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European Technical Assessment

ETA 10/0361 of 30/12/2015

I General Part

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

Trade name of the construction product	**THERMOPROSOPSIS FLEX**
Product family to which the construction product belongs	Product area code: 4 External Thermal Insulation Composite Systems with rendering on expanded polystyrene (EPS) for the use as external insulation to walls of buildings
Manufacturer	KNAUF GYPSOPIIA ABEE 10 Euripidou Str. GR 176 74 Kalithea Athens, Greece
Manufacturing plant(s)	KNAUF GYPSOPIIA ABEE GR-30500 Stanos Amfilochia Greece
This European Technical Assessment contains	14 pages including 3 Annexes which form an integral part of this assessment 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 is issued in accordance with regulation (EU) No.305/2011 on the basis of	ETAG 004, edition 2013, used as European Assessment Document (EAD)

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

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, apertures, 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

	Components	Coverage [kg/m²]	Thickness [mm]
Fully or partially bonded ETICS (according to ETA-holder's prescriptions the minimal bonded surface shall be at least 40% on EPS board). National application documents shall be taken into account.			
Insulation products with associated methods of fixing	• **Insulation product:** Expanded polystyrene boards (EPS) according to EN 13163: 2012; see Annex No. 1 for product characteristics	/	50 - 300
	• **Adhesive based on cement:** **THERMOPROSOPSIS multi** (trade name for Cyprus **"KAM 700 grey"**) *Product as delivered:* powder requiring addition of specified amount of water (0,29 - 0,32 l/kg) *Base:* aggregates, inert filler, cement, specific additives	4.0 – 6.0 (powder)	/
	• **Adhesive based on polyurethane:** **THERMOPROSOPSIS FOAM ADHESIVE** *Product as delivered:* thixotropic liquid ready to use delivered in a can, brown colour *Base:* polyurethane foam	1 can per 6 - 8 m²	3 - 15
Mechanically fixed ETICS with anchors and supplementary adhesive (according to ETA-holder's prescriptions the minimal bonded surface shall be at least 40% of EPS). National application documents shall be taken into account. See cl. 3.3.6 and Annex No. 2 for possible associations EPS/anchors.			

Insulation products with associated methods of fixing	• **Insulation product:** Expanded polystyrene boards (EPS) according to EN 13163: 2012; see Annex No. 1 for product characteristics	/	50 - 300
	• **Supplementary adhesive based on cement:** **THERMOPROSOPSIS multi** (trade name for Cyprus **"KAM 700 grey"**) *Product as delivered:* powder requiring addition of specified amount of water (0,29 - 0,32 l/kg) *Base:* aggregates, inert filler, cement, specific additives	4.0 – 6.0 (powder)	/
	• **Supplementary adhesive based on polyurethane:** **THERMOPROSOPSIS FOAM ADHESIVE** *Product as delivered:* thixotropic liquid ready to use delivered in a can, brown colour *Base:* polyurethane foam	1 can per 6 - 8 m^2	3 - 15
	• **Anchors:**		
	ejotherm NT U plastic nailed-in anchors	ETA 05/0009	/
	ejotherm STR U plastic screwed-in anchors	ETA 04/0023	/
	ejotherm NTK U plastic screwed-in anchors	ETA 07/0026	/
	Koelner TFIX-8S, TFIX-8ST plastic screwed-in anchors	ETA 11/0144	/
	KOELNER KI-10, KI-10PA, KI-10M plastic nailed-in anchor	ETA 07/0291	/
Base coat	**PASTOL Flex** *Product as delivered:* ready to use organic paste *Base:* aggregates, inert filler, specific additives	about 3.5 (powder)	2 – 3
Reinfor-cement	• Standard mesh applied in single layer see Annex No. 3 for product characteristics: **ES-L/S 014**	/	/
Key coat	**QUARZGRUND** (optional use) pigmented liquid not to be diluted	0.200	/
Finishing coats	• Ready to use paste – acrylic copolymer binder: **Addi S** - max. particle size 1.0 – 1.5 – 2.0 – 3.0 mm, - floated structure	1.6 – 3.6	regulated by particle size
	• Ready to use paste – silicone binder: **Butz 2 mm**	about 4.9	regulated by particle size
Ancillary materials	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. Changes to the ETICS or production process, which could result in this deposited data/information being incorrect, shall be notified to the Technical and Test Institute Prague before the changes are introduced. The Technical and Test Institute Prague 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 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 if 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 know 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 localised 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 No. 1 – 3.

