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-15/0298 of 15 June 2015

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	Magmax WDVS EPS
Product family to which the construction product belongs	External Thermal Insulation Composite System with rendering on expanded polystyrene for the use as external insulation of building walls
Manufacturer	MAGNETIC d.o.o. Sesvetska cesta 64 10360 SESVETE KROATIEN
Manufacturing plant	MAGNETIC d.o.o. Sesvetska cesta 64 10360 SESVETE KROATIEN
This European Technical Assessment contains	19 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 2013, used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.

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II SPECIFIC PART

1 Technical description of the product

1.1 Definition and composition of the kit

This product is an ETICS (External Thermal Insulation Composite System) with rendering - a kit comprising components which are factory-produced by the manufacturer or component suppliers. It's made up on site from these. The ETICS manufacturer is ultimately responsible for the ETICS.

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 base and finishing coat (site applied), the base coat contains reinforcement. The rendering system 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 ...) to treat details of ETICS (connections, apertures, corners, parapets, sills ...).

The ETICS may include special fittings (e.g. base profiles, corner profiles ...) to treat details of ETICS (connections, apertures, corners, parapets, sills ...). Assessment and performance of these components is not addressed in this ETA, however the ETICS-manufacturer is responsible for adequate compatibility and performance within the ETICS when the components are delivered as a part of the kit.

Definition of the construction product

	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
	• **Adhesives**		
	Magmax Klebespachtel grau	4.0 to 6.0	–
	Magmax Klebespachtel weiß	4.0 to 6.0	–
	Magmax Klebespachtel ds (cement based powder requiring addition of about 25 % of water)	4.0 to 6.0 (prepared)	–
	Magmax Klebespachtel zf (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
	• **Supplementary adhesives** (equal to bonded ETICS)		

	Components (National application documents shall be taken into account)	**Coverage [kg/m²]**	**Thickness [mm]**
Insulation material with associated method of fixing	• **Profiles** (see annex 3 for product characteristics) • "Magmax Halteleisten PVC" and • "Magmax Verbindungsleisten PVC" Polyvinylchlorid (PVC) profiles • **Anchors for profiles** (see annex 2 for product characteristics) • ejotherm SK U • WS 8 L • WS 8 N • ejotherm SDK U • IsoFux ND-8Z • SDF-K plus, SDF-S plus • ejotherm NK U		
	Mechanically fixed ETICS with profiles and supplementary adhesive: • **Insulation product** (see annex 1 for product characteristics) Factory-prefabricated expanded polystyrene • standard-EPS • elastified EPS • **Supplementary adhesives** (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	**Magmax Klebespachtel grau** **Magmax Klebespachtel weiß** Identical with the equally named adhesives given above.	4.5 to 7.5 (prepared)	3.0 to 5.0 (dry)
Glass fibre mesh	• **Standard mesh:** (see annex 4 for product characteristics) **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	**Magmax Silikat- Grund** Ready to use pigmented liquid – silicate/acrilic binder	about 0.15 l/m²	–
	Magmax Universal- Grund 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 "Magmax Universal-Grund " if applicable:***		
	• Thick layered cement based powder requiring addition of about 22 % of water:		
	Magmax Edelkratzputz (particle size 3 mm)	20.0 to 25.0 (prepared)	12,0 to 15,0
	• Thick layered cement based powder requiring addition of about 27 % of water:		
	Magmax Münchener Rauhputz (particle size 2 – 3 mm)	3.5 to 5.0 (prepared)	Regulated by particle size
	Magmax Scheibenputz (particle size 1.5 – 2 – 3 and 4 mm)	2.5 to 6.5 (prepared)	
	Magmax 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
	Magmax Leichtedelputz (Korngröße 1.5 – 2 bis 3 mm)	2.0 to 4.5 (prepared)	
	• Ready to use paste – acrylic/vinylic binder:		
	Magmax 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		
	Magmax Silikonharzputz (particle size 1.5 – 2 and 3 mm)	2.0 to 4.0 (prepared)	1.5 to 3.0
	Magmax 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 "Magmax Silikat- Grund" if applicable:*		
	• Ready to use pastes – silicate/acrylic binder:		
	Magmax Silikatputz (particle size 1 – 2 and 3 mm)	2.0 to 3.8 (prepared)	1.5 to 3.0
Ancillary material	Remain under the manufacturer's responsibilities.		

