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and types of construction

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European Technical Assessment

ETA-06/0142
of 12 March 2024

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General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

"RELIUS WDV-System V 550"

Product family
to which the construction product belongs

Product area code: 4
External Thermal Insulation Composite System with
rendering on expanded polystyrene intended for use on
building walls

Manufacturer

RELIUS Farbenwerke GmbH
Heimertinger Straße 10
87700 Memmingen
DEUTSCHLAND

Manufacturing plant

RELIUS Farbenwerke GmbH
Heimertinger Straße 10
87700 Memmingen
DEUTSCHLAND

This European Technical Assessment
contains

16 pages including 5 annexes which form an integral part
of this assessment

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

040083-00-0404

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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 the ETICS.

The ETICS kit comprises a prefabricated insulation product of expanded polystyrene (EPS) to be bonded and if necessary additionally 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 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 "RELIUS WDV-System V 550" of at least 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, but are to be regarded only as a means for choosing the right products in relation to the assumed economically reasonable working life of the works.

For use, maintenance and repair, the finishing coat shall normally be maintained in order to fully preserve the ETICS performance. Maintenance includes at least:

- visual inspection of the ETICS,
- the repairing of localized damaged areas due to accidents,
- the aspect maintenance with products compatible with the ETICS (possibly after washing or ad hoc preparation).

Necessary repairs are to be carried out as soon as the need has been identified.

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

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

3 Performance of the product and references to the methods used for its assessment

3.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire of the ETICS	(see annex 2) Euroclass according to EN 13501-1
Reaction to fire of the EPS-insulation product - Apparent density of the EPS-insulation product according to EN 1602	(see annex 2) Euroclass E according EN 13501-1 Value [kg/m ³]
Facade fire performance	no performance assessed

3.2 Hygiene, health and environment (BWR 3)

Essential characteristic	Performance
Release of dangerous substances	no performance assessed
Water absorption Base coat after 1 hour after 24 hours Rendering system after 1 hour after 24 hours EPS insulation product after 24 hours	(see annex 3.1) Average [kg/m ²] Average [kg/m ²] Average [kg/m ²] Average [kg/m ²] Maximum value 0.5 kg/m ²
Water-tightness of the ETICS: Hygrothermal behaviour on the test wall	Pass without defects
Water-tightness of the ETICS: freeze/thaw behaviour	The water absorption of the rendering system with all finishing coats except "RELIUS Mineralputz KM/ RM/ Waschputz" is less than 0.5 kg/m ² after 24 hours. The ETICS with the finishing coat "RELIUS Mineralputz KM/ RM/ Waschputz" has been assessed as freeze/thaw resistant according to the simulated method.
impact resistance	(see annex 3.2) Category
Water vapour permeability - Rendering system - EPS insulation product	(see annex 3.3) s _d value [m] μ = 20 - 70 Thickness of the insulation product 360 mm

3.3 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
<p>Bond strength between base coat and EPS-insulation product</p> <p>between adhesive and substrate</p> <p>between adhesive and EPS insulation</p>	<p>(see annex 4.1) - Minimal value/average [kPa], - Minimal value/average [kPa],</p> <p>(see annex 4.2) - Thickness [mm] of the used adhesives - Minimal value/average [kPa]: - Minimal value/ average [kPa]: - Minimal value/ average [kPa]:</p> <p>(see annex 4.3) - Thickness [mm] of the used adhesives - Minimal value/average [kPa]: - Minimal value/ average [kPa]: - Minimal value/ average [kPa]:</p>
Fixing strength (displacement test)	Test not required therefore no limitation of ETICS length required.
<p>Wind load resistance of ETICS pull-through test of fixing static foam block test</p>	<p>(see annex 4.4) - R_{panel} [kN/fixing], - R_{joint} [kN/fixing], - Plate diameter of anchor ≥ 60 mm resp. ≥ 90 mm - plate stiffness ≥ 0.3 kN/mm² - load resistance of the anchor plate ≥ 1.0 kN</p>
<p>Tensile strength perpendicular to the faces in dry conditions standard EPS</p>	<p>$\sigma_{\text{mt}} \geq 80$ kPa (bonded ETICS) $\sigma_{\text{mt}} \geq 100$ kPa (mechanically fixed ETICS with anchors and supplementary adhesive)</p>

