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European Technical Assessment **ETA 23/0884 of 29/01/2024**

GENERAL PART

Trade name of the construction product

Product family to which the construction product belongs

Manufacturer

Manufacturing plant

This European Technical Assessment contains:

This European Technical Assessment is issued in accordance with Regulation (EU) n° 305/2011, on the basis of

FASSATHERM RESPHIRA

**PAC 04: THERMAL INSULATION PRODUCTS.
COMPOSITE INSULATING KITS/SYSTEMS
External Thermal Insulation Composite
Systems (ETICS) with renderings**

**Fassa S.r.l.
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Plants: n. 1, 2, 3. See Annex A1

**16 pages, including 10 annexes which form
an integral part of this assessment**

**EAD 040083-00-0404 – External Thermal
Insulation Composite Systems (ETICS) with
renderings**

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SPECIFIC PARTS

1. TECHNICAL DESCRIPTION OF THE PRODUCT

The product "FASSATHERM RESPHIRA" is an External Thermal Insulation Composite Systems (ETICS) with renderings (rendering system) to be applied as external thermal insulation on the walls of buildings. The walls are made of masonry (bricks, blocks, stones) or concrete (cast on site or as prefabricated panels) with or without rendering systems.

The ETICS kit comprises a prefabricated insulation product of expanded polystyrene (EPS) to be bonded to the wall with 50 % supplementary adhesive. The methods of fixing and the relevant components are specified in Table 1.

The insulation product is faced with a rendering system consisting of one or more layers (site applied), one of which contains reinforcement. The rendering system is applied directly to the insulating boards, without any air gap or disconnecting layer.

1.1 COMPONENTS OF THE KIT "FASSATHERM RESPHIRA"

The components of the kit, as specified by the manufacturer, are reported in Table 1.

Table 1: Components of the kit

Components <i>(see Annexes A2-A3 for further description, characteristics and performances of the components)</i>	Quantity	Thickness [mm]	
Mechanically fixed ETICS with supplementary adhesive (according to manufacturer's instructions bonded surface is ≥ 50%). National application documents shall be taken into account.			
Insulation material with associated method of fixing	Insulation product 1: "EPS RESPHIRA" EPS graphite panel according to EN 13163 (see Annex A2)	//	60 - 240
	Adhesive: "A96 RESPHIRA": cement based powder requiring addition of 30.5 - 32.5% of water. White CEM I 52.5 R Grain size: 1.2 mm ± 0.2 mm	3 - 5.8 kg/m ²	5 - 10
	Anchors: "FASSA TOP FIX 2G"; "FASSA COMBI FIX PLUS"; "FASSA WK THERM FIX" "FASSA WK THERM ROTO FIX". Properties equal or higher than those reported in Table A3 of Annex A3	6/m ²	//
Base coat	"A96 RESPHIRA": cement based powder requiring addition 30.5-32.5% of water. White CEM I 52.5 R Grain size: 1.2 mm ± 0.2 mm	3 - 5.8 kg/m ²	4 - 6
Reinforcement	Standard Glass fibre mesh "FASSANET 160" mesh size: 4.0 x 3.5 mm ± 0.5 mm, Mass per unit area: 160 g/m ²	//	//
Key coat	Key coat 1 (to be used with finishing coat 1): "FA 249" water based product.	30-50 g/m ²	//
	Key coat 2 (to be used with finishing coat 2): "FS 412" water based product	100-150 g/m ²	//
	Key coat 3 (to be used with finishing coat 3): "FX 526" White or pigmented filler	100-150 g/m ²	//

Components (see Annexes A2-A3 for further description, characteristics and performances of the components)	Quantity	Thickness [mm]	
Finishing coat	Ready to use paste - acrylic resin binder to be used with the key coat of the same number		
	Finishing coat 1: “ RTA 549 ” acrylic copolymer Particle size: 1.0 mm; 1.5 mm; 2.0 mm; 3.0 mm	2.2 - 4.6 kg/m ²	According to grain size
	Finishing coat 2: “ RSR 421 ” Acrylic-silicone copolymer blend Particle size: 1.0 mm; 1.5 mm; 2.0 mm; 3.0 mm	2.2 - 4.6 kg/m ²	According to grain size
	Finishing coat 3 “ RX 561 ” Acrylic - polysiloxane copolymer blend Particle size: 1.0 mm; 1.5 mm; 2.0 mm; 3.0 mm.	2.2 - 4.6 kg/m ²	According to grain size
Decorative coat (Optional)	DESIDERI VELLUTO (only in combination with RSR 421) (Siloxane-enhanced smooth coating with a mineral appearance)		
	÷ 2.5 kg/m ²	÷ 0.3	

