European Technical Assessment

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European Technical Assessment

ETA-16/0978 of 09/04/2018

General Part

Technical Assessment Body issuing the European Technical Assessment: ICiMB	
Trade name of the construction product	KLEIB
Product family to which the construction product belongs	External Thermal Insulation Composite Systems (ETICS) with rendering
Manufacturer	KLEIB Sp. z o.o. Kolejowa 15-17, 87-880 Brześć Kujawski, POLAND
Manufacturing plant	Kolejowa 15-17, 87-880 Brześć Kujawski, POLAND
This European Technical Assessment contains	20 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 available.
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	ETAG 004 used as EAD, 2013
This European Technical Assessment replaces	ETA 16/0978, version 1, issued on 15/05/2017

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Specific parts

1. Technical description of the product

This product KLEIB 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 onto a wall. The method of fixing and the relevant components are specified in Table 1. The insulation product is faced with a rendering system consisting of one or more layers (site applied), one of which contains reinforcement. The rendering 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.

Table 1.

	Components	Coverage (kg/m^2)	Thickness (mm)
	Bonded ETICS; fully or partially bonded with supplementary mechanical fixings. National application documents shall be taken into account.		
Insulation materials with associated methods of fixing	• **Insulation product** Boards of expanded polystyrene (EPS) according to EN 13163 *Product characteristics - see Annex No 1*	-	20 to 300
	• **Adhesives** - **KLEIB C1** Cement based powder requiring addition of 0,18-0,20 l/kg of water	4,0 to 5,0 (powder)	-
	- **KLEIB C2** Cement based powder requiring addition of 0,18-0,20 l/kg of water	3,0 to 4,0 (powder)	-
	- **KLEIB C2 EXTRA** Cement based powder requiring addition of 0,18-0,20 l/kg of water	3,0 to 4,0 (powder)	-
	- **KLEIB C2B** Cement based powder requiring addition of 0,18-0,20 l/kg of water	3,0 to 4,0 (powder)	-
	• **Supplementary mechanical fixings** Plastic anchors covered by relevant ETA	-	-

Table 1. cont.

	Components	Coverage (kg/m²)	Thickness (mm)
Base coats	• **KLEIB C2** Cement based powder requiring addition of 0,18-0,20 l/kg of water	3,0 to 4,0 (powder)	3,0 to 5,0
	• **KLEIB C2 EXTRA** Cement based powder requiring addition of 0,18-0,20 l/kg of water	3,0 to 4,0 (powder)	3,0 to 5,0
	• **KLEIB C2B** Cement based powder requiring addition of 0,18-0,20 l/kg of water	3,0 to 4,0 (powder)	3,0 to 5,0
Reinforce-ment	• **Standard glass fibre mesh** **- 122** covered by ETA 16/0546 *Product characteristics - see Annex No 1*	-	-
Key coats	• **KLEIB C3** Ready to use liquid to be used with mineral, acrylic, siloxane and mosaic finishing coats	0,25 to 0,35	-
	• **KLEIB C3S** Ready to use liquid to be used with silicate-silicone finishing coats	0,25 to 0,35	-
	• **KLEIB C3SIL** Ready to use liquid to be used with silicone finishing coats	0,25 to 0,35	-
Finishing coats	• **White mineral finishing coat** **KLEIB C4** Cement based powder requiring addition of 0,23-0,25 l/kg of water floated structure max. particles size: 1,5; 2,0 mm	2,4 to 2,7	Regulated by particles size
	• **Grey mineral finishing coat** **KLEIB C4S** Cement based powder requiring addition of 0,23-0,25 l/kg of water floated structure max. particles size: 1,5; 2,0 mm	2,4 to 2,7	
	• **Acrylic finishing coat** **KLEIB C5** Ready to use paste – acrylic binder floated structure max. particles size: 1,0 mm 1,5 mm 2,0 mm	 1,7 to 2,5 2,5 to 3,0 3,0 to 3,5	

Table 1. cont.

