INSTYTUT TECHNIKI BUDOWLANEJ
PL 00-611 WARSZAWA
ul. Filtrowa 1
tel.: (+48 22) 825-04-71
(+48 22) 825-76-55
fax: (+48 22) 825-52-86
www.itb.pl

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

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European Technical Assessment

ETA-07/0110 of 15/11/2017

General Part

Technical Assessment Body issuing the European Technical Assessment	Instytut Techniki Budowlanej
Trade name of the construction product	BOLIX S
Product family to which the construction product belongs	External Thermal Insulation Composite System with rendering (ETICS)
Manufacturer	BOLIX S.A. ul. Stolarska 8 PL 34-300 Żywiec, Poland
Manufacturing plant(s)	BOLIX S.A. ul. Stolarska 8 PL 34-300 Żywiec, Poland
This European Technical Assessment contains	17 pages including 3 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	Guideline for European Technical Approval ETAG 004, Edition 2013 "External Thermal Insulation Composite Systems with rendering", used as European Assessment Document (EAD)
This version replaces	ETA-07/0110 issued on 25/11/2014

Specific Part

1 Technical description of the product

External Thermal Insulation Composite System with rendering BOLIX S called ETICS in the following text is a kit comprising components which are factory-produced by the manufacturer or component suppliers. ETICS is made up on site from these components. The ETICS manufacturer is ultimately responsible for all components of the ETICS specified in this ETA.

The ETICS kit comprises a prefabricated insulation product made of expanded polystyrene (EPS) to be bonded or mechanically fixed with supplementary adhesive onto a wall. The methods of fixing and the relevant components are specified in the table 1.

The insulation product is faced with a rendering system consisting of one or more layers (site applied), one of which contains reinforcement, one or two layers. The rendering is applied directly to the insulating panels, without any air gap or disconnecting layer.

The ETICS may include special fittings which are defined in clause 3.2.2.5 of ETAG 004. 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 components are delivered as a part of the kit.

Table 1

	Components	Coverage (kg/m²)	Thickness (mm)
Insulation material with associated methods of fixing	**Bonded ETICS:** fully bonded or partially bonded (bonded surface shall be at least 40%). National application documents shall be taken into account.		
	• **Insulation product:** factory prefabricated expanded polystyrene (EPS) according to EN 13163 – see Annex 1 for product characteristics	-	≤ 250
	• **Adhesives:** **BOLIX U** cement based powder requiring addition of 0,18 to 0,20 l/kg of water **BOLIX Z** cement based powder requiring addition of 0,19 to 0,21 l/kg of water **BOLIX UZ / BOLIX UZB**[2] cement based powder requiring addition of 0,21 to 0,23 l/kg of water	about 4,0[1] (powder) about 4,0[1] (powder) about 4,0[1] (powder)	- - -
	Mechanically fixed ETICS with supplementary adhesive: according to manufacturer's recommendation the minimal bonded surface shall be 40% of the surface. National application documents shall be taken into account.		
	• **Insulation product:** • factory prefabricated expanded polystyrene (EPS) according to EN 13163 – see Annex 1 for product characteristics		50 to 250
	• **Anchors:** see Annex 2 for product characteristics	-	-
	• **Supplementary adhesives:** see bonded ETICS	-	-

