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European Technical Assessment

ETA-12/0561
of 19 November 2025

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General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

StoTherm Vario 7

Product family
to which the construction product belongs

Product area code: 4

External Thermal Insulation Composite System with
rendering for the use as external insulation of building
walls

Manufacturer

Sto SE & Co. KGaA
Ehrenbachstraße 1
79780 Stühlingen
DEUTSCHLAND

Manufacturing plant

Sto SE & Co. KGaA
Ehrenbachstraße 1
79780 Stühlingen
DEUTSCHLAND

This European Technical Assessment
contains

20 pages including 6 annexes which form an integral part
of this assessment

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

EAD 040083-00-0404

This version replaces

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Specific Part

1 Technical description of the product

This product is an External Thermal Insulation Composite System (ETICS) 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 all components of the ETICS specified in this ETA.

The ETICS kit comprises a prefabricated insulation product of expanded polystyrene (EPS) to be bonded and if it necessary additionally mechanically fixed onto a wall. The methods of fixing and the relevant components are specified in annex 1.

The insulation product is faced with a rendering system consisting of one base coat and finishing coat (site applied), in which the base coat 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 are 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.

2 Specification of the intended use in accordance with the applicable European assessment Document

The performances in Section 3 can only be assumed if the ETICS is used in accordance with the specifications and under the boundary conditions specified in Annexes 2 to 5.

The verifications and assessment methods on which this ETA is based lead to the assumption of a working life of the ETICS "StoTherm Vario 7" 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.

For use, maintenance and repair, the finishing coat shall be maintained in order to fully preserve the ETICS performance. Maintenance includes at least:

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

Necessary repairs are to be carried out 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 known to the concerned people.

English translation prepared by DIBt

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

3.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire of the ETICS	(see annex 2) Euroclass according to EN 13501-1
Reaction to fire of the EPS-insulation product - Apparent density of the EPS-insulation product according to EN 1602	(see annex 2) Euroclass E according EN 13501-1 Value [kg/m ³]
Facade fire performance	no performance assessed

3.2 Hygiene, health and environment (BWR 3)

Essential characteristic	Performance
Release of dangerous substances	no performance assessed
Water absorption Base coat after 1 hour after 24 hours	(see annex 3.1) Mean value [kg/m ²] Mean value [kg/m ²]
Rendering system after 1 hour after 24 hours	 Mean value [kg/m ²] Mean value [kg/m ²]
MW insulation product after 24 hours	maximum value ≤ 0.5 [kg/m ²]
Water-tightness of the ETICS: Hygrothermal behaviour on the test wall	Passed without defects
Water-tightness of the ETICS: Freeze/thaw behaviour	As the water absorption of the base coat as well as the rendering system with all finishing coats except "StoSil" is less than 0.5 kg/m ² after 24 hours and is assessed as freeze/thaw resistant. The ETICS with the finishing coat "StoSil" has been assessed as freeze/thaw resistant according to the simulated method.
Impact resistance	(see annex 3.2) Category
Water vapour permeability - Rendering system - EPS insulation product	(see annex 3.3) s _d value [m] μ = 20 - 70 Thickness of the insulation product 400 mm

