Deutsches Institut für Bautechnik

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Bautechnisches Prüfamt

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European Technical Assessment

ETA-20/0204 of 4 January 2021

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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 Classic L/MW AimS
Product family to which the construction product belongs	External Thermal Insulation Composite System with rendering on mineral wool intended 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	17 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	EAD 040083-00-0404

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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 kit comprises a prefabricated insulation product of mineral wool (MW) to be bonded and if 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 ...) 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 Classic L/MW AimS" 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 Characteristics of products and methods of verification

3.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire of the ETICS	Euroclass according to EN 13501-1 see annex 2
Reaction to fire of the MW-insulation product	Euroclass A1 according EN 13501-1 see annex 2
Cross heat of combustion for the MW-insulation product EN ISO 1716	PCS ≤ 1,02 [MJ/kg]
Apparent density EN 1602 MW panel $\sigma_{mt} \geq 14$ [kPa] MW panel $\sigma_{mt} \geq 5$ [kPa] MW lamella	 $120 \leq \rho_a \leq 150$ [kg/m³] $85 \leq \rho_a \leq 150$ [kg/m³] $80 \leq \rho_a \leq 150$ [kg/m³]

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**	 Average 0.00 [kg/m²] Average 0.15 [kg/m²] see annex 3 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	
impact resistance	Category see annex 3	
Water vapour permeability - Rendering system	s_d value [m] see annex 3	
- 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 - Minimal value/ average [kPa], rupture type: Initial state (28 d immersion) - Minimal value/ average [kPa], rupture type: after hygrothermal cycles

Essential characteristic	**Performance**
between adhesive and substrate	- 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	- 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
minimal bonded surface area	S [%] = 0.03 N/ mm² x 100 / 0.063 N/ mm² S = 47 % The minimal bonded surface S of bonded ETICS is 50 % ≥ 47 %
Fixing strength (displacement test)	Test not required
Wind load resistance of ETICS pull-through test of fixing static foam block test	- R_{panel} [kN/fixing], see annex 4 - R_{joint} [kN/fixing], see annex 4 - Plate diameter of anchor ≥ 60 mm, ≥ 90 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 MW panel MW lamella in wet conditions - series 2 - series 3	 $\sigma_{mt} \geq 14$ [kPa] $10 \geq \sigma_{mt} \geq 5$ [kPa] $\sigma_{mt} \geq 80$ [kPa] ≥ 33 % of average value in dry conditions ≥ 50 % of average value in dry conditions
Shear strength of the ETICS MW panel $\sigma_{mt} \geq 14$ [kPa], MW lamella MW panel $\sigma_{mt} \geq 5$ [kPa]	 $20 \leq f_{\tau k} \leq 100$ [kPa] $6 \leq f_{\tau k} \leq 100$ [kPa]
shear modulus of the ETICS MW panel $\sigma_{mt} \geq 14$ [kPa], MW lamella MW panel $\sigma_{mt} \geq 5$ [kPa]	 $1{,}0 \leq G_m \leq 2{,}0$ [MPa] $0{,}3 \leq G_m \leq 2{,}0$ [MPa]

Essential characteristic	Performance
Render strip tensile test	crack width w_{rk} [mm] (no performance assessed)
Bond strength after ageing finishing coat tested on the rig finishing coat not tested on the rig	see annex 4 Minimal value/ average[kPa], rupture type Minimal value/ average [kPa], rupture type
Tensile strength of the glass fibre mesh in the as-delivered state Standard mesh Reinforced mesh	see annex 4 Average [N/mm] Average [N/mm]
Residual tensile strength of the glass fibre mesh after aging Standard mesh Reinforced mesh	see annex 4 Average [N/mm] Average [N/mm]
Relative residual tensile strength of the glass fibre mesh after aging Standard mesh Reinforced mesh	see annex 4 Average [%] Average [%]
Elongation of the glass fibre mesh in the as-delivered state Standard mesh Reinforced mesh	see annex 4 Average [N/mm] Average [N/mm]
Elongation of the glass fibre mesh after aging Standard mesh Reinforced mesh	see annex 4 Average [%] Average [%]

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 and thermal transmittance of ETICS	Calculated value or measurement value $(m^2 \cdot K)/W$, see annex 5.

