Deutsches Institut für Bautechnik

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Bautechnisches Prüfamt

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European Technical Assessment ETA-07/0089 of 29 June 2022

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General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Brillux WDV-System EPS ZF
Product family to which the construction product belongs	Product area code: 4 Product area code: 4 External Thermal insulation Composite System with rendering on expanded polystyrene for the use as external insulation of building walls
Manufacturer	Brillux GmbH & Co. KG Weseler Straße 401 48163 Münster DEUTSCHLAND
Manufacturing plant	Brillux GmbH & Co. KG Weseler Straße 401 48163 Münster 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
This version replaces	ETA-07/0089 issued on 14 August 2019

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Specific Part

1 Technical description of the product

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

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

The insulation product is faced with a rendering system consisting of one base coat and finishing coat (site applied), in which the base coat contains reinforcement. The rendering is applied directly to the insulating panels, without any air gap or disconnecting layer.

The ETICS may include special fittings (e.g. base profiles, corner profiles ...) for connection to adjacent building elements (apertures, corners, parapets ...). Assessment and performance of these components are not addressed in this ETA, however the ETICS manufacturer is responsible for adequate compatibility and performance within the ETICS when the components are delivered as a part of the kit.

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

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 "WDV-System EPS ZF" 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	(see annex 2) Euroclass according to EN 13501-1
Reaction to fire of the EPS-insulation product	(see annex 2) Euroclass E according EN 13501-1
Reaction to fire of the PU- foam adhesive	(see annex 2) Euroclass E according EN 13501-1
Apparent density EN 1602 of the EPS-insulation product according to EN 1602	ρa ≤ 30 [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 EPS insulation product after 24 h	(see annex 3.1) Average [kg/m²] Average [kg/m²] Average [kg/m²] Average [kg/m²] maximum value 0.5 [kg/(m² · h)]	
Water-tightness of the ETICS **Hygrothermal behaviour on the test wall**	Pass without defects	
freeze/thaw behaviour of the ETICS	The water absorption of the base coats as well as the rendering systems is less than 0.5 kg/m² after 24 hours for all configurations of the ETICS. The ETICS is so assessed as free/thaw resistant.	
Impact resistance	(see annex 3.2) Category	
Water vapour permeability - Rendering system	(see annex 3.3) s_d value [m]	
- EPS insulation product	μ = 20-78	Thickness of the insulation product 400 [mm]

3.3 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Bond strength between base coat and EPS insulation product	(see annex 4.1) - Minimal value/ average value [kPa], rupture type: Initial state (28 d immersion) - Minimal value/ average value [kPa], rupture type: after hygrothermal cycles
between adhesive and substrate	(see annex 4.2) - Thickness [mm] of the used adhesives - Minimal value/ average value [kPa], rupture type: Initial state (dry conditions) - Minimal value/ average value [kPa], rupture type: after 2 d immersion in water, 2 h drying - Minimal value/ average value [kPa], rupture type: after 2 d immersion in water, 7 d drying
between adhesive and EPS insulation	(see annex 4.3) - Thickness [mm] of the used adhesives - Minimal value [kPa], rupture type: Initial state (dry conditions) - Minimal value/ average value [kPa], rupture type: after 2 d immersion in water, 2 h drying - Minimal value/ average value [kPa], rupture type: after 2 d immersion in water, 7 d drying
of the foam adhesive	(see annex 4.4) - Minimal value/ average value [kPa]
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 40%
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 4.5) - R_{panel} [kN/fixing] - R_{joint} [kN/fixing] - Plate diameter of anchor ≥ 60 mm res. ≥ 90 mm - plate stiffness ≥ 0.3 [kN/mm²] - load resistance of the anchor plate ≥ 0.1 [kN]
Tensile strength perpendicular to the faces in dry conditions standard EPS elastified EPS	σ_{mt} ≥ 80 [kPa] (bonded ETICS) σ_{mt} ≥ 100 [kPa] (bonded ETICS with anchors) σ_{mt} ≥ 150 [kPa] (bonded ETICS with profiles) σ_{mt} ≥ 80 [kPa]