	Components	Coverage (kg/m²)	Thickness (mm)
Finishing coats	• **Silicate-silicone finishing coat** **KLEIB C6** Ready to use paste – silicate-silicone-acrylic binder floated structure max. particles size: 1,0 mm 1,5 mm 2,0 mm	 1,7 to 2,5 2,5 to 3,0 3,0 to 3,5	Regulated by particles size
	• **Silicone finishing coat** **KLEIB C7** Ready to use paste – silicone-acrylic binder floated structure max. particles size: 1,0 mm 1,5 mm 2,0 mm	 1,7 to 2,5 2,2 to 2,7 3,0 to 3,4	
	• **Siloxane finishing coats** **KLIB C8** Ready to use paste – siloxane-acrylic binder floated structure max. particles size: 1,0 mm 1,5 mm 2,0 mm	 1,7 to 2,1 2,1 to 2,5 2,8 to 3,2	
	• **Mosaic finishing coats** Ready to use pastes – acrylic binder **KLEIB M9** mosaic structure: 1,0 to 1,6 mm **KLEIB M10** mosaic structure: 0,8 to 1,2 mm 1,0 to 1,6 mm	 3,1 to 3,5 3,1 to 3,5 3,3 to 3,6	
Decorative coats	• Acrylic paint **KLEIB Q1** Ready to use pigmented liquid to be used optionally with acrylic finishing coats	0,25 to 0,35	-
	• Silicate paint **KLEIB Q2** Ready to use pigmented liquid to be used optionally with mineral or silicate-silicone finishing coats	0,25 to 0,35	-

Table 1. cont.

	Components	Coverage (kg/m²)	Thickness (mm)
Decorative coats	• Silicone paint **KLEIB Q3** Ready to use pigmented liquid to be used optionally with mineral or silicone finishing coats	0,25 to 0,35	-
	• Siloxane paint **KLEIB Q4** Ready to use pigmented liquid to be used optionally with mineral or siloxane finishing coats	0,25 to 0,35	-
Ancillary materials	Remain under the manufacturer's responsibility		

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

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 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 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 is not intended to ensure the airtightness of the building structure.

The provisions made in this European Technical Assessment are based on an assumed working life of the ETICS of at least 25 years, provided that the requirements for the packaging, transport, storage, installation as well as appropriate use, maintenance and repair are met. The indication given on the working life cannot be interpreted as a guarantee given by the manufacturer or the Technical Assessment Body, but should only be regarded as a means for choosing the appropriate products in relation to the expected, economically reasonable working life of the works.

Design, installation, maintenance and repair of ETICS shall be done in accordance with principles introduced in chapter 7 of ETAG 004, used as EAD, and shall be in conformity with Member States' legislation requirements.

The instructions regarding packaging, transport, storage and installation of ETICS are specified in the manufacturer's technical documentation.

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÷2.

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 2.

Configuration	Max. organic content / Max. heat of combustion	Flame retardant content	Euroclass acc. to EN 13501-1
Adhesive	1,8 % / -	No flame retardant	B-s1, d0
EPS boards* density ≤ 25 kg/m³	- / -		
Base coat	1,8 % / -		
Glass fibre mesh	- / 8,19 MJ/kg		
Key coat *excluding KLEIB C3S*	10,9 % / 3,19 MJ/kg		
Finishing coat *excluding: KLEIB C6, KLEIB M9, KLEIB M10.*	8,3 % / 1,96 MJ/kg		
Decorative coat	16,2 % / 5,33 MJ/kg		
Remaining configurations	-	No flame retardant	C-s1, d0
*flame retardant content in quantity ensuring Euroclass E according to EN 13501-1			

Note: 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 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 KLEIB C2:
  - Water absorption after 1 hour < 1 kg/m²;
  - Water absorption after 24 hours < 0,5 kg/m².
- Base coat KLEIB C2 EXTRA:
  - Water absorption after 1 hour < 1 kg/m²;
  - Water absorption after 24 hours < 0,5 kg/m².
- Base coat KLEIB C2B:
  - Water absorption after 1 hour < 1 kg/m²;
  - Water absorption after 24 hours < 0,5 kg/m².
- Rendering systems: Table 3.