[1] refers to fully bonded system

Table 1

	Components	Coverage (kg/m²)	Thickness (mm)
Base coats	• **BOLIX U** cement based powder requiring addition of 0,18 to 0,20 l/kg of water composition: sand, cement, mineral fillers, additives	about 4,0 (powder)	3,0 to 5,0
	• **BOLIX UZ / BOLIX UZB**[2] cement based powder requiring addition of 0,21 to 0,23 l/kg of water composition: sand, cement, mineral fillers, additives	about 4,0 (powder)	3,0 to 5,0
Glass fibre mesh	• **Standard glass fibre meshes** see Annex 2 for product characteristics	-	-
[2] BOLIX UZ and BOLIX UZB differ from each other in the colour of mineral filler			
Key coats	• **BOLIX O** composition: water, styroacrylat binder, additives ready to use liquid to be used with mineral and acrylic finishing coats	0,10 to 0,15	-
	• **BOLIX OP** composition: water, styroacrylat binder, mineral fillers, additives ready to use liquid to be used with mineral and acrylic finishing coats	0,25 to 0,40	-
	• **BOLIX SG** composition: water, styroacrylat binder, silicate binder, additives ready to use liquid to be used with silicate finishing coats	0,10 to 0,20	-
	• **BOLIX SG kolor** composition: water, styroacrylat binder, silicate binder, mineral fillers, additives ready to use liquid to be used with silicate finishing coats	0,25 to 0,40	-
	• **BOLIX SIG** composition: water, styroacrylat binder, silicone resin, additives ready to use liquid to be used with silicone and silicate-silicone finishing coats	0,10 to 0,20	-
	• **BOLIX SIG kolor** composition: water, styroacrylat binder, silicone resin, mineral fillers, additives ready to use liquid to be used with silicone and silicate-silicone finishing coats	0,25 to 0,40	-
Finishing coats	• **Acrylic finishing coats** composition: water, styroacrylat binder, sand, mineral fillers, additives ready to use paste		
	BOLIX KA particle size 2,0 mm; grained structure	3,0 to 3,5	regulated by particle size
	BOLIX KA 1 particle size 1,0 mm; grained structure	1,8 to 2,2	
	BOLIX KA 1,5 particle size 1,5 mm; grained structure	2,5 to 3,0	
	BOLIX TU particle size 2,5 mm; ribbed structure	3,0 to 3,5	
	BOLIX R particle size 2,5 mm; ribbed structure	3,0 to 3,5	
	BOLIX RS particle size 1,5 mm; ribbed structure	2,0 to 2,5	
	BOLIX MS particle size 1,0 mm; grained structure	3,0 to 3,5	
	BOLIX RMG particle size 2,0 mm; ribbed structure	1,8 to 4,0	
	BOLIX TM particle size 1,0 to 2,0 mm; grained structure	2,0 to 5,0	
	BOLIX KA COMPLEX particle size 2,0 mm; grained structure	3,0 to 3,5	

Table 1

	Components	Coverage (kg/m²)	Thickness (mm)
Finishing coats	**BOLIX KA 1 COMPLEX** particle size 1,0 mm; grained structure	1,8 to 2,2	regulated by particle size
	BOLIX KA 1,5 COMPLEX particle size 1,5 mm; grained structure	2,5 to 3,0	
	BOLIX TU COMPLEX particle size 2,5 mm; ribbed structure	3,0 to 3,5	
	BOLIX R COMPLEX particle size 2,5 mm; ribbed structure	3,0 to 3,5	
	BOLIX RS COMPLEX particle size 1,5 mm; ribbed structure	2,0 to 2,5	
	BOLIX MS COMPLEX particle size 1,0 mm; grained structure	3,0 to 3,5	
	• **Silicone finishing coats** composition: water, silicone resin, styroacrylat binder, sand, mineral fillers, additives ready to use paste		
	BOLIX SIT 1,5 KA particle size 1,5 mm; grained structure	2,0 to 2,5	regulated by particle size
	BOLIX SIT 2 KA particle size 2,0 mm; grained structure	2,5 to 3,0	
	BOLIX SIT 2 R particle size 2,5 mm; ribbed structure	3,0 to 3,5	
	• **Silicate-silicone finishing coats** composition: water, silicone resin, styroacrylat binder, sand, mineral fillers, additives ready to use paste		
	BOLIX SI-SIT 1,5 KA particle size 1,5 mm; grained structure	2,5 to 3,0	regulated by particle size
	BOLIX SI-SIT 2 KA particle size 2,0 mm; grained structure	3,0 to 3,5	
	BOLIX SI-SIT 2 R particle size 2,5 mm; ribbed structure	3,0 to 3,5	
	• **Mineral finishing coats** composition: sand, cement, limestone filler, synthetic resin, additives powder requiring addition of 0,17 to 0,24 l/kg of water		
	BOLIX MP KA 15 particle size 1,5 mm; grained structure	2,2 to 3,0	regulated by particle size
	BOLIX MP KA 20 particle size 2,0 mm; grained structure	3,0 to 3,5	
	BOLIX MP KA 30 particle size 3,0 mm; grained structure	3,0 to 4,0	
	BOLIX MP R 25 particle size 2,5 mm; ribbed structure	3,0 to 3,5	
	BOLIX MP KA 15 for painting particle size 1,5 mm; grained structure	2,2 to 3,0	
	BOLIX MP R 25 for painting particle size 2,5 mm; ribbed structure	3,0 to 3,5	
	• **Silicate finishing coats** composition: water, silicate resin, styroacrylat binder, sand, mineral fillers, additives ready to use paste		
	BOLIX S 1 KA particle size 1,0 mm; grained structure	1,8 to 2,2	regulated by particle size
	BOLIX S 1,5 KA particle size 1,5 mm; grained structure	2,5 to 3,0	
	BOLIX S 2 KA particle size 2,0 mm; grained structure	3,0 to 3,5	
	BOLIX S 2 R particle size 2,5 mm; ribbed structure	3,0 to 3,5	
Primers	• **BOLIX O** composition: water, styroacrylat binder, additives ready to use liquid to be used with BOLIX AZ decorative coat	0,10 to 0,15	-
	• **BOLIX SG** composition: water, styroacrylat binder, silicate binder, additives ready to use liquid to be used with BOLIX SZ decorative coat	0,10 to 0,20	-
	• **BOLIX SIG** composition: water, styroacrylat binder, silicone resin, additives ready to use liquid to be used with BOLIX SIL decorative coat	0,10 to 0,20	-
	• **BOLIX N** composition: water, styroacrylat binder, additives ready to use liquid to be used with BOLIX AZ decorative coat	0,10 to 0,20	-