Essential characteristic	Performance
Shear modulus of the ETICS standard EPS	$1.0 \leq G_m \leq 3.8$ MPa
Render strip tensile test	(see annex 4.5) crack width w_{rk} [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 [kPa] Minimal value/average [kPa]
Tensile strength of the glass fibre mesh in the as-delivered state	(see annex 4.7) Average [N/mm]
Residual tensile strength of the glass fibre mesh after aging	(see annex 4.7) Average [N/mm]
Relative residual tensile strength of the glass fibre mesh after aging	(see annex 4.7) Average [%]
Elongation of the glass fibre mesh in the as-delivered state	(see annex 4.7) Average [%]
Elongation of the glass fibre mesh after aging	(see annex 4.7) 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 of ETICS	(see annex 5) Calculated value or measurement value R [(m ² · K)/W]
Thermal transmittance of ETICS	(see annex 5) Calculated value or measurement value U [W/(m ² · K)]

English translation prepared by DIBt

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

In accordance with EAD 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
"RELIUS WDV-System V 550"	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 bis E) ⁽³⁾ , F	2+
	ETICS in external wall not subject to fire regulations	any	2+
<p>⁽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)</p> <p>⁽²⁾ Products/materials not covered by footnote (1)</p> <p>⁽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)</p>			

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 12 March 2024 by Deutschen Institut für Bautechnik

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Head of Section

beglaubigt:
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Annex 1

Composition of the ETICS

	Components National application documents shall be taken into account	Coverage [kg/m ²]	Thickness [mm]
Insulation material with associated method of fixing	Bonded ETICS: <ul style="list-style-type: none"> • Insulation product factory-prefabricated expanded polystyrene (EPS)* - standard EPS • Adhesives <ul style="list-style-type: none"> – RELIUS WDVS PHS KLEBER (cement based powder requiring addition of about 25 % of water) – RELIUS WDVS K.A.M. (cement based powder requiring addition of about 25 % of water) – RELIUS V 600 ZF (acrylic based paste requiring addition of 30 % in weight cement (CEM I 32,5 R)) 	–	≤ 360
	Mechanically fixed ETICS with anchors and supplementary adhesive: <ul style="list-style-type: none"> • Insulation product factory-prefabricated expanded polystyrene (EPS)* - standard EPS • Supplementary adhesive (equal to bonded ETICS) • Dübel für Wärmedämmstoff Anchors with ETA nach EAD 330196-01-0604¹ 	–	60 to 360
Base coat	RELIUS WDVS K.A.M. Identical with the equally named adhesive given above.	3.5 to 12.0 (powder)	Mean (dry): 3.0 to 10.0
Glass fibre mesh	RELIUS GITTERGEWEBE 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	RELIUS UNIVERSAL PUTZGRUND*** Ready to use pigmented acrylic-resin dispersion liquid For the compatibility with the finishing coats see below.	0.2 to 0.3 l/m ²	–

¹ EAD330196-01-0604

Plastic anchors made of virgin or non-virgin material for fixing of external thermal insulation composite systems with rendering (and previous versions)