Table 3.

		Water absorption after 24 hours	
		<0,5 kg/m²	≥0,5 kg/m²
Rendering system: Base coat KLEIB C2 + relevant key coat + finishing coat indicated hereafter:	KLEIB C4	-	x
	KLEIB C4S	-	x
	KLEIB C5	x	-
	KLEIB C6	x	-
	KLEIB C7	x	-
	KLEIB C8	x	-
	KLEIB M9	x	-
	KLEIB M10	x	-
Rendering system: Base coat KLEIB C2 EXTRA + relevant key coat + finishing coat indicated hereafter:	KLEIB C4	-	x
	KLEIB C4S	-	x
	KLEIB C5	x	-
	KLEIB C6	x	-
	KLEIB C7	x	-
	KLEIB C8	x	-
	KLEIB M9	x	-
	KLEIB M10	x	-

Table 3. cont.

		Water absorption after 24 hours	
		<0,5 kg/m²	≥0,5 kg/m²
Rendering system: Base coat KLEIB C2B + relevant key coat + finishing coat indicated hereafter:	KLEIB C4	-	x
	KLEIB C4S	-	x
	KLEIB C5	x	-
	KLEIB C6	x	-
	KLEIB C7	x	-
	KLEIB C8	x	-
	KLEIB M9	x	-
	KLEIB M10	x	-

3.2.2. Watertightness (ETAG 004: clause 5.1.3.2)

3.2.2.1. Hygrothermal behaviour (ETAG 004: clause 5.1.3.2.1)

Pass (without defects).

3.2.2.2. Freeze-thaw behaviour (ETAG 004: clause 5.1.3.2.2)

ETICS is frost resistant according to water absorption test and freeze-thaw test.

3.2.3. Impact resistance (ETAG 004: clause 5.1.3.3)

Table 4.

		Single layer of standard mesh
Rendering system: Base coat KLEIB C2 + relevant key coat + finishing coat indicated hereafter:	KLEIB C4	Category III
	KLEIB C4S	Category III
	KLEIB C5	Category III
	KLEIB C6	Category II
	KLEIB C7	Category II
	KLEIB C8	Category II
	KLEIB M9	Category I
	KLEIB M10	Category I

Table 4. cont

		Single layer of standard mesh
Rendering system: Base coat KLEIB C2 EXTRA + relevant key coat + finishing coat indicated hereafter:	KLEIB C4	Category II
	KLEIB C4S	Category III
	KLEIB C5	Category III
	KLEIB C6	Category III
	KLEIB C7	Category III
	KLEIB C8	Category III
	KLEIB M9	Category I
	KLEIB M10	Category I
Rendering system: Base coat KLEIB C2B + relevant key coat + finishing coat indicated hereafter:	KLEIB C4	Category II
	KLEIB C4S	Category III
	KLEIB C5	Category II
	KLEIB C6	Category II
	KLEIB C7	Category III
	KLEIB C8	Category III
	KLEIB M9	Category III
	KLEIB M10	Category III

3.2.4. Water vapour permeability (ETAG 004: clause 5.1.3.4)

Table 5.

		Average equivalent air thickness s_d
Rendering system: Base coat KLEIB C2 or KLEIB C2 EXTRA or KLEIB C2B + relevant key coat + finishing coat indicated hereafter + relevant decorative coat	KLEIB C4 + - KLEIB Q2 - KLEIB Q3 - KLEIB Q4	≤ 2 m, results: 0,1 m 0,1 m 0,1 m
	KLEIB C4S + - KLEIB Q2 - KLEIB Q3 - KLEIB Q4	≤ 2 m, results: 0,1 m 0,1 m 0,1 m
	KLEIB C5 + KLEIB Q1	≤ 2 m, result: 0,2 m
	KLEIB C6 + KLEIB Q2	≤ 2 m, result: 0,1 m
	KLEIB C7 + KLEIB Q3	≤ 2 m, result: 0,2 m
	KLEIB C8 + KLEIB Q4	≤ 2 m, result: 0,2 m
	KLEIB M9*	≤ 2 m, result: 0,3 m
	KLEIB M10*	≤ 2 m, result: 0,2 m

*decorative coat not used

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

No performance assessed.

