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and types of construction

Bautechnisches Prüfamt

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European Technical Assessment

ETA-07/0027
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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 Mineral 3

Product family
to which the construction product belongs

Product area code: 4
External Thermal Insulation Composite System with
rendering on mineral wool 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

18 pages including 3 annexes which form an integral part
of this assessment

Annex 4 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

ETAG 004, edition 2000, amended 2013,
used as EAD according to Article 66 Paragraph 3 of
Regulation (EU) No 305/2011.

This version replaces

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Specific Part

1 Technical description of the product

1.1 Definition of the kit

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 mineral wool (MW) 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 (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 is not addressed in this ETA, however the ETICS manufacturer is responsible for adequate compatibility and performance within the ETICS when the components are delivered as a part of the kit.

1.2 Composition of the ETICS

	Components	Coverage [kg/m ²]	Thickness [mm]
	National application documents shall be taken into account		
Insulation material with associated method of fixing	Bonded ETICS: <ul style="list-style-type: none"> • Insulation product (see annex 1 for product characteristics) factory-prefabricated mineral wool (MW) product <ul style="list-style-type: none"> - MW lamella • Adhesives <ul style="list-style-type: none"> - StoLevell FT (cement based powder requiring addition of about 28 % of water) - StoLevell Novo (cement based powder requiring addition of about 37 % of water) - StoLevell Uni (cement based powder requiring addition of about 20 - 23 % of water) 	<p>–</p> <p>4.0 to 7.5 (powder)</p> <p>3.0 to 7.5 (powder)</p> <p>3.0 to 7.5 (powder)</p>	<p>≤ 200</p> <p>–</p> <p>–</p> <p>–</p>
	Mechanically fixed ETICS with anchors and supplementary adhesive: <ul style="list-style-type: none"> • Insulation product (see annex 1 for product characteristics) factory-prefabricated mineral wool (MW) product <ul style="list-style-type: none"> - MW panel - MW lamella • Supplementary adhesive (equal to bonded ETICS) 	<p>–</p> <p>–</p>	<p>60 to 340</p> <p>60 to 200</p>

	Components National application documents shall be taken into account	Coverage [kg/m ²]	Thickness [mm]
Insulation material with associated method of fixing	<ul style="list-style-type: none"> Anchors for insulation product (see annex 2 for product characteristics) all anchors with ETA according to EAD 330196-00-0604¹ with characteristics defined in annex 2 		
Base coat	StoLevell Novo Identical with the equally named adhesives given above.	5.5 to 10.0 (powder)	5.0 to 10.0
Glass fibre mesh	Sto-Glasfasergewebe (see annex 4 for product characteristics) Alkali- and slide-resistant glass fibre mesh with mass per unit area of about 165 g/m ² and mesh size of about 6.0 mm x 6.0 mm. Sto-Glasfasergewebe F (see annex 4 for product characteristics) Alkali- and slide-resistant glass fibre mesh with mass per unit area of about 165 g/m ² and mesh size of about 4.0 mm x 4.0 mm. Sto-Panzerewebe (see annex 4 for product characteristics) (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/m ² and mesh size of about 7.5 mm x 7.5 mm. Sto-Abschirmewebe AES (see annex 4 for product characteristics) (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/m ² and mesh size of about 4.0 mm x 4.0 mm.	– – – –	– – – –
Key coat	StoPrep Miral StoPrep QS Sto-Putzgrund Sto-Putzgrund QS Ready to use pigmented acrylic-resin dispersion liquids. "StoPrep Miral" with additional potassium silicate binder. For the compatibility with the finishing coats see below.	} 0.3 to 0.4	
Finishing coat	To use with key coat "Sto-Putzgrund" if applicable:* <ul style="list-style-type: none"> Ready to use pastes - acrylic binder: <ul style="list-style-type: none"> Stolit K (particle size 1.0 to 6.0 mm) Stolit R (particle size 1.5 to 6.0 mm) Stolit Effect (particle size 3.0 mm) Stolit MP (thin, middle or thick layer) 	2.2 to 6.5 2.2 to 6.1 4.5 to 5.5 2.2 to 4.7	} regulated by particle size 1.5 to 3.0

¹ EAD 330196-00-0604

Plastic anchors for fixing of external thermal insulation composite systems with rendering