3.3 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
<p>Bond strength between base coat and EPS-insulation product</p> <p>between adhesive and substrate</p> <p>between adhesive and EPS insulation</p>	<p>(see annex 4.1) - Minimum value / Mean value, rupture type [kPa]</p> <p>(see annex 4.2) - Thickness [mm] of the used adhesives - Minimum value [kPa], rupture type: Initial state (dry conditions) - Minimum value / Mean value [kPa], rupture type: after 2 d immersion in water, 2 h drying - Minimum value / Mean value [kPa], rupture type: after 2 d immersion in water, 7 d drying</p> <p>(see annex 4.3) - Thickness [mm] of the used adhesives - Minimum value [kPa], rupture type: Initial state (dry conditions) - Minimum value / Mean value [kPa], rupture type: after 2 d immersion in water, 2 h drying - Minimum value / Mean value [kPa], rupture type</p>
Fixing strength (displacement test)	Test not required therefore no limitation of ETICS length required.
<p>Wind load resistance of ETICS pull-through test of fixing static foam block test</p>	<p>(see annex 4.4) - R_{panel} [kN/fixing], - R_{joint} [kN/fixing], - Plate diameter of anchor ≥ 60 mm res. ≥ 90 mm - plate stiffness ≥ 0.3 kN/mm² - load resistance of the anchor plate ≥ 1.0 kN</p>
<p>Tensile strength perpendicular to the faces in dry conditions standard EPS</p> <p>elastified EPS</p>	<p>$\sigma_{mt} \geq 80$ kPa (bonded ETICS) $\sigma_{mt} \geq 100$ kPa (mechanically fixed ETICS with anchors and supplementary adhesive) $\sigma_{mt} \geq 150$ kPa (Mechanically fixed ETICS with profiles and supplementary adhesive) $\sigma_{mt} \geq 80$ kPa (mechanically fixed ETICS with anchors and supplementary adhesive)</p>

Essential characteristic	Performance
Shear strength of the ETICS	≥ 20 kPa
Shear modulus of the ETICS standard EPS elastified EPS	≥ 1.0 MPa ≥ 0.3 MPa
Pull-through resistance of fixings from profiles	≥ 0.5 kN
Render strip tensile test	(see annex 4.5) crack width w_{rk} [mm]
Bond strength after ageing finishing coat not tested on the rig	(see annex 4.6) Minimum value / Mean value [kPa]
Tensile strength of the glass fibre mesh in the as-delivered state	(see annex 4.7) Mean value [N/mm]
Residual tensile strength of the glass fibre mesh after aging	(see annex 4.7) Mean value [N/mm]
Relative residual tensile strength of the glass fibre mesh after aging	(see annex 4.7) Mean value [%]
Elongation of the glass fibre mesh in the as-delivered state	(see annex 4.7) Mean value [%]
Elongation of the glass fibre mesh after aging	(see annex 4.7) Mean value [%]

3.4 Protection against noise (BWR 5)

Essential characteristic	Performance
Airborne sound insulation of ETICS	no performance assessed
Dynamic stiffness of the EPS insulation product	no performance assessed
Air flow resistance of the EPS insulation product	no performance assessed

3.5 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Thermal resistance of ETICS	(see annex 5) Calculated value or measurement value R [(m ² · K)/W]
Thermal transmittance of ETICS	(see annex 5) Calculated value or measurement value U [W/(m ² · K)]

English translation prepared by DIBt

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with EAD 040083-00-0404 the applicable European legal act is: 97/556/EC changed by 2001/596/EC.

The systems to be applied are:

Product	Intended use	Levels or classes (Reaction to fire)	Systems
"StoTherm Vario 7"	ETICS 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+
	ETICS in external wall not subject to fire regulations	any	2+
<p>⁽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)</p> <p>⁽²⁾ Products/materials not covered by footnote (1)</p> <p>⁽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)</p>			

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

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 19 November 2025 by Deutsches Institut für Bautechnik

