b> base coat <b>Marmoline FK 202 VALUE</b> + reinforcement and finishing coats listed hereafter:	<b>Single standard mesh</b> thickness 3 mm
<b>Marmoline SVR 1.5 VALUE</b>	Category III

Table No. 5

<b>Render coating:</b> base coat <b>Marmoline FK 202 VALUE</b> + reinforcement and finishing coats listed hereafter:	<b>Double standard mesh</b> thickness 5 mm
<b>Marmoline SVR 1.5 VALUE</b>	Category II

### 3.2.4 Water vapour permeability (ETAG 004 - clause 5.1.3.4)

Table No. 6

<b>Rendering system:</b> base coat <b>Marmoline FK 202 VALUE</b> + reinforcement and finishing coats indicated hereafter	<b>Equivalent air layer thickness <math>s_d</math></b>
	<b>Single standard mesh</b>
<b>Marmoline SVR 1.5 VALUE</b>	$\leq 0.21$ m

### 3.2.5 Release of dangerous substances (ETAG 004 - clause 5.1.3.5, EOTA TR034)

Kit not assessed according to EOTA TR 034.

## 3.3 Safety and accessibility in use (BWR 4)

### 3.3.1 Bond strength between base coat and insulation product (ETAG 004 - clause 5.1.4.1.1)

- Initial state: bond strength  $\geq 0.080$  MPa and a cohesive failure in the insulation product



- After hygrothermal cycles: bond strength  $\geq 0.080$  MPa and cohesive failure in the insulation product
- After freeze-thaw cycles: test not required (see Cl. 3.2.1 of this ETA)

### 3.3.2 Bond strength between adhesive and substrate / insulation product (ETAG 004 - clauses 5.1.4.1.2, 5.1.4.1.3)

Table No. 7

		Initial state	48 hrs. immersion in water + 2 hrs. 23°C/50% RH	48 hrs. immersion in water + 7 days 23°C/50% RH
<b>Marmoline FK 201 VALUE</b>	Concrete	$\geq 0.25$ MPa	$\geq 0.08$ MPa	$\geq 0.25$ MPa
	Expanded polystyrene (EPS)	$\geq 0.08$ MPa	$\geq 0.03$ MPa	$\geq 0.08$ MPa
	Extruded polystyrene (XPS)	$\geq 0.08$ MPa	$\geq 0.03$ MPa	$\geq 0.08$ MPa

### **3.3.3 Bond strength after ageing (ETAG 004 - clauses 5.1.7.1)**

- After ageing by hygrothermal cycles: bond strength  $\geq 0.080$  MPa and cohesive failure in the insulation product
- After freeze-thaw cycles: test not required (see Cl. 3.2.2.2 of this ETA)

### **3.3.4 Fixing strength (ETAG 004 - clause 5.1.4.2)**

Test not required (no limitation of ETICS length).

### 3.3.5 Wind load resistance (ETAG 004 - clause 5.1.4.3)

Table No. 8

Anchor description	Trade name		See Annex No. 3	
			Surface assembly	Countersunk assembly
	Plate diameter (mm)		60 or more	60 or more
EPS characteristics	Thickness (mm)		≥ 60	≥ 100
	Tensile strength perpendicular to faces (kPa)		≥ 100	≥ 100
Maximal load	Anchors placed at the body of the insulation product	$R_{panel}$	min. value: <b>0.44 kN</b>  mean value: <b>0.47 kN</b>	
	Anchors placed at joints of the insulation product	$R_{joint}$	min. value: <b>0.41 kN</b>  mean value: <b>0.43 kN</b>	

Table No. 9

Anchor description	Trade name		See Annex No. 3	
			Surface assembly	Countersunk assembly
	Plate diameter (mm)		60 or more	60 or more
XPS characteristics	Thickness (mm)		≥ 50	≥ 100
	Tensile strength perpendicular to faces (kPa)		≥ 400	≥ 400
Maximal load	Anchors placed at the body of the insulation product	$R_{panel}$	min. value: <b>1.27 kN</b>  mean value: <b>1.29 kN</b>	
	Anchors placed at joints of the insulation product	$R_{joint}$	min. value: <b>1.01 kN</b>  mean value: <b>1.02 kN</b>	