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 Classic L/MW AimS"	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 4 January 2021 by Deutsches Institut für Bautechnik

Anja Rogsch
Head of Section

beglaubigt:
Windhorst

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** **- Sto-Baukleber** (cement based powder requiring addition of 21 – 23 % of water) **- StoLevell Uni** (cement based powder requiring addition of 24 – 26 % of water) **- StoLevell Duo** (cement based powder requiring addition of 20 – 23 % of water) **- StoLevell Duo plus** (cement based powder requiring addition of about 25 % of water) **- StoLevell Duo plus QS** (cement based powder requiring addition of 22 – 25 % of water) **- StoLevell Novo** (cement based powder requiring addition of about 37 % of water) **- StoLevell FT** (cement based powder requiring addition of about 28 % of water) **- StoLevell Mineral HP** (cement based powder requiring addition of 23 – 25 % of water) **- StoColl CX** (cement based powder requiring addition of 23 – 25 % of water)	3.0 to 7.5 (powder) 3.0 to 7.5 (powder) 3.0 to 7.5 (powder) 3.0 to 7.5 (powder) 3.0 to 7.5 (powder) 3.0 to 7.5 (powder) 3.0 to 7.5 (powder) 3.0 to 7.5 (powder) 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	**StoArmat Classic AimS** ready to use paste – Acryldispersion	5.5 to 10.0	2.5 to 5.0

[1] EAD 330196-01-0604 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]**
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-Abschirmgewebe AES (special mesh including a thin stainless yarn to reduce radiation of electric fields) 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.	–	–
Finishing coat	• Ready to use pastes – acrylic-siloxan binder: **Stolit AimS K** (particle size 1.5 to 3.0 mm)	2.3 to 4.3	regulated by particle size
	• Ready to use pastes – acrylic-siloxane binder: **StoSilco blue** (particle size 1.5 to 3.0 mm)	2.3 to 4.3	
Decorative paint (optional)	**StoColor Lotusan** **StoColor Lotusan G** **StoColor Solical** **StoColor Lotusan AimS**	0.2 to 0.4 l/m²	–
Ancillary material	Remains the responsibility of the manufacturer.		

* Factory-prefabricated panels and lamella made of mineral wool (MW) to EN 13162:2015 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

Annex 2
Safety in case of fire (BWR 2)
Reaction to fire

Configurations	Organic content	Flame retardant content	Euroclass according to EN 13501-1
Base coat	max. 7.0 %	min. 12.0 %	A2 – s1,d0
Mineral wool	Euroclass A1 according to EN 13501-1	no flame retardant	
anchors	-	-	
Rendering system Base coat with finishing coat and compatible key coat in clause 1.2:			
Stolit AimsS K	max. 8.5 %	min. 10.0 %	
StoSilco blue	max. 9.7 %	min. 8.0 %	

Annex 3

Hygiene, health and environment (BWR 3)

3.1 Water absorption (capillarity test)

Rendering System

base coat and finishing coat indicated in annex 1	Average water absorption [kg/m²]	
	after 1h	**after 24h**
Stolit AimS K 2 mm	0.02	0.19
Sto Silco blue 2 mm	0.02	0.20

3.2 Impact resistance

Rendering system: Base coat with finishing coat indicated in annex 1:	Single mesh Sto-Glasfasergewebe	Double mesh: Sto-Glasfasergewebe
Stolit AimS K	Category I	Category I
StoSilco blue	Category I	Category I

For the impact resistance of all other configurations of the ETICS was no performance assessed.

