Deutsches Institut für Bautechnik

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Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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

European Technical Assessment ETA-07/0326 of 23 June 2017

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Unio-Plus VWS-System
Product family to which the construction product belongs	Product area code: 4 External Thermal Insulation Composite System with rendering on expanded polystyrene for the use as external insulation of building walls
Manufacturer	HORNBACH Baustoff Union GmbH Le Quartier Hornbach 11 67433 Neustadt an der Weinstraße DEUTSCHLAND
Manufacturing plant	HORNBACH Baustoff Union GmbH Le Quartier Hornbach 11 67433 Neustadt an der Weinstraße
This European Technical Assessment contains	18 pages including 4 annexes which form an integral part of this assessment Annex 5 Control Plan contains confidential information and is not included in the European Technical Assessment when that assessment is publicly available
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	Guideline for European technical approval of "External Thermal Insulation Composite Systems with Rendering", ETAG 004, Edition 2000, amended 2013, used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.
This version replaces	ETA-07/0326 issued on 22 May 2012

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Specific Part

1 Technical description of the product

1.1 Definition of the kit

This product is an ETICS (External Thermal Insulation Composite System) with rendering - a kit comprising components which are factory-produced. It's made up on site from these.

The ETICS kit comprises a prefabricated insulation product of expanded polystyrene (EPS) to be bonded and if it necessary additional mechanically fixed onto a wall. The methods of fixing and the relevant components are specified in the table below.
The insulation product is faced with a rendering system consisting of one or more layers (site applied), one of which contains reinforcement. The rendering is applied directly to the insulating panels, without any air gap or disconnecting layer.
The ETICS may include special fittings (e.g. base profiles, corner profiles ...) for connection to adjacent building elements (apertures, corners, parapets ...). 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.

1.2 Composition of the ETICS

	Components National application documents shall be taken into account	**Coverage [kg/m²]**	**Thickness [mm]**
Insulation material with associated method of fixing	**Bonded ETICS:** • **Insulation product** (see annex 1 for product characteristics) factory-prefabricated expanded polystyrene (EPS)		
	- standard EPS	–	≤ 400
	- elastified EPS	–	≤ 200
	- **Unio-Plus Klebe- und Armierungsmörtel grau**	4.0 to 6.0	–
	- **Unio-Plus Klebe- und Armierungsmörtel weiß**	4.0 to 6.0	–
	- **Unio-Plus Klebe- und Armierungsmörtel MG II** (cement based powder requiring addition of about 25 % of water)	4.0 to 6.0 (prepared)	–
	- **Unio-Plus WDVS-Spachtel** (organic based ready to use paste)	3.0 to 4.0 (prepared)	–
	Mechanically fixed ETICS with profiles and supplementary adhesive: • **Insulation product** (see annex 1 for product characteristics) factory-prefabricated expanded polystyrene (EPS)		
	- standard EPS	–	60 to 200

	Components National application documents shall be taken into account	**Coverage [kg/m²]**	**Thickness [mm]**
	• **Supplementary adhesive** (equal to bonded ETICS,		
Insulation material with associated method of fixing	• **Profiles** (see annex 3 for product characteristics) - "Unio-Plus Halteleisten PVC" and - "Unio-Plus Verbindungsleisten PVC" Polyvinylchlorid (PVC) profiles • **Anchors for profiles** (see annex 2 for product characteristics) - WS 8 L - WS 8 N - ejotherm SDK U - SDF-K plus - ejotherm NK U		
	Mechanically fixed ETICS with anchors and supplementary adhesive: • **Insulation product** (see annex 1 for product characteristics) factory-prefabricated expanded polystyrene (EPS) - standard EPS - elastified EPS • **Supplementary adhesive** (equal to bonded ETICS) • **Anchors for insulation product** (see annex 2 for product characteristics) all anchors with ETA according to ETAG 014[1] with characteristics defined in annex 2	 – – 	 60 to 400 60 to 200
Base coat	**Unio-Plus Klebe- und Armierungsmörtel grau** **Unio-Plus Klebe- und Armierungsmörtel weiß** Identical with the equally named adhesive*(s)* given above.	4.5 to 7.5 (prepared)	3.0 to 5.0 (dry)
Glass fibre mesh	**Standard mesh: Unio-Plus Armierungsgewebe F** Alkali- and slide-resistant glass fibre mesh with mass per unit area of about 160 g/m² and mesh size of about 4.0 mm x 4.0 mm	–	–