Essential characteristic	Performance
Shear strength of the ETICS	$20 \leq f_{tk} \leq 170$ [kPa]
Shear modulus of the ETCS standard EPS elastified EPS	 $1.0 \leq G_m \leq 3.8$ [MPa] $0.3 \leq G_m \leq 1.0$ [MPa]
Pull-through resistance of fixings from profiles	minimal value: 0.9 kN average value: 1.02 kN
Render strip tensile test	No cracks occurred during the Render Strip Tensile Test of the base coat "Qjusion Organic" and "Qjusion Organic SK" reinforced with the glass fibre mesh "WDVS Glasseidengewebe" at a render strain value of 1 %.
shear strength of foam adhesive	- Minimal value: 58 [kPa] - average value: 71 [kPa]
shear modulus of foam adhesive	- Minimal value: 0.571 [MPa] - average value: 0.82 [MPa]
Post expansion behaviour of foam adhesive	max. 21 mm
Bond strength after ageing finishing coat tested on the rig finishing coat not tested on the rig	(see annex 4.6) Minimal value/ average value[kPa], rupture type Minimal value/ average value [kPa], rupture type
Tensile strength of the glass fibre mesh in the as-delivered state	(see annex 4.7) Average value [N/mm]
Residual tensile strength of the glass fibre mesh after aging	(see annex 4.7) Average value [N/mm]
Relative residual tensile strength of the glass fibre mesh after aging	(see annex 4.7) Average value [%]
Elongation of the glass fibre mesh in the as-delivered state	(see annex 4.7) Average value [N/mm]
Elongation of the glass fibre mesh after aging	(see annex 4.7) Average value [%]

3.4 Protection against noise (BWR 5)

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

3.5 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Thermal resistance and thermal transmittance of ETICS	Calculated value or measurement value R $(m^2 \cdot K)/W$, 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
"WDV-System EPS ZF"	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 29 June 2022 by Deutsches Institut für Bautechnik

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beglaubigt:
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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 expanded polystyrene (EPS)* - standard-EPS - elastified EPS	 – –	 ≤ 400 ≤ 200
	• **Adhesives** - **WDVS Pulverkleber** (cement based powder requiring addition of about 24 % of water)	about 4.0 (powder)	–
	• **Foam Adhesives** - **WDVS Qju Klebeschaum** (foam adhesive on polyurethane, ready to use, in bottles supplied)	0.20 l/m²	–
	Mechanically fixed ETICS with profiles and supplementary adhesive: • **Insulation product** factory-prefabricated expanded polystyrene (EPS)* - standard EPS • **Supplementary adhesive** (equal to bonded ETICS) • **Profiles** – WDVS Halteleiste – WDVS Verbindungsleiste Polyvinyl chloride (PVC) profiles • **Anchors for profiles** - WS 8 L - ejotherm SDK U - SDF-K plus - ejotherm NK U	–	60 to 200
	Mechanically fixed ETICS with anchors and supplementary adhesive: • **Insulation product** factory-prefabricated expanded polystyrene (EPS)* – standard-EPS – elastified EPS	 – –	 60 to 400 60 to 200

	Components National application documents shall be taken into account	**Coverage [kg/m²]**	**Thickness [mm]**
Insulation material with associated method of fixing	• **Supplementary adhesive** (equal to bonded ETICS) • **Anchors for insulation product** anchors with ETA according to EAD330196-01-0604[1]		
Base coat	**Qjusion Organic** styrol-acrylat-copolymer dispersion **Qjusion Organic SK** styrol-acrylat-copolymer dispersion	3.0 to 6.0 3.0 to 6.0	1.5 to 4.5**** 1.5 to 4.5****
Glass fibre mesh	**WDVS Glasseidengewebe** 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 **WDVS Panzergewebe** (reinforced mesh implemented in addition to the mesh described above to improve the impact resistance) Alkali- and slide-resistant glass fibre mesh with mass per unit area of about 530 g/m²	– –	– –
Key coat	**Putzgrundierung** Ready to use pigmented liquid – vinylic binder: **Silicon-Putzgrundierung** Ready to use pigmented liquid – vinylic-siloxane binder For the compatibility with the finishing coats see below.	about 0.175 l/m² about 0.175 l/m²	– –
Finishing coat	**To use with key coat "Putzgrundierung"*****:** • Ready to use pastes – vinylic binder: **Rausan KR/R**** (particle size 1 – 2 – 3 – 4 and 5 mm) **To use with key coat "Silicon Putzgrundierung"*****:** • Ready to use paste – vinylic/siloxane binder: **Silicon-Putz KR/R**** (particle size 1 – 2 – 3 – 4 and 5 mm) **Silcosil KR/R**** (particle size 1 – 2 – 3 – 4 and 5 mm) **To use without key coat:** • Ready to use paste – acrylic binder – associated with synthetic briquettes: **Klebemörtel** with **Flachverblender**	 2.3 to 5.3 2.3 to 5.3 2.3 to 5.3 3.0 to 4.0 5.0 to 6.0	Regulated by particle size 1.0 to 2.0 3.0 to 5.0
Ancillary material	Remains the responsibility of the manufacturer of ETICS.		