	Components National application documents shall be taken into account	Coverage [kg/m ²]	Thickness [mm]
Finishing coat	Stolit Milano	2.0 to 4.0	1.0 to 2.0
	Stolit K (particle size 1.5 mm) + Stolit Milano	about 2.3 + about 3.0	2.0 to 3.0
	Sto-Ispolit K (particle size 1.5 to 3.0 mm)	2.3 to 4.3	} regulated by particle size 1.5 to 3.0
	StoLotusan K (particle size 1.0 to 3.0 mm)	2.3 to 4.3	
	StoLotusan MP (thin, middle or thick layer)	2.3 to 4.3	
	To use with key coat "Sto-Putzgrund"/ "StoPrep Miral" if applicable: *		
	• Ready to use pastes – acrylic/siloxane binder:		
	Sto-Silkolit K (particle size 1. to 3.0 mm)	2.3 to 4.3	} regulated by particle size 1.5 to 3.0
	StoSilco K (particle size 1.0 to 3.0 mm)	2.0 to 5.0	
	StoSilco R (particle size 1.5 to 3.5 mm)	2.3 to 4.5	
	StoSilco MP (thin, middle or thick layer)	2.2 to 4.7	
	To use with key coat "Sto-Putzgrund"/ "Sto-Putzgrund QS"/"StoPrep QS" if applicable: *		
	• Ready to use paste – acrylic binder: (application between 0 °C and 15 °C):		
Stolit QS K (particle size 1.0 to 3.0 mm)	2.0 to 4.8	} regulated by particle size 1.5 to 3.0	
Stolit QS R (particle size 1.5 to 3.0 mm)	2.2 to 4.5		
Stolit QS MP (thin, middle or thick layer)	2.2 to 4.7		
To use with key coat "Sto-Putzgrund"/ "Sto-Putzgrund QS"/"StoPrep Miral"/" StoPrep QS" if applicable:			
• 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)	2.0 to 5.0	} regulated by particle size 1.5 to 3.0	
StoSilco QS R (particle size 1.5 to 3.0 mm)	2.9 to 4.5		
StoSilco QS MP (thin, middle or thick layer)	2.2 to 4.7		
To use with key coat "StoPrep Miral" if applicable: *			
• Ready to use paste - silicate binder :			
StoSil K (particle size 1.0 to 3.0 mm)	2.2 to 4.4	} Regulated by particle size 1.5 to 3.5	
StoSil R (particle size 1.5 to 3.0 mm)	2.4 to 3.9		
StoSil MP (thin, middle or thick layer)	1.5 to 4.0		
• Cement based powder requiring addition of about 25 % in weight of water:			
StoMiral K (particle size 1.5 to 6.0 mm)	1.7 to 5.0	} Regulated by particle size	
StoMiral R (particle size 1.5 to 6.0 mm)	1.7 to 4.5		
StoMiral MP (fine structure)	1.5 to 4.0	1.5 bis 3.5	
• 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 4.5	2.0 to 5.0	

	Components National application documents shall be taken into account	Coverage [kg/m ²]	Thickness [mm]
Finishing coat	<ul style="list-style-type: none"> • Cement based powder requiring addition of about 30 % in weight of water associated with a decorative paint: Sto-Strukturputz K (particle size 2 and 3 mm) Sto-Strukturputz R (particle size 2 and 3 mm) • Cement based powder requiring addition of about 24 to 32 % in weight of water: StoMiral Edelkratzputz (particle size 2.0 to 4.0 mm) 	<p>2.3 to 2.7 2.4 to 2.7</p> <p>15.0 to 25.0</p>	<p>Regulated by particle size</p> <p>8.0 to 10.0**</p>
Decorative paint	<ul style="list-style-type: none"> • Ready to use paint with acrylic/siloxane binder: StoColor Silco StoColor Jumbosil 	0.2 to 0.4 l/m ²	–
Ancillary material	Remains the responsibility of the manufacturer.		
* The instruction of the installer concerning the use of a key coat remains under the manufacturer responsibilities.			
** The applied thickness of 10 to 25 mm is reduced to 8 to 10 mm by scraping.			

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

2.1 Intended use

This ETICS is intended to be used as external insulation to the walls of buildings made of masonry (bricks, blocks, stones ...) or concrete (cast on site or as prefabricated panels) with and without rendering. The characteristics of the walls shall be verified prior to use of the ETICS, especially regarding conditions for reaction to fire classification and for fixing of the ETICS either by bonding or mechanically. It shall be designed to give the wall to which it is applied satisfactory thermal insulation.

The ETICS is non load-bearing construction element. It does not contribute directly to the stability of the wall on which it is installed, but it can contribute to durability by providing enhanced protection from the effects of weathering.

