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European Technical Assessment

**ETA-13/0806
of 23/03/2016**

General Part

Technical Assessment Body issuing the European Technical Assessment

Instytut Techniki Budowlanej

Trade name of the construction product

BOLIX HD

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

BOLIX S.A.
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PL 34-300 Żywiec, Poland

This European Technical Assessment contains

16 pages including 2 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)

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Specific Part

1 Technical description of the product

External Thermal Insulation Composite System BOLIX HD called ETICS in the following text is a kit designed and installed in accordance with the manufacturer design and installation instructions deposited with the Instytut Techniki Budowlanej.

The ETICS comprises the following 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 ETICS.

The ETICS comprises a prefabricated insulation product made 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 reinforcing mesh. The rendering is applied directly to the insulation panels, without any air gap or disconnecting layer.

The ETICS also includes ancillary materials which are defined in clause 3.2.2.5 of ETAG 004. They shall be used in accordance with the manufacturer's instruction.

Table 1

	Components	Coverage (kg/m ²)	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.		
	<ul style="list-style-type: none"> Insulation product: factory prefabricated expanded polystyrene (EPS) according to EN 13163 – see Annex 1 for product characteristics 	-	≤ 250
	<ul style="list-style-type: none"> Adhesives: BOLIX US cement based powder requiring addition of 0,22 to 0,24 l/kg of water BOLIX Z cement based powder requiring addition of 0,22 to 0,24 l/kg of water 	about 4,0 ¹ (powder)	-
	Mechanically fixed ETICS with anchors and supplementary adhesive: according to the manufacturer's recommendation the minimal bonded surface shall be 40%. National application documents shall be taken into account.		
	<ul style="list-style-type: none"> Insulation product factory prefabricated expanded polystyrene (EPS) according to EN 13163 – see Annex 1 for product characteristics 	-	50 to 250
	<ul style="list-style-type: none"> Anchors: see Annex 2 for product characteristics 	-	-

¹ refers to fully bonded system

Table 1

	Components	Coverage (kg/m ²)	Thickness (mm)
Insulation material with associated methods of fixing	<ul style="list-style-type: none"> • Supplementary adhesives: BOLIX US cement based powder requiring addition of 0,22 to 0,24 l/kg of water BOLIX Z cement based powder requiring addition of 0,22 to 0,24 l/kg of water 	about 4,0 ¹ (powder)	-
		about 4,0 ¹ (powder)	-
¹ refers to fully bonded system			
Base coats	<ul style="list-style-type: none"> • BOLIX US cement based powder requiring addition of 0,18 to 0,20 l/kg of water composition: sand, cement, mineral fillers, additives • BOLIX KD ready to use paste composition: styroacrylat binder, mineral fillers, additives 	about 4,0 (powder)	3,0 to 5,0
		2,4 to 3,5 ² (paste)	2,0 to 3,0
Glass fibre meshes	<ul style="list-style-type: none"> • Standard and reinforced glass fibre meshes see Annex 2 for product characteristics 	-	-
² with one layer of standard glass fibre mesh			
Key coats (to be used with BOLIX US)	<ul style="list-style-type: none"> • BOLIX OP composition: water, styroacrylat binder, mineral fillers, additives ready to use liquid to be used with acrylic finishing coats 	0,25 to 0,40	-
	<ul style="list-style-type: none"> • BOLIX SIG composition: water, styroacrylat binder, silicone resin, additives ready to use liquid to be used with silicone finishing coats 	0,10 to 0,20	-
	<ul style="list-style-type: none"> • BOLIX SIG kolor composition: water, styroacrylat binder, silicone resin, mineral fillers, additives ready to use liquid to be used with silicone finishing coats 	0,25 to 0,40	-
Finishing coats	<ul style="list-style-type: none"> • Acrylic finishing coats composition: water, styroacrylat binder, sand, mineral fillers, additives ready to use paste 		
	BOLIX SI-SIT 2 KA particle size 2,0 mm; grained structure	3,0 to 3,5	regulated by particle size
	BOLIX SI-SIT 1,5 KA particle size 1,5 mm; grained structure	2,5 to 3,0	
	<ul style="list-style-type: none"> • 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	2,5 to 3,0	regulated by particle size
	BOLIX SIT 2 KA particle size 2,0 mm; grained structure	3,0 to 3,5	
	BOLIX SIT 2 R particle size 2,5 mm; ribbed structure	3,0 to 3,5	
	BOLIX SIT 1,5 KA complex particle size 1,5 mm; grained structure	2,5 to 3,0	
	BOLIX SIT 2 KA complex particle size 2,0 mm; grained structure	3,0 to 3,5	
BOLIX SIT 2 R complex particle size 2,5 mm; ribbed structure	3,0 to 3,5		
BOLIX SIT-P 1,5 KA particle size 1,5 mm; grained structure	2,5 to 3,0		
BOLIX SIT-P 2 KA particle size 2,0 mm; grained structure	3,0 to 3,5		