[1] ETAG 014 Plastic anchors for fixing of external thermal insulation composite systems with rendering

	Components National application documents shall be taken into account	**Coverage [kg/m²]**	**Thickness [mm]**
Key coat	**Unio-Plus Silikatverdünner** Ready to use pigmented liquid – silicate/acrilic binder	about 0.15 l/m²	–
	Unio-Plus Edelputzgrundierung Ready to use pigmented liquid – acrilic binder For the compatibility with the finishing coats see below.	about 0.20 l/m²	–
Finishing coat	**To use with key coat "Unio-Plus Edelputzgrundierung" if applicable:***		
	• Thick layered cement based powder requiring addition of about 22 % of water: **Unio-Plus Kratzputz Perfekt** (particle size 3 mm)	20.0 to 25.0 (prepared)	12.0 to 15.0
	• Thin layered cement based powder requiring addition of about 27 % of water:		
	Unio-Plus Münchener Rauhputz Super (particle size 2 - 3 mm)	3.5 to 5.0 (prepared)	Regulated by particle size
	Unio-Plus Scheibenputz (particle size 1.5 – 2 – 3 and 4 mm)	2.5 to 6.5 (prepared)	
	Unio-Plus Marmorputz (particle size 1 mm) (particle size 1.5 – 2 and 2.5 mm)	1.6 to 8.0 2.5 to 5.0 (prepared)	1.0 to 5.0
	Thin layered cement based powder requiring addition of 36 to 40 % of water:		Regulated by particle size
	Unio-Plus Strukturalputz Leicht (particle size 1.5 – 2 to 3 mm)	2.0 to 4.5 (prepared)	
	• Ready to use paste – acrylic/vinylic binder:		
	Unio-Plus Kunstharzputz (particle size 1.5 – 2 – 3 and 4 mm)	2.0 to 4.0 (prepared)	1.5 to 4.0
	• Ready to use paste – acrylic/vinylic/siloxane binder		
	Unio-Plus Silikonharzputz (particle size 1.5 – 2 and 3 mm)	2.0 to 4.0 (prepared)	1.5 to 3.0
	Unio-Plus Siloxanputz (particle size 1.5 – 2 and 3 mm)	2.0 to 4.0 (prepared)	1.5 to 3.0
	To use with key coat "Unio-Plus Silikatverdünner" if applicable:*		
	• Ready to use pastes – silicate/acrylic binder:		
	Unio-Plus Silikatputz (particle size 1.5 – 2 and 3 mm)	2.0 to 3.8 (prepared)	1.5 to 3.0
Ancillary material	Remains the responsibility of the manufacturer.		

* The instruction to the installer concerning the use of a key coat remains the responsibility of the ETA-holder.

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

2.1 Intended use

This ETICS is intended to be used as external insulation to the walls of buildings made of masonry (bricks, blocks, stones …) or concrete (cast on site or as prefabricated panels) with and 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. It shall be designed to give the wall to which it is applied satisfactory thermal insulation.

The ETICS is non load-bearing construction element. 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 can be used on new or existing (retrofit) vertical walls.

The ETICS is not intended to ensure the air tightness of the building structure.

The choice of the method of fixing depends on the characteristics of the substrate, which could need preparation (see clause 7.2.1 of ETAG 004) and on the national instructions.

The verifications and assessment methods on which this European Technical Assessment (hereinafter called ETA) is based lead to the assumption of a working life of the ETICS "Unio-Plus VWS-System" of at least 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, but are to be regarded only as a means for choosing the right products in relation to the assumed economically reasonable working life of the works.

2.2 Design and installation

The installation instructions including special installation techniques and provisions for the qualification of the personnel are given in the manufacturer's technical documentation.