The ETICS can be used on new or existing (retrofit) vertical walls.

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

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

The verifications and assessment methods on which this European Technical Assessment (hereinafter called ETA) is based lead to the assumption of a working life of the ETICS "StoTherm Mineral 3" 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.

English translation prepared by DIBt

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. The DIBt will decide whether 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)

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

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

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

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

3 Characteristics of products and methods of verification

3.0 General

The performances of the kit as described in this chapter are valid provided that the components of the kit comply with Annexes 1 to 3.

3.1 Mechanical resistance and stability (BWR 1)

not relevant

3.2 Safety in case of fire (BWR 2)
Reaction to fire (ETAG 004 - clause 5.1.2)

Configurations	Organic content	Flame retardant content	Euroclass according to EN 13501-1:2007
Base coat	max. 3.5 %	no flame retardant	
Mineral wool insulation product	in quantity ensuring Euroclass E according to EN 13501-1	no flame retardant	
Profile	-	-	
Anchors	-	-	
rendering system : Base coat with finishing coat and compatible key coat indicated in hereafter:			
Stolit K1.5 + Stolit Milano with key coat "Sto-Putzgrund"	max. 9.6%	min. 7.6 %	B – s2,do
Stolit K/R (Korngröße 3.5 to 6.0 mm with key coat "Sto-Putzgrund"			
Stolit K/R (Korngröße 1.0 to 3.0 mm) with key coat "Sto-Putzgrund"			A2 – s1,d0
Stolit Effect/MP with key coat "Sto-Putzgrund"			
Stolit Milano with key coat "Sto-Putzgrund"			
StoLotusan K/MP with key coat "Sto-Putzgrund"			
StoSilco K/R/MP with key coat "Sto-Putzgrund"/ "StoPrep Miral"			
Stolit QS K/R/MP with key coat "Sto-Putzgrund"/ "Sto-Putzgrund QS"/"StoPrep QS"			
StoSilco QS K/R/MP with key coat "Sto-Putzgrund"/ "Sto-Putzgrund QS"/"StoPrep Miral"/ "StoPrep QS"			
Sto-Sikolit K with key coat "Sto-Putzgrund"			no flame retardant
Sto-Ispolit K with key coat "Sto-Putzgrund"			
StoSil K/R/MP with key coat "StoPrep Miral"	max. 6.0 %		

Configurations	Organic content	Flame retardant content	Euroclass according to EN 13501-1:2007
StoMiral K/R/MP with key coat "StoPrep Miral"	max. 2,4 %	no flame retardant	A2 – s1,d0
StoMiral Nivell F with key coat "StoPrep Miral" associated with a decorative paint			
Sto-Strukturputz K/R with key coat "StoPrep Miral" associated with a decorative paint			
StoMiral Edelkratzputz with key coat "StoPrep Miral"			

3.3 Hygiene, health and environment (BWR 3)

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

Base coat:

- Water absorption after 1 hour < 1.0 kg/m²
- Water absorption after 24 hours < 0.5 kg/m²

Rendering system:

		Water absorption after 24 h	
		< 0.5 kg/m ²	< 0.5 kg/m ²
Rendering systems: Base coat with finishing coat indicated hereafter:	Stolit K/R/Effect/MP	x	
	Stolit Milano	x	
	Stolit K1.5 + Stolit Milano	x	
	Sto-Ispolit K	x	
	StoLotusan K/MP	x	
	Sto-Silikolit K	x	
	StoSilco K/R/MP	x	
	Stolit QS K/R/MP	x	
	StoSilco QS K/R/MP	x	
	StoSil K/R/MP		x
	StoMiral K/R/MP	x	
	StoMiral Nivell F associated with a decorative paint	x	
	Sto-Strukturputz K/R associated with a decorative paint	x	
StoMiral Edelkratzputz		x	

3.3.2 Hygrothermal behaviour (ETAG 004 - clause 5.1.3.2)

Pass (without defects)

Freeze/thaw behaviour

The ETICS with the finishing coats "StoSil" and "StoMiral Edelkratzputz" has been assessed as freeze/thaw resistant according to the simulated method.