Dirk Brandenburger
Head of Department

Beglaubigt
Klette

	Components National application documents shall be taken into account	Coverage [kg/m ²]	Thickness [mm]
Insulation material with associated method of fixing	<p>Mechanically fixed ETICS with anchors and supplementary adhesive:</p> <ul style="list-style-type: none"> • Insulation product Factory-prefabricated expanded polystyrene (EPS)* - standard-EPS - elastified EPS • Supplementary adhesives (equal to bonded ETICS) • Anchors for insulation product all anchors with ETA according to EAD 330196-01-0604¹ 	– –	60 to 400 60 to 200
Base coat	<p>StoLevell FT Identical with the equally named adhesive given above.</p>	4.0 to 5.0 (powder)	3.0 to 4.0
Glass fibre mesh	<p>Sto-Glasfasergewebe Alkali- and slide-resistant glass fibre mesh with mass per unit area of about 165 g/m² and mesh size of about 6.0 mm x 6.0 mm</p> <p>Sto-Glasfasergewebe F Alkali- and slide-resistant glass fibre mesh with mass per unit area of about 165 g/m² and mesh size of about 4.0 mm x 4.0 mm</p> <p>Sto-Panzergerewebe (reinforced mesh implemented in addition to the mesh described above to improve the impact resistance) Alkali- and slide-resistant glass fibre mesh with mass per unit area of about 450 g/m² and mesh size of about 7.5 mm x 7.5 mm.</p>	– – –	– – –
Key coat**	<p>StoPrep Miral StoPrep Miral AimS Sto-Putzgrund Sto-Putzgrund QS StoPrep QS StoPrep Isol Q Ready to use pigmented acrylic- resin dispersion liquids. StoPrep Miral with additional potassium silicate binder. To be used with finishing coats indicated hereafter.</p>	0.3 to 0.4 0.3 to 0.4 0.3 0.3 0.3	– – – – –
Finishing coat	<ul style="list-style-type: none"> • Ready to use paste - acrylic binder: Stolit K (particle size 1.0 to 6.0 mm) Stolit R (particle size 1.0 to 6.0 mm) Stolit Effect (particle size 3.0 mm) Stolit MP (thin, middle or thick layer) StoMarlit K (particle size 1.5 to 3.5 mm) StoMarlit R (particle size 1.5 to 3.5 mm) StoLotusan K (particle size 1.0 to 3.0 mm) StoLotusan MP (thin, middle or thick layer) • Ready to use pastes - acrylic binder: StoSilco K (particle size 1.0 to 3.0 mm) StoSilco R (particle size 1.0 to 3.0 mm) StoSilco MP (thin, middle or thick layer) 	1.8 to 6.0 1.8 to 6.0 3.5 to 5.5 1.5 to 4.0 2.3 to 4.3 2.3 to 4.3 1.8 to 4.3 1.5 to 4.0 1.8 to 4.3 1.8 to 4.3 1.5 to 4.0	Regulated by particle size 1.0 to 3.0 regulated by particle size 1.0 to 3.0 regulated by particle size 1.0 to 3.0

¹ EAD 330196-01-0604

Plastic anchors made of virgin or non-virgin material for fixing of external thermal insulation composite systems with rendering (and previous versions)

