European Technical Assessment

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European Technical Assessment

ETA-18/0805 of 23/12/2019

General Part

Technical Assessment Body issuing the European Technical Assessment:	ŁUKASIEWICZ – ICiMB
Trade name of the construction product	BOLIX EXPRESS THERM WOOD EPS
Product family to which the construction product belongs	ETICS with renderings for the use on timber frame buildings
Manufacturer	BOLIX SA Stolarska 8 34-300 Żywiec, POLAND
Manufacturing plant	BOLIX SA Stolarska 8 34-300 Żywiec, POLAND
This European Technical Assessment contains	33 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	EAD 040089-00-0404

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Specific parts

1. Technical description of the product:

This product BOLIX EXPRESS THERM WOOD EPS is an External Thermal Insulation Composite System (ETICS) with renderings for the use on timber frame buildings – 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 bonded with supplementary mechanical fixings or mechanically fixed with supplementary adhesive on external boards. The external boards can be wood based panels, cement bonded particle boards, fibre-gypsum panels and similar products. The method of fixing and the relevant components are specified in Table 1. The insulation product is faced with a rendering system consisting of several 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, rustication strips, expansion joints, sealing and finishing 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/m²)	Thickness (mm)
	Bonded ETICS or bonded ETICS 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, white or graphite, with a smooth surface, square or half lapped edges *Product characteristics - see Annex No 1*	-	20 to 400
	• **Adhesives:** - Two-component adhesive - **BOLIX UBG (component A)** cement based powder requiring addition of 0,18-0,22 l/kg of water	about 3,0 (powder)	-
	- **BOLIX FLEX (component B)** ready to use liquid	about 0,24	
	- **BOLIX Z** cement based powder requiring addition of 0,19-0,21 l/kg of water	about 4,0 (powder)	-
	- **BOLIX U** cement based powder requiring addition of 0,18-0,20 l/kg of water	about 4,0 (powder)	-
	- **BOLIX PTW** ready to use paste	about 1,0	-
	- **BOLIX ZP** ready to use polyurethane foam	about 90 ml/m²	-
	• **Supplementary mechanical fixings:** *Products characteristics - see Annex No 2*	-	-

Table 1. cont.

	Components	Coverage (kg/m²)	Thickness (mm)
	Mechanically fixed ETICS with supplementary adhesive. 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, white or graphite with a smooth surface, square or half lapped edges *Product characteristics - see Annex No 1*	-	50 to 400
	• **Anchors** *Products characteristics - see Annex No 2*	-	-
	• **Supplementary adhesives:** - Two-component adhesive - **BOLIX UBG (component A)** cement based powder requiring addition of 0,18-0,20 l/kg of water	about 3,0 (powder)	-
	- **BOLIX FLEX (component B)** ready to use liquid	about 0,24	
	- **BOLIX Z** cement based powder requiring addition of 0,19-0,21 l/kg of water	about 4,0 (powder)	-
	- **BOLIX U** cement based powder requiring addition of 0,18-0,20 l/kg of water	about 4,0 (powder)	-
	- **BOLIX PTW** ready to use paste	about 1,0	-
	- **BOLIX ZP** ready to use polyurethane foam	about 90 ml/m²	-
Base coats	• **BOLIX UBG**[1)] cement based powder requiring addition of 0,18-0,20 l/kg of water	about 4,0 (powder)	3,0 to 5,0
	• **BOLIX U** cement based powder requiring addition of 0,18-0,20 l/kg of water	about 4,0 (powder)	3,0 to 5,0
	• Two-component adhesive[1)] - **BOLIX UBG (component A)** cement based powder requiring addition of 0,18-0,20 l/kg of water	about 3,5 (powder)	3,0 to 5,0
	- **BOLIX FLEX (component B)** ready to use liquid	about 0,28	

[1)] key coats to be used optionally onto base coats BOLIX UBG and BOLIX UBG + BOLIX FLEX

Table 1. cont.

	Components	Coverage (kg/m²)	Thickness (mm)
Reinforce-ment	• **Standard glass fibre meshes** applied in one or two layers		
	- **BOLIX HD 145/S**	-	-
	- **BOLIX HD 158/S**	-	-
	- **BOLIX HD 160/S**	-	-
	- **BOLIX HD 174/S**	-	-
	• **Reinforced glass fibre mesh** to be used with standard glass fibre meshes		
	- **BOLIX HD 335/P**	-	-
	Products characteristics - see Annex No 3		
Key coats	• **BOLIX T** ready to use liquid to be used with finishing coat BOLIX WS	0,10 to 0,20	-
	• **BOLIX SG** ready to use liquid to be used with finishing coat BOLIX SMP	0,10 to 0,20	-
	• **BOLIX OP** ready to use liquid to be used with finishing coats BOLIX MP, BOLIX TR, BOLIX, BOLIX TM, BOLIX DECO and BOLIX TM DECO	0,25 to 0,40	-
	• **BOLIX SIG KOLOR** ready to use liquid to be used with finishing coats BOLIX SIT / BOLIX SIT Complex, BOLIX SIT-P and BOLIX SI-SIT	0,25 to 0,40	-
Finishing coats	• Mineral finishing coat **BOLIX WS** to be used onto base coats BOLIX U and BOLIX UBG + BOLIX FLEX; cement based powder requiring addition of 0,19-0,21 l/kg of water modelled structure (e.g. imitation of wooden board) max. particles size: 0,5 mm	4,5 to 15,0 (powder)	3,0 to 10,0
	• Mineral finishing coat **BOLIX MP** cement based powder requiring addition of 0,17-0,24 l/kg of water floated structure max. particles size: 1,0; 1,5; 2,0; 3,0 mm	1,8 to 4,0 (powder)	Regulated by particles size

Table 1. cont.