	Components National application documents shall be taken into account	Coverage [kg/m ²]	Thickness [mm]
Finishing coat	<p>To use without key coat:</p> <ul style="list-style-type: none"> Thin layered cement based powder requiring addition of about 27% of water: <ul style="list-style-type: none"> RELIUS MINERAL-KRATZPUTZ (particle size 2.0 to 3.0 and 4.0 mm) RELIUS MINERAL-RILLENPUTZ (particle size 2.0 to 3.0 and 4.0 mm) RELIUS WASCHELPUTZ FEIN (particle size 0.5 and 1.5 mm) <p>To use with key coat " RELIUS UNIVERSAL PUTZGRUND*** if applicable:</p> <ul style="list-style-type: none"> Ready to use paste – acrylic binder: <ul style="list-style-type: none"> RELIUS EDELPUTZ K** (particle size 1.5 to 2.0 and 3.0 mm) RELIUS RILLENPUTZ R** (particle size 1.5 to 2.0 and 3.0 mm) RELIUS STRUKTURPUTZ (without particles size) Ready to use paste - acrylosiloxane binder: <ul style="list-style-type: none"> RELIUS SILCOSAN EDELPUTZ K** (particle size 1.5 to 2.0 and 3.0 mm) RELIUS SILCOSAN RILLENPUTZ R** (particle size 1.5 to 2.0 and 3.0 mm) Ready to use pastes – acrylic/silicate binder: <ul style="list-style-type: none"> RELIUS SILAT EDELPUTZ K** (particle size 1.5 to 2.0 and 3.0 mm) RELIUS SILAT RILLENPUTZ R** (particle size 1.5 to 2.0 and 3.0 mm) 	<p>3.0 to 4.5</p> <p>3.0 to 4.5</p> <p>4.0 to 11.0 (trocken)</p> <p>2.0 to 4.0</p> <p>2.0 to 4.0</p> <p>2.0 to 6.0</p> <p>2.0 to 4,0</p> <p>2.0 to 4.0</p> <p>2.8 to 5.0</p>	<p>Regulated by particles size</p> <p>3.0 to 8.0</p> <p>Regulated by particles size</p> <p>2.0 to 8.0</p> <p>Regulated by particles size</p>
Ancillary material	Remains the responsibility of the manufacturer.		
<p>* Factory-prefabricated, uncoated panels made of expanded polystyrene (EPS) acc.to EN 133163 shall be used.</p> <p>** K / R indicates different structures of the finishing coats.</p> <p>*** The instruction to the installer concerning the use of a key coat remains the responsibility of the manufacturer.</p>			

Annex 2

Safety in case of fire (BWR 2)

2.1 Reaction to fire

Configurations	Organic content	Flame retardant content	Euroclass according to EN 13501-1
Base coat	max. 2.5 %	no flame retardant content	
EPS insulation product	Euroclass E according to EN 13501-1	Euroclass E according to EN 13501-1	
anchors	-	-	
Rendering system: Base coat with finishing coat and compatible key coat indicated in annex 1:			
RELIUS SILAT EDELPUTZ K RELIUS SILAT RILLENPUTZ R	max. 4.0 %	min. 8.0 %	B - s1,d0
RELIUS MINERAL-KRATZPUTZ/ RELIUS MINERAL-RILLENPUTZ RELIUS WASCHELPUTZ FEIN	max. 3.5 %	no flame retardant content	
RELIUS SILCOSAN EDELPUTZ K RELIUS SILCOSAN RILLENPUTZ R RELIUS EDELPUTZ K RELIUS RILLENPUTZ R	max. 6.5 %	min. 5.0 %	
RELIUS STRUKTURPUTZ	max. 5.0 %	no flame retardant content	no performance assessed

2.2 Apparent density of the EPS-insulation product according to EN 1602

$$\rho_a \leq 30 \text{ kg/m}^3$$

Annex 3

Hygiene, health and environment (BWR 3)

3.1 Water absorption (capillarity test)

Base coat:

Base coat	Thickness	Average water absorption [kg/m ²]	
		after 1h	after 24 h
RELIUS WDVS K.A.M.	4 mm	0.013	0.165

Rendering system:

