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-13/0901 of 17 October 2025

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	StoTherm Mineral 5
Product family to which the construction product belongs	Product area code: 4 External Thermal Insulation Composite System with rendering on mineral wool for use on 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	21 pages including 5 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	040083-00-0404
This version replaces	ETA-13/0901 issued on 22 June 2018

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Specific Part

1 Technical description of the product

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 is comprised a prefabricated insulation product of mineral wool (MW) to be bonded and if necessary additional mechanically fixed onto a wall.

The walls are made of masonry (bricks, blocks, stones…) or concrete (cast on site or as prefabricated panels). The methods of fixing and the relevant components are specified in annex 1 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 ...) 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.

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 Mineral 5" 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 normally 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.

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 MW-insulation product - Cross heat of combustion for the MW-insulation product EN ISO 1716 - Apparent density EN 1602	(see annex 2) Euroclass A1 according EN 13501-1 Value [MJ/kg] Value [kg/m³]
Facade fire performance	no performance assessed
Propensity to undergo continuous smouldering of ETICS	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 **Rendering system** after 1 hour after 24 hours MW insulation product after 24 hours	(see annex 3.1) Average [kg/m²] Average [kg/m²] Average [kg/m²] Average [kg/m²] Maximum value 3.0 kg/m²	
Water-tightness of the ETICS Hygrothermal behaviour on the test wall	Pass without defects	
Water-tightness of the ETICS: Freeze/thaw behaviour	The water absorption of the base coats as well as the rendering systems with all finishing coats except "StoSil" is less than 0.5 kg/m² after 24 hours. 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	(see annex 3.3) s_d value [m]	
- MW insulation product	μ = 1	Thickness of the insulation product 340 mm

3.3 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Bond strength	
between base coat and MW insulation product	(see annex 4.1) - Minimal value/average [kPa], Initial state (28 d immersion) - Minimal value/average [kPa], after hygrothermal cycles
between adhesive and substrate	(see annex 4.2) - Thickness [mm] of the used adhesives - Minimal value [kPa], rupture type: Initial state (dry conditions) - Minimal value/average [kPa], rupture type: after 2 d immersion in water, 2 h drying - Minimal value/average [kPa], rupture type: after 2 d immersion in water, 7 d drying
between adhesive and MW insulation	(see annex 4.3) - Thickness [mm] of the used adhesives - Minimal value [kPa], rupture type: Initial state (dry conditions) - Minimal value/average [kPa], rupture type: after 2 d immersion in water, 2 h drying - Minimal value/average [kPa], rupture type: after 2 d immersion in water, 7 d drying
Fixing strength (displacement test)	Test not required therefore no limitation of ETICS length required.
Wind load resistance of ETICS pull-through test of fixing static foam block test	(see annex 4.4) - R_{panel} [kN/fixing], - R_{joint} [kN/fixing], - Plate diameter of anchor ≥ 60 mm, ≥ 90 mm res. ≥ 140 mm - plate stiffness ≥ 0.3 kN/mm² - load resistance of the anchor plate ≥ 1.0 kN
Tensile strength perpendicular to the faces	
in dry conditions MW panel	$\sigma_{mt} \geq 14$ kPa, $\sigma_{mt} \geq 5$ kPa (mechanically fixed ETICS with anchors and supplementary adhesive)
MW lamella	$\sigma_{mt} \geq 80$ kPa (bonded ETICS)
in wet conditions - series 2 - series 3	≥ 33 % of average value in dry conditions ≥ 50 % of average value in dry conditions