	Components	Coverage (kg/m²)	Thickness (mm)
Finishing coats	• Mineral finishing coat **BOLIX SMP** to be used onto base coats BOLIX U and BOLIX UBG + BOLIX FLEX; cement based powder requiring addition of 0,28-0,30 l/kg of water spread structure max. particles size: 0,5 mm	1,4 to 3,2 (powder)	1,0 to 3,0
	• Mineral finishing coat **BOLIX TBR** to be used onto base coats BOLIX U and BOLIX UBG + BOLIX FLEX; cement based powder requiring addition of 0,18-0,22 l/kg of water; to be used in multi-layer coating with mineral finishing coat BOLIX BRICK POINT modelled structure max. particles size: 0,8 mm	9,5 to 14,0 (powder)	6,0 to 8,0
	• Mineral finishing coat **BOLIX BRICK POINT** cement based powder requiring addition of 0,16-0,20 l/kg of water; to be used onto the mineral finishing coat BOLIX TBR modelled structure (e.g. imitation of brick) max. particles size: 0,8 mm	5,0 to 9,5 (powder)	3,0 to 5,0
	• Acrylic finishing coat **BOLIX TR** to be used onto base coats BOLIX U and BOLIX UBG + BOLIX FLEX; ready to use paste – acrylic binder applied in two layers modelled structure (e.g. imitation of wooden board, brick) max. particles size: 0,5 mm	2,6 to 7,0	1,5 to 4,0
	• Acrylic finishing coat **BOLIX** ready to use paste – acrylic binder floated structure max. particles size: 1,0; 1,5; 2,0 mm	1,7 to 3,4	
	• Acrylic finishing coat **BOLIX TM** to be used onto base coats BOLIX U and BOLIX UBG + BOLIX FLEX; ready to use paste – acrylic binder mosaic structure max. particles size: 0,8; 1,6 mm	2,0 to 4,0	Regulated by particles size

Table 1. cont.

	Components	Coverage (kg/m²)	Thickness (mm)
Finishing coats	• Acrylic finishing coat **BOLIX DECO** to be used onto base coats BOLIX U and BOLIX UBG + BOLIX FLEX; ready to use paste – acrylic binder mosaic or modelled structure max. particles size: 0,5 ÷ 1,0; 0,5 ÷ 2,0 mm	2,5 to 3,5	1,5 to 3,0
	• Acrylic finishing coat **BOLIX TM DECO** to be used onto base coats BOLIX U and BOLIX UBG + BOLIX FLEX; ready to use paste – acrylic binder spread structure max. particles size: 0,8 mm	2,9 to 4,5	2,0 to 3,0
	• Acrylic finishing coat **BOLIX GMP** to be used onto base coats BOLIX U and BOLIX UBG + BOLIX FLEX; ready to use paste – acrylic binder spread structure max. particles size: 0,4 mm	0,8 to 1,2	0,3 to 0,8
	• Silicone finishing coat **BOLIX SIT / BOLIX SIT Complex** ready to use paste – silicone and acrylic binder floated structure max. particles size: 1,0; 1,5; 2,0 mm	1,7 to 3,4	Regulated by particles size
	• Silicone finishing coat **BOLIX SIT-P** ready to use pastes – silicone and acrylic binder floated structure max. particles size: 1,5; 2,0 mm	2,2 to 3,4	
	• Silicate-silicone finishing coat **BOLIX SI-SIT** ready to use paste – silicate, silicone and acrylic binder floated structure max. particles size: 1,5; 2,0; 3,0[2)] mm	2,2 to 4,2	

[2)] BOLIX SI-SIT floated 3,0 mm is used only with base coat BOLIX UBG + BOLIX FLEX

Table 1. cont.

	Components	Coverage (kg/m²)	Thickness (mm)
Key coats	• **BOLIX T** ready to use liquid to be used onto finishing coat BOLIX WS	0,10 to 0,20	-
	• **BOLIX N** ready to use liquid to be used with decorative coats BOLIX METALLIC POINT and BOLIX AZ / BOLIX AZ Complex	0,10 to 0,20	-
	• **BOLIX SIG** ready to use liquid to be used with decorative coats BOLIX SIL / BOLIX SIL Complex and BOLIX SIL-P	0,10 to 0,20	-
Decorative coats (paints and impregnating coats)	• **BOLIX SIL / BOLIX SIL Complex** ready to use pigmented liquid to be used optionally with finishing coats BOLIX MP, BOLIX SMP, BOLIX SIT / BOLIX SIT Complex and BOLIX SI-SIT	0,18 to 0,28	-
	• **BOLIX SIL-P** ready to use pigmented liquid to be used optionally with finishing coats BOLIX MP, BOLIX SMP, BOLIX SIT / BOLIX SIT Complex and BOLIX SI-SIT	0,18 to 0,28	-
	• **BOLIX AZ / BOLIX AZ Complex** ready to use pigmented liquid to be used optionally with finishing coat BOLIX SMP	0,27 to 0,42	-
	• **BOLIX DECO LAZUR** ready to use pigmented liquid to be used obligatory with finishing coat BOLIX WS and optionally with finishing coat BOLIX TR	0,18 to 0,28	-
	• **BOLIX METALLIC POINT** ready to use pigmented liquid to be used obligatory with finishing coat BOLIX GMP and optionally with finishing coat BOLIX SMP	0,38 to 0,50	-
	• **BOLIX OM** ready to use pigmented liquid to be used optionally onto decorative coat BOLIX DECO LAZUR	0,10 to 0,30	-
	• **BOLIX BIK** ready to use pigmented liquid to be used optionally onto finishing coat BOLIX BRICK POINT	0,10 to 0,50	-

Table 1. cont.