### 3.3.6 Render strip tensile test

- Base coat **Marmoline FK 201 VALUE**

Table No. 10

		Glass fibre mesh <b>R 131 A101</b> (manufacturer: SAINT-GOBAIN ADFORS CZ s.r.o.)					
		Crack width $W_{typ}$ [mm]/ number of cracks at relative elongation $\epsilon$					
Load direction		$\epsilon = 0.3 \%$	$\epsilon = 0.5 \%$	$\epsilon = 0.8 \%$	$\epsilon = 1.0 \%$	$\epsilon = 1.5 \%$	$\epsilon = 2.0 \%$
Warp	Sample No. 1	$\leq 0.05/9$	$\leq 0.05/11$	$\leq 0.05/17$	$\leq 0.05/19$ $\leq 0.10/2$	$\leq 0.05/22$ $\leq 0.10/4$	$\leq 0.05/15$ $\leq 0.10/10$ $\leq 0.15/3$
	Sample No. 2	$\leq 0.05/9$	$\leq 0.05/10$	$\leq 0.05/16$	$\leq 0.05/21$ $\leq 0.10/2$	$\leq 0.05/23$ $\leq 0.10/4$	$\leq 0.05/16$ $\leq 0.10/9$ $\leq 0.15/3$
	Sample No. 3	$\leq 0.05/8$	$\leq 0.05/12$	$\leq 0.05/16$	$\leq 0.05/22$ $\leq 0.10/1$	$\leq 0.05/23$ $\leq 0.10/6$	$\leq 0.05/17$ $\leq 0.10/7$ $\leq 0.15/5$
Weft	Sample No. 1	$\leq 0.05/11$	$\leq 0.05/13$	$\leq 0.05/17$ $\leq 0.10/2$	$\leq 0.05/14$ $\leq 0.10/6$	$\leq 0.05/14$ $\leq 0.10/10$	$\leq 0.05/10$ $\leq 0.10/12$ $\leq 0.15/2$
	Sample No. 2	$\leq 0.05/7$	$\leq 0.05/11$	$\leq 0.05/13$ $\leq 0.10/3$	$\leq 0.05/15$ $\leq 0.10/4$	$\leq 0.05/17$ $\leq 0.10/7$	$\leq 0.05/13$ $\leq 0.10/10$ $\leq 0.15/2$
	Sample No. 3	$\leq 0.05/9$	$\leq 0.05/13$	$\leq 0.05/16$ $\leq 0.10/3$	$\leq 0.05/15$ $\leq 0.10/5$	$\leq 0.05/17$ $\leq 0.10/6$	$\leq 0.05/13$ $\leq 0.10/9$ $\leq 0.15/3$

The characteristic crack width  $W_{rk}$  [mm] at a render strain value of 0.8%, determined with simple Method II pursuant to ETAG 004, cl. 5.5.4.1.

Table No. 11

	Characteristic width of cracks $W_{rk}$ [mm] at render strain value of 0.8%	
	Warp direction	Weft direction
<b>R 131 A101</b>	0.050	0.114

The width of cracks in reinforced base coat at 2% elongation is equal or lower than 0.15 mm.

### **3.4 Protection against noise (BWR 5)**

#### **3.4.1 Airborne sound insulation**

No performance assessed.

### 3.5 Energy economy and heat retention (BWR 6)

#### 3.5.1 Thermal resistance

The thermal transmittance of the substrate wall covered by the ETICS is calculated in accordance with the standard EN ISO 6946:

$$U_c = U + \chi_p \times n$$

Where:

- $\chi_p \times n$  has only to be taken into account if it is greater than 0.04 W/(m<sup>2</sup>.K)
- $U_c$  global (corrected) thermal transmittance of the covered wall (W/ (m<sup>2</sup>.K))
- $n$  number of anchors (through insulation product) per 1 m<sup>2</sup>
- $\chi_p$  local influence of thermal bridge caused by an anchor. The values listed below can be taken into account if not specified in the anchor's ETA:
- = 0.002 W/K for anchors with a stainless steel screw covered by plastic anchors and for anchors with an air gap at the head of the screw  
( $\chi_p \times n$  negligible for  $n < 20$ )
  - = 0.004 W/K for anchors with a galvanized steel screw with the head covered by a plastic material  
( $\chi_p \times n$  negligible for  $n < 10$ )
  - = negligible for anchors with plastic nails (reinforced or not with glass fibres ...)