Rendering system: base coat "RELIUS WDVS K.A.M." with finishing coat and compatible key coat indicated hereafter	Thickness	Average water absorption [kg/m ²]	
		after 1h	after 24 h
RELIUS UNIVERSAL PUTZGRUND and RELIUS EDELPUTZ K/ RELIUS RILLENPUTZ R/ RELIUS STRUKTUPUTZ	Base coat: 4 mm Finishing coat: 1.5 mm	0.076	0.379
RELIUS UNIVERSAL PUTZGRUND and RELIUS SILCOSAN EDELPUTZ K RELIUS SILCOSAN RILLENPUTZ R	Base coat: 4 mm Finishing coat: 1.5 mm	0.076	0.379
RELIUS UNIVERSAL PUTZGRUND and RELIUS SILAT EDELPUTZ K RELIUS SILAT RILLENPUTZ R	Base coat: 4 mm Finishing coat: 1.5 mm	0.020	0.363
RELIUS MINERAL-KRATZPUTZ/ RELIUS MINERAL-RILLENPUTZ RELIUS WASCHELPUTZ FEIN	Base coat: 4 mm Finishing coat: 4 mm	0.216	0.656

3.2 Impact resistance

Rendering system: base coat "RELIUS WDVS K.A.M." with finishing coat and compatible key coat indicated hereafter	Single standard mesh: "RELIUS GITTERGEWEBE"
RELIUS UNIVERSAL PUTZGRUND and RELIUS EDELPUTZ K/ RELIUS RILLENPUTZ R/ RELIUS STRUKTUPUTZ	category I
RELIUS UNIVERSAL PUTZGRUND and RELIUS SILCOSAN EDELPUTZ K RELIUS SILCOSAN RILLENPUTZ R	category I
RELIUS UNIVERSAL PUTZGRUND and RELIUS SILAT EDELPUTZ K RELIUS SILAT RILLENPUTZ R	category I
RELIUS MINERAL-KRATZPUTZ/ RELIUS MINERAL- RILLENPUTZ RELIUS WASCHELPUTZ FEIN	category II

3.3 Water vapour permeability

Rendering system: base coat "RELIUS WDVS K.A.M." with finishing coat and compatible key coat indicated hereafter	Equivalent air thickness s_d [m]
RELIUS UNIVERSAL PUTZGRUND and RELIUS EDELPUTZ K/ RELIUS RILLENPUTZ R/ RELIUS STRUKTUPUTZ	≤ 1.0 m (0.3 m; corresponds to the structure K, particle size 3 mm)
RELIUS UNIVERSAL PUTZGRUND and RELIUS SILCOSAN EDELPUTZ K RELIUS SILCOSAN RILLENPUTZ R	≤ 1.0 m (0.3 m; corresponds to the structure K, particle size 3 mm)
RELIUS UNIVERSAL PUTZGRUND and RELIUS SILAT EDELPUTZ K RELIUS SILAT RILLENPUTZ R	≤ 1.0 m (0.2 m; corresponds to the structure K, particle size 3 mm)
RELIUS MINERAL-KRATZPUTZ/ RELIUS MINERAL-RILLENPUTZ RELIUS WASCHELPUTZ FEIN	≤ 1.0 m (0.1 m; corresponds to the structure KM, particle size 4 mm)

Annex 4

Safety and accessibility in use (BWR 4)

4.1 Bond strength between base coat and insulation product (EPS)

		Conditioning		
		Initial state [kPa]	After hygrothermal cycles [kPa]	After freeze/thaw test
RELIUS WDVS K.A.M.	Average	120	80	Test not required because freeze/thaw cycles not necessary
	Minimal value	90	80	

4.2 Bond strength between adhesive and substrate

Substrate: concrete		Conditioning		
		Initial state [kPa]	2 d immersion in water and 2 h drying [kPa]	2 d immersion in water and 7 d drying [kPa]
RELIUS WDVS PHS KLEBER (3 – 5 mm)	Average	1058	1771	3531
	Minimal value	562	1103	2531
RELIUS WDVS K.A.M. (3 – 5 mm)	Average	1150	680	830
	Minimal value	1070	89	315
RELIUS V 600 ZF (3 – 5 mm)	Average	689	89	315
	Minimal value	635	84	397

4.3 Bond strength between adhesive and insulation product (EPS)

		Conditioning		
		Initial state [kPa]	2 d immersion in water and 2 h drying [kPa]	2 d immersion in water and 7 d drying [kPa]
RELIUS WDVS PHS KLEBER (3 – 5 mm)	Average	170	171	179
	Minimal value	152	153	160
RELIUS WDVS K.A.M. (3 – 5 mm)	Average	100	94	100
	Minimal value	90	90	100
RELIUS V 600 ZF (3 – 5 mm)	Average	133	143	137
	Minimal value	122	138	122

Bonded surface

$$S [\%] = 0.03 \text{ N/mm}^2 \times 100 / 0.08 \text{ N/mm}^2$$

$$S = 37.5 \%$$

The minimal surface bonded area S of bonded ETICS is 40 %.