Table 1

	Components	Coverage (kg/m²)	Thickness (mm)
Decorative coats (paints)	to be used obligatory with "for painting" finishing coats and optionally with the other finishing coats ready to use liquids		
	• **BOLIX AZ** composition: styroacrylat binder, mineral fillers, additives	0,18 to 0,28	-
	• **BOLIX AZ COMPLEX** composition: styroacrylat binder, mineral fillers, additives	0,18 to 0,28	-
	• **BOLIX SZ** composition: styroacrylat binder, silicate binder, additives, mineral fillers	0,18 to 0,28	-
	• **BOLIX SIL** composition: styroacrylat binder, silicone resin, additives, mineral fillers	0,18 to 0,28	-
Ancillary materials	Remain under ETICS manufacturer responsibility. Anchors as supplementary mechanical fixings covered by ETA		

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

This ETICS is intended to be used as external thermal insulation of buildings' walls made of masonry (bricks, blocks, stones, etc.) or concrete (cast on site or as prefabricated panels) with or without rendering. 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 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 effects 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 conditions for the packaging, transport, storage, installation as well as appropriate use, maintenance and repair are met. The indications 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 shall take into account principles given in clause 7 of ETAG 004 and shall be done in accordance with national provisions.

3 Performance of the product and references to the methods used for its assessment

Performances of the ETICS related to the Basic Requirements were determined in compliance with the ETAG 004.

Performances of the ETICS as described in this clause are valid provided that the components of the kit comply with Annexes 1 ÷ 2.

3.1 Safety in the case of fire (BWR 2)

3.1.1 Reaction to fire (ETAG 004, clause 5.1.2.1)

Table 2

Configuration	Maximum declared organic content	Declared flame retardant content	Reaction to fire class according to EN 13501-1
ETICS BOLIX S with EPS boards (reaction to fire Class E) and rendering system: • Base coats: BOLIX U, BOLIX UZ / BOLIX UZB • Finishing coats (with relevant key coats): KA, KA 1, KA 1,5, TU, R, RS, MS, RMG, TM, KA COMPLEX, KA 1 COMPLEX, KA 1,5 COMPLEX, TU COMPLEX, R COMPLEX, RS COMPLEX, MS COMPLEX, SIT 2 KA, SIT 1,5 KA, SIT 2 R, SI-SIT 2 KA, SI-SIT 1,5 KA, SI-SIT 2 R • Decorative coats(with relevant primers): AZ, AZ COMPLEX, SZ, SIL	≤ 4,3% ≤ 11,7% ≤ 17,0%	0% (no flame retardant)	**B – s1, d0**
ETICS BOLIX S with EPS boards (reaction to fire Class E) and rendering system: • Base coats: BOLIX U, BOLIX UZ / BOLIX UZB • Finishing coats (with relevant key coats): MP KA 15, MP KA 20, MP KA 30, MP R 25, MP KA 15 for painting, MP R 25 for painting, S 1 KA, S 1,5 KA, S 2 KA, S 2 R • Decorative coats(with relevant primers): AZ, AZ COMPLEX, SZ, SIL	≤ 4,3% ≤ 3,5% ≤ 17,0%		

Note: European reference fire scenario has not been laid down for facades. In some Member States the classification according to EN 13501-1 might not be sufficient for the use in facades. An additional tests might be required to comply with national provisions (e.g. large scale tests).

Mounting and fixing

The assessment of reaction to fire is based on tests with an insulation layer (EPS) thickness of 180 mm – SBI test according to EN 13823, 60 mm – test according to EN ISO 11925-2 and insulation material (EPS) density of 17,9 kg/m^3 as well as finishing coats with maximum organic content.