	Components	Coverage (kg/m²)	Thickness (mm)
Ancillary materials	• Setting accelerator **BOLIX PW-S EXPRESS**, ready to use powder to be used optionally with adhesive BOLIX U, coverage: 10 g/kg of adhesive • Setting accelerator **BOLIX PW EXPRESS**, ready to use liquid to be used optionally with finishing coats BOLIX TR, BOLIX, BOLIX SIT / BOLIX SIT Complex and BOLIX SI-SIT, coverage: 7 ml/kg of finishing coat • Other according to EAD 040089-00-0404 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 designed to give the timber frame building wall to which it is applied additional thermal insulation and protection from effects of weathering.

The ETICS can be used on new or existing (retrofit) vertical timber frame building walls. It can also be used on horizontal or inclined surfaces which are not exposed to precipitation.

The surface for the application of bonded ETICS or bonded ETICS with supplementary mechanical fixings can be a board substrate: wood based panels (plywood acc. to EN 636), cement bonded particle boards acc. to EN 634-2, fibre-gypsum panels (fermacell Gypsum fibre boards acc. to ETA-03/0050) and similar products (particleboards acc. to EN 312 and OSB acc. to EN 300).

The surface for the application of mechanically fixed ETICS with supplementary adhesive can be a board substrate: wood based panels (plywood acc. to EN 636), cement bonded particle boards acc. to EN 634-2, fibre-gypsum panels (fermacell Gypsum fibre boards acc. to ETA-03/0050) and similar products (OSB acc. to EN 300).

The board substrate must be suitable for humid conditions as specified in EN 13986.

The ETICS is non load-bearing construction element. It does not contribute directly to the stability of the timber frame building wall on which it is installed. The verification of the structural capacities of the wall and their suitability for the application of ETICS shall be in accordance with ETAG 007 (and its conversion into EAD), clause 5.1 using calculation methods (EN 1995-1-1 – Eurocode 5 Part 1-1, etc.) as well as verifications by testing (EN 380, EN 594, EN 595, EN 596, etc.) where the load bearing capacity is unable to calculate.

The ETICS can contribute to the durability of a timber frame building by providing enhanced protection from the effects of weathering.

The ETICS is not intended to ensure the airtightness of the timber frame building structure. The timber frame building wall as such has therefore to be airtight to:
a) reduce the thermal transmittance of the wall
b) avoid interstitial condensation due to convection.

The provisions made in this European Technical Assessment are based on an assumed working life of the ETICS on timber frames 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.

The works shall be executed by trained installers. Installation, maintenance and repair of ETICS shall be done in accordance with manufacturer's instructions and technical documentation.

Design, installation and execution of ETICS 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 No 1÷3.

3.1. Safety in case of fire (BWR 2)

3.1.1. Reaction to fire of the ETICS (EAD 040089-00-0404: clause 2.2.1.1, EN 13501-1)

Table 2.

Configuration	Max. organic content (%)	Flame retardant content	Euroclass acc. to EN 13501-1
Adhesive (excluding BOLIX ZP)	33,0	No flame retardant	B-s2, d0
EPS boards* *density ≤ 24,0 kg/m³*	-		
Base coat	4,7		
Glass fibre mesh - standard - reinforced	 1,37** 2,24**		
Key coat	100,0		
Finishing coat	9,2		
Key coat	100,0		
Decorative coat	100,0		
Configuration including BOLIX ZP	-	-	No performance assessed
*flame retardant content in quantity ensuring Euroclass E according to EN 13501-1 **max. heat of combustion, MJ/m²			

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.

3.1.2. Reaction to fire of insulation product (EAD 040089-00-0404: clause 2.2.1.3, EN 13501-1)

See Annex No 1

3.1.3. Reaction to fire of mechanical fixings (EAD 040089-00-0404: clause 2.2.1.2)

No performance assessed.

3.2. Hygiene, health and environment (BWR 3)

3.2.1. Water absorption of the ETICS (EAD 040089-00-0404: clause 2.2.2.1)

- Base coat BOLIX UBG:
  - Water absorption after 1 hour < 1 kg/m²;
  - Water absorption after 24 hours < 0,5 kg/m².
- Base coat BOLIX U:
  - Water absorption after 1 hour < 1 kg/m²;
  - Water absorption after 24 hours < 0,5 kg/m².
- Base coat BOLIX UBG + BOLIX FLEX:
  - 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 BOLIX UBG + finishing coat:	BOLIX MP	x	-
	BOLIX	x	-
	BOLIX SIT / BOLIX SIT Complex	x	-
	BOLIX SIT-P	x	-
	BOLIX SI-SIT	x	-
Rendering system: Base coat BOLIX U + key coat + finishing coat + key coat + decorative coat indicated hereafter (if relevant):	BOLIX T + BOLIX WS + BOLIX T + BOLIX DECO LAZUR	x	-
	BOLIX OP + BOLIX MP	x	-
	BOLIX SG + BOLIX SMP	-	x
	BOLIX TBR + BOLIX BRICK POINT	x	-
	BOLIX OP + BOLIX TR	x	-
	BOLIX OP + BOLIX	x	-
	BOLIX OP + BOLIX TM	x	-
	BOLIX OP + BOLIX DECO	x	-
	BOLIX OP + BOLIX TM DECO	x	-
	BOLIX GMP + BOLIX N + BOLIX METALLIC POINT	x	-
	BOLIX SIG KOLOR + BOLIX SIT / BOLIX SIT Complex	x	-
	BOLIX SIG KOLOR + BOLIX SIT-P	x	-
	BOLIX SIG KOLOR + BOLIX SI-SIT	x	-

Table 3. cont.