2. SPECIFICATION OF THE INTENDED USE IN ACCORDANCE WITH EUROPEAN ASSESSMENT DOCUMENT N° 040083-00-0404 (hereinafter EAD)

The “FASSATHERM RESPHIRA” is intended to be used on new or existing (retrofit) vertical building walls. The ETICS may also be used on horizontal or inclined surfaces which are not exposed to precipitation.

The ETICS gives the building wall to which it is applied additional thermal insulation and protection from effects of weathering. ETICS are non-load-bearing construction elements. They do not contribute directly to the stability of the building wall on which they are installed.

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

Concerning product packaging, transport and storage it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport and storage, as he considers necessary in order to reach the declared performances.

The information about installation is provided with the technical documentation from the Manufacturer and it is assumed that the product will be installed according to it or (in absence of such instructions) according to the usual practice of the building professionals.

The performances assessed in this European Technical Assessment, according to the applicable EAD, are based on an assumed intended working life of at least 25 years, provided that the conditions for packaging, transport, storage, installation as well as appropriate use, maintenance and repair are met. 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 expected economically reasonable working life of the works.

3. PERFORMANCE OF THE PRODUCT AND REFERENCES TO THE METHODS USED FOR ITS ASSESSMENT

The tests for performance assessment of “FASSATHERM RESPHIRA” were carried out in compliance with EAD 040083-00-0404 according to the test methods reported herein, as well for what concerns sampling, conditioning and testing provisions.

The performances of the kit as described in this chapter are valid provided that the components of the kit comply with Section 1 of the ETA and the relative Annexes A2–A3.

The numbering (#) in the following tables corresponds to the numbering of Table 1 of EAD 040083-00-0404.

3.1 SAFETY IN CASE OF FIRE (BWR 2)

#	Essential characteristic	Performance
1	Reaction to fire	
	- Reaction to fire of ETICS	Euroclass B – s1, d0. (see Annex B1, Table B1).
	- Reaction to fire of thermal insulation material	Euroclass E.
	- Reaction to fire of PU foam adhesive	Not applicable.
2	Façade fire performance	No performance assessed.
3	Propensity to undergo continuous smouldering of ETICS	No performance assessed.

3.2 HYGIENE, HEALTH AND THE ENVIRONMENT (BWR 3)

#	Essential characteristic	Performance
4	Content, emission and/or release of dangerous substances – leachable substances	No performance assessed.
5	Water absorption	
	- of the base coat and the rendering system	See Annex B2, Table B2.
	- of the thermal insulation product	$\leq 0.5 \text{ kg/m}^2$
6	Water-tightness of the ETICS: Hygrothermal behaviour	The ETICS passed the test without defects. The system FASSATHERM RESPHIRA is resistant to hygrothermal cycles. <i>Hygrothermal cycles have been performed on a rig.</i>
7	Water-tightness: Freeze thaw performance	See Annex B3, Table B6
8	Impact resistance	See Annex B2, Table B3.
9	Water vapour permeability	
	- of the rendering system	See Annex B3, Table B4.
	- of the thermal insulation product	$\mu \leq 15$