Note: There may be requirements applicable to the ETICS falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Regulation (EU) No 305/2011, these requirements need to be complied with, when and where they apply.

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 and after hygrothermal cycles:

- Bond strength between base coat KLEIB C2 and insulation product ≥ 0,08 MPa
- Bond strength between base coat KLEIB C2 EXTRA and insulation product ≥ 0,08 MPa
- Bond strength between base coat KLEIB C2B and insulation product ≥ 0,08 MPa

3.3.2. Bond strength between adhesive and substrate (ETAG 004: clause 5.1.4.1.2)

Table 6.

	Initial state	48 h immersion in water + 2 hours 23°C/50% RH	48 h immersion in water + 7 days 23°C/50% RH
KLEIB C1	≥ 0,25 MPa	≥ 0,08 MPa	≥ 0,25 MPa
KLEIB C2			
KLEIB C2 EXTRA			
KLEIB C2B			

3.3.3. Bond strength between adhesive and insulation product (ETAG 004: clause 5.1.4.1.3)

Table 7.

	Initial state	48 h immersion in water + 2 hours 23°C/50% RH	48 h immersion in water + 7 days 23°C/50% RH
KLEIB C1 minimal bonded surface area S: 33%	≥ 0,08 MPa	≥ 0,03 MPa	≥ 0,08 MPa
KLEIB C2 minimal bonded surface area S: 38%			
KLEIB C2 EXTRA minimal bonded surface area S: 33%			
KLEIB C2B minimal bonded surface area S: 33%			

3.3.4. Bond strength after ageing (ETAG 004: clause 5.1.7.1)

Table 8.

		After hygrothermal cycles
Rendering system: Base coat KLEIB C2 + relevant key coat + finishing coat indicated hereafter:	KLEIB C4	≥ 0,08 MPa
	KLEIB C4S	
	KLEIB C5	
	KLEIB C6	
	KLEIB C7	
	KLEIB C8	
	KLEIB M9	
	KLEIB M10	

Table 8. cont.

		After hygrothermal cycles
Rendering system: Base coat KLEIB C2 EXTRA + relevant key coat + finishing coat indicated hereafter:	KLEIB C4	≥ 0,08 MPa
	KLEIB C4S	
	KLEIB C5	
	KLEIB C6	
	KLEIB C7	
	KLEIB C8	
	KLEIB M9	
	KLEIB M10	
Rendering system: Base coat KLEIB C2B + relevant key coat + finishing coat indicated hereafter:	KLEIB C4	≥ 0,08 MPa
	KLEIB C4S	
	KLEIB C5	
	KLEIB C6	
	KLEIB C7	
	KLEIB C8	
	KLEIB M9	
	KLEIB M10	

3.3.5. Render strip tensile test (ETAG 004: clause 5.5.4.1)

No performance assessed.

3.4. Protection against noise (BWR 5)

3.4.1. Airborne sound insulation (ETAG 004: clause 5.1.5.1)

No performance assessed.

3.5. Energy economy and heat retention (BWR 6)

3.5.1. Thermal resistance (ETAG 004: clause 5.1.6.1)

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

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

where:

$\chi_p \cdot n$ has only to be taken into account if it is greater than 0,04 W/(m²·K)

U_c: global (corrected) thermal transmittance of the covered wall (W/ (m²·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 ($\chi_p \cdot n$ negligible for n < 20)

= 0,004 W/K for anchors with a galvanized steel screw with the head covered by a plastic material ($\chi_p \cdot n$ 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 render (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 (further described in Annex V to Regulation (EU) No 305/2011) 1 and 2+ apply.

Table 9.

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 the 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

The manufacturer shall exercise permanent 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. The production control system shall ensure performance constancy of the product covered by this European Technical Assessment.