Essential characteristic	Performance
Shear strength of the ETICS MW panel $\sigma_{mt} \geq 14$ kPa MW lamella $\sigma_{mt} \geq 80$ kPa MW panel $\sigma_{mt} \geq 5$ kPa	 ≥ 20 kPa ≥ 20 kPa ≥ 6 kPa
Shear modulus of the ETICS MW panel $\sigma_{mt} \geq 14$ kPa MW lamella $\sigma_{mt} \geq 80$ kPa MW panel $\sigma_{mt} \geq 5$ kPa	 ≥ 1.0 MPa ≥ 1.0 MPa ≥ 0.3 MPa
Render strip tensile test	No cracks occurred during the Render Strip Tensile Test of the base coat reinforced with the glass fibre meshes "Sto-Glasfasergewebe" and "Sto-Glasfasergewebe F" at a render strain value of 1 %.
Bond strength after ageing finishing coat tested on the rig finishing coat not tested on the rig	(see annex 4.5) Minimal value/average [kPa] Minimal value/average [kPa]
Tensile strength of the glass fibre mesh in the as-delivered state	(see annex 4.6) Average [N/mm]
Residual tensile strength of the glass fibre mesh after aging	(see annex 4.6) Average [N/mm]
Relative residual tensile strength of the glass fibre mesh after aging	(see annex 4.6) Average [%]
Elongation of the glass fibre mesh in the as-delivered state	(see annex 4.6) Average [%]
Elongation of the glass fibre mesh after aging	(see annex 4.6) Average [%]

3.4 Protection against noise (BWR 5)

Essential characteristic	Performance
Airborne sound insulation of ETICS	no performance assessed
Dynamic stiffness of the MW insulation product	no performance assessed
Air flow resistance of the MW 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 [(m² ·K)/W]
Thermal transmittance of ETICS	(see annex 5) Calculated value or measurement value U [W/(m² ·K)]

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

In accordance with EAD No. 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 Mineral 5"	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+

(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

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 17 October 2025 Deutsches Institut für Bautechnik

Anja Rogsch
Head of Section

beglaubigt:
Klette

Annex 1
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** factory-prefabricated mineral wool (MW) product* - MW lamella	– –	≤ 200
	• **Adhesives** – **StoLevell FT** (cement based powder requiring addition of about 28 % of water)	3.0 to 7.5 (powder)	–
	– **StoLevell Uni** (cement based powder requiring addition of about 24 - 26 % of water)	3.0 to 7.5 (powder)	–
	– **StoLevell Duo plus** (cement based powder requiring addition of about 25 % of water)	3.0 to 7.5 (powder)	–
	– **StoColl IP** (cement based powder requiring addition of about 20 % of water)	4.0 to 5.0 (powder)	–
	– **StoColl IP Plus** (cement based powder requiring addition of about 21 – 23 % of water)	3.0 to 7,5 (powder)	–
	– **StoColl Mineral HP** (cement based powder requiring addition of about 23 – 25 % of water)	3.0 to 7,5 (powder)	–
	– **StoLevell Novo** (cement based powder requiring addition of about 37 % of water)	3.0 to 7,5 (powder)	–
	– **Sto-Baukleber** (cement based powder requiring addition of 21 - 23 % of water)	3.0 to 7.5 (powder)	–
	Mechanically fixed ETICS with anchors and supplementary adhesive: • **Insulation product** factory-prefabricated mineral wool (MW) product* - MW panel - MW lamella • **Supplementary adhesive** (equal to bonded ETICS) • **Anchors for insulation product** all anchors with ETA according to EAD 330196-01-0604[1]	 – –	 60 to 340 60 to 200
Base coat	**StoLevell FT** Identical with the equally named adhesive given above.	4.0 to 7.0 (powder)	4.0 to 6.0

