Deutsches Institut für Bautechnik

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Approval body for construction products and types of construction

Bautechnisches Prüfamt

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European Technical Assessment ETA-07/0158 of 19 February 2018

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General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	villerit-ECO Therm Mineral
Product family to which the construction product belongs	External Thermal Insulation Composite System with rendering for the use as external insulation of building walls
Manufacturer	villerit-Putzsysteme Unterer Dammweg 26 78050 Villingen-Schwenningen
Manufacturing plant	villerit-Putzsysteme Unterer Dammweg 26 78050 Villingen-Schwenningen
This European Technical Assessment contains	20 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	ETA-07/0158 issued on 22 November 2012

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Specific Part

1 Technical description of the product

1.1 Definition of the kit

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

	Components (National application documents shall be taken into account)	**Coverage [kg/m²]**	**Thickness [mm]**
Insulation material with associated method of fixing	**Bonded ETICS:** • **Insulation product** (see annex 1 for product characteristics) factory-prefabricated mineral wool (MW) product - MW lamella	–	≤ 400
	• **Adhesives** (cement based powder requiring addition of about 25 % of water) - **villerit Baukleber VWS 850 grau** - **villerit Baukleber VWS 850 weiß** - **villerit KA-Basic Klebe- und Armierungsmörtel**	4.0 – 6.0 (prepared)	–
	- **villerit InnoTherm** - **villerit activDRY Klebe- und Armierungsmörtel**	3.5 – 5.5 (prepared)	–
	Mechanically fixed ETICS with anchors and supplementary adhesive: • Insulation product (see annex 1 for product characteristics) factory-prefabricated mineral wool (MW) product	–	
	- MW panel		60 to 340
	- MW lamella		60 to 200
	• **Supplementary adhesive** (equal to bonded ETICS)		

	Components (National application documents shall be taken into account)	**Coverage [kg/m²]**	**Thickness [mm]**
	• **Anchors for insulation product** all anchors with ETA according to EAD 330196-00-0604[1] with characteristics defined in annex 2		
Base coat	**villerit Baukleber VWS 850 grau** **villerit Baukleber VWS 850 weiß** **villerit KA-Basic Klebe- und Armierungsmörtel**	4.5 – 5.7 (prepared)	mean (dry): about 5.0
	villerit Inno Therm **villerit activDRY Klebe- und Armierungsmörtel**	4.0 – 7.0 (prepared)	3.0 - 10.0 (dry)
	Identical with the equally named adhesive(s) given above.		
Glass fibre mesh	**villerit Armierungsgewebe fein** Alkali- and slide-resistant glass fibre mesh with mass per unit area of about 160 g/m² and mesh size of about 4.0 mm x 4.0 mm.	–	–
Key coat	**Villerit Quarzbrücke** Ready to use pigmented acrylic-resin dispersion liquid For the compatibility with the finishing coats see below.	ca. 0,300 l/m²	–
Finishing coat	**To use with key coat if applicable: **** • Ready to use paste – acrylosiloxane binder:		
	villerit Siliconit K* **villerit Siliconit R*** (particle size 1.5 – 2 – 3 and 4 mm)	2.2 to 5.0 2.2 to 5.0	
	villerit activDRY Siliconit K* **villerit activDRY Siliconit R*** (particle size 1.5 – 2 – 3 and 4 mm)	2.2 to 5.0 2.2 to 5.0	
	Application without key coat: • Ready to use paste – silicate binder:		
	villerit Silan K* (particle size 1.5 – 2 and 3 mm)	2.2 to 4.0	Regulated by particle size
	villerit Silan R* (particle size 1.5 – 2 – 3 and 4 mm)	2.2 to 5.0	
	villerit activDRY Silan K* (particle size 1.5 – 2 and 3 mm)	2.2 to 4.0	
	villerit activDRY Silan R* (particle size 1.5 – 2 – 3 and 4 mm)	2.2 to 5.0	
	• Thin layered cement based powder requiring addition of about 27 % of water:		
	villerit Rustikalputz (particle size 1.5 – 2 and 3 mm)	2.5 to 3.5 (prepared)	
	villerit -Rauhputz (particle size 1.5 – 2 – 3 – 4 – 5 and 6 mm)	2.2 to 6.6 (prepared)	
	villerit Stockputz (particle size 1.5 – 2 – 3 – 4 – 5 and 6 mm)	2.2 to 6.6 (prepared)	