Design, installation and execution of ETICS are to be in conformity with national documents. Such documents and the level of their implementation in Member States' legislation are different. Therefore, the assessment and declaration of performance are done taking into account general assumptions introduced in the chapters 7.1 and 7.2 of ETAG 004 used as EAD, which summarize how information introduced in the ETA and related documents is intended to be used in the construction process and gives advice to all parties interested when normative documents are missing.

2.3 Packing, transport and storage

The information on packaging, transport and storage is given in the manufacturer's technical documentation. It is the responsibility of the manufacturer to ensure that this information is made know to the concerned people.

2.4 Use, maintenance, repair

The finishing coat shall normally be maintained in order to fully preserve the ETICS performance. Maintenance includes at least:

- visual inspection of the ETICS
- the repairing of localised damaged areas due to accidents
- the aspect maintenance with products adapted and compatible with the ETICS (possibly after washing or ad hoc preparation)

Only products which are compatible with the ETICS shall be used.

Necessary repairs should be performed as soon as the need has been identified.

The information on use, maintenance and repair is given in the manufacturer's technical documentation.

It is the responsibility of the manufacturer to ensure that this information is made know to the concerned people.

3 Characteristics of products and methods of verification

3.0 General

The performances of the kit as described in this chapter are valid provided that the components of the kit comply with Annexes 1 to 4.

3.1 Mechanical resistance and stability (BWR 1)

not relevant

3.2 Safety in case of fire (BWR 2)

Reaction to fire (ETAG 004 - clause 5.1.2)

Configurations	**Organic content**	**Flame retardant content**	**Euroclass according to EN 13501-1:2007**
Base coat	max. 2.1 %	no flame retardant	
EPS - insulation product	in quantity ensuring Euroclass E according to EN 13501-1	in quantity ensuring Euroclass E according to EN 13501-1	
Profile	-	-	
Anchors	-	-	
rendering system : Base coat with finishing coat and compatible key coat indicated in clause 1.2:			
Unio-Plus Münchner Rauhputz Super Unio-Plus Scheibenputz Unio-Plus Strukturalputz Leicht Unio-Plus Marmorputz Unio-Plus Kratzputz Perfekt with Unio-Plus Edelputzgrundierung	max. 1.2 %	no flame retardant	B – s1,do
Unio-Plus Silikatputz with Unio-Plus Silikatverdünner Unio-Plus Kunstharzputz Unio-Plus Silikonharzputz Unio-Plus Siloxanputz with Unio-Plus Edelputzgrundierung	max. 9.7 %	min. 3 %	B – s1,do

3.3 Hygiene, health and environment (BWR 3)

3.3.1 Water absorption (capillarity test) (ETAG 004 - clause 5.1.3.1)

Base coat:

- Water absorption after 1 hour < 1.0 kg/m^2
- Water absorption after 24 hours < 0.5 kg/m^2

Rendering system:

		Water absorption after 24 hours	
		< 0.5 kg/m²	**≥ 0.5 kg/m²**
Rendering systems: Base coat with finishing coat and compatible key coat indicated in clause 1.2:	Unio-Plus Münchner Rauhputz Super with Unio-Plus Edelputzgrundierung	x	
	Unio-Plus Scheibenputz with Unio-Plus Edelputzgrundierung	x	
	Unio-Plus Strukturalputz Leicht with Unio-Plus Edelputzgrundierung	x	
	Unio-Plus Marmorputz with Unio-Plus Edelputzgrundierung	x	
	Unio-Plus Kratzputz Perfekt with Unio-Plus Edelputzgrundierung	x	
	Unio-Plus Silikonharzputz with Unio-Plus Edelputzgrundierung	x	
	Unio-Plus Siloxanputz with Unio-Plus Edelputzgrundierung	x	
	Unio-Plus Kunstharzputz with Unio-Plus Edelputzgrundierung	x	
	Unio-Plus Silikatputz with Unio-Plus Silikatverdünner	x	

3.3.2 Hygrothermal behaviour (ETAG 004 - clause 5.1.3.2)

Pass (without defects)

3.3.3 Impact resistance (ETA G004 – clause 5.1.3.3)

The verified resistance to hard body impact and to perforation of the ETICS results in the classification into category II.