	Components National application documents shall be taken into account	Coverage [kg/m ²]	Thickness [mm]
Finishing coat	<ul style="list-style-type: none"> Ready to use pastes – acrylic binder (application between 0 °C and 15 °C): Stolit QS K (particle size 1.0 to 3.0 mm) Stolit QS R (particle size 1.5 to 3.0 mm) Stolit QS MP (thin, middle or thick layer) Ready to use pastes - acrylic/siloxane binder (application between 0 °C and 15 °C): StoSilco QS K (particle size 1.0 to 3.0 mm) StoSilco QS R (particle size 1.5 to 3.0 mm) StoSilco QS MP (thin, middle or thick layer) Ready to use pastes - silicate binder: StoSil K (particle size 1.0 to 3.0 mm) StoSil R (particle size 1.5 to 3.0 mm) StoSil MP (thin, middle or thick layer) Cement based powder requiring addition of about 25 % water: StoMiral K (particle size 1.5 to 6.0 mm) StoMiral R (particle size 1.5 to 6.0 mm) StoMiral MP (fine structure) Cement based powder requiring addition of 20 to 23 % water associated with a decorative coat: StoMiral Nivell F (fine structure) Cement based powder requiring addition of about 30 % water associated with a decorative coat: Sto-Strukturputz K (particle size 2.0 and 3.0 mm) Sto-Strukturputz R (particle size 2.0 and 3.0 mm) 	<p>1.8 to 4.3 1.8 to 4.3 1.5 to 4.0</p> <p>1.8 to 4.3 1.8 to 4.3 1.5 to 4.0</p> <p>2.2 to 4.3 2.2 to 4.3 1.5 to 4.0</p> <p>1.6 to 5.2 1.6 to 5.2 1.5 to 4.0</p> <p>3.0 to 5.1</p> <p>2.5 to 2.9 2.5 to 2.9</p>	<p>regulated by particle size 1.0 to 3.0</p> <p>1.0 to 3.0</p> <p>regulated by particle size</p>
Decorative coat (optional)	<ul style="list-style-type: none"> Ready to use paint with acrylic/siloxane binder: StoColor Silco StoColor Silco G StoColor Jumbosil StoColor Silco + 2% StoAdditiv QS StoColor Jumbosil + 2% StoAdditiv QS StoColor Maxicryl StoColor Maxicryl + 2% StoAdditiv QS StoColor Crylan StoColor Lotusan StoColor Lotusan G StoColor Silco Variant StoColor Silco Variant G StoColor Solical StoColor Solical G StoColor X-black StoColor Maxisil StoColor Top StoColor Dryonic StoColor Dryonic G StoColor Dryonic M 	<p>0,2 bis 0,4 0,2 bis 0,4 0,15 bis 0,3 0,15 bis 0,3 0,15 bis 0,3 0,1 bis 0,17</p>	<p>– –</p>
Ancillary	Remains the responsibility of the manufacturer.		
* Factory-prefabricated, uncoated panels made of expanded polystyrene (EPS) to EN 13163 shall be used.			
** The instruction to the installer concerning the use of a key coat remains the responsibility of the manufacturer.			

Annex 2

Safety in case of fire (BWR 2)

2.1 Reaction to fire

Configurations	Organic content	Flame retardant	Euroclass according to EN 13501-1
Base coat	max. 3,5 %	no flame retardant	
EPS insulation product	Euroclass E according to EN 13501-1	Euroclass E according to EN 13501-1	
Profile	-	-	
Anchors	-	-	
Rendering system: Base coat with finishing coat and compatible key coat indicated in annex 1:			
Stolit K/R (particle size 3.5 to 6.0 mm) with key coat "Sto-Putzgrund" or "StoPrep Miral AimS"	max. 9.6 %	min. 7.7%	B - s2,d0
Stolit K/R (particle size 1.0 to 3.0 mm) with key coat "Sto-Putzgrund" or "StoPrep Miral AimS"			B - s2,d0
Stolit Effect/MP with key coat "Sto-Putzgrund" or "StoPrep Miral AimS"			
StoMarlit K/R with key coat "Sto-Putzgrund" or "StoPrep Miral AimS"			
StoLotusan K/MP with key coat "Sto-Putzgrund" or "StoPrep Miral AimS"			
StoSilco K/R/MP with key coat "Sto-Putzgrund" or "StoPrep Miral AimS"			
Stolit QS K/R/MP with key coat "Sto-Putzgrund QS" or "StoPrep Miral AimS"			
StoSilco QS K/R/MP with key coat "Sto-Putzgrund QS" or "StoPrep Miral AimS"			
StoSil K/R/MP with key coat "StoPrep Miral"	max. 6.0 %		
StoMiral K/R/MP with key coat "StoPrep Miral"	max.-1,8 %	no flame retardant	B - s2,d0
StoMiral Nivell F with key coat "StoPrep Miral", associated with a decorative coat			
Sto-Strukturputz K/R with key coat "StoPrep Miral", associated with a decorative coat			

2.2 Apparent density of the EPS-insulation product according to EN 1602

$$\rho_a \leq 30 \text{ kg/m}^3$$

Annex 3

Hygiene, health and environment (BWR 3)

3.1 Water absorption (capillarity test)

Base coat	Thickness [mm]	Mean value water absorption [kg/m ²]	
		after 1 h	after 24 h
StoLevell FT	3	0.043	0.288