Table 1

	Components	Coverage (kg/m ²)	Thickness (mm)
Finishing coats	<ul style="list-style-type: none"> • Acrylic decorative finishing coats composition: water, styroacrylat binder, sand, mineral fillers, additives ready to use paste 		
	BOLIX DECO particle size 1,0 to 1,6 mm	2,0 to 2,4	1,0 to 1,6
	BOLIX DECO TM particle size 1,0 to 1,6 mm	2,0 to 5,0	
BOLIX TM particle size 1,0 to 1,6 mm	2,0 to 5,0		
Primers	<ul style="list-style-type: none"> • 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	-
	<ul style="list-style-type: none"> • BOLIX N composition: water, styroacrylat binder, additives ready to use liquid to be used with BOLIX AZ decorative coat 	0,10 to 0,20	-
Decorative coats (paints)	<ul style="list-style-type: none"> • BOLIX AZ to be used optionally; ready to use liquids composition: styroacrylat binder, mineral fillers, additives 	0,18 to 0,28	-
	<ul style="list-style-type: none"> • BOLIX AZ complex to be used optionally; ready to use liquids composition: styrolacrylat binder, mineral fillers, additives 	0,18 to 0,28	-
	<ul style="list-style-type: none"> • BOLIX SIL to be used optionally; ready to use liquids composition: styroacrylat binder, silicone binder, additives, mineral fillers 	0,18 to 0,28	-
	<ul style="list-style-type: none"> • BOLIX SIL complex to be used optionally; ready to use liquids composition: styroacrylat binder, silicone resin, additives, mineral fillers 	0,18 to 0,28	-
	<ul style="list-style-type: none"> • BOLIX SIL-P to be used optionally; ready to use liquids 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 issued according to ETAG 014.		

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 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 HD: <ul style="list-style-type: none"> • Base coats: BOLIX US, BOLIX KD • Finishing coats (with relevant key coats acc. to Table 1): SI-SIT 2 KA, SI-SIT 1,5 KA, SIT 1,5 KA, SIT 2 KA, SIT 2 R, SIT 1,5 KA complex, SIT 2 KA complex, SIT 2R complex, SIT-P 1,5 KA, SIT-P 2 KA, TM, TM DECO, DECO • Decorative coats (with relevant primers acc. to table 1): SIL, SIL complex, SIL-P 	<p style="text-align: center;">≤ 8,7%</p> <p style="text-align: center;">≤ 11,7%</p> <p style="text-align: center;">≤ 10,0%</p>	0% (no flame retardant)	B – s2, d0
All other configurations (e.g. with primer BOLIX N and decorative coats AZ and AZ complex)	-	-	No performance assessed

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 18,1 kg/m³ 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 US:
 - water absorption after 1 hour < 1,0 kg/m²,
 - water absorption after 24 hours < 0,5 kg/m²,
- Base coat BOLIX KD:
 - water absorption after 1 hour < 1,0 kg/m²,
 - water absorption after 24 hours < 0,5 kg/m²,
- Rendering systems – according to Table 3.