		Water absorption after 24 hours	
		<0,5 kg/m²	≥0,5 kg/m²
Rendering system: Base coat BOLIX UBG + BOLIX FLEX + finishing coat + key coat + decorative coat indicated hereafter (if relevant):	BOLIX WS + BOLIX T + BOLIX DECO LAZUR	x	-
	BOLIX MP	x	-
	BOLIX SMP	-	x
	BOLIX TBR + BOLIX BRICK POINT	x	-
	BOLIX TR	x	-
	BOLIX	x	-
	BOLIX TM	x	-
	BOLIX DECO	x	-
	BOLIX TM DECO	x	-
	BOLIX GMP + BOLIX N + BOLIX METALLIC POINT	x	-
	BOLIX SIT / BOLIX SIT Complex	x	-
	BOLIX SIT-P	x	-
	BOLIX SI-SIT	x	-

3.2.2. Water tightness of the ETICS: Hygrothermal behaviour (EAD 040089-00-0404: clause 2.2.2.2)

Pass (without defects).

3.2.3. Water tightness of the ETICS: Freeze-thaw behaviour (EAD 040089-00-0404: clause 2.2.2.3)

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

3.2.4. Water tightness of the ETICS: Water penetration (EAD 040089-00-0404: clause 2.2.2.5)

No performance assessed.

3.2.5. Water vapour permeability of the ETICS (EAD 040089-00-0404: clause 2.2.2.6)

Table 4.

		Average equivalent air thickness s_d
Rendering system: Base coat BOLIX UBG or BOLIX U + or BOLIX UBG + BOLIX FLEX + key coat + finishing coat + key coat + decorative coat indicated hereafter (if relevant):	BOLIX OP + BOLIX MP + BOLIX SIG + BOLIX SIL / BOLIX SIL Complex + BOLIX SIL-P	≤ 2 m, results: 0,3 m 0,3 m
	BOLIX OP + BOLIX	≤ 2 m, result: 0,4 m
	BOLIX SIG KOLOR + BOLIX SIT / BOLIX SIT Complex + BOLIX SIG + BOLIX SIL / BOLIX SIL Complex + BOLIX SIL-P	≤ 2 m, results: 0,2 m 0,2 m
	BOLIX SIG KOLOR + BOLIX SIT-P + BOLIX SIL-P	≤ 2 m, result: 0,2 m
	BOLIX SIG KOLOR + BOLIX SI-SIT + BOLIX SIL / BOLIX SIL Complex + BOLIX SIL-P	≤ 2 m, results: 0,3 m 0,3 m
Rendering system: Base coat BOLIX U or BOLIX UBG + BOLIX FLEX + key coat + finishing coat + key coat + decorative coat indicated hereafter (if relevant):	BOLIX T + BOLIX WS + BOLIX T + BOLIX DECO LAZUR + BOLIX OM	≤ 2 m, result: 0,3 m
	BOLIX SG + BOLIX SMP + BOLIX N + BOLIX METALLIC POINT + BOLIX SIG + BOLIX SIL / BOLIX SIL Complex + BOLIX SIG + BOLIX SIL-P + BOLIX N + BOLIX AZ / BOLIX AZ Complex	≤ 2 m, results: 0,3 m 0,2 m 0,2 m 0,2 m
	BOLIX TBR + BOLIX BRICK POINT + BOLIX BIK	≤ 2 m, result: 0,2 m
	BOLIX OP + BOLIX TR + BOLIX T + BOLIX DECO LAZUR + BOLIX OM	≤ 2 m, result: 0,5 m
	BOLIX OP + BOLIX TM	≤ 2 m, result: 0,5 m
	BOLIX OP + BOLIX DECO	≤ 2 m, result: 0,3 m
	BOLIX OP + BOLIX TM DECO	≤ 2 m, result: 0,3 m
	BOLIX GMP + BOLIX N + BOLIX METALLIC POINT	≤ 2 m, result: 0,3 m

3.2.6. Water absorption of insulation product (EAD 040089-00-0404: clause 2.2.2.7)

No performance assessed.

3.2.7. Water vapour permeability of insulation product (EAD 040089-00-0404: clause 2.2.2.8)

See Annex No 1

3.3. Safety and accessibility in use (BWR 4)

3.3.1. Bond strength between base coat and insulation product (EAD 040089-00-0404: clause 2.2.3.1)

Base coat: BOLIX UBG

- Initial state and after hygrothermal cycles:
  ≥ 0,10 MPa

Base coat: BOLIX U

- Initial state and after hygrothermal cycles:
  ≥ 0,10 MPa

Base coat: BOLIX UBG + BOLIX FLEX

- Initial state and after hygrothermal cycles:
  ≥ 0,10 MPa

3.3.2. Bond strength between adhesive and substrate (EAD 040089-00-0404: clause 2.2.3.2)

Table 5.

	Initial state	7 days at 23°C/95% RH	7 days at 23°C/95% RH + 7 days at 23°C/50% RH
Plywood acc. to EN 636			
BOLIX UBG + BOLIX FLEX	≥ 0,40 MPa	≥ 0,25 MPa	≥ 0,35 MPa
BOLIX Z	≥ 0,10 MPa	≥ 0,10 MPa	≥ 0,10 MPa
BOLIX U	≥ 0,25 MPa	≥ 0,25 MPa	≥ 0,20 MPa
BOLIX PTW	≥ 1,20 MPa	≥ 1,10 MPa	≥ 1,05 MPa
OSB acc. to EN 300			
BOLIX UBG + BOLIX FLEX	≥ 0,10 MPa	≥ 0,08 MPa	≥ 0,08 MPa
BOLIX Z	≥ 0,10 MPa	≥ 0,08 MPa	≥ 0,10 MPa
BOLIX U	≥ 0,25 MPa	≥ 0,20 MPa	≥ 0,25 MPa
BOLIX PTW	≥ 0,55 MPa	≥ 0,50 MPa	≥ 0,45 MPa

Table 5. cont.