3.3.3 Impact resistance (ETA G004 – clause 5.1.3.3)

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

Rendering system: Base coat with finishing coat indicated hereafter:	Standard mesh or Sto-Abschirmgewebe AES	Standard mesh and Sto-Panzergerewebe	2 x Standard mesh
Stolit K/R/Effect/MP	Category II		
Stolit Milano	Category III	Category II	Category III
Stolit K1.5 + Stolit Milano	Category II		
Sto-Ispolit K			
StoLotusan K/MP			
Sto-Silkolit K			
StoSilco K/R/MP			
Stolit QS K/R/MP			
StoSilco QS K/R/MP			
StoSil K/R/MP			
StoMiral K/R/MP	Category II		
StoMiral Nivell F	Category II		
Sto-Strukturputz K/R	Category II	Category I	
StoMiral Edelkratzputz	Category I	Category I	

3.3.4 Water vapour permeability (ETAG004 – clause 5.1.3.4)

Rendering system: Base coat with finishing coat indicated in clause 1.2:(evaluated without decorative coating or key coat, if not stated differently)	Equivalent air thickness s_d
Stolit K/R/Effect/MP	≤ 1.0 m (Test result obtained with Stolit K2 : 0.41 m)
Stolit Milano	≤ 1.0 m (Test result obtained with d = 1 mm : 0.52 m)
Stolit K1.5 + Stolit Milano	≤ 1.0 m (Test result obtained with d = 2.5 mm : 0.8 m)
Sto-Ispolit K	≤ 1.0 m (Test result obtained with Stolispolit K2 : 0.51 m)
StoLotusan K/MP	≤ 1.0 m (Test result obtained with StoLotusan K2 : 0.2 m)
Sto-Silkolit K	≤ 1.0 m (Test result obtained with StoSilkolit K2 : 0.31 m)
StoSilco K/R/MP	≤ 1.0 m (Test result obtained with StoSilco K2 : 0.31 m)
Stolit QS K/R/MP	≤ 1.0 m (Test result obtained with Stolit QS K2 : 0.31 m)
StoSilco QS K/R/MP	≤ 1.0 m (Test result obtained with StoSilco QS K2 : 0.3 m)
StoSil K/R/MP	≤ 1.0 m (Test result obtained with StoSil K2 : 0.2 m)
StoMiral K/R/MP	≤ 1.0 m (Test result obtained with StoMiral K2 : 0.1 m)
StoMiral Nivell F associated with a decorative paint	≤ 1.0 m (Test result obtained with d = 1.5 mm and a double coat of paint "StoColor Silco": 0.2 m)
Sto-Strukturputz K/R associated with a decorative paint	≤ 1.0 m (Test result obtained with Sto-Strukturputz K2 and a double coat of paint "StoColor Silco" : 0.2 m)
StoMiral Edelkratzputz	≤ 1.0 m (Test result obtained with d = 11 mm : 0.4 m)

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

Essential characteristic	Performance
Release of dangerous substances	no performance assessed

3.4 Safety and accessibility in use (BWR 4)

3.4.1 Bond strength between base coat and insulation product (MW) (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 substrate resp. insulation product (MW lamella) (ETAG 004 – clauses 5.1.4.1.2 and 5.1.4.1.3)

Klebemörtel	Untergrund bzw. Wärme- dämmstoff	Konditionierung		
		Anfangszustand	2-tägige Wasser- lagerung and 2 h Trocknung	2-tägige Wasser- lagerung and 7-tägige Trocknung
StoLevell Novo	Concrete	≥ 0,25 MPa	≥ 0,08 MPa	≥ 0,25 MPa
	MW lamella	≥ 0,08 MPa	≥ 0,03 MPa	≥ 0,08 MPa
StoLevell FT	Concrete	≥ 0,25 MPa	≥ 0,08 MPa	≥ 0,25 MPa
	MW lamella	≥ 0,08 MPa	≥ 0,03 MPa	< 0,08 MPa but failure in the insulation product
StoLevell Uni	Concrete	≥ 0,25 MPa	≥ 0,08 MPa	≥ 0,25 MPa
	MW lamella	≥ 0,08 MPa	≥ 0,03 MPa	≥ 0,08 MPa

Bonded surface:

With a bonded surface of 50 % the formula given in clause 6.1.4.1.3 of ETAG 004 is fulfilled and the use as bonded ETICS is possible.