[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/m²]	Thickness [mm]
Glass fibre mesh	**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.	–	–
	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.	–	–
	Sto-Panzergewebe (reinforced mesh implemented in addition to the meshes 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.	–	–
Key coat**	**StoPrep Miral**	0.3 to 0.4	–
	StoPrep Miral AimS	0.3 to 0.4	–
	StoPrep Isol Q	0.3	
	Sto-Putzgrund	0.3	–
	Sto-Putzgrund QS	0.3	–
	Ready to use pigmented acrylic-resin dispersion liquids. "StoPrep Miral" with additional potassium silicate binder.		
Finishing coat	• Ready to use pastes - acrylic binder:		
	Stolit K (particle size 1.0 to 6.0 mm)	1.8 to 6.0	regulated by particle size
	Stolit R (particle size 1.0 to 6.0 mm)	1.9 to 6.0	
	Stolit Effect (particle size 3.0 mm)	3.5 to 5.5	
	Stolit MP (thin, middle or thick layer)	1.5 to 4.0	1.0 to 3.0
	StoMarlit K (particle size 1.5 to 3.5 mm)	2.3 bis 4.3	regulated by particle size
	StoMarlit R (particle size 1.5 to 3.5 mm)	2.3 to 4.3	
	StoLotusan K (particle size 1.0 to 3.0 mm)	1.8 to 4.3	
	StoLotusan MP (thin, middle or thick layer)	1.5 bis 4.0	1.0 to 3.0
	• Ready to use pastes – acrylic/siloxane binder:		
	StoSilco K (particle size 1.0 to 3.0 mm)	1.8 to 4.3	regulated by particle size
	StoSilco R (particle size 1.0 to 3.0 mm)	1.8 to 4.3	
	StoSilco MP (thin, middle or thick layer)	1.5 to 4.0	1.0 to 3.0
	• Ready to use paste – acrylic binder: (application between 0 °C and 15 °C):		
	Stolit QS K (particle size 1.0 to 3.0 mm)	1.8 to 4.3	regulated by particle size
	Stolit QS R (particle size 1.0 to 3.0 mm)	1.8 to 4.3	
	Stolit QS MP (thin, middle or thick layer)	1.5 to 4.0	1.0 to 3.0
	• Ready to use paste – acrylic/siloxane binder (application between 0 °C and 15 °C):		
	StoSilco QS K (particle size 1.0 to 3.0 mm)	1.8 to 4.3	regulated by particle size
	StoSilco QS R (particle size 1.0 to 3.0 mm)	1.8 to 4.3	
	StoSilco QS MP (thin, middle or thick layer)	1.5 to 4.0	1.0 to 3.0
	• Ready to use paste - silicate binder:		
	StoSil K (particle size 1.0 to 3.0 mm)	2.2 to 4.3	regulated by particle size
	StoSil R (particle size 1.0 to 3.0 mm)	2.2 to 4.3	
	StoSil MP (thin, middle or thick layer)	1.5 to 4.0	1.0 to 3.0

	Components National application documents shall be taken into account	Coverage [kg/m²]	Thickness [mm]
Finishing coat	• Cement based powder requiring addition of about 25 % in weight of water:		
	StoMiral K (particle size 1.0 to 6.0 mm)	1.6 to 5.2	regulated by particle size
	StoMiral R (particle size 1.0 to 6.0 mm)	1.6 to 5.2	
	StoMiral MP (thin, middle or thick layer)	1.5 to 4.0	1.0 to 3.0
	• Cement based powder requiring addition of about 23 % in weight of water associated with a decorative paint:		
	StoMiral Nivell F (fine structure)	3.0 to 5.1	1.0 to 3.0
	• Cement based powder requiring addition of about 30 % in weight of water associated with a decorative paint:		
	Sto-Strukturputz K (particle size 2.0 and 3.0 mm)	2.5 to 2.9	regulated by particle size
	Sto-Strukturputz R (particle size 2.0 and 3.0 mm)	2.5 to 2.9	
	• Ready to use pastes – actylic binder – associated with synthetic briquettes		
	StoCleyer B with	48 to 76 [pieces/m²]	4.0
	Sto-Klebe- und Fugenmörtel	3.0 to 3.5	1.0 to 3.0
	StoEcoshape with	2.4 to 780 [pieces/m²]	4.0 to 7.0
	Sto-Klebe- und Fugenmörtel	3.0 to 3.5	1.0 to 2.0
Decorative paint	• Ready to use paint with acrylic/siloxane binder:	[l/m²]	
	StoColor Silco	0.2 to 0.4	–
	StoColor Silco G	0.2 to 0.4	–
	StoColor Jumbosil	0.2 to 0.4	–
	StoColor Silco + 2% StoAdditiv QS	0.2 to 0.4	–
	StoColor Jumbosil + 2% StoAdditiv QS	0.2 to 0.4	–
	StoColor Maxicryl	0.2 to 0.4	–
	StoColor Maxicryl + 2% StoAdditiv QS	0.2 to 0.4	–
	StoColor Crylan	0.2 to 0.4	–
	StoColor Lotusan	0.2 to 0.4	–
	StoColor Lotusan G	0.2 to 0.4	–
	StoColor Silco Variant	0.2 to 0.4	–
	StoColor Silco Variant G	0.2 to 0.4	–
	StoColor Solical	0.2 to 0.4	–
	StoColor Solical G	0.2 to 0.4	–
	StoColor X-black	0.2 to 0.4	–
	StoColor Maxisil	0.2 to 0.4	–
	StoColor Top	0.15 to 0.3	–
	StoColor Dryonic	0.15 to 0.3	–
	StoColor Dryonic G	0.15 to 0.3	–
	StoColor Dryonic M	0.1 to 0.17	–
Ancillary material	Remains the responsibility of the manufacturer.		