	Initial state	7 days at 23°C/95% RH	7 days at 23°C/95% RH + 7 days at 23°C/50% RH
Particleboard acc. to EN 312			
BOLIX UBG + BOLIX FLEX	≥ 0,08 MPa	≥ 0,05 MPa	≥ 0,08 MPa
BOLIX Z	≥ 0,08 MPa	≥ 0,05 MPa	≥ 0,08 MPa
BOLIX U	≥ 0,20 MPa	≥ 0,05 MPa	≥ 0,20 MPa
BOLIX PTW	≥ 0,65 MPa	≥ 0,30 MPa	≥ 0,50 MPa
Cement-bonded particleboard acc. to EN 634-2			
BOLIX UBG + BOLIX FLEX	≥ 0,50 MPa	≥ 0,45 MPa	≥ 0,55 MPa
BOLIX Z	≥ 0,40 MPa	≥ 0,35 MPa	≥ 0,70 MPa
BOLIX U	≥ 0,45 MPa	≥ 0,30 MPa	≥ 0,45 MPa
BOLIX PTW	≥ 0,85 MPa	≥ 0,70 MPa	≥ 0,65 MPa
Fibre-gypsum panel – fermacell acc. to ETA-03/0050			
BOLIX UBG + BOLIX FLEX	≥ 0,20 MPa	≥ 0,20 MPa	≥ 0,20 MPa
BOLIX Z	≥ 0,20 MPa	≥ 0,20 MPa	≥ 0,30 MPa
BOLIX U	≥ 0,35 MPa	≥ 0,30 MPa	≥ 0,35 MPa
BOLIX PTW	≥ 0,30 MPa	≥ 0,25 MPa	≥ 0,30 MPa

3.3.3. Bond strength between adhesive and insulation product (EAD 040089-00-0404: clause 2.2.3.3)

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
BOLIX UBG + BOLIX FLEX	≥ 0,08 MPa	≥ 0,03 MPa	≥ 0,08 MPa
BOLIX Z	≥ 0,08 MPa	≥ 0,03 MPa	≥ 0,08 MPa
BOLIX U	≥ 0,10 MPa	≥ 0,05 MPa	≥ 0,10 MPa
BOLIX PTW	≥ 0,10 MPa	≥ 0,05 MPa	≥ 0,10 MPa

3.3.4. Bond strength of foam adhesive (EAD 040089-00-0404: clause 2.2.3.4)

Table 7.

	BOLIX ZP (minimal bonded surface area S: 40 %)	
Substrate	**Application conditions**	**Bond strength (MPa)**
Plywood acc. to EN 636	standard	≥ 0,08
	thickness of foam 15 mm	≥ 0,08
	open time 7 minutes	≥ 0,08
	temperature 5 °C	≥ 0,08
	temperature 35 °C and relative humidity 30 %	≥ 0,08
OSB acc. to EN 300	standard	≥ 0,08
	thickness of foam 15 mm	≥ 0,08
	open time 7 minutes	≥ 0,08
	temperature 5 °C	≥ 0,08
	temperature 35 °C and relative humidity 30 %	≥ 0,08
Particleboard acc. to EN 312	standard	≥ 0,08
	thickness of foam 15 mm	≥ 0,08
	open time 7 minutes	≥ 0,08
	temperature 5 °C	≥ 0,08
	temperature 35 °C and relative humidity 30 %	≥ 0,08
Cement-bonded particleboard acc. to EN 634-2	standard	≥ 0,08
	thickness of foam 15 mm	≥ 0,08
	open time 7 minutes	≥ 0,08
	temperature 5 °C	≥ 0,08
	temperature 35 °C and relative humidity 30 %	≥ 0,08
Fibre-gypsum panel – fermacell acc. to ETA-03/0050	standard	≥ 0,08
	thickness of foam 15 mm	≥ 0,08
	open time 7 minutes	≥ 0,08
	temperature 5 °C	≥ 0,08
	temperature 35 °C and relative humidity 30 %	≥ 0,08

3.3.5. Fixing strength (transverse displacement) (EAD 040089-00-0404, clause 2.2.3.5)

Test not required. ETICS fulfils the criteria E · d ≤ 50 000 N/mm.

3.3.6. Wind load resistance of mechanically fixed ETICS

3.3.6.1. Pull-through tests of fixings (EAD 040089-00-0404, clause 2.2.3.6.1)

Table 8.

Anchor for which the following failure loads apply		**Koelner KCX + UC ϕ6**	
	Plate diameter (mm)		≥ 60
Characteristics of the **EPS boards** for which the following failure loads apply	Thickness (mm)		≥ 50
	Tensile strength perpendicular to the faces (kPa)		≥ 100
Failure loads (N)	Anchors not placed at the panel joints (*Pull-through test*) dry conditions	R_{panel}	Minimum: 368 Average: 468
	Anchors placed at the panel joints (*Pull-through test*) dry conditions	R_{joint}	Minimum: 330 Average: 381

Table 9.

Anchor for which the following failure loads apply		**Wkręt-Met DRIVE S**	
	Plate diameter (mm)		≥ 60
Characteristics of the **EPS boards** for which the following failure loads apply	Thickness (mm)		≥ 50
	Tensile strength perpendicular to the faces (kPa)		≥ 100
Failure loads (N)	Anchors not placed at the panel joints (*Pull-through test*) dry conditions	R_{panel}	Minimum: 578 Average: 603
	Anchors placed at the panel joints (*Pull-through test*) dry conditions	R_{joint}	Minimum: 413 Average: 460

Table 10.