* The instruction of the installer concerning the use of a key coat remains under the ETA-holder responsibilities

2. Specification of the intended use in accordance with the applicable European assessment Document (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 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 is based lead to the assumption of a working life of the ETICS "Magmax WDVS EPS" 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 Manufacturing

The ETA is issued for the ETICS on the basis of agreed data/information, deposited with the DIBt, which identifies the ETICS that has been assessed and judged. Changes to the ETICS or the components or their production process, which could result in this deposited data/information being incorrect, should be notified to the DIBt before the changes are introduced. DIBt will decide whether or not such changes affect the approval and consequently the validity of the CE-marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.

2.3 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.

2.4 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.

2.5 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).

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

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 - 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 5.1.2.1, EN 13501-1)

Configurations	Organic content	Flame retardant content	Euroclass according to EN 13501-1
Base coat	max.2,1 %	no flame retardant	B – s1,d0
Panels of expanded polystyrene EPS	in quantity ensuring Euroclass E according to EN 13501-1	in quantity ensuring Euroclass E according to EN 13501-1	
profiles	-	-	
anchors	-	-	
rendering system consisting of: Magmax Münchner Rauhputz Magmax Scheibenputz Magmax Leichtedelputz Magmax Marmorputz Magmax Edelkratzputz + Magmax Universal- Grund	max. 1,2 %	no flame retardant	
Magmax Silikatputz + Magmax Silikat- Grund Magmax Kunstharzputz Magmax Silikonharzputz Magmax Siloxanputz + Magmax Universal- Grund	max. 9,7 %	max. 5 %	

3.3 Hygiene, health and environment (BWR 3)

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

Base coat: **Magmax Klebespachtel grau**
Magmax Klebespachtel weiß

- Water absorption after 1 hour < 1 kg/m^2
- Water absorption after 24 hours $< 0{,}5$ kg/m^2

- Rendering systems:

		Water absorption after 24 hours	
		< 0,5 kg/m²	**≥ 0,5 kg/m²**
Rendering systems: Base coat: **Magmax Klebespachtel grau** or **Magmax Klebespachtel weiß** + finishing coats indicated hereafter:	Magmax Münchener Rauhputz + SCHWEPA ARU-200 Super	X	
	Magmax Scheibenputz + SCHWEPA ARU-200 Super	X	
	Magmax Leichtedelputz + SCHWEPA ARU-200 Super	X	
	Magmax Marmorputz + SCHWEPA ARU-200 Super	X	
	Magmax Edelkratzputz + SCHWEPA ARU-200 Super	X	
	Magmax Silikonharzputz + SCHWEPA ARU-200 Super	X	
	Magmax Siloxanputz + SCHWEPA ARU-200 Super	X	
	Magmax Kunstharzputz + SCHWEPA ARU-200 Super	X	
	Magmax Silikatputz + SCHWEPA Silikatverdünner	X	

3.3.2 Hygrothermal behaviour (ETAG 004 - clause 5.1.3.2)

Pass (without defects)

3.3.3 Impact resistance (ETAG004 – clause 5.1.3.3)

Rendering system: Base coat: **Magmax Klebespachtel grau** or **Magmax Klebespachtel weiß** + reinforcement and finishing coat indicated hereafter:	Standard mesh: Armierungsgewebe F
Magmax Münchener Rauhputz + Magmax Universal- Grund	**category II**
Magmax Scheibenputz + Magmax Universal- Grund	
Magmax Leichtedelputz + Magmax Universal- Grund	
Magmax Marmorputz + Magmax Universal- Grund	

Rendering system: Base coat: **Magmax Klebespachtel grau** or **Magmax Klebespachtel weiß** + reinforcement and finishing coat indicated hereafter:	Standard mesh: Armierungsgewebe F
Magmax Edelkratzputz + Magmax Universal- Grund	**category II**
Magmax Silikonharzputz + Magmax Universal- Grund	
Magmax Siloxanputz + Magmax Universal- Grund	
Magmax Kunstharzputz + Magmax Universal- Grund	
Magmax Silikatputz + Magmax Silikat- Grund	