* Factory-prefabricated panels and lamella made of mineral wool (MW) with the following designation code and the other properties shall be used, provided that the manufacturer and the trade name of the MW are deposited with the DIBt

MW – EN 13162 – T5 – DS(T+) – WS – WL(P) – MU1

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

Annex 2

Safety in case of fire (BWR 2)

2.1 Reaction to fire

Configurations	Organic content	Flame retardant content	Euroclass according to EN 13501-1
Base coat	max. 3.5 %	no flame retardant	
Mineral wool insulation product	Euroclass A1 according to EN 13501-1	no flame retardant	
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 %	A2 - s1,d0
Stolit K/R (particle size 1.0 to 3.0 mm) with key coat "Sto-Putzgrund" or "StoPrep Miral AimS"			
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 %	no flame retardant	A2 - s1,d0
StoMiral K/R/MP with key coat "StoPrep Miral"	max..1.8 %		
StoMiral Nivell F with key coat "StoPrep Miral" with decorative paint			
Sto-Strukturputz K/R with key coat "StoPrep Miral", with decorative paint			

Configurations	Organic content	Flame retardant content	Euroclass according to EN 13501-1
StoCleyer B with Sto-Klebe- und Fugenmörtel	max. 8,0 % max. 7,9 %	min. 15 % min. 20 %	A2 - s1,d0
StoEcoshape with Sto-Klebe- und Fugenmörtel	max. 8,0 % max. 7,9 %	min. 15 % min. 20 %	

2.2 Cross heat of combustion for the MW insulation product EN ISO 1716

PCS ≤ 1.02 MJ/kg

2.3 Apparent density EN 1602

Description and characteristics	MW panel	MW panel	MW lamella
Tensile strength perpendicular to the faces [kPa]; EN 1607 - in dry conditions*	$\sigma_{mt} \geq 14$	$\sigma_{mt} \geq 5$	$\sigma_{mt} \geq 80$
Apparent density [kg/m³]; EN 1602	$120 \leq \rho_a \leq 150$	$100 \leq \rho_a \leq 150$	$80 \leq \rho_a \leq 150$
* Minimal value of all single values			

Annex 3

Hygiene, health and environment (BWR 3)

3.1 Water absorption (capillarity test)

Base coat:

Base coat	Thickness	Average water absorption [kg/m²]	
		after 1h	after 24h
StoLevell FT	3 mm	0.050	0.245

Rendering system:

Finishing coat with base coat "StoLevell FT" indicated hereafter	Average water absorption [kg/m²]	
	after 1h	after 24h
Stolit K/R/Effect/MP	0.014	0.120
StoMarlit K/R	0.016	0.152
StoLotusan K/MP	0.015	0.084
StoSilco K/R/MP	0.031	0.160
Stolit QS K/R/MP	0.017	0.151
StoSilco QS K/R/MP	0.019	0.216
StoSil K/R/MP	0.081	0.881
StoMiral K/R/MP	0.051	0.254
StoMiral Nivell F with decorative paint	0.014	0.107
Sto-Strukturputz K/R with decorative paint	0.029	0.254
StoCleyer B with Sto-Klebe- und Fugenmörtel	0,017	0,182
StoEcoshape with Sto-Klebe- und Fugenmörtel	0,017	0,182

3.2 Impact resistance

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

Rendering system: Base coat "StoLevell FT" with finishing coat indicated hereafter	Standard mesh/ 2 x Standard mesh [Category]	Standard mesh with Sto-Panzergewebe [Category]
Stolit K/R/Effect/MP	II	I
StoMarlit K/R		II
StoLotusan K/MP		
StoSilco K/R/MP		
Stolit QS K/R/MP		I
StoSilco QS K/R/MP		II
StoSil K/R/MP		
StoMiral K/R/MP		
StoMiral Nivell F with decorative paint		
Sto-Strukturputz K/R with decorative paint		
StoCleyer B with Sto-Klebe- und Fugenmörtel		
StoEcoshape with Sto-Klebe- und Fugenmörtel		

3.3 Water vapour permeability ETICS

Rendering system: Base coat "StoLevell FT" with finishing coat and compatible key coat and decorative coating 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 MP: 0,62 m)
StoSilco K/R/MP with key coat "StoPrep 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: 0.10mm)
StoMiral Nivell F with key coat "StoPrep Miral" or "StoPrep Miral AimS"and associated with a decorative paint	≤ 1.0 m (Test result obtained with d = 2 mm and a double coat of paint "StoColor Silco": 0.18 m) (Test result obtained with d = 2 mm and a double coat of paint "StoColor Jumbosil": 0.22 m) (Test result obtained with d = 2 mm and a double coat of paint "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 a decorative paint	≤ 1.0 m (Test result obtained with d = 2 mm and a double coat of paint "StoColor Silco": 0.17 m) (Test result obtained with d = 2 mm and a double coat of paint "StoColor Jumbosil": 0.21 m) (Test result obtained with d = 2 mm and a double coat of paint "StoColor Lotusan": 0.12 m)
StoCleyer B with Sto-Klebe- und Fugenmörtel	≤ 1.0 m (Test result obtained with "Sto-Klebe- und Fugenmörtel": 0.73 m)
StoEcoshape with Sto-Klebe- und Fugenmörtel	≤ 1.0 m (Test result obtained with "Sto-Klebe- und Fugenmörtel": 0.73 m)

For all other configuration: no performance assessed.

Annex 4

Safety and accessibility in use (BWR 4)

4.1 Bond strength between base coat and MW lamella

		Conditioning		
		Initial state [kPa]	**After hygrothermal cycles [kPa]**	**After freeze/thaw test**
StoLevell FT	Average	83	91	Test not required because freeze/thaw cycles not necessary
	Minimal value	73	70*	
* < 80 kPa, but failure in the insulation product				

4.2 Bond strength between adhesive and substrate

substrate: concrete		**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]**
StoLevell FT (5 mm)	Average	in adhesive	1233	369	1157
	Minimal value		784	299	1026
StoLevell Duo plus (5 mm)	Average	in adhesive	1230	583	2020
	Minimal value		1166	501	1893
Sto-Baukleber (5 mm)	Average	in adhesive	1210	1150	1620
	Minimal value		930	970	1210
StoLevell Uni (5 mm)	Average	in adhesive	1793	637	2560
	Minimal value		1586	467	2489
StoColl IP (3 - 5 mm)	Average	in adhesive	1565	975	1830
	Minimal value		1407	577	1738
StoColl IP Plus (4 - 5 mm)	Average	in adhesive	1210	1150	1620
	Minimal value		930	970	1210
StoColl Mineral HP (5 mm)	Average	in adhesive	2080	1840	1790
	Minimal value		1927	1732	1732
StoLevell Novo (5 mm)	Average	in adhesive	793	405	1059
	Minimal value		733	327	947