Anchors for which the following failure loads apply		**ejotherm STR H / ejotherm STR H A2 / ejotherm STR H E**	
		Plate diameter (mm)	≥ 60
Characteristics of the **EPS boards** for which the following failure loads apply		Thickness (mm)	≥ 50
		Tensile strength perpendicular to the faces (kPa)	≥ 100
Failure loads (N)	Anchors not placed at the panel joints (*Pull-through test*) dry conditions	R_{panel}	Minimum: 594 Average: 607
	Anchors placed at the panel joints (*Pull-through test*) dry conditions	R_{joint}	Minimum: 487 Average: 511

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

$$R_d = \frac{R_{panel} x\, n_{panel} + R_{joint}\, x\, n_{joint}}{\gamma m}$$

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
γm: national safety factor

3.3.7. Impact resistance (EAD 040089-00-0404: clause 2.2.3.19)

Table 11.

				Hard body impact	
				3 J	10 J
Single layer of standard mesh				**Impact diameter (mm) / damages**	
Rendering system: Base coat BOLIX UBG + finishing coat:	BOLIX MP	*particles size:*	*1,0 mm*	No performance assessed	
			1,5; 2,0; 3,0 mm	22 / cracks without reaching the insulation product	32 / cracks without reaching the insulation product
	BOLIX			20 / superficial damages without cracks formation	35 / cracks without reaching the insulation product
	BOLIX SIT / BOLIX SIT Complex			18 / superficial damages without cracks formation	38 / cracks without reaching the insulation product
	BOLIX SIT-P			21 / superficial damages without cracks formation	45 / cracks without reaching the insulation product
	BOLIX SI-SIT			10 / superficial damages without cracks formation	33 / cracks without reaching the insulation product

Table 11. cont.

		Hard body impact	
		3 J	10 J
Single layer of standard mesh		**Impact diameter (mm) / damages**	
Rendering system: Base coat BOLIX U + key coat + finishing coat + key coat + decorative coat indicated hereafter (if relevant):	BOLIX T + BOLIX WS + BOLIX T + BOLIX DECO LAZUR	18 / cracks without reaching the insulation product	37 / cracks without reaching the insulation product
	BOLIX OP + BOLIX MP	14 / superficial damages without cracks formation	27 / cracks without reaching the insulation product
	BOLIX OP + BOLIX	26 / superficial damages without cracks formation	42 / cracks without reaching the insulation product
	BOLIX SG + BOLIX SMP	20 / cracks without reaching the insulation product	72 / cracks without reaching the insulation product
	BOLIX TBR + BOLIX BRICK POINT	0 / no damages	13 / superficial damages without cracks formation
	BOLIX OP + BOLIX TR	6 / superficial damages without cracks formation	25 / cracks without reaching the insulation product
	BOLIX OP + BOLIX TM	6 / superficial damages without cracks formation	23 / cracks without reaching the insulation product
	BOLIX OP + BOLIX DECO	16 / superficial damages without cracks formation	26 / cracks without reaching the insulation product
	BOLIX OP + BOLIX TM DECO	5 / superficial damages without cracks formation	29 / cracks without reaching the insulation product
	BOLIX GMP + BOLIX N + BOLIX METALLIC POINT	24 / cracks without reaching the insulation product	34 / cracks without reaching the insulation product
	BOLIX SIG KOLOR + BOLIX SIT / BOLIX SIT Complex	19 / superficial damages without cracks formation	36 / cracks without reaching the insulation product
	BOLIX SIG KOLOR + BOLIX SIT-P	16 / superficial damages without cracks formation	39 / superficial damages without cracks formation
	BOLIX SIG KOLOR + BOLIX SI-SIT	16 / superficial damages without cracks formation	39 / cracks without reaching the insulation product

Table 11. cont.

		Hard body impact	
		3 J	10 J
Single layer of standard mesh		**Impact diameter (mm) / damages**	
Rendering system: Base coat BOLIX UBG + BOLIX FLEX + finishing coat + key coat + decorative coat indicated hereafter (if relevant):	BOLIX WS + BOLIX T + BOLIX DECO LAZUR	32 / cracks without reaching the insulation product	42 / cracks without reaching the insulation product
	BOLIX MP	10 / superficial damages without cracks formation	41 / cracks without reaching the insulation product
	BOLIX	10 / superficial damages without cracks formation	26 / superficial damages without cracks formation
	BOLIX SMP	24 / cracks without reaching the insulation product	39 / cracks without reaching the insulation product
	BOLIX TBR + BOLIX BRICK POINT	0 / no damages	14 / superficial damages without cracks formation
	BOLIX TR	5 / superficial damages without cracks formation	13 / superficial damages without cracks formation
	BOLIX TM	4 / superficial damages without cracks formation	26 / cracks without reaching the insulation product
	BOLIX DECO	18 / cracks without reaching the insulation product	22 / cracks without reaching the insulation product
	BOLIX TM DECO	2 / superficial damages without cracks formation	18 / cracks without reaching the insulation product
	BOLIX GMP + BOLIX N + BOLIX METALLIC POINT	17 / cracks without reaching the insulation product	46 / cracks without reaching the insulation product
	BOLIX SIT / BOLIX SIT Complex	10 / superficial damages without cracks formation	20 / superficial damages without cracks formation
	BOLIX SIT-P	0 / no damages	10 / superficial damages without cracks formation
	BOLIX SI-SIT	5 / superficial damages without cracks formation	20 / superficial damages without cracks formation

Table 12.