3.3.4 Water vapour permeability (ETAG004 – clause 5.1.3.4)

Rendering system: Base coat with finishing coat and compatible key coat indicated in clause 1.2: (evaluated without decorative coating or key coat)	**Equivalent air thickness s_d**
Unio-Plus Münchner Rauhputz Super with Unio-Plus Edelputzgrundierung	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
Unio-Plus Scheibenputz with Unio-Plus Edelputzgrundierung	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
Unio-Plus Marmorputz with Unio-Plus Edelputzgrundierung	≤ 1.0 m (Test result obtained with particle size 2.5 mm: 0.1 m)
Unio-Plus Strukturalputz Leicht with Unio-Plus Edelputzgrundierung	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
Unio-Plus Kratzputz Perfekt with Unio-Plus Edelputzgrundierung	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
Unio-Plus Silikonharzputz with Unio-Plus Edelputzgrundierung	≤ 1.0 m (Test result obtained with particle size 2 mm: 0.2 m)
Unio-Plus Siloxanputz with Unio-Plus Edelputzgrundierung	≤ 1.0 m (Test result obtained with particle size 2 mm: 0.2 m)
Unio-Plus Kunstharzputz with Unio-Plus Edelputzgrundierung	≤ 1.0 m (Test result obtained with particle size 2 mm: 0.4 m)
Unio-Plus Silikatputz with Unio-Plus Silikatverdünner	≤ 1.0 m (Test result obtained with particle size 2 mm: 0.1 m)

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

Essential characteristic	**Performance**
Release of dangerous substances	no performance assessed

3.4 Safety and accessibility in use (BWR 4)

3.4.1 Bond strength between base coat and insulation product (EPS) (ETAG 004 - clause 5.1.4.1.1)

Conditioning		
Initial state	**After hygrothermal cycles**	**After freeze/thaw test**
≥ 0.08 MPa	≥ 0.08 MPa	Test not required because freeze/thaw cycles not necessary

3.4.2 Bond strength between base coat and substrate resp. insulation product (EPS) (ETAG 004 – clauses 5.1.4.1.2 and 5.1.4.1.3)

		Conditioning		
Adhesive	**Substrate resp. insulation product**	**Initial state**	**2 d immersion in water and 2 h drying**	**2 d immersion in water and 7 d drying**
Unio-Plus Klebe- und Armierungsmörtel grau/weiß	Concrete	≥ 0.25 MPa	≥ 0.08 MPa	≥ 0.25 MPa
	EPS	≥ 0.08 MPa	≥ 0.03 MPa	≥ 0.08 MPa
Unio-Plus Klebe- und Armierungsmörtel MG II	Concrete	≥ 0.25 MPa	≥ 0.08 MPa	≥ 0.25 MPa
	EPS	≥ 0.08 MPa	≥ 0.03 MPa	≥ 0.08 MPa
Unio-Plus WDVS-Spachtel	Concrete	≥ 0.25 MPa	≥ 0.08 MPa	≥ 0.25 MPa
	EPS	≥ 0.08 MPa	≥ 0.03 MPa	≥ 0.08 MPa

Bonded surface:

For bonded ETICS the calculated minimal bonded surface area, according to ETAG 004, clause 6.1.4.1.3 is 40 %.