- $U$  thermal transmittance of the current part of the covered wall (excluding thermal bridges) (W/ (m<sup>2</sup>.K)) determined as follows:

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

Where:

- $R_i$  thermal resistance of the insulation product (according to declaration in reference to EN 13163 or EN 13164) in (m<sup>2</sup>.K)/W
- $R_{render}$  thermal resistance of the rendering system (about 0.02 in (m<sup>2</sup>.K)/W) or determined by test according to EN 12667 or EN 12664
- $R_{substrate}$  thermal resistance of the substrate of the building (concrete, brick ...) in (m<sup>2</sup>.K)/W
- $R_{se}$  external superficial thermal resistance in (m<sup>2</sup>.K)/W
- $R_{si}$  internal superficial thermal resistance in (m<sup>2</sup>.K)/W

The value of thermal resistance of each insulation product shall be given in the manufacturer's documentation along with the possible range of thicknesses. In addition, the point thermal conductivity of anchors shall be given when anchors are used in the ETICS.

### 3.6 Sustainable use of natural resources (BWR 7)

No performance assessed.

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

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

Table No. 12

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

<sup>(1)</sup> Products/materials for which a 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)

<sup>(2)</sup> Products/materials not covered by footnote (1)

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

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

In order to help the Notified Body to make an evaluation of conformity, the Technical Assessment Body issuing the ETA shall supply the information detailed below. This information together with the requirements given in EC Guidance Paper B will generally form the basis on which the factory production control (FPC) is assessed by the Notified Body.

This information shall initially be prepared or collected by the Technical Assessment Body and shall be agreed with the manufacturer. The following gives guidance on the type of information required:

1) ETA

Where confidentiality of information is required, this ETA makes reference to the manufacturer's technical documentation which contains such information.

2) Basic manufacturing process

The basic manufacturing process is described in sufficient detail to support the proposed FPC methods.

The different components of the ETICS are generally manufactured using conventional techniques. Any critical process or treatment of the components which affects performance are highlighted in the manufacturer's documentation.

3) Product and materials specifications

The manufacturer's documentation includes:

- detailed drawings (possibly including manufacturing tolerances),
- incoming (raw) materials specifications and declarations,
- references to European and/or international standards,
- technical data sheets.

4) Control Plan (as a part of FPC)

The manufacturer and the Technical and Test Institute for Construction Prague have agreed a Control Plan which is deposited with the Technical and Test Institute for Construction Prague in documentation which accompanies the ETA. The Control Plan specifies the type and frequency of checks/tests conducted during production and on the final product. This includes the checks conducted during manufacture on properties that cannot be inspected at a later stage and for checks on the final product.

Products not manufactured by the ETICS manufacturer shall also be tested according to the Control Plan. It must be demonstrated to the Notified Body that the FPC system contains elements securing that the ETICS manufacturer takes products conforming to the Control Plan from his supplier(s).

Where materials/components are not manufactured and tested by the supplier in accordance with agreed methods, then where appropriate they shall be subject to suitable checks/tests by the ETICS manufacturer referring to the Control Plan once again.

In cases where the provisions of the European Technical Assessment and its Control Plan are no longer fulfilled, the Notified Body shall withdraw the certificate and inform the Technical and Test Construction Institute Prague without delay.



Issued in Prague on 29/11/2016



**Ing. Mária Schaán**

Head of the Technical Assessment Body

A handwritten signature in blue ink, appearing to be 'MS', written over the printed name and title.