* Factory-prefabricated, uncoated panels made of expanded polystyrene (EPS) shall be used.
** K / R / MP indicates different structures of the finishing coat/s.
*** The instruction to the installer concerning the use of a key coat remains the responsibility of the manufacture
**** The base coat "Qjusion Organic" and "Qjusion Organic SK" has to be used with thickness of 2.0 mm to max. 2.5 mm with foam adhesive "WDVS Qju Klebeschaum 3700" and the "Flachverblender"

[1] EAD330196-01-0604 Plastic anchors for fixing of external thermal insulation composite systems with rendering

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

Configuration	Organic content	Flame retardant content	Euroclass according to EN 13501-1
adhesives	max. 4.0 %	no flame retardent	
foam adhesive	max. 100 %	min. 3.7 %	
Base coat	max. 8.9 %	min. 13.6 %	
EPS-insulation product	Euroclass E according to EN 13501-1	Euroclass E according to EN 13501-1	
profiles	-	-	
anchors	-	-	
rendering system: Base coat with finishing coat and compatible key coat indicated in annex 1:			
Putzgrundierung with Rausan KR/R	max. 9.8 %	min. 13.0 %	B – s2, d0
Silicon Putzgrundierung with Silicon-Putz KR/R	max. 10.1 %	min. 12.8 %	
Silicon Putzgrundierung with Silcosil KR/R	max. 9.7 %	min. 13.0 %	
Klebemörtel with Flachverblender	max. 9.2 % max. 9.9 %	min. 9.0 % no flame retardant	no performance assessed

Annex 3

Hygiene, health and environment (BWR 3)

3.1 Water absorption (capillarity test)

Base coat

base coat	Average water absorption [kg/m²]	
	after 1h	after 24h
Qjusion Organic	0.124	0.207
Qjusion Organic SK	0.124	0.207

Rendering system:

Finishing coat with base coat "Qjusion Organic" or "Qjusion Organic SK" indicated hereafter	Average water absorption [kg/m²]	
	after 1h	after 24 h
Rausan KR	0.032	0.206
Rausan R	0.069	0.248
Silicon-Putz KR	0.048	0.186
Silicon-Putz R	0.034	0.155
Silcosil KR	0.070	0.283
Silcosil R	0.047	0.217
Klebemörtel with Flachverblender	0.040	0.488

3.2 Impact resistance

Rendering system: Base coat "Qjusion Organic" or "Qjusion Organic SK" with finishing coat indicated hereafter	**single standard mesh:** "WDVS Glasseidengewebe"	**double mesh** "WDVS Glasseidengewebe"
		"WDVS Glasseidengewebe" with "WDVS Panzergewebe"
Rausan KR/R	category I	category I
Silicon-Putz KR/R	category I	category I
Silcosil KR/R	category I	category I
Klebemörtel with Flachverblender	category I	category I

3.3 Water vapour permeability ETICS

Rendering system: Base coat "Qjusion Organic" or "Qjusion Organic SK" with finishing coat indicated hereafter	**Equivalent air thickness s_d**
Rausan KR/R	≤ 1.0 m (Test result obtained with structure KR particle size 3 mm: 0.4 m)
Silicon-Putz KR/R	≤ 1.0 m (Test result obtained with structure KR particle size 3 mm: 0.4 m)
Silcosil KR/R	≤ 1.0 m (Test result obtained with structure KR particle size 3 mm: 0.3 m)
Klebemörtel with Flachverblender	≤ 1.0 m (Result: 0.4 m)

Annex 4

Safety and accessibility in use (BWR 4)

4.1 Bond strength between base coat and EPS

		Conditioning		
		Initial state [kPa]	**After hygrothermal cycles [kPa]**	**After freeze/thaw test**
Qjusion Organic	Average	99	82	Test not required because freeze/thaw cycles not necessary
	Minimal value	87	44	
Qjusion Organic SK	Average	99	82	
	Minimal value	87	44	

4.2 Bond strength between adhesive and substrate

Substrate: concrete		Conditioning		
		Initial state [kPa]	**2 d immersion in water and 2 hrs. drying [kPa]**	**2 d immersion in water and 7 d drying [kPa]**
WDVS Pulverkleber	Average	880	no performance assessed	no performance assessed
	Minimal value	440	no performance assessed	no performance assessed

4.3 Bond strength between adhesive and EPS

		Conditioning		
		Initial state [kPa]	**2 d immersion in water and 2 hrs. drying [kPa]**	**2 d immersion in water and 7 d drying [kPa]**
WDVS Pulverkleber	Average	103	121	96
	Minimal value	86	91	90