4.3 Bond strength between adhesive and MW lamella

		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]
StoLevell FT (3 – 5 mm)	Average	in insulation product	86	64	68*
	Minimal value		73*	57	56*
StoLevell Duo plus (3 – 5 mm)	Average	in insulation product	91	74	92
	Minimal value		85	67	80
Sto-Baukleber (3 – 5 mm)	Average	in insulation product	102	92	78*
	Minimal value		91	81	70*
StoLevell Uni (3 – 5 mm)	Average	in insulation product	87	60	81
	Minimal value		77*	55	78*
StoColl IP (3 – 5 mm)	Average	in insulation product	102	92	78*
	Minimal value		91	81	70*
StoColl IP Plus (4 - 5 mm)	Average	in insulation product	102	92	78*
	Minimal value		91	81	70*
StoColl Mineral HP (5 mm)	Average	in insulation product	140	110	110
	Minimal value		128	106	101
StoLevell Novo (3 – 5 mm)	Average	in insulation product	81	41	80
	Minimal value		75*	34	72*
* < 80 kPa but failure in thermal insulation material					

Minimal bonded surface area

S [%] = 0.03 N/mm² x 100 / 0.08 N/mm²

S = 37.5 %

The minimal bonded surface S of bonded ETICS is 50 % (systemic).

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 in annex 1.

4.4.1 Safety in use of mechanically fixed ETICS using anchors

Failure loads – table 1

Apply to all anchors listed in the annex 1 mounted on the insulation panels surface			
Characteristics of the **MW panels**	Thickness		≥ 60 mm
	Tensile strength perpendicular to the faces		**≥ 14 kPa**
Plate diameter of anchor			≥ ∅ 60 mm
Failure load [kN]	Anchors not placed at the panel joints (Static Foam Block Test)	R_{panel}	Minimal: 0.65 Average: 0.74
	Anchors placed at the panel joints (Static Foam Block Test)	R_{joint}	Minimal: 0.59 Average: 0.61
	Anchors not placed at the panel joints (Pull-through test, dry conditions)	R_{panel}	Minimal: 0.64 Average: 0.60
	Anchors not placed at the panel joints (Pull-through test, wet conditions) - series 2* - series 3*	R_{panel}	Minimal: 0.36 Average: 0.39 Minimal: 0.41 Average: 0.45
* according to EAD 040083-00-0404 clause 2.2.14.2			

Failure loads – table 2

Apply to all anchors listed in the annex 1 mounted on the insulation panels surface				
Characteristics of the **MW panels**	Thickness		≥ 80 mm	
	Tensile strength perpendicular to the faces		**≥ 5.0 kPa**	
Plate diameter of anchor			≥ ∅ 90 mm	≥ ∅ 140 mm
Failure load [kN]	Anchors not placed at the panel joints (Static Foam Block Test)	R_{panel}	Minimal: 0.48 Average: 0.49	Minimal: 0.56 Average: 0.69
	Anchors placed at the panel joints (Static Foam Block Test)	R_{joint}	Minimal: 0.38 Average: 0.39	Minimal: 0.44 Average: 0.54
	Anchors not placed at the panel joints (Pull-through test, dry conditions)	R_{panel}	Minimal: 0.54 Average: 0.61	no performance assessed
	Anchors not placed at the panel joints (Pull-through test, wet conditions) - series 2*	R_{panel}	Minimal: 0.40 Average: 0.46	no performance assessed
* according to EAD 040083-00-0404 clause 2.2.14.2				