		Hard body impact	
		3 J	10 J
Double layer of standard mesh		**Impact diameter (mm) / damages**	
Rendering system: Base coat BOLIX UBG + finishing coat:	BOLIX MP	11 / superficial damages without cracks formation	24 / superficial damages without cracks formation
	BOLIX	11 / superficial damages without cracks formation	24 / superficial damages without cracks formation
	BOLIX SIT / BOLIX SIT Complex	6 / superficial damages without cracks formation	24 / superficial damages without cracks formation
	BOLIX SIT-P	8 / superficial damages without cracks formation	23 / superficial damages without cracks formation
	BOLIX SI-SIT	7 / superficial damages without cracks formation	19 / superficial damages without cracks formation
Rendering system: Base coat BOLIX U + key coat + finishing coat:	BOLIX OP + BOLIX MP	14 / superficial damages without cracks formation	26 / cracks without reaching the insulation product
	BOLIX OP + BOLIX	9 / superficial damages without cracks formation	24 / cracks without reaching the insulation product
	BOLIX SIG KOLOR + BOLIX SIT / BOLIX SIT Complex	14 / superficial damages without cracks formation	23 / superficial damages without cracks formation
	BOLIX SIG KOLOR + BOLIX SIT-P	11 / superficial damages without cracks formation	23 / cracks without reaching the insulation product
	BOLIX SIG KOLOR + BOLIX SI-SIT	3 / superficial damages without cracks formation	26 / superficial damages without cracks formation
Rendering system: Base coat BOLIX UBG + BOLIX FLEX + finishing coat:	BOLIX MP	0 / no damages	0 / no damages
	BOLIX	0 / no damages	3 / superficial damages without cracks formation
	BOLIX SIT / BOLIX SIT Complex	7 / superficial damages without cracks formation	12 / superficial damages without cracks formation
	BOLIX SIT-P	0 / no damages	0 / no damages
	BOLIX SI-SIT	4 / superficial damages without cracks formation	15 / superficial damages without cracks formation

3.3.8. Bond strength after ageing (EAD 040089-00-0404: clause 2.2.3.20 and 2.2.3.21)

Table 13.

		After hygrothermal cycles
Rendering system: Base coat BOLIX UBG + finishing coat:	BOLIX MP	≥ 0,12 MPa
	BOLIX	≥ 0,13 MPa
	BOLIX SIT / BOLIX SIT Complex	≥ 0,13 MPa
	BOLIX SIT-P	≥ 0,12 MPa
	BOLIX SI-SIT	≥ 0,13 MPa
Rendering system: Base coat BOLIX U + key coat + finishing coat + key coat + decorative coat indicated hereafter (if relevant):	BOLIX T + BOLIX WS + BOLIX T + BOLIX DECO LAZUR	≥ 0,09 MPa
	BOLIX OP + BOLIX MP	≥ 0,08 MPa
	BOLIX SG + BOLIX SMP	≥ 0,10 MPa
	BOLIX TBR + BOLIX BRICK POINT	≥ 0,10 MPa
	BOLIX OP + BOLIX TR	≥ 0,10 MPa
	BOLIX OP + BOLIX	≥ 0,12 MPa
	BOLIX OP + BOLIX TM	≥ 0,10 MPa
	BOLIX OP + BOLIX DECO	≥ 0,10 MPa
	BOLIX OP + BOLIX TM DECO	≥ 0,10 MPa
	BOLIX GMP + BOLIX N + BOLIX METALLIC POINT	≥ 0,09 MPa
	BOLIX SIG KOLOR + BOLIX SIT / BOLIX SIT Complex	≥ 0,10 MPa
	BOLIX SIG KOLOR + BOLIX SIT-P	≥ 0,10 MPa
	BOLIX SIG KOLOR + BOLIX SI-SIT	≥ 0,12 MPa

Table 13. cont.

		After hygrothermal cycles
Rendering system: Base coat BOLIX UBG + BOLIX FLEX + finishing coat + key coat + decorative coat indicated hereafter (if relevant):	BOLIX WS + BOLIX T + BOLIX DECO LAZUR	≥ 0,10 MPa
	BOLIX MP	≥ 0,10 MPa
	BOLIX SMP	≥ 0,10 MPa
	BOLIX TBR + BOLIX BRICK POINT	≥ 0,10 MPa
	BOLIX TR	≥ 0,10 MPa
	BOLIX	≥ 0,10 MPa
	BOLIX TM	≥ 0,10 MPa
	BOLIX DECO	≥ 0,10 MPa
	BOLIX TM DECO	≥ 0,10 MPa
	BOLIX GMP + BOLIX N + BOLIX METALLIC POINT	≥ 0,10 MPa
	BOLIX SIT / BOLIX SIT Complex	≥ 0,11 MPa
	BOLIX SIT-P	≥ 0,10 MPa
	BOLIX SI-SIT	≥ 0,10 MPa

3.3.9. Tensile resistance of insulation product in dry conditions (EAD 040089-00-0404: clause 2.2.3.7)

See Annex No 1

3.3.10. Tensile resistance of insulation product in wet conditions (EAD 040089-00-0404: clause 2.2.3.8)

No performance assessed.

3.3.11. Shear strength and shear modulus of elasticity of insulation product (EAD 040089-00-0404: clause 2.2.3.9)

See Annex No 1

3.3.12. Pull-out strength of mechanical fixings (EAD 040089-00-0404: clause 2.2.3.14)

Table 14.

Anchor trade name	Substrate	Withdrawal capacity f_{ax} (N/mm^2)
Koelner KCX + UC ϕ6	Plywood (thickness 12 mm)	42,6
	OSB (thickness 12 mm)	9,7
	Cement-bonded particleboards (thickness 13 mm)	16,3
	Fibre-gypsum panels (thickness 12,5 mm)	8,5
Wkręt-Met DRIVE S	Plywood (thickness 12 mm)	40,5
	OSB (thickness 12 mm)	9,3
	Cement-bonded particleboards (thickness 13 mm)	15,5
	Fibre-gypsum panels (thickness 12,5 mm)	9,0
ejotherm STR H / ejotherm STR H A2 / ejotherm STR H E	Plywood (thickness 12 mm)	42,2
	OSB (thickness 12 mm)	8,9
	Cement-bonded particleboards (thickness 13 mm)	15,1
	Fibre-gypsum panels (thickness 12,5 mm)	7,5

3.3.13. Protection against corrosion of mechanical fixings (EAD 040089-00-0404: clause 2.2.3.22)

No performance assessed.