Rendering system: Base coat "StoLevell FT" with finishing coat without key coat but with decorative coat indicated hereafter	Mean value water absorption [kg/m ²]	
	after 1 h	after 24 h
Stolit K/R/Effect/MP	0.015	0.130
StoMarlit K/R	0.012	0.105
StoLotusan K/MP	0.015	0.084
StoSilco K/R/MP	0.024	0.160
Stolit QS K/R/MP	0.015	0.158
StoSilco QS K/R/MP	0.027	0.208
StoSil K/R/MP	0.048	0.847
StoMiral K/R/MP	0.044	0.239
StoMiral Nivell F associated with the decorative coat "StoColor Silco"	0.009	0.130
Sto-Strukturputz K/R associated with the decorative coat "StoColor Silco"	0.040	0.242

3.2 Impact resistance

Standard mesh: "Sto-Glasfasergewebe" or "Sto-Glasfasergewebe F"

Rendering system: Base coat "StoLevell FT" with finishing coat without key coat and decorative coat indicated hereafter	Standard mesh (total thickness about 5.5 mm)	Standard mesh (total thickness about 6 - 6.5 mm)	Standard mesh and Sto-Panzergerewebe
Stolit K/R/Effect/MP	Category II	Category II	Category II
StoMarlit K/R			
StoLotusan K/MP			
StoSilco K/R/MP			
Stolit QS K/R/MP			
StoSilco QS K/R/MP			
StoSil K/R/MP			
StoMiral K/R/MP			
StoMiral Nivell F, G			
Sto-Strukturputz K/R			

3.3 Water vapour permeability ETICS

Rendering system: Base coat "StoLevell FT" with finishing coat, compatible key coat and decorative coat indicated hereafter	Equivalent air thickness s_d
Stolit K/R/Effect/MP with key coat "Sto-Putzgrund"	≤ 1.0 m (Test result obtained with Stolit K2: 0.63 m)
StoMarlit K/R with key coat "Sto-Putzgrund"	≤ 1.0 m (Test result obtained with StoMarlit K2: 0.59 m)
StoLotusan K/MP with key coat "Sto-Putzgrund"	≤ 1.0 m (Test result obtained with StoLotusan K2: 0.62 m)
StoSilco K/R/MP with key coat "Sto-Prep Miral" or "StoPrep Miral AimS"	≤ 1.0 m (Test result obtained with StoSilco K2: 0.28 m)
StoSilco K/R/MP with key coat "Sto-Putzgrund"	≤ 1.0 m (Test result obtained with StoSilco K2: 0.53 m)
Stolit QS K/R/MP with key coat "Sto-Putzgrund QS"	≤ 1.0 m (Test result obtained with Stolit QS K2: 0.53 m)
Stolit QS K/R/MP with key coat "StoPrep Isol Q"	≤ 1.0 m (Test result obtained with Stolit QS K2: 0.59 m)
StoSilco QS K/R/MP with key coat "StoPrep Isol Q"	≤ 1.0 m (Test result obtained with StoSilco QS K2: 0.54 m)
StoSil K/R/MP with key coat "StoPrep Miral" or "StoPrep Miral AimS"	≤ 1.0 m (Test result obtained with StoSil K2: 0.28 m)
StoMiral K/R/MP with key coat "StoPrep Miral" or "StoPrep Miral AimS"	≤ 1.0 m (Test result obtained with StoMiral K2: 0.09 m)
StoMiral Nivell F with key coat "StoPrep Miral" or "StoPrep Miral AimS"	≤ 1.0 m (Test result obtained with d = 2 mm: 0.10 mm)
StoMiral Nivell F with key coat "StoPrep Miral" or "StoPrep Miral AimS" and associated with the decorative coats "StoColor Silco", "StoColor Jumbosil" or "StoColorLotusan"	≤ 1.0 m (Test result obtained with d = 2 mm and a double decorative coat "StoColor Silco": 0.18 m) (Test result obtained with d = 2 mm and a double decorative coat "StoColor Jumbosil": 0.22 m) (Test result obtained with d = 2 mm and a double decorative coat "StoColor Lotusan": 0.13 m)
Sto-Strukturputz K/R with key coat "StoPrep Miral" or "StoPrep Miral AimS"	≤ 1.0 m (Test result obtained with Sto-Strukturputz K2: 0.09 m)
Sto-Strukturputz K/R with key coat "StoPrep Miral" or "StoPrep Miral AimS" and associated with the decorative coats "StoColor Silco", "StoColor Jumbosil" or "StoColorLotusan"	≤ 1.0 m (Test result obtained with d = 2 mm and a double decorative coat "StoColor Silco": 0.17 m) (Test result obtained with d = 2 mm and a double decorative coat "StoColor Jumbosil": 0.21 m) (Test result obtained with d = 2 mm and a double decorative coat "StoColor Lotusan": 0.12 m)