For the SBI test according to EN 13823, the ETICS is mounted directly to a substrate (Class A2-s1, d0) with a thickness of 12 mm.

For the test according to EN ISO 11925-2 no substrate is used.

The installation of the ETICS was carried out by the manufacturer following the manufacturer's specifications (instruction of installation) using a single layer of the glass fibre mesh all over the test specimen (no overlapping glass fibre mesh). The test specimens were prefabricated and did not include any joints.

Anchors were not included in the tested ETICS as they have no influence on the test results.

3.2 Hygiene, health and the environment (BWR 3)

3.2.1 Water absorption (ETAG 004, clause 5.1.3.1)

- Base coat BOLIX U:
  - water absorption after 1 hour < 1,0 kg/m^2,
  - water absorption after 24 hours < 0,5 kg/m^2,
- Base coat BOLIX UZ / BOLIX UZB:
  - water absorption after 1 hour < 1,0 kg/m^2,
  - water absorption after 24 hours < 0,5 kg/m^2,
- Rendering systems – according to Table 3.

Table 3

		Water absorption after 24 h	
		< 0,5 kg/m²	≥ 0,5 kg/m²
Rendering system: base coat BOLIX U (with the relevant key-coat) + finishing coat indicated hereafter:	KA, KA 1, KA 1,5, TU, R, RS, MS, RMG, TM, KA COMPLEX, KA 1 COMPLEX, KA 1,5 COMPLEX, TU COMPLEX, R COMPLEX, RS COMPLEX, MS COMPLEX	X	-
	SIT 2 KA, SIT 1,5 KA, SIT 2 R	X	-
	SI-SIT 2 KA, SI-SIT 1,5 KA, SI-SIT 2 R	X	-
	MP KA 15, MP KA 20, MP KA 30, MP R 25, MP KA 15 for painting, MP R 25 for painting	X	-
	S 1 KA, S 1,5 KA, S 2 KA, S 2 R	X	-
Rendering system: base coat BOLIX UZ / BOLIX UZB (with the relevant key-coat) + finishing coat indicated hereafter:	KA, KA 1, KA 1,5, TU, R, RS, MS, RMG, TM, KA COMPLEX, KA 1 COMPLEX, KA 1,5 COMPLEX, TU COMPLEX, R COMPLEX, RS COMPLEX, MS COMPLEX	X	-
	SIT 2 KA, SIT 1,5 KA, SIT 2 R	X	-
	SI-SIT 2 KA, SI-SIT 1,5 KA, SI-SIT 2 R	X	-
	MP KA 15, MP KA 20, MP KA 30, MP R 25, MP KA 15 for painting, MP R 25 for painting	X	-
	S 1 KA, S 1,5 KA, S 2 KA, S 2 R	X	-

3.2.2 Watertightness (ETAG 004, clause 5.1.3.2)

Passed without defects. None of the following defects occurred during testing:

- blistering or peeling of any finishing,
- failure or cracking associated with joints between insulation product boards or profiles fitted with ETICS,
- detachment of the render,
- cracking allowing water penetration to the insulation layer.

The ETICS is so assessed as resistant to hygrothermal cycles.

The water absorption of base coat and the rendering system is less than 0,5 kg/m² after 24 hours for all configurations of the ETICS, so the ETICS is assessed as freeze/thaw resistant.

3.2.3 Impact resistance (ETAG 004, clause 5.1.3.3)

Table 4

		Single standard mesh
Rendering system: base coat BOLIX U (with relevant key coat) + finishing coat indicated hereafter:	KA, KA 1, KA 1,5, TU, R, RS, MS, RMG, TM, KA COMPLEX, KA 1 COMPLEX, KA 1,5 COMPLEX, TU COMPLEX, R COMPLEX, RS COMPLEX, MS COMPLEX	**Category III**
	SIT 2 KA, SIT 1,5 KA, SIT 2 R	**Category III**
	SI-SIT 2 KA, SI-SIT 1,5 KA, SI-SIT 2 R	**Category III**
	MP KA 15, MP KA 20, MP KA 30, MP R 25, MP KA 15 for painting, MP R 25 for painting	**Category III**
	S 1 KA, S 1,5 KA, S 2 KA, S 2 R	**Category II**
Rendering system: base coat BOLIX UZ / BOLIX UZB (with relevant key coat) + finishing coat indicated hereafter:	KA, KA 1, KA 1,5, TU, R, RS, MS, RMG, TM, KA COMPLEX, KA 1 COMPLEX, KA 1,5 COMPLEX, TU COMPLEX, R COMPLEX, RS COMPLEX, MS COMPLEX	**Category III**
	SIT 2 KA, SIT 1,5 KA, SIT 2 R	**Category III**
	SI-SIT 2 KA, SI-SIT 1,5 KA, SI-SIT 2 R	**Category III**
	MP KA 15, MP KA 20, MP KA 30, MP R 25, MP KA 15 for painting, MP R 25 for painting	**Category III**
	S 1 KA, S 1,5 KA, S 2 KA, S 2 R	**Category II**