3.3 SAFETY AND ACCESSIBILITY IN USE (BWR 4)

#	Essential characteristic	Performance
10	Bond strength	
	- Bond strength between the base coat and the thermal insulation product	See Annex B3, Table B5.
	- Bond strength between the adhesive and the substrate	Not relevant because the system is mechanically fixed with supplementary adhesive.
	- Bond strength between the adhesive and the thermal insulation product	
- Bond strength of foam adhesives	Not applicable.	
11	Fixing strength (transverse displacement test)	Not applicable.
12	Wind load resistance of ETICS	
	- pull-through tests of fixings	See Annex B4, Table B7.
	- static foam block test	Not applicable.
	- dynamic wind uplift test	Not applicable.
13	Tensile test perpendicular to the faces of the thermal insulation product	
	- in dry conditions	TR 150
	- in wet conditions	Not applicable.
14	Shear strength and shear modulus of elasticity test of ETICS	Not relevant because the system is mechanically fixed with supplementary adhesive.
	- Shear strength	
	- Shear modulus of elasticity	
15	Pull-through resistance of fixings from profiles	Not applicable.
16	Render strip tensile test	FASSANET 160 W _{rk} warp = 0.16 mm W _{rk} weft = 0.21 mm Simplified method.
17	Shear strength and shear modulus of foam adhesive	Not applicable.
18	Post expansion behaviour of foam adhesives	Not applicable.
19	Bond strength after ageing	
	- bond strength after ageing of finishing coat tested on the rig	See Annex B5, Table B9.
	- bond strength after ageing of finishing coat not tested on the rig	Not applicable.
20	Mechanical and physical characteristics of the mesh	
	- Tensile strength of the glass fibre mesh	See Annex B6, Table B10.
	- Protection of metal mesh	Not applicable.

3.4 PROTECTION AGAINST NOISE (BWR 5)

#	Essential characteristic	Performance
21	Airborne sound insulation of ETICS	No performance assessed.
	Dynamic stiffness of the thermal insulation product	No performance assessed.
	Air flow resistance of the thermal insulation product	No performance assessed.

3.5 ENERGY ECONOMY AND HEAT RETENTION (BWR 6)

#	Essential characteristic	Performance
22	Thermal resistance and thermal transmittance of ETICS	See Annex B7, Table B11.

4. ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE (AVCP) SYSTEM APPLIED, WITH REFERENCE TO ITS LEGAL BASE

In accordance with the European Assessment Document EAD No. 040083-00-0404, the applicable European legal act is: **Commission Decision 97/556/EC**.

The system of assessment and verification of constancy of performance (AVCP) is **2+**.

In addition, with regard to reaction to fire for products, the applicable European legal act is **Commission Decision 97/556/EC**, as amended by **Commission Decision 2001/596/EC**.

The system of assessment and verification of constancy of performance (AVCP) is **2+**.

5. TECHNICAL DETAILS NECESSARY FOR THE IMPLEMENTATION OF THE AVCP SYSTEM, AS PROVIDED FOR IN EAD 040083-00-0404

Technical details necessary for the implementation of the AVCP system are laid down in the Control Plan deposited at ITAB/ITC-CNR.

Issued in San Giuliano Milanese, Italy on 29/01/2024 by ITAB/ITC-CNR

Coordinator of ITAB Technical Committee
Annalisa Franco, PhD

Director of ITAB
Professor Antonio Occhiuzzi

Table A1: Manufacturing plants

N. Manufacturing plant	Manufacturing plants	Address
1	Spresiano	31027 - Spresiano (Treviso) via Fornaci, 8 - Italy
2	Mazzano	25080 - Mazzano (Brescia) via S. Rocco, 23 - Italy
3	Popoli	65026 - Popoli (Pescara) Strada Provinciale per Vittorito s.n.c - Italy

FASSATHERM RESPHIRA

Manufacturing plants

**Annex A1
of ETA N° 23/0884**

Table A2: Thermal insulation product characteristics

Descriptions and characteristics	Reference standard	EPS RESPHIRA
Reaction to fire	EN 13501-1	Euroclass E Max. density: 20.38 kg/m ³
Water absorption by partial immersion	EN 1609 Method A	WL(P) ≤ 0.5 kg/m ²
Water vapour permeability (water – vapour resistance factor, μ)	EN 12086	≤ 15
Tensile strength	EN 1607	EPS - EN 13163 - TR 150
Shear strength	EN 12090	≥ 20 kPa
Shear modulus of elasticity	EN 12090	≥ 1000 kPa
Compression resistance	EN 826	-
Conductivity (λ_D)	EN 12667	0.031 W/mK
Thermal resistance for the minimum thickness (60 mm)	EN 12667	2.6 m ² K/W
Thickness	EN 823	T1 (EN 13163)
Length	EN 822	L2 (EN 13163)
Width	EN 822	W2 (EN 13163)
Squareness	EN 824	S2 (EN 13163)
Flatness	EN 825	P5 (EN 13163)
Surface conditions	-	Cut surface
Dimensional stability (23 ± 2°C, 50 ± 5% RH)	EN 1603	DSN(2) (EN 13163)
Dimensional stability (70 ± 2°C, 90 ± 5% RH for 48 hours)	EN 1604	DS(70,-)1 (EN 13163)