For all other configuration has been no performance assessed.

Annex 4

Safety and accessibility in use (BWR 4)

4.1 Bond strength between base coat and insulation product (EPS)

		Rupture type	Conditioning		
			Initial state [kPa]	After hygrothermal cycles [kPa]	After freeze/thaw test
StoLevell FT	Mean value	in insulation product	112	107	Test not required because freeze/thaw cycles not necessary
	Minimum value		87	91	

4.2 Bond strength between adhesive and substrate

Substrate: concrete		Rupture type	Conditioning		
			Initial state [kPa]	2 d immersion in water and 2 hrs. drying [kPa]	2 d immersion in water and 7 d drying [kPa]
Sto-Baukleber (5 mm)	Mean value	In adhesive	1210	1150	1620
	Minimum value		930	970	1210
StoLevell Uni (5 mm)	Mean value	In adhesive	1793	637	2560
	Minimum value		1586	467	2489
StoLevell Duo plus (5 mm)	Mean value	In adhesive	1230	583	2020
	Minimum value		1166	501	1893
StoLevell Novo (5 mm)	Mean value	In adhesive	793	405	1059
	Minimum value		733	327	947
StoLevell FT (5 mm)	Mean value	In adhesive	1233	369	1157
	Minimum value		784	299	1026
StoColl IP (3 – 5 mm)	Mean value	In adhesive	1565	975	1830
	Minimum value		1407	577	1738
StoColl IP Plus (5 mm)	Mean value	In adhesive	1210	1150	1620
	Minimum value		930	970	1210
Sto-Dispersionskleber (3 – 5 mm)	Mean value	*	1525	1480	1043
	Minimum value		1364	1349	870

*
Initial state: 100 % in adhesive
2 d immersion in water and 2 h drying: 45 % in substrate; 55 % in adhesive
2 d immersion in water and 7 d drying: 5 % in substrate; 95 % in adhesive

4.3 Bond strength between adhesive and insulation product (EPS)

		Rupture type	Conditioning		
			Initial state [kPa]	2 d immersion in water and 2 h drying [kPa]	2 d immersion in water and 7 d drying [kPa]
Sto-Baukleber (5 mm)	Mean value	in insulation product	128	120	141
	Minimum value		107	119	132
StoLevell Uni (5 mm)	Mean value	in insulation product	121	99	122
	Minimum value		112	81	112
StoLevell Duo plus (5 mm)	Mean value	in insulation product	109	74	101
	Minimum value		99	58	81
StoLevell Novo (5 mm)	Mean value	in insulation product	115	74	108
	Minimum value		107	58	92
StoLevell FT (5 mm)	Mean value	in insulation product	103	89	120
	Minimum value		84	84	113
StoColl IP (3 – 5 mm)	Mean value	*	145	95	145
	Minimum value		138	90	141
StoColl IP Plus (5 mm)	Mean value	in insulation product	112	109	126
	Minimum value		96	105	119
Sto-Dispersionkleber (3 – 5 mm)	Mean value	in insulation product	120	120	130
	Minimum value		112	109	120
* Initial state: 100 % in insulation product 2 d immersion in water and 2 h drying: 95 % in adhesive; 5 % in insulation product 2 d immersion in water and 7 d drying: 100 % in insulation product					

Minimal bonded surface:

$$S [\%] = 0,03 \text{ N/mm}^2 \times 100 / 0,08 \text{ N/mm}^2$$

$$S = 37,5 \%$$

The minimal surface bonded area S of bonded ETICS is 40 %.