Corrosion protection of metal fasteners corresponds to the requirements of the intended service class (see EN 1995-1-1 and the corresponding reference standards). For especially corrosive conditions consideration should be given to heavier hot dip coatings or stainless steel.

3.3.14. Hardened base coat: static modulus of elasticity, tensile strength and elongation at break for products with a thickness up to 5 mm (EAD 040089-00-0404: clause 2.2.3.16)

No performance assessed.

3.3.15. Shear strength and shear modulus of foam adhesive (EAD 040089-00-0404: clause 2.2.3.17)

Table 15.

	Shear strength (kPa)	Shear modulus (kPa)
BOLIX ZP	≥ 78,4	≥ 525

3.3.16. Post expansion behaviour of foam adhesive (EAD 040089-00-0404: clause 2.2.3.18)

Table 16.

	Expansion (mm) after -initial thickness 8 mm-					
	5 min.	10 min.	20 min.	40 min.	60 min.	24 hours
BOLIX ZP	0,80	0,46	0,14	0,12	0,17	0,26

3.3.17. Tearing strength and elongation of reinforcement: glass fibre mesh (EAD 040089-00-0404: clause 2.2.3.23)

See Annex No 3

3.3.18. Tensile strength of rendering system (EAD 040089-00-0404: clause 2.2.3.12)

No performance assessed.

3.4. Protection against noise (BWR 5)

3.4.1. Airborne sound insulation (EAD 040089-00-0404: clause 2.2.4.1)

No performance assessed.

3.4.2. Dynamic stiffness of insulation product (EAD 040089-00-0404: clause 2.2.4.2)

No performance assessed.

3.5. Energy economy and heat retention (BWR 6)

3.5.1. Thermal resistance of the ETICS (EAD 040089-00-0404: clause 2.2.5.1)

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/ ($m^2 \cdot K$)) 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 ($m^2 \cdot K$)/W

R_{render}: thermal resistance of the render (about 0,02 in ($m^2 \cdot K$)/W or determined by test according to EN 12667 or EN 12664)

$R_{substrate}$: thermal resistance of the substrate wall in ($m^2 \cdot K$)/W

R_{se}: external superficial thermal resistance in ($m^2 \cdot K$)/W

R_{si}: internal superficial thermal resistance in ($m^2 \cdot K$)/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.

3.5.2. Thermal resistance of insulation product (EAD 040089-00-0404: clause 2.2.5.2)

See Annex No 1

3.5.3. Air flow resistance of insulation product (EAD 040089-00-0404: clause 2.2.5.3)

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 17.

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 perform a permanent internal factory production control based on the Control Plan.
The Control Plan for the manufacturer is specified in clause 3.2 of EAD 040089-00-0404 *ETICS with renderings for the use on timber frame buildings.*
The manufacturer and ŁUKASIEWICZ – ICiMB have agreed a Control Plan which is deposited at ŁUKASIEWICZ – ICiMB in documentation which accompanies ETA.

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By

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Annexes:

Annex No 1 – Insulation products characteristics

Annex No 2 – Anchors characteristics for mechanically fixed ETICS with supplementary adhesive

Annex No 3 – Glass fibre meshes characteristics

Annex No 1 – Insulation products characteristics

		Boards of expanded polystyrene EPS white or graphite	
		Bonded ETICS	**Mechanically fixed ETICS**
Reaction to fire / EN 13501-1		Euroclass – E max. density: 24,0 kg/m^3	
Thermal resistance		Defined in the CE marking in reference to EN 13163 (m^2·K)/W	
Thickness / EN 823		± 2 mm [EN 13163 – T(2)]	
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]	≥ 100 kPa [EN 13163 – TR100]
Shear strength / EN 12090 – EN 13163		≥ 35 kPa	
Shear modulus / EN 12090		No performance assessed	

Annex No 2 – Anchors characteristics for mechanically fixed ETICS with supplementary adhesive

Anchor trade name	Plate diameter (mm)	Anchor thread diameter (mm)
Koelner KCX + UC ϕ6	60	6
Wkręt-Met DRIVE S	60	6
ejotherm STR H	60	6
ejotherm STR H A2	60	6
ejotherm STR H E	60	6

Annex No 3 – Glass fibre meshes characteristics

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	Elongation after ageing (%)
BOLIX HD 145/S	R 117 A101	Mass per unit area: 152 g/m² Mesh size: 4,0 x 4,5 mm	≥ 20	≥ 50	See ETA 13/0392
BOLIX HD 158/S	ST 2924-100/7 KM	Mass per unit area: 155 g/m² Mesh size: 4,8 x 3,7 mm	≥ 20	≥ 50	≤ 3,0
BOLIX HD 160/S	03-1	Mass per unit area: 160 g/m² Mesh size: 3,5 x 3,8 mm	≥ 20	≥ 50	≤ 3,5
	SSA-1363-160	Mass per unit area: 165 g/m² Mesh size: 4,0 x 3,9 mm	≥ 20	≥ 50	See ETA 16/0526
BOLIX HD 174/S	ST 112-100/7KM	Mass per unit area: 170 g/m² Mesh size: 4,0 x 3,7 mm	≥ 20	≥ 50	≤ 4,2
BOLIX HD 335/P	REDNET E335	Mass per unit area: 335 g/m² Mesh size: 6,0 x 9,0 mm	≥ 20	≥ 50	≤ 3,0

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