*Annexes:*

- Annex No. 1 Insulation product characteristics
- Annex No. 2 Insulation product characteristics
- Annex No. 3 Anchors, description of individual product characteristics contained in the ETA
- Annex No. 4 Description of glass fibre mesh

## Annex No. 1 Insulation product characteristics

Description and characteristics		Regulation	Declared characteristics of EPS boards	
			Class, level according to EN 13163	Value
Reaction to fire		EN 13501	E	Apparent density $\leq 33 \text{ kg/m}^3$
Thermal resistance		EN 12667	Defined in CE mark in accordance with EN 13163	
Thickness		EN 823	T(2)	$\pm 2 \text{ mm}$
Length		EN 822	L(2)	$\pm 2 \text{ mm}$
Width			W(2)	$\pm 2 \text{ mm}$
Squareness		EN 824	S(2)	$\pm 2 \text{ mm/m}$
Flatness		EN 825	P(3)	3 mm
Surface		ETAG 004	Cut surface (homogenous, without coating)	
Dimensional stability	Under defined temperature and humidity conditions	EN 1604	DS(70,-)1	1%
			DS(70,90)1	1%
	Under constant laboratory conditions	EN 1603	DS(N)2	0.2%
Short term water absorption at partial immersion		EN 1609	---	$< 1 \text{ kg/m}^2$
Diffusion factor ( $\mu$ )		EN 13163	MU 20 – 40 MU 30 – 70	20 - 70
Tensile strength perpendicular to the faces of insulation product		EN 1607	TR100	$\geq 100 \text{ kPa}$
Shear strength		EN 12090	SS20	$\geq 20 \text{ kPa}$
Shear modulus of elasticity			GM1000	$\geq 1000 \text{ kPa}$

**Note:** Classes and levels for individual characteristics comply with EN 13163:2012

Reaction to fire E has to be proved for every insulation product also at 10 mm products thickness.

## Annex No. 2 Insulation product characteristics

Description and characteristics		Regulation	Declared characteristics of XPS boards	
			Class, level according to EN 13164	Value
Reaction to fire		EN 13501	E	Apparent density $\leq 33 \text{ kg/m}^3$
Thermal resistance		EN 12667	Defined in CE mark in accordance with EN 13164	
Thickness		EN 823	T(3)	$\pm 1 \text{ mm}$
Length		EN 822	-	$\pm 8 \text{ mm}$
Width			-	$\pm 8 \text{ mm}$
Squareness		EN 824	-	$\leq 5 \text{ mm/m}$
Flatness		EN 825	-	$\leq 6 \text{ mm}$
Dimensional stability	Under defined temperature and humidity conditions	EN 1604	DS(70,-)	1%
			DS(70,90)	1%
Short term water absorption at partial immersion		EN 1609	---	$< 1 \text{ kg/m}^2$
Diffusion factor ( $\mu$ )		EN 13164	MU50	$\leq 50$
Tensile strength perpendicular to the faces of insulation product		EN 1607	TR400	$\geq 400 \text{ kPa}$
Shear strength		EN 12090	SS24	$\geq 0.24 \text{ MPa}$
Shear modulus of elasticity			-	$\geq 6.7 \text{ MPa}$

**Note:** Classes and levels for individual characteristics comply with EN 13164:2012

Reaction to fire E has to be proved for every insulation product also at 10 mm products thickness.

**Annex No. 3 Anchors, description of individual product characteristics contained in the ETA**

Trade name	Plate diameter (mm)	Characteristic pull-out resistance	Plate stiffness (kN/mm)	Load at plate rupture (kN)
<b>Surface assembly</b>				
Ejothem STR U, STR U 2G	60	See ETA-04/0023	0.60	2.08
Hilti SD – FV 8	60	See ETA-03/0028	0.30	1.55
<b>Countersunk assembly</b>				
Ejothem STR U, STR U 2G	60	See ETA-04/0023	0.60	2.08
fischer TERMOZ 8 SV	60	See ETA-06/0180	1.10	2.13

In addition to this list, anchors assessed in accordance with ETAG 014 can be used provided that such anchors meet the following requirements:

	<b>Requirements</b>	
Plate diameter	≥ 60 mm	
Plate stiffness	Surface assembly:	≥ 0.3 kN/mm
	Countersunk assembly:	≥ 0.6 kN/mm
Rupture force of anchor's plate	≥ Higher of figures $R_{panel}$ and $R_{joint}$ in relevant table in Cl. 3.3.5	

#### Annex No. 4 Description of glass fibre mesh

	Description	Strength after ageing	
	Standard fibre mesh applied in one or two layers with aperture size	Absolute strength after ageing (N/mm)	Relative residual strength after ageing, of the strength in the as-delivered state (%)
<b>R 131 A101</b>	3.5 x 3.8 mm	≥ 20	≥ 50