3.4.3 Bond strength after ageing (ETAG 004 – clause 5.1.7.1):

Rendering system: Base coat with finishing coat and compatible key coat indicated in clause 1.2	Unio-Plus Münchner Rauhputz Super with Unio-Plus Edelputzgrundierung	≥ 0.08 MPa
	Unio-Plus Scheibenputz with Unio-Plus Edelputzgrundierung	
	Unio-Plus Strukturalputz Leicht with Unio-Plus Edelputzgrundierung	
	Unio-Plus Marmorputz with Unio-Plus Edelputzgrundierung	
	Unio-Plus Kratzputz Perfekt with Unio-Plus Edelputzgrundierung	
	Unio-Plus Silikonharzputz with Unio-Plus Edelputzgrundierung	
	Unio-Plus Siloxanputz with Unio-Plus Edelputzgrundierung	
	Unio-Plus Kunstharzputz with Unio-Plus Edelputzgrundierung	
	Unio-Plus Silikatputz with Unio-Plus Silikatverdünner	

3.4.4 Fixing strength (displacement test) (ETAG 004 - clause 5.1.4.2)

Test not required therefore no limitation of ETICS length required.

3.4.5 Wind load resistance (ETAG 004 - clause 5.1.4.3)

The following failure loads only apply to the listed combination of component characteristics and the characteristics of the insulation product given in annex 1.

3.4.5.1 Safety in use of mechanically fixed ETICS using profiles

Characteristics of the EPS **(standard EPS)**	Dimensions	500 mm x 500 mm
	Thickness	≥ 60 mm
	Tensile strength perpendicular to the faces	**≥ 150 kPa**
	Shear modulus	≥ 1.0 N/mm²
Failure loads [N / panel] (Static Foam Block Test)	Horizontal profiles fixed every 30 cm and 49.4 cm long vertical connection profiles	Minimal: 950 Average: 1010

3.4.5.2 Safety in use of mechanically fixed ETICS using anchors

Apply to all anchors listed in the clause 1.2 mounted on the insulation panels surface				
Characteristics of the EPS **(standard EPS)**	Thickness		≥ 60 mm	
	Tensile strength perpendicular to the faces		**≥ 100 kPa**	
	Shear modulus		≥ 1.0 N/mm²	
Plate diameter of anchor			∅ 60 mm	∅ 90 mm
Failure loads [N]	Anchors not placed at the panel joints (Static Foam Block Test)	R_{panel}	Minimal: 510 Average: 520	Minimal: 720 Average: 730
	Anchors placed at the panel joints (Pull-through test)	R_{joint}	Minimal : 400 Average: 430	Minimal: 430 Average: 470

Apply to all anchors listed in the clause 1.2 mounted on the insulation panels surface			
Characteristics of the EPS **(elastified EPS)**	Thickness		≥ 60 mm
	Tensile strength perpendicular to the faces		**≥ 80 kPa**
	Shear modulus		≥ 0.3 N/mm²
Plate diameter of anchor			∅ 60 mm
Failure loads [N]	Anchors not placed at the panel joints (Static Foam Block Test)	R_{panel}	Minimal: 350 Average: 360
	Anchors placed at the panel joints (Pull-through test)	R_{joint}	Minimal: 300 Average: 310

The failure loads specified above for a plate diameter of anchor of 60 mm apply to the following anchors with deep mounting but only on the following conditions of installation:

Anchor	Thickness of the EPS [d]	Conditions of installation *
ejotherm STR U, ejotherm STR U 2G (ETA-04/0023)	100 mm > d ≥ 80 mm (for standard and elastified EPS)	– Maximum installation depth of the anchor plate: 15 mm (≙ thickness of insulation cover) – Maximum depth of die: 5 mm
	≥ 100 mm (for standard and elastified EPS)	– Maximum installation depth of the anchor plate: 15 mm (≙ thickness of insulation cover) – Maximum depth of die: 20 mm
* according to the appropriate ETA of anchor		

3.4.6 Render strip tensile test (ETAG 004 – clause 5.5.4.1)

The average value of crack width of the base coat "Unio-Plus Klebe- und Armierungsmörtel grau" reinforced with the glass fibre mesh “Unio-Plus Armierungsgewebe F” measured at a render strain value of 1 % is about 0.18 mm.

3.5 Protection against noise (BWR 5)

For the sound insulation properties of the ETICS no performance was assessed.

3.6 Energy economy and heat retention (BWR 6)

3.6.1 Thermal resistance

The nominal value of the additional thermal resistance R provided by the ETICS to the substrate wall is calculated in accordance with EN ISO 6946:2007 from the nominal value of the insulation product's thermal resistance R_D given accompanied to the CE marking and from the thermal resistance of the rendering system R_{render} which is about 0.02 (m² ·K)/W.