4.4 Bond strength of foam adhesive

foam adhesive		Standard application conditions [kPa]	Modification of foam thickness [kPa]	Modification of processing time (open time 5 min) [kPa]	Modification of temperature (low temperature) [kPa]	Modification of temperature (low temperature) [kPa]
WDVS Qju Klebe-schaum	Average	82	82	114	81	82
	Minimal value	80	77	105	69	80

4.5 Wind load resistance

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

4.5.1 Safety in use of mechanically fixed ETICS using profiles

Characteristics of the EPS **(standard EPS)**	Dimensions	500 mm x 500 mm
	Thickness	≥ 60 mm
	Tensile strength perpendicular to the faces	**≥ 150 kPa**
	Shear modulus	≥ 1.0 N/mm²
Failure load [kN / panel] (Static Foam Block Test)	Horizontal profiles fixed every 30 cm and 49.4 cm long vertical connection profiles	Minimal: 0.0950 Average: 0.101

4.5.2 Safety in use of mechanically fixed ETICS using anchors

Apply to all anchors listed in annex 1 mounted on the insulation panels surface				
Characteristics of the EPS **(standard EPS)**	Thickness		≥ 60 mm	
	Tensile strength perpendicular to the faces		**≥ 100 kPa**	
	Shear modulus		≥ 1.0 N/mm²	
Plate diameter of anchor			∅ 60 mm	∅ 90 mm
plate stiffness			≥ 0.3 kN/mm	
load resistance of the anchor plate			≥ 1.0 kN	
Failure load [kN]	Anchors not placed at the panel joints (Static Foam Block Test)	R_{panel}	Minimal: 0.51 Average: 0.52	Minimal: 0.72 Average: 0.73
	Anchors placed at the panel joints (Pull-through test)	R_{joint}	Minimal: 0.40 Average: 0.43	Minimal: 0.43 Average: 0.47

Apply to all anchors listed in annex 1 mounted on the insulation panels surface			
Characteristics of the EPS **(elastified EPS)**	Thickness		≥ 60 mm
	Tensile strength perpendicular to the faces		**≥ 80 kPa**
	Shear modulus		≥ 0.3 N/mm²
Plate diameter of anchor			∅ 60 mm
plate stiffness			≥ 0.3 kN/mm
load resistance of the anchor plate			≥ 1.0 kN
Failure load [kN]	Anchors not placed at the panel joints (Static Foam Block Test)	R_{panel}	Minimal: 0.35 Average: 0.36
	Anchors placed at the panel joints (Pull-through test)	R_{joint}	Minimal: 0.30 Average: 0.31

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

Anchor	Thickness of the EPS [d]	Conditions of installation *
ejotherm STR U (ETA-04/0023)	100 mm > d ≥ 80 mm (for standard and elastified EPS)	– Maximum installation depth of the anchor plate: 15 mm (≙ thickness of insulation cover) – Maximum depth of die: 5 mm
	≥ 100 mm (for standard and elastified EPS)	– 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 (for standard EPS only)	– Maximum installation depth of the anchor plate: 15 mm (≙ thickness of insulation cover)
* according to the appropriate ETA of anchor		

4.6 Bond strength after aging [kPa]

Finishing coat with base coat indicated hereafter		**After hygrothermal cycles [kPa] with base coat "Qjusion Organic" or "Qjusion Organic SK"**	**7 d immersion in water and 7 d drying [kPa] with base coat "Qjusion Organic" or "Qjusion Organic SK"**
Rausan KR/R	Average	80	80
	Minimal value	61	60
Silcosil KR/R	Average	73	100
	Minimal value	62	80
Silicon-Putz KR/R	Average	90	100
	Minimal value	78	70
Klebemörtel with Flachverblender	Average	84	90
	Minimal value	57	120

4.7 Reinforcement (glass fibre mesh)

WDVS Glasseidengewebe	Average warp	Average weft
Tensile strength in as-delivered state	2071 N / 50 mm	2189 N / 50 mm
Residual tensile strength after aging	1083 N / 50 mm	1261 N / 50 mm
Relative residual tensile strength after aging	53.0 %	57.0 %
Elongation in as-delivered state	3.8 %	3.9 %
Elongation after aging	2.3 %	2.5 %

WDVS Panzergewebe	Average warp	Average weft
Tensile strength in as-delivered state	4976 N / 50 mm	8501 N / 50 mm
Residual tensile strength after aging	3110 N / 50 mm	5006 N / 50 mm
Relative residual tensile strength after aging	62.0 %	59.0 %
Elongation in as-delivered state	3.2 %	3.5 %
Elongation after aging	2.6 %	2.8 %

Annex 5

Energy economy and heat retention (BWR6)

5.1 Energy economy and heat retention (BWR 6)

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

The thermal bridges caused by profiles are negligible.