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

Apply to all anchors listed in the 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/mm ²	
Plate diameter of anchor			∅ 60 mm	∅ 90 mm
Failure loads [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

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:

Anchors	Thickness of the EPS [t]	Conditions of installation*
ejothem STR U, ejothem STR U 2G (ETA-04/0023)	≥ 80 mm	– Maximum installation depth of the anchor plate: 15 mm (≙ thickness of insulation cover) – Incision depth: 20 mm
	≥ 100 mm	– Maximum installation depth of the anchor plate: 15 mm (≙ thickness of insulation cover) – Incision depth: 35 mm

* according to the appropriate ETA of anchor

4.5 Render strip tensile test

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 $w_{m(1\%)}$
RELIUS WDVS K.A.M.	RELIUS GITTERGEWEBE	0.15 mm

4.6 Bond strength after ageing

Base coat with finishing coat and compatible key coat indicated hereafter		After hygrothermal cycles [kPa] with base coat "RELIUS WDVS K.A.M."
RELIUS UNIVERSAL PUTZGRUND and RELIUS EDELPUTZ K/ RELIUS RILLENPUTZ R/ RELIUS STRUKTUPUTZ RELIUS UNIVERSAL PUTZGRUND and RELIUS SILCOSAN EDELPUTZ K RELIUS SILCOSAN RILLENPUTZ R	Average	85
	Minimal value	80
RELIUS UNIVERSAL PUTZGRUND and RELIUS SILAT EDELPUTZ K RELIUS SILAT RILLENPUTZ R	Average	no performance assessed
	Minimal value	
RELIUS UNIVERSAL PUTZGRUND and RELIUS EDELPUTZ K/ RELIUS RILLENPUTZ R/ RELIUS STRUKTUPUTZ RELIUS UNIVERSAL PUTZGRUND and RELIUS SILCOSAN EDELPUTZ K RELIUS SILCOSAN RILLENPUTZ R	Average	84
	Minimal value	78
RELIUS UNIVERSAL PUTZGRUND and RELIUS SILAT EDELPUTZ K RELIUS SILAT RILLENPUTZ R	Average	no performance assessed
	Minimal value	

4.7 Reinforcement (glass fibre mesh)

RELIUS GITTERGEWEBE	Average warp	Average weft
Tensile strength in as-delivered state	2438 N / 50 mm	2872 N / 50 mm
Residual tensile strength after aging	1267 N / 50 mm	1607 N / 50 mm
Relative residual tensile strength after aging	52.0 %	55.9 %
Elongation in as-delivered state	4.1 %	4.4 %
Elongation after aging	2.0 %	2.2 %

Annex 5

Energy economy and heat retention (BWR 6)

5.1 Thermal resistance und thermal transmittance

The nominal value of the additional thermal resistance R provided by the ETICS to the substrate wall is calculated in accordance with EN ISO 6946 from the nominal value of the insulation product's thermal resistance R_D given accompanied to the CE marking and from the thermal resistance of the rendering system R_{render} which is about $0.02 \text{ (m}^2 \cdot \text{K)/W}$.

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

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

$$U_c = U + \chi_p \cdot n$$

Where:	U_c :	corrected thermal transmittance [$\text{W}/(\text{m}^2 \cdot \text{K})$]
	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 ETA:
	$\chi_p = 0.004 \text{ W/K}$	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 covered by plastic anchors and for anchors with an air gap at the head of the screw