Table 3

		Water absorption after 24 h	
		< 0,5 kg/m ²	≥ 0,5 kg/m ²
Rendering system: base coat BOLIX US (with the relevant key-coat) + finishing coat indicated hereafter:	SI-SIT 2 KA, SI-SIT 1,5 KA	X	-
	SIT 1,5 KA, SIT 2 KA, SIT 2 R SIT 1,5 KA complex, SIT 2 KA complex SIT 2 R complex	X	-
	SIT-P 1,5 KA, SIT-P 2 KA	X	-
	DECO, DECO TM, TM	X	-
Rendering system: base coat BOLIX KD + finishing coat indicated hereafter:	SI-SIT 2 KA, SI-SIT 1,5 KA	X	-
	SIT 1,5 KA, SIT 2 KA, SIT 2 R SIT 1,5 KA complex, SIT 2 KA complex SIT 2 R complex	X	-
	SIT-P 1,5 KA, SIT-P 2 KA	X	-
	DECO, DECO TM, TM	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 mesh layer AKE 145
Rendering system: base coat BOLIX US (with relevant key coat acc. to table 1) + finishing coat indicated hereafter:	SI-SIT 2 KA, SI-SIT 1,5 KA	Category II
	SIT 1,5 KA, SIT 2 KA, SIT 2 R, SIT 1,5 KA complex SIT 2 KA complex, SIT 2 R complex	Category III
	SIT-P 1,5 KA, SIT-P 2 KA	Category III
	DECO, DECO TM, TM	Category II
Rendering system: base coat BOLIX KD finishing coat indicated hereafter:	SI-SIT 2 KA, SI-SIT 1,5 KA	Category II
	SIT 1,5 KA, SIT 2 KA, SIT 2 R, SIT 1,5 KA complex SIT 2 KA complex, SIT 2 R complex	Category II
	SIT-P 1,5 KA, SIT-P 2 KA	Category II
	DECO, DECO TM, TM	Category I

Table 5

		Single mesh layer ST 2924-100/7 KM
Rendering system: base coat BOLIX US (with relevant key coat acc. to table 1) + finishing coat indicated hereafter	SI-SIT 2 KA, SI-SIT 1,5 KA	Category II
	SIT 1,5 KA, SIT 2 KA, SIT 2 R, SIT 1,5 KA complex SIT 2 KA complex, SIT 2 R complex	Category II
	SIT-P 1,5 KA, SIT-P 2 KA	Category II
	DECO, DECO TM, TM	Category II
Rendering system: base coat BOLIX KD + finishing coat indicated hereafter	SI-SIT 2 KA, SI-SIT 1,5 KA	Category I
	SIT 1,5 KA, SIT 2 KA, SIT 2 R, SIT 1,5 KA complex SIT 2 KA complex, SIT 2 R complex	Category II
	SIT-P 1,5 KA, SIT-P 2 KA	Category I
	DECO, DECO TM, TM	Category II

Table 6

		Single mesh layer ST 112-100/7 KM
Rendering system: base coat BOLIX US (with relevant key coat acc. to table 1) + finishing coat indicated hereafter	SI-SIT 2 KA, SI-SIT 1,5 KA	Category II
	SIT 1,5 KA, SIT 2 KA, SIT 2 R, SIT 1,5 KA complex SIT 2 KA complex, SIT 2 R complex	Category II
	SIT-P 1,5 KA, SIT-P 2 KA	Category II
	DECO, DECO TM, TM	Category II
Rendering system: base coat BOLIX KD + finishing coat indicated hereafter	SI-SIT 2 KA, SI-SIT 1,5 KA	Category I
	SIT 1,5 KA, SIT 2 KA, SIT 2 R, SIT 1,5 KA complex SIT 2 KA complex, SIT 2 R complex	Category II
	SIT-P 1,5 KA, SIT-P 2 KA	Category I
	DECO, DECO TM, TM	Category II

Table 7

		Double mesh layer AKE 145
Rendering system: base coat BOLIX US (with relevant key coat acc. to table 1) + finishing coat indicated hereafter	SI-SIT 2 KA, SI-SIT 1,5 KA	Category I
	SIT 1,5 KA, SIT 2 KA, SIT 2 R, SIT 1,5 KA complex SIT 2 KA complex, SIT 2 R complex	Category II
	SIT-P 1,5 KA, SIT-P 2 KA	Category I
	DECO, DECO TM, TM	Category I
Rendering system: base coat BOLIX KD + finishing coat indicated hereafter	SI-SIT 2 KA, SI-SIT 1,5 KA	Category I
	SIT 1,5 KA, SIT 2 KA, SIT 2 R, SIT 1,5 KA complex SIT 2 KA complex, SIT 2 R complex	Category I
	SIT-P 1,5 KA, SIT-P 2 KA	Category I
	DECO, DECO TM, TM	Category I

Table 8

		Double mesh layer ST 2924-100/7 KM
Rendering system: base coat BOLIX US (with relevant key coat acc. to table 1) + finishing coat indicated hereafter	SI-SIT 2 KA, SI-SIT 1,5 KA	Category I
	SIT 1,5 KA, SIT 2 KA, SIT 2 R, SIT 1,5 KA complex SIT 2 KA complex, SIT 2 R complex	Category I
	SIT-P 1,5 KA, SIT-P 2 KA	Category I
	DECO, DECO TM, TM	Category I
Rendering system: base coat BOLIX KD + finishing coat indicated hereafter	SI-SIT 2 KA, SI-SIT 1,5 KA	Category I
	SIT 1,5 KA, SIT 2 KA, SIT 2 R, SIT 1,5 KA complex SIT 2 KA complex, SIT 2 R complex	Category I
	SIT-P 1,5 KA, SIT-P 2 KA	Category I
	DECO, DECO TM, TM	Category I