4.4 Wind load resistance

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

4.4.1 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/mm ²
Failure loads [kN / panel] (Static Foam Block Test)	Horizontal profiles fixed every 30 cm and 49.4 cm long vertical connection profiles	Minimal: 0.095 Mean value : 0.101

4.4.2 Safety in use of mechanically fixed ETICS using anchors

Apply to all anchors listed in annex 1 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/mm ²		
Plate diameter of anchor		∅ 60 mm	∅ 90 mm	
plate stiffness		≥ 0.3 kN/mm		
load resistance of the anchor plate		≥ 1.0 kN		
Failure loads [kN/anchor]	Anchors not placed at the panel joints (Static Foam Block Test)	R _{panel}	Minimal: 0.51 Mean value : 0.52	Minimal: 0.72 Mean value : 0.73
	Anchors placed at the panel joints (Pull-through test)	R _{joint}	Minimal: 0.40 Mean value : 0.43	Minimal: 0.43 Mean value : 0.47

Apply to all anchors listed in annex 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/mm ²		
Plate diameter of anchor		∅ 60 mm		
plate stiffness		≥ 0.3 kN/mm		
load resistance of the anchor plate		≥ 1.0 kN		
Failure load [kN/anchor]	Anchors not placed at the panel joints (Static Foam Block Test)	R _{panel}	Minimal: 0.35 Mean value :0.36	
	Anchors placed at the panel joints (Pull-through test)	R _{joint}	Minimal: 0.30 Mean value : 0.31	

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 panel [t]	Conditions of installation*
ejothem STR U, ejothem STR U 2G (ETA-04/0023)	t ≥ 80 mm (for standard and elastified EPS)	– Maximum installation depth of the anchor plate: 15 mm (\triangleq thickness of insulation cover) – Incision depth: 20 mm
	t ≥ 100 mm (for standard and elastified EPS)	– Maximum installation depth of the anchor plate: 15 mm (\triangleq thickness of insulation cover) – Incision depth: 35 mm
TERMOZ 8 SV (ETA-06/0180)	t ≥ 80 mm (for standard EPS only)	– Maximum installation depth of the anchor plate: 15 mm (\triangleq thickness of insulation cover)

* according to the appropriate ETA of anchor

4.5 Render strip tensile test

The Mean value of crack width of the base coats reinforced with the different glass fibre meshes measured at a render strain value of 1.0 % is:

Base coat	Glass fibre mesh	Mean value of crack width w_m (%)
StoLevell FT	Sto-Glasfasergewebe	0.13 mm
	Sto-Glasfasergewebe F	0.10 mm
	Sto-Panzergerewebe	no performance assessed

4.6 Bond strength after aging

Finishing coat with base coat indicated hereafter		7 d immersion in water and 7 d drying [kPa]
Stolit K/R/Effect/MP	Mean value	118
	Minimum value	110
StoMarlit K/R	Mean value	122
	Minimum value	117
StoLotusan K/MP	Mean value	117
	Minimum value	106
StoSilco K/R/MP	Mean value	124
	Minimum value	120
Stolit QS K/R/MP	Mean value	93
	Minimum value	81
StoSilco QS K/R/MP	Mean value	112
	Minimum value	103
StoSil K/R/MP	Mean value	110
	Minimum value	101
StoMiral K/R/MP	Mean value	112
	Minimum value	100
StoMiral Nivell F	Mean value	120
	Minimum value	107
Sto-Strukturputz K/R	Mean value	109
	Minimum value	101