3.3.4 Water vapour permeability (ETAG004 – clause 5.1.3.4)

Rendering system: Base coat: **Magmax Klebespachtel grau** oder **Magmax Klebespachtel weiß** + finishing coat and compatible key coat indicated hereafter:	**Equivalent air thickness s_d**
Magmax Münchener Rauhputz + Magmax Universal- Grund	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
Magmax Scheibenputz + Magmax Universal- Grund	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
Magmax Leichtedelputz + Magmax Universal- Grund	≤ 1.0 m (Test result obtained with particle size 2.5 mm: 0.1 m)
Magmax Marmorputz + Magmax Universal- Grund	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
Magmax Edelkratzputz + Magmax Universal- Grund	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
Magmax Silikonharzputz + Magmax Universal- Grund	≤ 1.0 m (Test result obtained with particle size 2 mm: 0.2 m)
Magmax Siloxanputz + Magmax Universal- Grund	≤ 1.0 m (Test result obtained with particle size 2 mm: 0.2 m)
Magmax Kunstharzputz + Magmax Universal- Grund	≤ 1.0 m (Test result obtained with particle size 2 mm: 0.4 m)
Magmax Silikatputz + Magmax Silikat- Grund	≤ 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 TR034)

The product does not contain dangerous substances specified in TR034 (edition May 2014) except

a biocidal product (< 1 % by weight) contains in finishing coat Magmax Kunstharzputz, Magmax Siloxanputz and MagmaxSilikonharzputz.

Contained active ingredients: Terbutryn, 2-Octyl-2H-isothiazol, Zinkpyrithion, Zinkoxid

3.4 Safety and accessibility in use (BWR 4)

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

Conditioning		
Initial state	**After hygrothermal cycles**	**After freeze/thaw test**
≥ 0.08 MPa	< 0.08 MPa but failure in the insulation product	Test not required because freeze/thaw cycles not necessary

3.4.2 Bond strength between base coat and insulation product (EPS) (ETAG 004 - clause 5.1.4.1.2 and 5.4.1.3)

		Initial state	48 hrs. immersion in water + 2 hrs. drying	48 hrs. immersion in water + 7 days drying
Magmax Klebespachtel grau Magmax Klebespachtel weiß Magmax Klebespachtel ds Magmax Klebespachtel zf	Beton	≥ 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 Fixing strength (displacement test) (ETAG 004 - clause 5.1.4.2)

Test not required (no limitation of ETICS length)

3.4.4 Wind load resistance (ETAG 004 - clause 5.1.4.3)

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

3.4.4.1 Safety in use of mechanically fixed ETICS using profiles

Failure loads – Table 1

Characteristics of the EPS **(standard EPS)**	dimensions	500 mm x 500 mm
	thickness	≥ 60 mm
	tensile strength perpendicular to the faces	≥ 150 kPa
	shear modulu	≥ 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

3.4.4.2 Safety in use of mechanically ETICS using anchors

Failure loads – Table 2

Apply to all anchors listed in annex 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

Failure loads – Table 3

Apply to all anchors listed in the Table in clause 1.1 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 only apply to the following anchors with deep mounting under the given conditions of installation:

Anchor	Thickness of the EPS [d]	Conditions of installation*
ejotherm STR U (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
IsoFux NDT8LZ (ETA-05/0080)	≥ 80 mm (for standard and elastified EPS)	– Maximum depth of countersink: 20 mm
TERMOZ 8 SV (ETA-06/0180)	≥ 80 mm (for standard EPS only)	– Maximum installation depth of the anchor plate: 15 mm (≙ thickness of insulation cover)
* According to the appropriate ETA of anchor		

3.4.5 Render strip tensile test

The mean value of the crack width of the base coat "Magmax Klebespachtel weiß" with the glass fibre mesh "Magmax Armierungsgewebe F", measured at a render strain value of 1 % is about 0,18 mm.

Reinforcement (glass fibre mesh)

Characteristics (alkali resistance): Pass

3.5 Protection against noise (BWR 5)

NPD (no performance determined)

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[2] 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[2]:

$U_c = U + \chi_p \cdot n$

Where: U_c: corrected thermal transmittance (W/ (m^2.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:

[2] EN ISO 6946:1996 Building components an building elements – Thermal resistance and thermal transmittance – Calculation method

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

U: thermal transmittance

The thermal bridges caused by profiles are negligible.