Table 9

		Double mesh layer ST 112-100/7 KM
Rendering system: base coat BOLIX US (with relevant key coat acc. to table 1) + finishing coat indicated hereafter	SI-SIT 2 KA, SI-SIT 1,5 KA	Category I
	SIT 1,5 KA, SIT 2 KA, SIT 2 R, SIT 1,5 KA complex SIT 2 KA complex, SIT 2 R complex	Category I
	SIT-P 1,5 KA, SIT-P 2 KA	Category I
	DECO, DECO TM, TM	Category I
Rendering system: base coat BOLIX KD + finishing coat indicated hereafter	SI-SIT 2 KA, SI-SIT 1,5 KA	Category I
	SIT 1,5 KA, SIT 2 KA, SIT 2 R, SIT 1,5 KA complex SIT 2 KA complex, SIT 2 R complex	Category I
	SIT-P 1,5 KA, SIT-P 2 KA	Category I
	DECO, DECO TM, TM	Category I

Table 10

		Double mesh layer AKE 145 + BOLIX HD 335
Rendering system: base coat BOLIX US (with relevant key coat acc. to table 1) + finishing coat indicated hereafter	SI-SIT 2 KA, SI-SIT 1,5 KA	Category II
	SIT 1,5 KA, SIT 2 KA, SIT 2 R, SIT 1,5 KA complex SIT 2 KA complex, SIT 2 R complex	Category II
	SIT-P 1,5 KA, SIT-P 2 KA	Category II
	DECO, DECO TM, TM	Category II
Rendering system: base coat BOLIX KD + finishing coat indicated hereafter	SI-SIT 2 KA, SI-SIT 1,5 KA	Category I
	SIT 1,5 KA, SIT 2 KA, SIT 2 R, SIT 1,5 KA complex SIT 2 KA complex, SIT 2 R complex	Category I
	SIT-P 1,5 KA, SIT-P 2 KA	Category I
	DECO, DECO TM, TM	Category I

3.2.4 Water vapour permeability (ETAG 004, clause 5.1.3.4)

Table 11

		Equivalent air thickness s_d , m
Rendering system: base coat BOLIX US + finishing coat indicated hereafter:	SI-SIT 2 KA, SI-SIT 1,5 KA	$\leq 2,0$ m BOLIX SIG kolor + BOLIX SI-SIT 2 KA + BOLIX N + BOLIX AZ: 0,80
	SIT 1,5 KA, SIT 2 KA, SIT 2 R SIT 1,5 KA complex, SIT 2 KA complex SIT 2 R complex	$\leq 2,0$ m BOLIX SIG kolor + BOLIX SIT 2 R + BOLIX SIG + BOLIX SIL: 0,44
	SIT-P 1,5 KA, SIT-P 2 KA	$\leq 2,0$ m BOLIX SIG kolor + BOLIX SIT-P 2 R + BOLIX SIG + BOLIX SIL-P: 0,74
	DECO, DECO TM, TM	$\leq 2,0$ m BOLIX OP + BOLIX DECO TM: 0,36
Rendering system: base coat BOLIX KD + finishing coat indicated hereafter:	SI-SIT 2 KA, SI-SIT 1,5 KA	$\leq 2,0$ m BOLIX SI-SIT 2 KA + BOLIX N + BOLIX AZ: 1,23
	SIT 1,5 KA, SIT 2 KA, SIT 2 R SIT 1,5 KA complex, SIT 2 KA complex SIT 2 R complex	$\leq 2,0$ m BOLIX SIT 2 R + BOLIX SIG + BOLIX SIL: 0,99
	SIT-P 1,5 KA, SIT-P 2 KA	$\leq 2,0$ m BOLIX SIT-P 2 R + BOLIX SIG + BOLIX SIL-P: 1,53
	DECO, DECO TM, TM	$\leq 2,0$ m BOLIX DECO TM: 0,74

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.