3.2.4 Water vapour permeability (ETAG 004, clause 5.1.3.4)

Table 5

		Equivalent air thickness s_d, m
Rendering system: base coat BOLIX U + finishing coat indicated hereafter:	KA, KA 1, KA 1,5, TU, R, RS, MS, RMG, TM, KA COMPLEX, KA 1 COMPLEX, KA 1,5 COMPLEX, TU COMPLEX, R COMPLEX, RS COMPLEX, MS COMPLEX	**≤ 2,0** BOLIX OP+BOLIX KA 1,5+BOLIX SIG+BOLIX SIL: 1,39 BOLIX OP+BOLIX KA 1,5 +BOLIX N+BOLIX AZ: 1,60 BOLIX OP+BOLIX TM: 0,39
	SIT 2 KA, SIT 1,5 KA, SIT 2 R	**≤ 2,0** BOLIX SIG+BOLIX SIT 2 KA+BOLIX SIG+BOLIX SIL: 1,36 BOLIX SIG kolor+BOLIX SIT 2 KA+BOLIX SIG+BOLIX SIL: 1,20 BOLIX SIG+BOLIX SIT 2 KA: 0,74
	SI-SIT 2 KA, SI-SIT 1,5 KA, SI-SIT 2 R	**≤ 2,0** BOLIX SIG+BOLIX SI-SIT 1,5 KA+BOLIX N+BOLIX AZ: 1,64 BOLIX SIG+BOLIX SI-SIT 1,5 KA+BOLIX SIG+BOLIX SIL: 1,40 BOLIX SIG+BOLIX SI-SIT 1,5 KA: 0,89
	MP KA 15, MP KA 20, MP KA 30, MP R 25, MP KA 15 for painting, MP R 25 for painting	**≤ 2,0** BOLIX OP+BOLIX MP R 25+BOLIX AZ: 0,51 BOLIX OP+BOLIX MP R 25: 0,26
	S 1 KA, S 1,5 KA, S 2 KA, S 2 R	**≤ 2,0** BOLIX SG+BOLIX S 2 KA+BOLIX SG+BOLIX SZ: 0,24

Table 5

		Equivalent air thickness s_d, m
Rendering system: base coat BOLIX UZB + finishing coat indicated hereafter:	KA, KA 1, KA 1,5, TU, R, RS, MS, RMG, TM, KA COMPLEX, KA 1 COMPLEX, KA 1,5 COMPLEX, TU COMPLEX, R COMPLEX, RS COMPLEX, MS COMPLEX	**≤ 2,0** BOLIX OP+BOLIX KA 1,5+BOLIX SIG+BOLIX SIL: 1,34 BOLIX OP+BOLIX KA 1,5+BOLIX N+BOLIX AZ: 1,40 BOLIX OP+BOLIX KA 1,5: 0,70 BOLIX OP+BOLIX TM: 0,50
	SIT 2 KA, SIT 1,5 KA, SIT 2 R	**≤ 2,0** BOLIX SIG+BOLIX SIT 2 KA+BOLIX SIG+BOLIX SIL: 0,91 BOLIX SIG kolor+BOLIX SIT 2 KA+BOLIX SIG+BOLIX SIL: 0,84
	SI-SIT 2 KA, SI-SIT 1,5 KA, SI-SIT 2 R	**≤ 2,0** BOLIX SIG+BOLIX SI-SIT 1,5 KA+BOLIX N+BOLIX AZ: 1,32 BOLIX SIG+BOLIX SI-SIT 1,5 KA+BOLIX SIG+BOLIX SIL: 1,17 BOLIX SIG+BOLIX SI-SIT 1,5 KA: 0,74
	MP KA 15, MP KA 20, MP KA 30, MP R 25, MP KA 15 for painting, MP R 25 for painting	**≤ 2,0** BOLIX OP+BOLIX MP R 25+BOLIX AZ: 0,67
	S 1 KA, S 1,5 KA, S 2 KA, S 2 R	**≤ 2,0** BOLIX SG+BOLIX S 2 KA+BOLIX SG+BOLIX SZ: 0,25
Rendering system: base coat BOLIX UZ + finishing coat indicated hereafter:	KA, KA 1, KA 1,5, TU, R, RS, MS, RMG, TM, KA COMPLEX, KA 1 COMPLEX, KA 1,5 COMPLEX, TU COMPLEX, R COMPLEX, RS COMPLEX, MS COMPLEX	**≤ 2,0** BOLIX OP+BOLIX TU 30: 0,43 BOLIX OP+BOLIX TU+BOLIX N+BOLIX AZ: 0,72
	SIT 2 KA, SIT 1,5 KA, SIT 2 R	**≤ 2,0** BOLIX SIG+BOLIX SIT 2 R: 0,32 BOLIX SIG+BOLIX SIT 2R+BOLIX N+BOLIX AZ: 0,64
	SI-SIT 2 KA, SI-SIT 1,5 KA, SI-SIT 2 R	**≤ 2,0** BOLIX SIG+BOLIX SI-SIT 2R: 0,48 BOLIX SIG+BOLIX SI-SIT 2 R+BOLIX N+BOLIX AZ: 0,94
	MP KA 15, MP KA 20, MP KA 30, MP R 25, MP KA 15 for painting, MP R 25 for painting	**≤ 2,0** BOLIX OP+BOLIX MP KA 30: 0,18 BOLIX OP+BOLIX MP KA 30+BOLIX N+BOLIX AZ: 0,42
	S 1 KA, S 1,5 KA, S 2 KA, S 2 R	**≤ 2,0** BOLIX SG+BOLIX S 2 R: 0,15 BOLIX SG+BOLIX S 2 R+BOLIX N+BOLIX AZ: 0,28