[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/m²]**	**Thickness [mm]**
	villerit activDRY Mineralputz Rustik (particle size 1.5 – 2 and 3 mm)	2.5 to 3.5 (prepared)	Regulated by particle size
	villerit activDRY Mineralputz R (particle size 1.5 – 2 – 3 – 4 – 5 and 6 mm)	2.2 to 6.6 (prepared)	
	villerit activDRY Mineralputz K (particle size 1.5 – 2 – 3 – 4 – 5 and 6 mm)	2.2 to 6.6 (prepared)	
	villerit Stockputz SLC*** (particle size 1.5 – 2 – 3 – 4 – 5 and 6 mm)	1.5 to 5.0 (prepared)	
	villerit Rauhputz SLC*** (particle size 1.5 – 2 – 3 – 4 – 5 and 6 mm)	1.5 to 5.5 (prepared)	
Ancillary material	Remains the responsibility of the manufacturer.		

* K / R indicates different structures of the finishing coats.

** The instruction to the installer concerning the use of a key coat remains the responsibility of the manufacturer

*** The finishing coats "villerit Stockputz SLC" and "villerit Rauhputz SLC" shall be used only with the base coats "villerit Baukleber VWS 850 grau/weiß" and "villerit KA-Basic Klebe- und Armierungsmörtel"

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

2.1 Intended use

This ETICS is intended to be used as external insulation to the walls of buildings made of masonry (bricks, blocks, stones …) or concrete (cast on site or as prefabricated panels) with and without rendering. The characteristics of the walls shall be verified prior to use of the ETICS, especially regarding conditions for reaction to fire classification and for fixing of the ETICS either 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 is based lead to the assumption of a working life of the ETICS "villerit-ECO Therm Mineral" of at least 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, but are to be regarded only as a means for choosing the right products in relation to the assumed economically reasonable working life of the works.

2.2 Manufacturing

The ETA is issued for the ETICS on the basis of agreed data/information, deposited with the DIBt, which identifies the ETICS that has been assessed and judged. Changes to the ETICS or the components or their production process, which could result in this deposited data/information being incorrect, should be notified to the DIBt before the changes are introduced. 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).

Necessary repairs should be performed as soon as the need has been identified.
Only products which are compatible with the ETICS shall be used.
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 - 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
Base coat	max. 3.1 %	no flame retardent	
Mineral wool	In quantity ensuring Euroclass E according to EN 13501-1	no flame retardant	
Anchors	-	-	
rendering system : Base coat with finishing coat and compatible key coat indicated in clause 1.2:			
Silicate based pastes: villerit Silan K/R villerit activDRY Silan K/R	max. 4.8 %	no flame retardent	A2 - s2,d0
Cement based powders: villerit Stockputz / Rauhputz / Rustikalputz, villerit activDRY Mineralputz K/R/Rustik, villerit Stockputz SLC and villerit Rauhputz SLC associated with a decorative paint	max. 2.5 %	no flame retardent	A2 - s1,d0
Organic based pastes villerit Siliconit K/R villerit activDRY Siliconit K/R with key coat villerit Quarzbrücke	max. 9.9 %	no flame retardent	A2 - s1,d0

3.3 Hygiene, health and environment (BWR 3)

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

Base coat:

Base coat	Water absorption after 1 h < 1.0 kg/m²	Water absorption after 24 h < 0.5 kg/m²
villerit Baukleber VWS 850 grau	x	
villerit Baukleber VWS 850 weiß	x	
villerit KA-Basic Klebe- und Armierungsmörtel	x	x
villerit Inno Therm	x	x
villerit activDRY Klebe- und Armierungsmörtel	x	x

Rendering systems:

		Water absorption after 24 hours	
		< 0,5 kg/m²	≥ 0,5 kg/m²
Rendering systems: Base coat "**villerit Baukleber VWS 850 grau/weiß**" and **"villerit KA-Basic Klebe- und Armierungsmörtel"** with finishing coat and compatible key coat indicated adjoining:	villerit Stockputz		x
	villerit Rauhputz	x	
	villerit Rustikalputz	x	
	villerit Stockputz SLC	x	
	villerit activDRY Mineralputz K		x
	villerit activDRY Mineralputz R	x	
	villerit activDRY Mineralputz Rustik	x	
	villerit Rauhputz SLC		x
	villerit Siliconit		x
	villerit activDRY Siliconit		x
	villerit Siliconit with villerit Quarzbrücke		x
	villerit Silan	x	
	villerit activDRY Silan	x	