In addition to the specific clauses relating to dangerous substances contained in this ETA, 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 in use (BWR 4)

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

Table 12

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 US	≥ 0,08 MPa	≥ 0,08 MPa	test not required because freeze/thaw cycles not necessary
BOLIX KD	≥ 0,08 MPa	≥ 0,08 MPa	

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 13

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 US	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

Bonded surface area: at least 40%.

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

Table 14

		After hygrothermal cycles
Rendering system: base coat BOLIX US (with relevant key coat) + finishing coat indicated hereafter:	SI-SIT 2 KA, SI-SIT 1,5 KA	≥ 0,08 MPa
	SIT 1,5 KA, SIT 2 KA, SIT 2 R SIT 1,5 KA complex, SIT 2 KA complex SIT 2 R complex, SIT-P 1,5 KA, SIT-P 2 KA	≥ 0,08 MPa
	SIT-P 1,5 KA, SIT-P 2 KA	≥ 0,08 MPa
	DECO, DECO TM, TM	≥ 0,08 MPa

Table 15

		After hygrothermal cycles
Rendering system: base coat BOLIX KD + finishing coat indicated hereafter	SI-SIT 2 KA, SI-SIT 1,5 KA	≥ 0,08 MPa
	SIT 1,5 KA, SIT 2 KA, SIT 2 R SIT 1,5 KA complex, SIT 2 KA complex SIT 2 R complex, SIT-P 1,5 KA, SIT-P 2 KA	≥ 0,08 MPa
	SIT-P 1,5 KA, SIT-P 2 KA	≥ 0,08 MPa
	DECO, DECO TM, TM	≥ 0,08 MPa

3.3.4 Fixing strength (ETAG 004, clause 5.1.4.2)

Test not required because the ETICS fulfills the criteria given in clause 5.1.4.2.

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:

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

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 16

Anchors for which the following failure loads apply	Anchors according to Annex 2			
	Plate diameter of the anchor	≥ 60 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 joint (pull-through test)	R_{panel}	Minimum value: Average value:	0,44 0,46
	Anchors placed at the panel joint (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 all other anchors if they meet the following criteria:

- covered by ETA according to ETAG 014,
- 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:

$$U = 1 : [R_i + R_{\text{render}} + R_{\text{substrate}} + R_{\text{se}} + R_{\text{si}}]$$

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)

$R_{\text{substrate}}$: 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 17

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.

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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/m ³
Thermal resistance (m ² ·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/m ²) 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 HD		Annex 1 of European Technical Assessment ETA-13/0806
Thermal insulation products characteristic		

Anchors		
Anchor trade name	Plate diameter (mm)	Description of the anchor and characteristics resistance in the substrate
FISHER TERMOZ CN 8	≥ 60	ETA-09/0394
FISHER TERMOZ PN 8	≥ 60	ETA-09/0171
FISHER TERMOZ 8 U	≥ 60	ETA-02/0019
Wkręt-Met ŁTXØ8	≥ 60	ETA-09/0001
Wkręt-Met ŁTXØ10	≥ 60	ETA-08/0172
Wkręt-Met FIXPLUGØ8	≥ 60	ETA-11/0231
Wkręt-Met FIXPLUGØ10	≥ 60	ETA-11/0231
Koelner TFIX-8M	≥ 60	ETA-07/0336
Koelner TFIX-8S	≥ 60	ETA-11/0144
Koelner KI-10	≥ 60	ETA-07/0291
Ejothem STR U, STR U 2G	≥ 60	ETA-04/0023

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

- ETA according to ETAG 014
- plate diameter ≥ 60 mm
- plate stiffness ≥ 0,4 kN/mm
- load resistance of the plate ≥ 1,6 kN

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, %
R 117 A 101 / AKE 145	standard mesh mass per unit area: 145 g/m ² mesh size: 4,0 x 4,5 mm	≥ 20	≥ 50
ST 112-100/7 KM (BOLIX HD 174/S)	standard mesh mass per unit area: 174 g/m ² mesh size: 3,8 x 3,2 mm	≥ 20	≥ 50
ST 2924-100/7 KM (BOLIX HD 158/S)	standard mesh mass per unit area: 158 g/m ² mesh size: 3,9 x 4,0 mm	≥ 20	≥ 50
BOLIX HD 335	reinforced mesh mass per unit area: 367 g/m ² mesh size: 4,7 x 5,6 mm	≥ 20	≥ 40

BOLIX HD	Annex 2 of European Technical Assessment ETA-13/0806
Anchors characteristic. Glass fibre meshes characteristic	