The manufacturer may only use materials stated in the technical documentation of this European Technical Assessment. The factory production control shall be performed in accordance with the Control Plan which is a confidential part of the European Technical Assessment. The Control Plan was developed as a part of factory production control system.

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

Issued in Krakow on 09.04.2018

By

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Annexes:

Annex No 1 – Characteristics of insulation product

Annex No 2 – Characteristics of glass fibre meshes

Annex No 3 – Alternative trade names of KLEIB system components

Annex No 1- Characteristics of insulation product

		Boards of expanded polystyrene EPS
Reaction to fire / EN 13501-1		Euroclass – E max. density: 25 kg/m^3
Thermal resistance		Defined in the CE marking in reference to EN 13163 (m^2·K)/W
Thickness / EN 823		± 1 mm [EN 13163 - T(1)]
Length / EN 822		± 2 mm [EN 13163 - L(2)]
Width / EN 822		± 2 mm [EN 13163 - W(2)]
Squareness / EN 824		± 5 mm/m [EN 13163 - S(5)]
Flatness / EN 825		5 mm [EN 13163 - P(5)]
Dimensional stability under specified conditions	EN 1603	± 0,2 % [EN 13163 - DS(N)2]
	EN 1604	2 % [EN 13163 - DS(70,-)2]
Bending strength / EN 12089		≥ 75 kPa [EN 13163 – BS75]
Water vapour permeability, diffusion factor (μ) / EN 12086 - EN 13163		20 to 40
Tensile strength perpendicular to the faces in dry conditions / EN 1607		≥ 80 kPa [EN 13163 – TR80]
Shear strength / EN 12090 - EN 13163		≥ 35 kPa

Annex No 2 - Characteristics of glass fibre meshes

Mesh trade name	Description	Alkalis resistance	
		Residual resistance after ageing (N/mm)	Relative residual resistance: % (after ageing) of the strength in the as delivered state
122	Mass per unit area: *160 g/m^2; **165 g/m^2 Mesh size: 4,6 x 4,2 mm	≥ 20	≥ 50

*Manufacturing plant in Macedonia; **Manufacturing plant in Slovakia

Annex No 3 – Alternative trade names of KLEIB system components

Component	Trade name	Alternative trade name
Adhesives	KLEIB C1	- FASAKOL F1 - REMBET R1 - PROFIT - KLM-10
	KLEIB C2	- FASAKOL F2 - REMBET R2 - PROFIT - KLM-20
	KLEIB C2 EXTRA	- FASAKOL F2 EXTRA - KLM-23
	KLEIB C2B	- FASAKOL F2B - PROFIT B - KLM-20W
Base coats	KLEIB C2	- FASAKOL F2 - REMBET R2 - PROFIT - KLM-20
	KLEIB C2 EXTRA	- FASAKOL F2 EXTRA - KLM-23
	KLEIB C2B	- FASAKOL F2B - PROFIT B - KLM-20W
Key coats	KLEIB C3	- FASAKOL F3 - GP-30
	KLEIB C3S	- FASAKOL F3S - GP-30S
	KLEIB C3SIL	- FASAKOL F3SIL - GP-30SIL
Finishing coats	KLEIB C4	- FASAKOL F4 - MP-40W
	KLEIB C4S	- FASAKOL F4S - MP-40S
	KLEIB C5	- FASAKOL F5 - AP-50
	KLEIB C6	- FASAKOL F6 - SP-60
	KLEIB C7	- FASAKOL F7 - SP-70
	KLEIB C8	- FASAKOL F8 - SP-80
	KLEIB M9	- FASAKOL M9 - DPM-900
	KLEIB M10	- FASAKOL M10 - DPM-1000

Annex No 3 – Alternative trade names of KLEIB system components cont.

Component	Trade name	Alternative trade name
Decorative coats	KLEIB Q1	- FASAKOL Q1 - AF-10
	KLEIB Q2	- FASAKOL Q2 - SF-20
	KLEIB Q3	- FASAKOL Q3 - SF-30
	KLEIB Q4	- FASAKOL Q4 - SF-40