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

Rendering system: Base coat with finishing coat indicated hereafter	Stolit K/R/Effect/MP	≥ 0,08 MPa
	Stolit Milano	≥ 0,08 MPa
	Stolit K1.5 + Stolit Milano	≥ 0,08 MPa
	Sto-Ispolit K	< 0.08 MPa but failure in the insulation product
	StoLotusan K/MP	≥ 0,08 MPa
	Sto-Sikolit K	< 0.08 MPa but failure in the insulation product
	StoSilco K/R/MP	≥ 0,08 MPa
	Stolit QS K/R/MP	≥ 0,08 MPa
	StoSilco QS K/R/MP	≥ 0,08 MPa
	StoSil K/R/MP	< 0.08 MPa but failure in the insulation product
	StoMiral K/R/MP	≥ 0,08 MPa
	StoMiral Nivell F	< 0.08 MPa but failure in the insulation product
	Sto-Strukturputz K/R	≥ 0,08 MPa
StoMiral Edelkratzputz	≥ 0,08 MPa	

English translation prepared by DIBt

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

Test not required therefore no limitation of ETICS length required.

3.4.5 Wind load resistance (ETAG 004 - clause 5.1.4.3)

The following failure loads only apply for the listed combination (way of fixing the ETICS)/ (MW panel's characteristics) and the characteristics of the insulation product given in annex 1.

3.4.5.1 Safety in use of mechanically fixed ETICS using anchors

Failure loads – Table 1

Apply to all anchors listed in the clause 1.2 mounted on the insulation panels surface			
Characteristics of the MW panels	Thickness		≥ 60 mm
	Tensile strength perpendicular to the faces		≥ 14 kPa
Versagenslast [N]	Anchors not placed at the panel joints (Static Foam Block Test)	R _{panel}	Mindestwert: 650 Mittelwert: 740
	Anchors placed at the panel joints (Static Foam Block Test)	R _{joint}	Mindestwert: 590 Mittelwert: 610
	Anchors not placed at the panel joints (Pull-through test, dry conditions)	R _{panel}	Mindestwert: 640 Mittelwert: 690
	Anchors not placed at the panel joints (Pull-through test, wet conditions) - series 2* - series 3*	R _{panel}	Mindestwert: 360 Mittelwert: 390 Mindestwert: 410 Mittelwert: 450

* according to ETAG 004 clause 5.2.4.1.2 test method (2)

Failure loads – Table 2

Apply to all anchors listed in the clause 1.2 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			≥ Ø 90 mm	≥ Ø 140 mm
Failure loads [N]	Anchors not placed at the panel joints (Static Foam Block Test)	R _{panel}	Minimal: 480 Average: 490	Minimal: 56 Average: 69
	Anchors placed at the panel joints (Static Foam Block Test)	R _{joint}	Minimal: 380 Average: 390	Minimal: 44 Average: 54
	Anchors not placed at the panel joints (Pull-through test, dry conditions)	R _{panel}	Minimal: 540 Average: 610	npd
	Anchors not placed at the panel joints (Pull-through test, wet conditions) - series 2*	R _{panel}	Minimal: 400 Average: 460	npd

* according to ETAG 004 clause 5.2.4.1.2 test method (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			≥ Ø 140 mm
Failure loads [N]	Anchors placed at the panel joints (Pull-through test, dry condition)	R _{joint}	Minimal: 620 Average: 660
	Anchors placed at the panel joints (Pull-through test, wet condition)	R _{joint}	Minimal: 510 Average: 570
	Anchors placed at the panel joints (Static Foam Block Test)	R _{joint}	Minimal: 710

The failure loads of table 1 specified above only apply to the following anchors with deep mounting under the given conditions of installation:

Anchor	Thickness of the MW panel [d]	Conditions of installation *
ejothem STR U (ETA-04/0023)	100 mm > d ≥ 80 mm	– Maximum installation depth of the anchor plate: 15 mm (≙ thickness of insulation cover) – Maximum depth of die: 5 mm
	≥ 100 mm	– Maximum installation depth of the anchor plate: 15 mm (≙ thickness of insulation cover) – Maximum depth of die: 20 mm
TERMOZ 8 SV (ETA-06/0180)	≥ 80 mm	– Maximum installation depth of the anchor plate: 15 mm (≙ thickness of insulation cover)

* according to the appropriate ETA of anchor

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

The average value of crack width of the base coat reinforced with the different glass fibre meshes measured at a render strain value of 1 % is:

Base coat	Glass fibre mesh	Average value of crack width w _{m(1%)}
StoLevell Novo	Sto-Glasfasergewebe	0.09 mm
	Sto-Glasfasergewebe F	0.06 mm
	Sto-Abschirmgewebe AES	0.06 mm

3.5 Protection against noise (BWR 5)

For the protection against noise no performance was assessed for this product.

3.6 Energy economy and heat retention (BWR 6)

3.6.1 Thermal resistance

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

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

The thermal bridges caused by mechanical fixing devices (anchors profiles) increase the thermal transmittance U. This influence had to take into account according to EN ISO 6946: 2007.