		Water absorption after 24 hours	
		< 0,5 kg/m²	≥ 0,5 kg/m²
Rendering systems: Base coat **"villerit Inno Therm"** and **"villerit activDRY Klebe- und Armierungsmörtel"** with finishing coat and compatible key coat indicated adjoining:	villerit Stockputz		x
	villerit Rauhputz		x
	villerit Rustikalputz		x
	villerit activDRY Mineralputz K		x
	villerit activDRY Mineralputz R		x
	villerit activDRY Mineralputz Rustik		x
	villerit Siliconit		x
	villerit activDRY Siliconit		x
	villerit Silan		x
	villerit activDRY Silan		x

3.3.2 Hygrothermal behaviour (ETAG 004 - clause 5.1.3.2)

Pass (without defects)

Freeze/thaw behaviour

The water absorption of the rendering system with the base coats "villerit Baukleber VWS 850 grau/weiß" and "villerit KA-Basic Klebe- und Armierungsmörtel" as well as the finishing coats "villerit Rauhputz", "villerit Rustikalputz", "villerit activDRY Mineralputz R", "villerit activDRY Mineralputz Rustik", "villerit Stockputz SLC", "villerit Silan" and " villerit activDRY Silan is less than 0.5 kg/m² after 24 hours for all configurations of the ETICS. The ETICS is so assessed as freeze/thaw resistant.

The ETICS with the base coats "villerit Baukleber VWS 850 grau/weiß" itself and together with the finishing coats "villerit Stockputz", "villerit activDRY Mineralputz K", "villerit Rauhputz SLC", "villerit Siliconit" and "villerit activDRY Siliconit" has been assessed as freeze/thaw resistant according to the simulated method.

Freeze/thaw cycles have not been performed for the ETICS with base coats "villerit InnoTherm" and "villerit activDRY Klebe- und Armierungsmörtel".

3.3.3 Impact resistance (ETAG004 – clause 5.1.3.3)

The verified resistance to hard body impact of the ETICS results in the classification into categories listed below.

Rendering system: Base coat "**villerit Baukleber VWS 850 grau/weiß"** und **"villerit KA-Basic Klebe- und Armierungsmörtel"** with finishing coat and compatible key coat indicated in clause 1.2:	**Single standard mesh:** **"villerit Armierungsgewebe fein"**
villerit Rauhputz (1.5 mm)	category II
villerit Stockputz (1.5 mm)	category II
villerit Rustikalputz (1.5 mm)	category II
villerit activDRY Mineralputz R (1.5 mm)	category II
villerit activDRY Mineralputz K (1.5 mm)	category II
villerit activDRY Mineralputz Rustik (1.5 mm)	category II
villerit Stockputz SLC (1.5 mm)	category II
villerit Rauhputz SLC (1.5 mm)	category II
villerit Siliconit (1.5 mm)	category II
villerit activDRY Siliconit (1.5 mm)	category II
villerit Silan (1.5 mm)	category II
villerit activDRY Silan (1.5 mm)	category II

The impact resistance of the ETICS with base coats "villerit InnoTherm" und "villerit activDRY Klebe- und Armierungsmörtel" is not determined (npd).

3.3.4 Water vapour permeability (ETAG 004 – clause 5.1.3.4)

Rendering system: Base coat **"villerit Baukleber VWS 850 grau/weiß"** and **"villerit KA-Basic Klebe- und Armierungsmörtel"** with finishing coat and compatible key coat indicated in clause 1.2:	**Equivalent air thickness s_d**
villerit Rustikalputz	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
villerit Rauhputz	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
villerit Stockputz	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
villerit activDRY Mineralputz K	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
villerit activDRY Mineralputz R	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
villerit activDRY Mineralputz Rustik	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
villerit Rauhputz SLC	≤ 1.0 m (Test result obtained with particle size 4 mm: 0.1 m)
villerit Stockputz SLC	≤ 1.0 m (Test result obtained with particle size 4 mm: 0.1 m)
villerit Silan	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
villerit activDRY Silan	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
villerit Siliconit	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.3 m)
villerit activDRY Siliconit	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.3 m)
villerit Quarzbrücke + villerit Siliconit	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.2 m)