FASSATHERM RESPHIRA

Product Description – Thermal insulation product - EPS RESPHIRA

**Annex A2
of ETA N° 23/0884**

Table A3: Anchors product characteristics

Trade name ⁽¹⁾	ETA reference	Description	Size [mm]	Plate stiffness [kN/mm]
EJOT STRU 2G	ETA-04/0023 (5/06/2023)	Screw-in high-density polyethylene (HDPE) anchor with the pin made of galvanized steel	Plate diameter: Ø 60 Ø nail: 8	0.60
EJOTHERM H2 ECO	ETA-15/0740 (01/12/2016)	Screw-in high-density polyethylene (HDPE) anchor with the pin made of galvanized steel	Plate diameter: Ø 60 Ø nail: 8	0.97
WK THERM S	ETA-13/0724 (14/05/2018)	Screw-in polyamide anchor with the pin made of galvanized steel.	Plate diameter: Ø 60 Ø nail: 8	0.6
KLIMAS WKRET-MET SCREW-IN PLUG ECO-DRIVE	ETA-13/0107 (09/02/2023)	Screw-in polyamide with the pin made of galvanized steel.	Plate diameter: Ø 60 Ø nail: 8	0.6

⁽¹⁾ Other anchors can be used, provided they have plate dimension and stiffness equal or higher than those reported in this table.

FASSATHERM RESPHIRA

Product Description – Anchors product characteristics

**Annex A3
of ETA N° 23/0884**

Table B1: Reaction to fire of ETICS

Configuration	Organic content of the rendering system [%]	Flame retardant content of the rendering system [%]	Maximum thickness [mm]	Class
FASSATHERM RESPHIRA: - Adhesive/base coat: A96 RESPHIRA - Insulation max thickness: 200 mm, max density: $20 \pm 6\%$ kg/m ³ - Reinforcement glass fiber: FASSANET 160 - Key coat: FA 249 - Finishing coat: RTA 549	Base coat: 2.5 Finishing coat: 13.4	No flame retardant	200	B – s1, d0
FASSATHERM RESPHIRA all configurations with thermal insulation max density 20 kg/m ³	B – s1, d0			

FASSATHERM RESPHIRA

Performances – Reaction to fire

Annex B1
of ETA N° 23/0884

Table B2: Water absorption of the base coat and the rendering system

Product/Configuration	after 1 hour		after 24 hours	
	< 1.0 kg/m ²	≥ 1.0 kg/m ²	< 0.5 kg/m ²	≥ 0.5 kg/m ²
	Mean value		Mean value	
Reinforced base coat	0.065	not applicable	not applicable	0.704
Rendering system made of: - base coat A96 Resphira - reinforcement: Fassanet 160 - key coat: FS 412 - finishing coat: RSR 421	0.0031	not applicable	0.367	not applicable
Rendering system made of: - base coat - key coat: FA 249 - finishing coat: RTA 549	0.020	not applicable	0.298	not applicable
Rendering system made of: - base coat - key coat: FX 526 - finishing coat: RX 561	0.019	not applicable	0.117	not applicable

Table B3: Impact test

Reinforced base coat with finishing coats	Key coat and finishing coat	Results			
		Impact Energy [J]	Maximum impact diameter [mm]	Damage	Impact resistance category
	Key coat FA 249+ RTA 549 (1 mm)	3	30	Cracks	III
		10	40	Cracks	
	Key coat FX 526 RX 561 (1 mm)	3	26	Cracks	III
		10	50	Cracks	
	Key coat FS 412 + RSR 421 (1 mm)	3	22	Cracks	III
		10	30	Cracks	

FASSATHERM RESPHIRA

Performances – Water absorption of the base coat and of the rendering system and Impact resistance

**Annex B2
of ETA N° 23/0884**

Table B4: Water vapour permeability of the rendering system

Configuration	Key coat and finishing coat	Render system thickness [mm]	Equivalent air thickness s_d (mean value) [m]
Base coat A96 RESPHIRA with key coat and finishing coat	- RSR 421 + Desideri Velluto	10.0	$0.6 \leq 2$
	- RTA 549	10.0	$0.4 \leq 2$
	- RX 561	12.0	$0.6 \leq 2$