Failure loads – Table 3

Apply to all anchors listed in the annex 1 mounted on the insulation panels surface			
Characteristics of the **MW lamella**	Thickness		≥ 60 mm
	Tensile strength perpendicular to the faces		**≥ 80 kPa**
Plate diameter of anchor			≥ ∅ 140 mm
Failure load [kN]	Anchors placed at the panel joints (Pull-through test, dry condition)	R_{joint}	Minimal: 0.62 Average: 0.66
	Anchors placed at the panel joints (Pull-through test, wet condition)	R_{joint}	Minimal: 0.51 Average: 0.57
	Anchors placed at the panel joints (Static Foam Block Test)	R_{joint}	Minimal: 0.71

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

Anchor	Thickness of the MW panel [t]	Conditions of installation*
ejotherm STR U ejotherm STR U 2G (ETA-04/0023)	t ≥ 80 mm	– Maximum installation depth of the anchor plate: 15 mm (≙ thickness of insulation cover) – Cutting depth: 20 mm
	t ≥ 100 mm	– Maximum installation depth of the anchor plate: 15 mm (≙ thickness of insulation cover) – Cutting depth: 35 mm
TERMOZ 8 SV (ETA-06/0180)	t ≥ 80 mm	– Maximum installation depth of the anchor plate: 15 mm (≙ thickness of insulation cover)

* according to the appropriate ETA of anchor

4.5 Bond strength after aging

Finishing coat with base coat "StoLevell FT" indicated hereafter		7 d immersion in water and 7 d drying [kPa]
Stolit K/R/Effect/MP	Average	76
	Minimal value	72
StoMarlit K/R	Average	65
	Minimal value	58
StoLotusan K/MP	Average	75
	Minimal value	67
StoSilco K/R/MP	Average	65
	Minimal value	58
Stolit QS K/R/MP	Average	63
	Minimal value	55
StoSilco QS K/R/MP	Average	64
	Minimal value	42
StoSil K/R/MP	Average	74
	Minimal value	66
StoMiral K/R/MP	Average	78
	Minimal value	64
StoMiral Nivell F and associated with a decorative paint	Average	68
	Minimal value	60
Sto-Strukturputz K/R and associated with a decorative paint	Average	68
	Minimal value	61
StoCleyer B with Sto-Klebe- und Fugenmörtel	Mittelwert	117
	Kleinstwert	104
StoEcoshape with Sto-Klebe- und Fugenmörtel	Mittelwert	117
	Kleinstwert	104

4.6 Reinforcement (glass fibre mesh)

Sto-Glasfasergewebe	**Average warp**	**Average weft**
Tensile strength in as-delivered state	2154 N / 50 mm	2883 N / 50 mm
Residual tensile strength after aging	1274 N / 50 mm	1807 N / 50 mm
Relative residual tensile strength after aging	59.1 %	62.7 %
Elongation in as-delivered state	3.7 %	3.8 %
Elongation after aging	1.8 %	2.1 %

Sto-Glasfasergewebe F	**Average warp**	**Average weft**
Tensile strength in as-delivered state	2236 N / 50 mm	2434 N / 50 mm
Residual tensile strength after aging	1494 N / 50 mm	1523 N / 50 mm
Relative residual tensile strength after aging	66.8 %	68.1 %
Elongation in as-delivered state	3.9 %	4.2 %
Elongation after aging	2.7 %	2.6 %

Sto-Panzergewebe	**Average warp**	**Average weft**
Tensile strength in as-delivered state	7954 N/ 50 mm	8936 N/ 50 mm
Residual tensile strength after aging	5886 N/ 50 mm	5051 N/ 50 mm
Relative residual tensile strength after aging	74.0 %	56.5 %
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 and 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 (m² ·K)/W.

$R = R_D + R_{render}$

The thermal bridges caused by mechanical fixing (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 [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