4.7 Reinforcement (glass fibre mesh)

Sto-Glasfasergewebe	Mean value warp	Mean value weft
Tensile strength in as-delivered state	≥ 40 N/mm	≥ 55 N/mm
Residual tensile strength after aging	≥ 20 N/mm	≥ 30 N/mm
Relative residual tensile strength after aging	≥ 50 %	≥ 50 %
Elongation in as-delivered state	3.7 %	3.8 %
Elongation after aging	1.8 %	2.1 %

Sto-Glasfasergewebe F	Mean value warp	Mean value weft
Tensile strength in as-delivered state	≥ 40 N/mm	≥ 45 N/mm
Residual tensile strength after aging	≥ 25 N/mm	≥ 30 N/mm
Relative residual tensile strength after aging	≥ 50 %	≥ 50 %
Elongation in as-delivered state	3.9 %	4.2 %
Elongation after aging	2.7 %	2.6 %

Sto-Panzerewebe	Mean value warp	Mean value weft
Tensile strength in as-delivered state	≥ 150 N/mm	≥ 170 N/mm
Residual tensile strength after aging	≥ 110 N/mm	≥ 100 N/mm
Relative residual tensile strength after aging	≥ 50 %	≥ 50 %
Elongation in as-delivered state	4.3 %	4.4 %
Elongation after aging	3.2 %	2.7 %

Annex 5

Energy economy and heat retention (BWR 6)

5.1 Thermal resistance und thermal transmittance

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 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 $0.02 \text{ (m}^2 \cdot \text{K)/W}$.

$$R = R_D + R_{render}$$

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

$$U_c = U + \chi_p \cdot n$$

Where: U_c :	corrected thermal transmittance [$\text{W}/(\text{m}^2 \cdot \text{K})$]
n :	number of anchors per m^2
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:
$\chi_p = 0.004 \text{ W/K}$	for anchors with a galvanized steel screw with the head covered by a plastic material
$\chi_p = 0.002 \text{ W/K}$	for anchors with a stainless steel screw covered by plastic anchors and for anchors with an air gap at the head of the screw

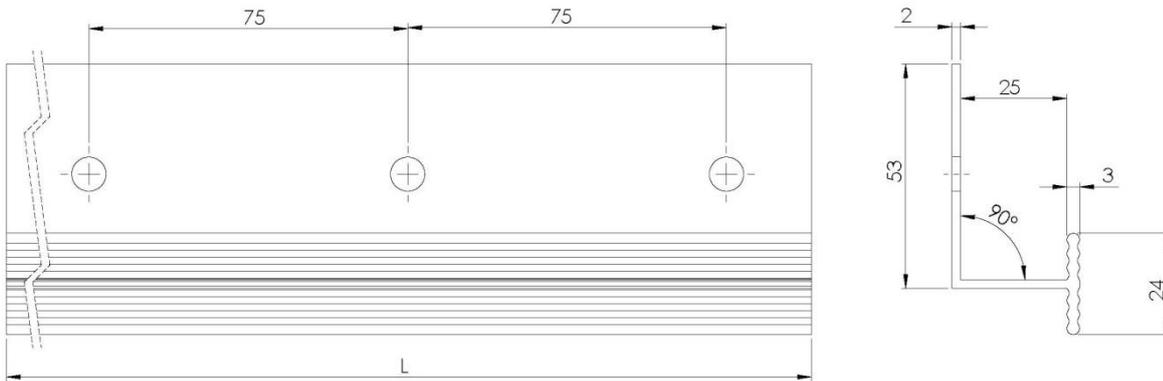
The thermal bridges caused by profiles are negligible.

Annex 6

Profiles

Polyvinyl chloride (PVC) profiles, PVC-U, EGL, 082-05-T33 to EN ISO 1163-1 are to be used in the mechanically fixed ETICS with profiles. The Pull-through resistance of fixings from profiles is ≥ 0.5 kN.

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



Vertical connection profile "Sto-Halteleiste PVC" (dimensions in millimetres)