$R = R_D + R_{render}$

The thermal bridges caused by anchors profiles increases the thermal transmittance U. This influence had to take into account according to EN ISO 6946:2007

$U_c = U + \chi_p \cdot n$

Where:	U_c:	corrected thermal transmittance [W/(m² ·K)]
	n:	number of anchors 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:
	χ_p = 0.004 W/K	for anchors with a galvanized steel screw with the head covered by a plastic material
	χ_p = 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

The thermal bridges caused by profiles are negligible.

4 Assessment and verification of constancy of performance (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 assessment and verification of constancy of performance system (AVCP) applies suitable following table (see Annex V to Regulation (EU) No 305/2011).

Product	Intended use	Levels or classes (Reaction to fire)	Systems
"Unio-Plus VWS-System"	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 European Assessment Document (EAD)

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 23 June 2017 by Deutsches Institut für Bautechnik

Dirk Brandenburger
Head of Department

beglaubigt:
Hartstock

Annexes:

Annex 1: Thermal insulation product characteristic

Annex 2: Anchors

Annex 3: Profiles

Annex 4: Reinforcement

Annex 1: Thermal insulation product characteristic

Factory-prefabricated, uncoated panels made of expanded polystyrene (EPS) to EN 13163:2008 shall be used, having the description and characteristics defined in the Table below.

Description and characteristics	For bonded ETICS	For mechanically fixed ETICS	
		with anchors and supplementary adhesive	with profiles and supplementary adhesive****
Reaction to fire; EN 13501-1:2007	Class E*		
Thermal resistance [(m²·K)/W]	Defined in the CE marking in reference to EN 13163:2008		
Tolerances			
Length; EN 822:1994	± 0.6 % or ± 3 mm whichever gives the greatest numerical tolerance (class L1 or class L2)		
Width [mm]; EN 822:1994	± 2 (class W2)		
Thickness [mm]; EN 823:1994	± 1 (class T2)		
Squareness [mm/m]; EN 824:1994	± 2 (class S2)		
Flatness [mm/m]; EN 825:1994	5 (class P4)		
Dimensional stability under			
- laboratory conditions [%]; EN 1603:1996	± 0.2 (class DS(N)2)		
- specified temperature and humidity conditions [%]; EN 1604:1996	2 (level DS(70,-)2 or level DS(70,-)1)		
Water absorption (long term partial immersion) [kg/m²]; EN 12087:1997	$W_{lp} \leq 0.5$		
Water vapour diffusion resistance factor; EN 12086:1997	$\mu = 20 - 78$		
Tensile strength perpendicular to the faces in dry conditions** [kPa]; EN 1607:1996			
- standard EPS	$\sigma_{mt} \geq 80$	$\sigma_{mt} \geq 100$	$\sigma_{mt} \geq 150$
- elastified EPS***	$\sigma_{mt} \geq 80$	$\sigma_{mt} \geq 80$	not used
Bending strength** [kPa]; EN 12089:1997	$\sigma_b \geq 50$		
Apparent density [kg/m³]; EN 1602:1996	$\rho_a \leq 30$		
Shear strength** [kPa]; EN 12090:1997	$20 \leq f_{\tau k} \leq 170$		
Shear modulus [MPa]; EN 12090:1997			
- standard EPS	$1.0 \leq G_m \leq 3.8$		
- elastified EPS***	$0.3 \leq G_m \leq 1.0$	$0.3 \leq G_m \leq 1.0$	not used
Testing of characteristics see EN 13163:2008.			

* See the conditions of clause 3.2 for the EPS.

** Minimal value of all single values

*** Elastified EPS is made from standard EPS by short time high load pressing to reduce the dynamic stiffness. The protection against noise of the entire wall is improved by the use of elastified EPS related to an ETICS with standard EPS.