3.3 Water vapour permeability ETICS

Rendering system: Base coat with finishing coats indicated in annex 1 (evaluated without decorative paint)	**Equivalent air thickness s_d**
Stolit AimS K	≤ 1.0 m (Test result obtained with Stolit AimS K2: 0.80 m)
StoSilco blue	≤ 1.0 m (Test result obtained with StoSilco blue K2: 0.84 m)

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**
StoArmat Classic AimS	Average	100	100	Test not required because freeze/thaw cycles not necessary
	Minimal value	98.5	98.6	

4.2 Bond strength between adhesive and substrate

Substrate: concrete		**Conditioning**		
		Initial state [kPa]	**48 hrs. immersion in water and 2 hrs. drying [kPa]**	**48 hrs. immersion in water and 7 days drying [kPa]**
Sto-Baukleber	Average	1930	770	1890
	Minimal value	1770	631	1793
Stolevell Uni	Average	1700	445	1250
	Minimal value	1581	412	1019
StoLevell Duo	Average	1925	720	1360
	Minimal value	1356	607	1268
StoLevell Duo plus	Average	1522	746	1146
	Minimal value	1035	545	1056
StoLevell Duo plus QS	Average	1264	523	2001
	Minimal value	961	341	1691
StoLevell FT	Average	855	390	710
	Minimal value	726	363	650
StoColl Mineral HP	Average	2080	184	1790
	Minimal value	1927	173	1732
Sto Coll CX	Average	1366	960	1830
	Minimal value	1305	875	1759

4.3 Bond strength between adhesive and mineralwool lamella

		Conditioning		
		Initial state [kPa]	**48 hrs. immersion in water and 2 hrs. drying [kPa]**	**48 hrs. immersion in water and 7 days drying [kPa]**
Sto-Baukleber	Average	105	70	95
	Minimal value	82	58	75
Stolevell Uni	Average	105	90	100
	Minimal value	96	76	87
StoLevell Duo	Average	130	135	125
	Minimal value	108	121	111
StoLevell Duo plus	Average	123	113	125
	Minimal value	110	96	103
StoLevell Duo plus QS	Average	68	64	68
	Minimal value	63 ≥ 30 kPa but failure in the insulation product	58	64
StoLevell FT	Average	83	64	68
	Minimal value	73	56	56
StoColl Mineral HP	Average	140	110	110
	Minimal value	127	105	101
Sto Coll CX	Average	80	80	80
	Minimal value	80	76	79

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 anchors

Failure loads – table 1

Apply to all anchors listed in 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: 0.69
	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 annex 1 mounted on the insulation panels surface				
Characteristics of the MW panels	Thickness		≥ 80 mm	
	Tensile strength perpendicular to the faces		**10.0 kPa ≥ σ_{mt} ≥ 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 clause 1.2 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 of table 1 specified above only apply to the following anchors even with deep mounting but only under the given conditions of installation:

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) – Incision depth: 20 mm
	t ≥ 100 mm	– Maximum installation depth of the anchor plate: 15 mm (≙ thickness of insulation cover) – Incision 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

Base coat with finishing coats indicated in annex 1		After hygrothermal cycles [kPa]	Rupture typ
Stolit AimS K	Average	6.0	< 80 kPa but failure in the insulation product
	Minimal value	4.3	
StoSilco blue	Average	5.0	
	Minimal value	3.0	

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-Abschirmgewebe AES	Average warp	Average weft
Tensile strength in as-delivered state	1812 N / 50 mm	2361 N / 50 mm
Residual tensile strength after aging	1085 N / 50 mm	1829 N / 50 mm
Relative residual tensile strength after aging	59.9 %	77.5 %
Elongation in as-delivered state	3.86 %	3.46 %
Elongation after aging	2.62 %	2.66 %

Annex 5

5 Energy economy and heat retention (BWR 6)

5.1 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 mechanical fixing (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