Table B5: Bond strength

Configuration	Tested thickness of adhesive [mm]	Failure mode ⁽¹⁾ [%]	Mean value [kPa]	Minimum value [kPa]
Bond strength between base coat and insulation product TR150				
under dry conditions	6	80 Cs 20 Aa-s	138	132
After freeze-thaw cycles	6	100 Aa-s	97	81

⁽¹⁾ Cs Cohesive failure into substrate (concrete or insulation)
Aa-s Adhesive failure between adhesive and insulation

Table B6: Freeze-thaw behaviour of ETICS

Product/Configuration	Results after 30 cycles of freeze-thaw cycles
Rendering system made of: - insulation EPS RESPHIRA - base coat A96 RESPHIRA	The system with basecoat 6mm is freeze-thaw resistant.
Rendering system made of: - insulation EPS RESPHIRA - base coat A96 RESPHIRA - finishing coat: RTA 549	No performance assessed
Rendering system made of: - insulation EPS RESPHIRA - base coat A96 RESPHIRA - finishing coat: RSR 421	No performance assessed
Rendering system made of: - insulation EPS RESPHIRA - base coat A96 RESPHIRA finishing coat: RX 561	No performance assessed

FASSATHERM RESPHIRA

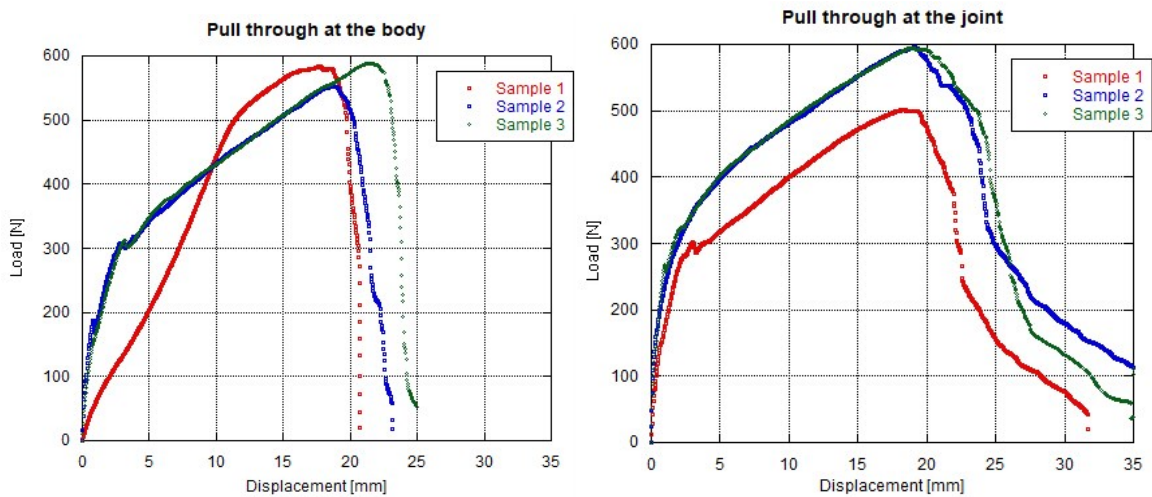
Performances – Water vapour permeability of the rendering system, bond strength and freeze-thaw resistance

**Annex B3
of ETA N° 23/0884**

Table B7: Pull-through tests of fixings

Characteristics of components				
Anchors	Trade name		Apply to all anchors listed in the Annex A3	
	Plate diameter [mm]		60	
	Plate stiffness [kN/mm]		≥ 0.6	
Characteristics of EPS panels	Thickness [mm]		≥ 60	
	Tensile strength perpendicular to the face [kPa] in dry condition		≥ 100	
Pull-through test in dry condition				
Failure load [N]	Anchors not placed at the panel joints	R_{panel} Minimum: 553 Average: 575	Anchors placed at the panel joints	R_{joint} Minimum: 501 Average: 564

Figure B1 – Load-displacement graph of pull through tests in dry conditions at the body and at the joint



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Performances – Pull-through tests of fixings

Annex B4
of ETA N° 23/0884

Table B8: Bond strength after ageing of base coat tested on the rig

Configuration	Failure mode ⁽¹⁾ [%]	Individual value [kPa]	Mean Value [kPa]
Insulation Base coat	60 Cs 40 Aa-s	172	160
		172	
		140	
		164	
		172	