**** Thermal insulation materials for mechanically fixed ETICS with profiles must circumferentially at the edges, 24 mm from the inner surface, get an approx. 3 mm wide and 13 to 18 mm deep groove cut-in at the factory.

Annex 2: Anchors

All anchors with ETA according to ETAG 014[1] with characteristics having the description below shall be used in the mechanically fixed ETICS:

- plate diameter of anchor ≥ 60 mm resp. ≥ 90 mm
- plate stiffness ≥ 0.3 kN/mm
- load resistance of the anchor plate ≥ 1.0 kN

These characteristics and the characteristic tension resistance of the anchors shall be taken from the corresponding ETA.

The anchors listed in the Table in clause 1.2 with reference to the respective ETA shall be used in the mechanically fixed ETICS with profiles for fixing the horizontal profiles.

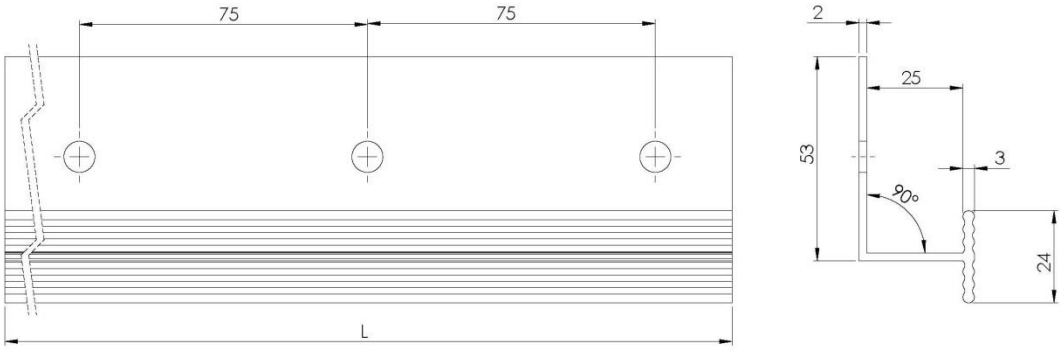
Trade name	ETA-number
WS 8 L	ETA-02/0019
WS 8 N	ETA-03/0019
IsoFux ND-8Z	ETA-04/0032
SDF-K plus	ETA-04/0064
ejotherm NK U	ETA-05/0009

Annex 3: Profiles

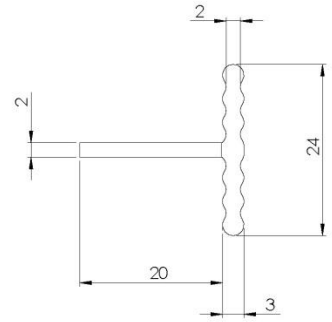
Polyvinyl chloride (PVC) profiles, PVC-U, EGL, 082-05-T33 to EN ISO 1163-1:1999 are to be used in the mechanically fixed ETICS with profiles.

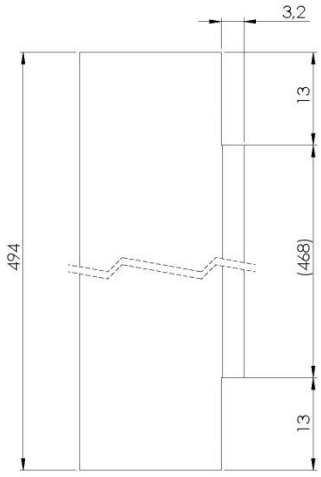
The Pull-through resistance of fixings from profiles is ≥ 500 N.

Horizontal profile – "Halteleiste PVC" (dimensions in millimetres)



Vertical connection profile – "Verbindungsleiste PVC" (dimensions in millimetres)





Annex 4: Reinforcement (glass fibre mesh)

Characteristics (alkali resistance): Pass

	Description	**Residual strength after ageing [N/mm]**	**Relative residual strength after ageing, of the strength in the as-delivered state [%]**
"Unio-Plus Armierungsgewebe F"	Alkali- and slide-resistant glass fibre mesh with mass per unit area of about 160 g/m² and mesh size of about 4.0 mm x 4.0 mm	≥ 20	≥ 50