3.2.5 Release of dangerous substances (ETAG 004 - clause 5.1.3.5, EOTA TR 034)

The written declaration on dangerous substances was submitted by the manufacturer to the Technical Assessment Body.

Regarding dangerous substances there may be other 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 also 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)

Table 6

Bond strength between base coat and insulation product (EPS panels)			
Base coat	**Initial state**	**After hygrothermal cycles (on the rig)**	**After freeze/thaw cycles**
BOLIX U	**≥ 0,08 MPa**	**≥ 0,08 MPa**	test not required because freeze/thaw cycles not necessary
BOLIX UZ / BOLIX UZB	**≥ 0,08 MPa**	**≥ 0,08 MPa**	test not required because freeze/thaw cycles not necessary

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

Table 7

Bond strength between: adhesive – substrate (concrete) and adhesive – insulation product (EPS)				
Adhesives		**Under dry conditions**	**48 h immersion in water + 2 h drying at (23±2)°C and (50±5)% RH**	**48 h immersion in water + 7 days drying at (23±2)°C and (50±5)% RH**
BOLIX U	Concrete	**≥ 0,25 MPa**	**≥ 0,08 MPa**	**≥ 0,25 MPa**
	EPS	**≥ 0,08 MPa**	**≥ 0,03 MPa**	**≥ 0,08 MPa**
BOLIX Z	Concrete	**≥ 0,25 MPa**	**≥ 0,08 MPa**	**≥ 0,25 MPa**
	EPS	**≥ 0,08 MPa**	**≥ 0,03 MPa**	**≥ 0,08 MPa**
BOLIX UZ / BOLIX UZB	Concrete	**≥ 0,25 MPa**	**≥ 0,08 MPa**	**≥ 0,25 MPa**
	EPS	**≥ 0,08 MPa**	**≥ 0,03 MPa**	**≥ 0,08 MPa**

The ETICS shall be installed on the substrate with application of the adhesive on the following minimal surface:

Table 8

	Tensile strength perpendicular to the faces of EPS	
	≥ 100 kPa	≥ 150 kPa
BOLIX U, BOLIX Z, BOLIX UZ / BOLIX UZB	40%	40%

3.3.3 Bond strength after ageing (ETAG 004, clause 5.1.7)

Table 9

		After hygrothermal cycles
Rendering system: base coat BOLIX U (with relevant key coat) + finishing coat indicated hereafter:	KA, KA 1, KA 1,5, TU, R, RS, MS, RMG, TM, KA COMPLEX, KA 1 COMPLEX, KA 1,5 COMPLEX, TU COMPLEX, R COMPLEX, RS COMPLEX, MS COMPLEX	**≥ 0,08 MPa**
	SIT 2 KA, SIT 1,5 KA, SIT 2 R	**≥ 0,08 MPa**
	SI-SIT 2 KA, SI-SIT 1,5 KA, SI-SIT 2 R	**≥ 0,08 MPa**
	MP KA 15, MP KA 20, MP KA 30, MP R 25, MP KA 15 for painting, MP R 25 for painting	**≥ 0,08 MPa**
	S 1 KA, S 1,5 KA, S 2 KA, S 2 R	**≥ 0,08 MPa**