3.7 Sustainable use of natural resources (BWR 7)

For the sustainable use of natural resources no performance was investigated for this product.

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.

Product	Intended use	Levels or classes (Reaction to fire)	Systems
"Magmax WDVS EPS"	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

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 15 June 2015 by Deutsches Institut für Bautechnik

Dirk Brandenburger
Head of Department

beglaubigt:
Windhorst

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 No performance determined (Class F)		
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

Description and characteristics	For bonded ETICS	For mechanically fixed ETICS	
		with anchors and supplementary adhesive	with profiles and supplementary adhesive
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	$20 \leq f_{rk} \leq 170$		
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.			

* 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.

Annex 2: Anchors

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

- plate diameter of anchor ≥ 60 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 1.1 with reference to the respective ETA shall be used in the mechanically ETICS with profiles for fixing the horizontal profiles.

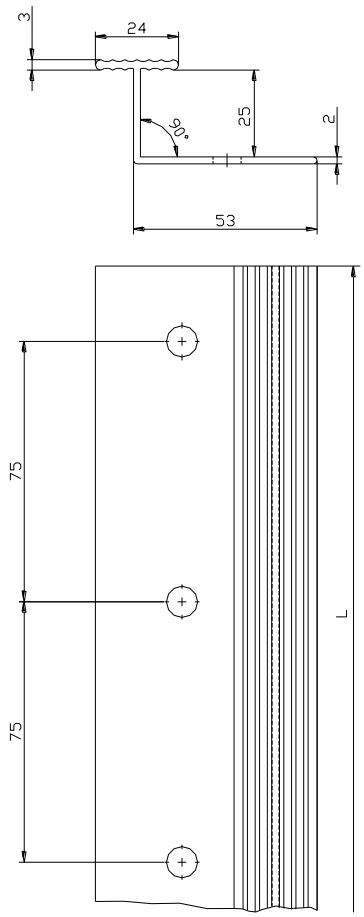
Trade name	ETA-number
ejotherm SK U	ETA-02/0018
WS 8 L	ETA-02/0019
WS 8 N	ETA-03/0019
ejotherm SDK U	ETA-04/0023
IsoFux ND-8Z	ETA-04/0032
SDF-K plus, SDF-S plus	ETA-04/0064
ejotherm NK U	ETA-05/0009

Annex 3: Profiles

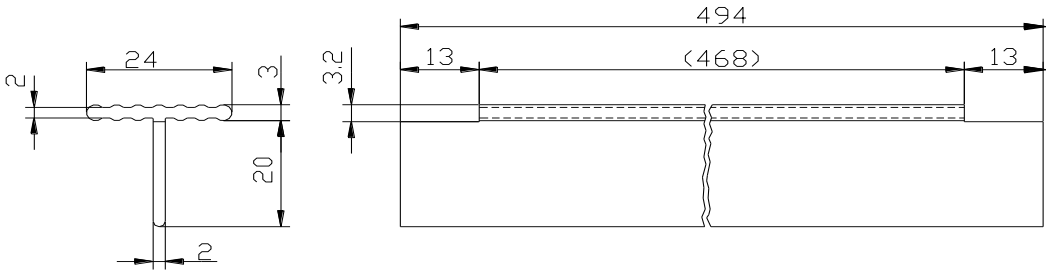
Polyvinyl chloride (PVC) profiles, PVC-U, EGL, 082-05-T33 to EN ISO 1163-1:1999, with the measurements according to Annex 1 are to be used in the mechanically fixed ETICS with profiles.

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

Horizontal profile – "Magmax Halteleisten PVC" (dimensions in mm)



Vertical connection profile "Magmax verbindungsleisten PVC" (dimensions in mm)



Annex 4: Reinforcement (glass fibre mesh)

Characteristics (alkali resistance): Pass

	Description	**Strength after ageing**	
		Absolute strength after ageing (N/mm)	**Relative residual strength after ageing, of the strength in the asdelivered state (%)**
"Armierungs-gewebe F"	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