English translation prepared by DIBt

$U_c = U + \Delta U_{\text{anchor}}$	corrected thermal transmittance
$\Delta U_{\text{anchor}} = \chi_p \cdot n$	correction term for anchors
where: 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 technical approval
$\chi_p = 0.004 \text{ W/K}$	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 with the head covered by plastic material, and for anchors with an air gap at the head of the screw

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

According to the European Commission decision 97/556/EC amended by the European Commission decision 2001/596/EC, the assessment and verification of constancy of performance system (AVCP) applies suitable following table (see Annex V to Regulation (EU) No 305/2011).

Product	Intended use	Levels or classes (Reaction to fire)	Systems
"StoTherm Mineral 3"	in external wall subject to fire regulations	A1 ⁽¹⁾ , A2 ⁽¹⁾ , B ⁽¹⁾ , C ⁽¹⁾	1
		A1 ⁽²⁾ , A2 ⁽²⁾ , B ⁽²⁾ , C ⁽²⁾ , D, E, (A1 to E) ⁽³⁾ , F	2+
	in external wall not subject to fire regulations	any	2+
⁽¹⁾ Products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material) ⁽²⁾ Products/materials not covered by footnote (1) ⁽³⁾ Products/materials that do not require to be tested for reaction to fire (e.g. products/materials of Classes A1 according to Commission Decision 96/603/EC)			

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

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

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Annexes:

Annex 1: Thermal insulation product characteristic

Annex 2: Anchors

Annex 3: Reinforcement

Annex 1: Thermal insulation product characteristic

Factory-prefabricated panels and lamella made of mineral wool (MW) to EN 13162:2015 with the following designation code and the other properties having the description in the Table below 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

Description and characteristics	MW panel	MW panel	MW lamella
Reaction to fire; EN 13501-1:2007	Class A1		
Gross heat of combustion [MJ/kg]; EN ISO 1716:2010	PCS ≤ 1.02		
Thermal resistance [(m ² · K)/W]	Defined in the CE marking in reference to EN 13162:2008		
Tensile strength perpendicular to the faces [kPa]; EN 1607:2013 - in dry conditions*	$\sigma_{mt} \geq 14$	$\sigma_{mt} \geq 5$	$\sigma_{mt} \geq 80$
- in wet conditions** Average value - series 2 - series 3	≥ 33 % of average value in dry conditions ≥ 50 % of average value in dry conditions		
Compressive strength* [kPa]; EN 826:2013	$\sigma_m \geq 40$	$\sigma_m \geq 4$	$\sigma_m \geq 40$
Apparent density [kg/m ³]; EN 1602:2013	$120 \leq \rho_a \leq 150$	$100 \leq \rho_a \leq 150$	$80 \leq \rho_a \leq 150$
Shear strength* [kPa]; EN 12090:2013	$20 \leq f_{tk} \leq 100$	$6 \leq f_{tk} \leq 100$	$20 \leq f_{tk} \leq 100$
Shear modulus [MPa]; EN 12090:2013	$1.0 \leq G_m \leq 2.0$	$0.3 \leq G_m \leq 2.0$	$1.0 \leq G_m \leq 2.0$
* Minimal value of all single values ** According to ETAG 004 clause 5.2.4.1.2 test method (2)			

Annex 2: Anchors

All anchors with ETA according to EAD330196-00-0604¹ with characteristics having the description below shall be used in the mechanically fixed ETICS:

- plate diameter of anchor ≥ 60 mm resp. ≥ 90 mm or ≥ 140 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.

Annex 3: Reinforcement (glass fibre mesh)

Characteristics (alkali resistance): Pass

	Description	Residual strength after ageing [N/mm]	Relative residual strength after ageing, of the strength in the as-delivered state [%]
"Sto-Glasfasergewebe"	Alkali- and slide-resistant glass fibre mesh with mass per unit area of about 165 g/m ² and mesh size of about 6.0 mm x 6.0 mm.	≥ 20	≥ 50
"Sto-Glasfasergewebe F"	Alkali- and slide-resistant glass fibre mesh with mass per unit area of about 165 g/m ² and mesh size of about 4.0 mm x 4.0 mm.	≥ 20	≥ 50
"Sto-Panzergerewebe"	(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/m ² and mesh size of about 7.5 mm x 7.5 mm.	no performance assessed	no performance assessed
"Sto-Abschirmgerewebe 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/m ² and mesh size of about 4.0 mm x 4.0 mm.	≥ 20	≥ 50