Rendering system: Base coat **"villerit Inno Therm"** and **"villerit activDRY Klebe- und Armierungsmörtel"** with finishing coat and compatible key coat indicated in clause 1.2:	**Equivalent air thickness s_d**
villerit Siliconit	≤ 1.0 m (Test result obtained with particle size 4 mm: 0.3 m)
villerit activDRY Siliconit	≤ 1.0 m (Test result obtained with particle size 4 mm: 0.3 m)
villerit Rustikalputz	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
villerit Rauhputz	≤ 1.0 m (Test result obtained with particle size 6 mm: 0.1 m)
villerit Stockputz	≤ 1.0 m (Test result obtained with particle size 6 mm: 0.1 m)
villerit activDRY Mineralputz K	≤ 1.0 m (Test result obtained with particle size 6 mm: 0.1 m)
villerit activDRY Mineralputz R	≤ 1.0 m (Test result obtained with particle size 6 mm: 0.1 m)
villerit activDRY Mineralputz Rustik	≤ 1.0 m (Test result obtained with particle size 3 mm: 0.1 m)
villerit Silan	≤ 1.0 m (Test result obtained with particle size 4 mm: 0.1 m)
villerit activDRY Silan	≤ 1.0 m (Test result obtained with particle size 4 mm: 0.1 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 (EPS) (ETAG 004 - clause 5.1.4.1.1)

Conditioning		
Initial state	**After hygrothermal cycles**	**After freeze/thaw test**
≥ 0.08 MPa	≥ 0.08 MPa	< 0.08 MPa but failure in the insulation product

3.4.2 Bond strength between base coat and insulation product (ETAG 004 - clause 5.1.4.1.2 and 5.1.4.1.3)

		Initial state	2 d immersion in water + 2 h drying	2 d immersion in water + 7 d drying
villerit Baukleber VWS 850	Concrete	≥ 0.25 MPa	≥ 0.08 MPa	≥ 0.25 MPa
	MW Lamella	≥ 0.08 MPa	≥ 0.03 MPa	≥ 0.08 MPa
villerit KA-Basic Klebe- und Armierungsmörtel	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
villerit Inno Therm	Concrete	≥ 0.25 MPa	≥ 0.08 MPa	≥ 0.25 MPa
	MW Lamella	≥ 0.08 MPa	≥ 0.03 MPa	≥ 0.08 MPa
villerit activDRY Klebe- und Armierungsmörtel	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 **"villerit Baukleber VWS 850 grau/weiß"** and **"villerit KA-Basic Klebe- und Armierungsmörtel"** with finishing coat and compatible key coat indicated in clause 1.2	villerit Stockputz	< 0,08 MPa but failure in the insulation product
	villerit Rauhputz	
	villerit Rustikalputz	
	villerit activDRY Mineralputz K	
	villerit activDRY Mineralputz R	
	villerit activDRY Mineralputz Rustik	
	villerit Stockputz SLC	
	villerit Rauhputz SLC	
	villerit Siliconit	
	villerit activDRY Siliconit	
	villerit Silan	
	villerit activDRY Silan	

Rendering system: Base coat **"villerit Inno Therm"** und **"villerit activDRY Klebe- und Armierungsmörtel"** with finishing coat and compatible key coat indicated in clause 1.2	villerit Stockputz	< 0,08 MPa but failure in the insulation product
	villerit Rauhputz	
	villerit Rustikalputz	
	villerit activDRY Mineralputz K	
	villerit activDRY Mineralputz R	
	villerit activDRY Mineralputz Rustik	
	villerit Siliconit	
	villerit activDRY Siliconit	
	villerit Silan	
	villerit activDRY Silan	

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 to the listed combination of component 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			≥ ∅ 90 mm	≥ ∅ 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			≥ ∅ 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 tables 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 *
ejotherm STR U ejotherm STR U 2G (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)

No performance determined for the width of cracks.

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 increase the thermal transmittance U. This influence had to take into account according to EN ISO 6946: 2007.

$U_c = U + \Delta U$	corrected thermal transmittance [W/(m²·K)]
$\Delta U = \Delta U_{anchor}$	correction term for mechanical fixing devices
$\Delta U_{anchor} = \chi_p \cdot n$	correction term for anchors
where: 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 technical approval
$\chi_p = 0.004$ W/K	for anchors with a galvanized steel screw with the head covered by a plastic material
$\chi_p = 0.002$ 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
" villerit-ECO Therm Mineral "	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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beglaubigt:
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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 [(m² ·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/m³]; 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	$20 \leq f_{\tau k} \leq 100$	$6 \leq f_{\tau k} \leq 100$	$20 \leq f_{\tau k} \leq 100$
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 EAD 330196-00-0604[1] 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 [%]**
"villerit Armierungsgewebe fein"	Alkali- and slide-resistant glass fibre mesh with mass per unit area of about 160 g/m² and mesh size of about 4.0 mm x 4.0 mm	≥ 20	≥ 50