Table 9

		After hygrothermal cycles
Rendering system: base coat BOLIX UZ / BOLIX UZB (with relevant key coat) + finishing coat indicated hereafter	KA, KA 1, KA 1,5, TU, R, RS, MS, RMG, TM, KA COMPLEX, KA 1 COMPLEX, KA 1,5 COMPLEX, TU COMPLEX, R COMPLEX, RS COMPLEX, MS COMPLEX	**≥ 0,08 MPa**
	SIT 2 KA, SIT 1,5 KA, SIT 2 R	**≥ 0,08 MPa**
	SI-SIT 2 KA, SI-SIT 1,5 KA, SI-SIT 2 R	**≥ 0,08 MPa**
	MP KA 15, MP KA 20, MP KA 30, MP R 25, MP KA 15 for painting, MP R 25 for painting	**≥ 0,08 MPa**
	S 1 KA, S 1,5 KA, S 2 KA, S 2 R	**≥ 0,08 MPa**

3.3.4 Fixing strength (ETAG 004, clause 5.1.4.2)

Test not required because the ETICS fulfils the criteria $E \cdot d \leq 50.000$ N/mm.

3.3.5 Wind load resistance (ETAG 004, clause 5.1.4.3)

The wind load resistance of the ETICS R_d is calculated as follow:

$R_d = (R_{panel} \times n_{panel} + R_{joint} \times n_{joint}) / \gamma$

where:

n_{panel}: number (per m^2) of anchors not placed at the panel joints

n_{joint}: number (per m^2) of anchors placed at the panel joints

γ: national safety factor

Table 10

Anchors for which the following failure loads apply	Plate diameter of the anchor		**≥ 60 mm**	
	Plate stiffnes of the anchor		**≥ 0,4 kN/mm**	
Characteristics of the **EPS panels** for which the following failure loads apply	Thickness		**≥ 50 mm**	
	Tensile strength perpendicular to the faces		**≥ 100 kPa**	
Failure load, kN	Anchors not placed at the panel joints (pull-through test)	R_{panel}	Minimum value: Average value:	**0,44** **0,46**
	Anchors placed at the panel joints (pull-through test)	R_{joint}	Minimum value: Average value:	**0,42** **0,45**

The above given loads apply for anchors according to Annex 2 and also for all anchors if they meet the following criteria:

- covered by ETA,
- plate diameter ≥ 60 mm,
- plate stiffness of anchor ≥ 0,4 kN/mm,
- load resistance of anchor plate ≥ 1,6 kN,
- anchors mounted on the insulation panel surface.

3.3.6 Render strip tensile test (ETAG 004, clause 5.5.4)

No performance assessed.

3.4 Protection against noise (BWR 5)

3.4.1 Airborne sound insulation (ETAG 004, clause 5.1.5)

No performance assessed.

3.5 Energy economy and heat retention (BWR 6)

3.5.1 Thermal resistance and thermal transmittance (ETAG 004, clause 5.1.6)

The thermal transmittance of the 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: corrected thermal transmittance of the covered wall (W/(m²·K)

n: number of anchors (through insulation product) per 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 plastic screw, stainless steel screw with a head covered by plastic material 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)

= 0,008 W/K for all other anchors (worst case)

U: thermal transmittance of the current part of the covered wall (excluding thermal bridges) (W/(m²·K) determined as follows:

$$U = 1 : [R_{ETICS} + R_{substrate} + R_{se} + R_{si}]$$

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 (e.g. 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 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 (AVCP) system applied, with reference to its legal base

According to Decision 97/556/EC of the European Commission amended by the Decision 2001/596/EC, the systems of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table apply.

Table 11

Product	Intended use	Level or class (Reaction to fire)	System
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 Class 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 European Assessment Document (EAD)

Technical details necessary for the implementation of the AVCP system are laid down in the control plan which is deposited at Instytut Techniki Budowlanej.