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)

Configuration	Organic content / heat of combustion	Flame retardant content	Euroclass according to EN 13501-1
all configurations of ETICS	- / -	No flame retardant	**F** (without testing)

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 PASTOL Flex:
  - Water absorption after 1 hour < 1 kg/m^2
  - Water absorption after 24 hours < 0.5 kg/m^2
- Rendering system:

		Water absorption after 24 hours	
		< 0.5 kg/m^2	**≥ 0.5 kg/m^2**
Rendering system: base coat PASTOL Flex + finishing coats indicated hereafter:	Addi S	X	
	Buzt	X	

3.2.2 Watertightness (ETAG 004 - clause 5.1.3.2)

3.2.2.1 Hygrotermal behaviour

Pass (without defects).

3.2.2.2 Freeze-thaw behaviour

Rendering systems with finishing coats Addi, Butz: the water absorption of both base coat and the rendering systems are less than 0.5 kg/m^2 after 24 hours and so the corresponding configurations of the ETICS are assessed as freeze/thaw resistant.

3.2.3 Impact resistance (ETAG 004 - clause 5.1.3.3)

Rendering system:	Finishing coats:	Single standard mesh
EPS boards (TR 100) + base coat + finishing coats indicated hereafter:	Addi max. particle size 1.0 mm	**Category III**
	Addi max. particle size 1.5 – 2.0 – 3.0 mm	**Category II**
	Butz	**Category II**

3.2.4 Water vapour permeability (ETAG 004 – clause 5.1.3.4)

Rendering system: Base coat PASTOL Flex + finishing coats indicated hereafter:	**Equivalent air layer thickness s_d**
Addi	≤ 0.80 m
Butz	≤ 1.0 m

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

No performance assessed

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 ≥ 0.08 MPa
- After hygrothermal cycles: bond strength ≥ 0.08 MPa
- After freeze-thaw cycles: test not required (see cl. 3.2.2.2 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)

		Initial state	**48 hours immersion in water + 2 hours. 23°C/50% RH**	**48 hours immersion in water + 7 days 23°C/50% RH**
THERMOPRO-SOPSIS multi	Concrete	≥ 0.25 MPa	≥ 0.08 MPa	≥ 0.25 MPa
	EPS	≥ 0.08 MPa	≥ 0.03 MPa	≥ 0.08 MPa

3.3.3 Bond strength of foam adhesives to the substrate and insulation product (ETAG 004 - clauses 5.1.4.1.4)

		Insulation product	Substrate	Thickness	Test conditions: Tempera-ture / Relative humidity	Bond strength
THERMO-PROSOPSIS FOAM ADHESIVE	Standard application conditions	EPS TR150	Concrete	8 ± 1 mm	23 ± 2 °C / 50 ± 5 % RH	≥ 0.08 MPa
	Modification of foam thickness	EPS TR150	Concrete	15 ± 1 mm	23 ± 2 °C / 50 ± 5 % RH	
	Modification of processing time (open time)	EPS TR150	Concrete	8 ± 1 mm	23 ± 2 °C / 50 ± 5 % RH	
	Modification of temperature: low temperature	EPS TR150	Concrete	8 ± 1 mm	5 ± 2 °C / /	
	Modification of temperature: high temperature	EPS TR150	Concrete	8 ± 1 mm	35 ± 2 °C / 30 ± 5 % RH	

3.3.4 Bond strength after ageing (ETAG 004 – Clause 5.1.7.1)

- After ageing: bond strength ≥ 0.08 MPa
- After freeze-thaw cycles: test not required (see cl. 3.2.2.2 of this ETA)

3.3.5 Fixing strength (ETAG 004 - clause 5.1.4.2)

Test not required (no limitation of ETICS length).