For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

Issued in Warsaw on 15/11/2017 by Instytut Techniki Budowlanej

Krzysztof Kuczyński, PhD
Deputy Director of ITB

Description and characteristics		EPS panels according to EN 13163
Reaction to fire EN 13501-1		Class E thickness: 20 mm to 250 mm density: up to 20,0 kg/m³
Thermal resistance (m²·K)/W		Defined in the CE marking in reference to EN 13163
Thickness (mm) EN 823		EPS-EN 13163 – T1
Length (mm) EN 822		EPS-EN 13163 – L2
Width (mm) EN 822		EPS-EN 13163 – W2
Squareness (mm/m) EN 824		EPS-EN 13163 – S5
Flatness (mm/m) EN 825		EPS-EN 13163 – P5
Surface condition		Cut surface (homogeneous and without "skin")
Dimensional stability	laboratory conditions EN 1603	EPS-EN 13163 – DS(N)2
	specified temperature and humidity EN 1604	EPS-EN 13163 – DS(70,-)1 EPS-EN 13163 – DS(70,-)2
Short-term water absorption (partial immersion) (kg/m²) EN 1609		≤ 1,0
Water vapour diffusion resistance factor (μ) EN 12086		20 to 60
Tensile strength perpendicular to the faces in dry conditions EN 1607		EPS-EN 13163 – TR100 EPS-EN 13163 – TR150
Bending strength (kPa) EN 12089		≥ 75
Shear strength (MPa) EN 12090		≥ 0,02
Shear modulus (MPa) EN 12090		≥ 1,0

BOLIX S	**Annex 1** of European Technical Assessment ETA-07/0110
Thermal insulation product characteristic	

Anchors mounted on the insulation panels surface

Anchor trade name	Plate diameter (mm)	Description of the anchor and characteristics resistance in the substrate	Plate stiffness (kN/mm)	Load resistance of the plate (kN)
fischer termoz CN 8	≥ 60	see ETA-09/0394	≥ 0,4	≥ 1,60
fischer termoz 8 U	≥ 60	see ETA-02/0019	≥ 0,5	≥ 2,45
fischer termoz CS 8	≥ 60	see ETA-14/0372	≥ 0,6	≥ 1,70
fischer termoz PN 8	≥ 60	see ETA-09/0171	≥ 0,4	≥ 1,60
ejotherm STR U	≥ 60	see ETA-04/0023	≥ 0,6	≥ 2,08
ejotherm STR U 2G	≥ 60	see ETA-04/0023	≥ 0,6	≥ 2,08
KOELNER TFIX-8M	≥ 60	see ETA 07/0336	≥ 1,0	≥ 1,75
KOELNER TFIX-8S	≥ 60	see ETA-11/0144	≥ 0,6	≥ 2,04
KOELNER TFIX-8ST	≥ 60	see ETA-11/0144	≥ 0,6	≥ 2,04
FIXPLUG 10	≥ 60	see ETA-15/0373	≥ 0,6	≥ 1,60

In addition every anchor meeting the following criteria can be used:

- covered by ETA,
- plate diameter ≥ 60 mm,
- plate stiffness of anchor ≥ 0,4 kN/mm,
- load resistance of anchor plate ≥ 1,60 kN,
- anchors mounted on the insulation panel surface.

BOLIX S	**Annex 2** of European Technical Assessment ETA-07/0110
Anchors characteristic	

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, %
BOLIX HD 145/S	VERTEX R 117 A 101	mass per unit area: 145 g/m² mesh size: 4,5 x 4,0 mm	≥ 20	≥ 50
	SSI-SIT-1363-150 SM0,5	mass per unit area: 150 g/m² mesh size: 3,6 x 4,3 mm	≥ 20	≥ 50
	AKE 145	mass per unit area: 145 g/m² mesh size: 4,5 x 4,0 mm	≥ 20	≥ 50
BOLIX HD 158/S	ST-2924/100 KM	mass per unit area: 155 g/m² mesh size: 4,8 x 3,7 mm	≥ 20	≥ 50
BOLIX HD 160/D	ASGLATEX 03-1	mass per unit area: 160 g/m² mesh size: 3,6 x 3,8 mm	≥ 20	≥ 50
	SSI-SIT-1363-160 SM0,5A	mass per unit area: 160 g/m² mesh size: 3,6 x 3,8 mm	≥ 20	≥ 50
	AKE 160	mass per unit area: 160 g/m² mesh size: 3,2 x 3,7 mm	≥ 20	≥ 50
BOLIX HD 174/S	ST 112/100/7 KM	mass per unit area: 160 g/m² mesh size: 3,6 x 3,8 mm	≥ 20	≥ 50

BOLIX S	**Annex 3** of European Technical Assessment ETA-07/0110
Glass fibre mesh characteristic	