3.3.6 Wind load resistance (ETAG 004 - clause 5.1.4.3)

Anchor description	Trade name		**See Annex No. 2**	**See Annex No. 2**
	Assembly method		Surface assembly	Countersunk assembly
	Plate diameter [mm]		60 or more	
EPS board character-ristics	Thickness [mm]		≥ 50	≥ 100
	Tensile strength [kPa]		≥ 100	
Maximal load	Anchors placed at the body of the insulation product	R_{panel}	min. value: 0.46 kN average value: 0.47 kN	min. value: 0.47 kN average value: 0.48 kN
	Anchors placed at joints of the insulation product	R_{joint}	min. value: 0.39 kN average value: 0.40 kN	min. value: 0.52 kN average value: 0.55 kN

3.3.7 Render strip tensile test

The characteristic crack width W_{rk} [mm] at a render strain value of 0.8%:

No performance assessed

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^2.K)

U_c global (corrected) thermal transmittance of the covered wall (W/ (m^2.K)

n number of anchors (through insulation product) per 1 m²

χ_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/ (m².K)) determined as follows:

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

Where:

R_i: thermal resistance of the insulation product (according to declaration in reference to EN 13163) in (m².K)/W

R_{render}: thermal resistance of the rendering system (about 0.02 in (m².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 (m².K)/W

R_{se}: external superficial thermal resistance in (m².K)/W

R_{si}: internal superficial thermal resistance in (m².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).

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 (1), A2 (1), B (1), C (1)	1
		A1 (2), A2 (2), B (2), C (2), D, E, (A1 to E) (3), F	2+
	In external wall not subject to fire regulations	Any	2+

(1) Products/materials for which a clearly identifiable stage in the production process results in an improvement of he reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material)
(2) Products/materials not covered by footnote (1)
(3)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 30/12/2015

By

Ing. Mária Schaan

Head of the Technical Assessment Body

Annexes:

Annex No. 1

EPS boards characteristics for bonded/mechanically fixed ETICS:

Description of the characteristics		Regulation	Declared characteristic EPS	
			Class, level according to EN 13163:2012	Value
Reaction to fire		EN 13501 -1+A1	Euroclass E	
Thermal resistance		EN 12667	acc. to the declaration in accordance with EN 13163 ((m².K)/W)	
Thickness		EN 823	T(1)	± 1 mm
Length		EN 822	L(2)	± 2 mm
Width		EN 822	W(2)	± 2 mm
Squareness		EN 824	S(2)	± 2 mm/m
Flatness		EN 825	P(5)	5 mm
Surface		ETAG 004	No additional treatment (homogenous, without coating)	
Dimensional stability under:	specified temperature and humidity condition	EN 1604	DS(70,-)1	1%
	laboratory condition	EN 1603	DS(N)2	± 0.2%
Water absorption (partial immersion)		EN 1609	---	< 1 kg/m²
Water vapour permeability, diffusion factor (μ)		EN 12086 EN 13163	MU 20 - 40	20 - 40
Tensile strength perpendicular to the front of the slab in dry conditions		EN 1607	TR100	≥ 100 kPa
Shear strength		EN 12090	SS20	≥ 20 kPa
Shear modulus of elasticity		EN 12090	GM1000	≥ 1000 kPa

Notes:
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

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)
Surface assembly				
ejotherm NT U	60	see ETA 05/0009	0.60	2.43
ejotherm STR U	60	see ETA 04/0023	0.60	2.08
ejotherm NTK U	60	see ETA 07/0026	0.50	1.44
Koelner TFIX-8S	60	see ETA 11/0144	0.60	2.04
Koelner KI-10	60	see ETA 07/0291	0,39	0,81
Countersunk assembly				
Koelner TFIX-8ST	60	see ETA 11/0144	0.60	2.04
Ejotherm STR U	60	see ETA 04/0023	0.60	2.08

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

	Requirements	
Plate diameter	≥ 60 mm	
Plate stiffness	Surface assembly:	≥ 0.39 kN/mm
	Countersunk assembly:	≥ 0.60 kN/mm
Rupture force of anchor's plate	Shall be higher of figures R_{panel} and R_{joint} in relevant table in cl. 3.3.6	

Annex No. 3

Description of glass fiber meshes:

	Description	Strength after ageing	
	Standard fiber 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 (%)
ES-L/S 014 (manufacturer: Dr. Günther Kast GmbH & Co.)	4.5 x 4.0 mm	≥ 20	≥ 50