⁽¹⁾ Cs Cohesive failure into substrate (concrete or insulation)
Aa-s Adhesive failure between adhesive and insulation

Table B9: Bond strength after ageing of finishing coats tested on the rig

Configuration	Failure mode ⁽¹⁾ [%]	Individual value [kPa]	Mean Value [kPa]
Insulation Base coat with key coat FA 249 and Finishing coat: RTA 549	60 Aa-s 40 Cs	164	180
		164	
		196	
		172	
		200	
Insulation Base coat with key coat FS 412 and Finishing coat: RSR 421	60 Aa-s 40 Cs	184	190
		172	
		176	
		196	
		204	
Insulation Base coat with key coat FX 526 and Finishing coat: RX 561	60 Aa-s 40 Cs	204	170
		164	
		164	
		168	
		164	

⁽¹⁾ Cs Cohesive failure into substrate (concrete or insulation)
Aa-s Adhesive failure between adhesive and insulation

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Performances – Bond strength after ageing

**Annex B5
of ETA N° 23/0884**

Table B10: Tensile strength of the glass fibre mesh

Tensile strength of the glass fibre mesh										
Product	As-delivered state				After ageing					
	Tensile strength [N/mm]		Elongation [%]		Tensile strength [N/mm]		Residual tensile strength [%]		Elongation [%]	
	warp	weft	warp	weft	warp	weft	warp	weft	warp	weft
FASSANET 160	43	53	3.7	4.4	35	44	81	83	3.1	3.5

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Performances – Tensile strength of the glass fibre mesh

Annex B6
of ETA N° 23/0884

Table B11: Thermal resistance and thermal transmittance of ETICS

Product	Minimum thickness [mm]	Thermal resistance [m ² K/W]
EPS RESPHIRA	60	2.0
<p>The additional thermal resistance provided by the ETICS (R_{ETICS}) to the substrate wall is calculated from the thermal resistance of the thermal insulation product ($R_{insulation}$), determined in accordance with 2.2.23.1, and from either the tabulated R render value of the render system (R_{render} is about 0.02 m²K/W) or R_{render} determined by test according to EN 12667 or EN 12664 (depending on expected thermal resistance).</p> $R_{ETICS} = R_{insulation} + R_{render} \text{ [(m}^2\cdot\text{K)/W]}$ <p>as described in EN ISO 10456.</p> <p>The thermal bridges caused by mechanical fixing devices influence the thermal transmittance of the entire wall and shall be taken into account using the following calculation:</p> $U_c = U + \Delta U \text{ [W/(m}^2\cdot\text{K)]}$ <p>With: U_c corrected thermal transmittance of the entire wall, including thermal bridges U thermal transmittance of the entire wall, including ETICS, without thermal bridges</p> $U = \frac{1}{R_{ETICS} + R_{substrate} + R_{se} + R_{si}}$ <p>$R_{substrate}$ thermal resistance of the substrate wall [(m²·K)/W] R_{se} external surface thermal resistance [(m²·K)/W] R_{si} internal surface thermal resistance [(m²·K)/W] ΔU correction term of the thermal transmittance for mechanical fixing devices = $\chi_p \cdot n$ (for anchors) + $\sum \psi_i \cdot l_i$ (for profiles) (formula for U_c) χ_p point thermal transmittance value of the anchor [W/K]. If not specified in ETA for anchors, the following values apply: = 0.002 W/K for anchors with a plastic screw/nail, stainless steel screw/nail with the head covered by at least 15 mm plastic material, or with a minimum 15 mm air gap at the head of the screw/nail. = 0.004 W/K for anchors with a galvanized carbon steel screw/nail with the head covered by at least 15 mm a plastic material or a minimum 15 mm air gap at the head of the screw/nail. = 0.008 W/K for all other anchors (worst case) n number of anchors per m². In case n is more than 16, the formula for U_c is not applied. ψ_i linear thermal transmittance value of the profile [W/(m·K)] l_i length of the profile per m².</p> <p>The influence of thermal bridges can also be calculated as described in EN ISO 10211. It shall be calculated according to this standard if there are more than 16 anchors per m² foreseen. The declared χ_p - values do not apply in this case.</p>		
FASSATHERM RESPHIRA		Annex B7 of ETA N° 23/0884
Performances – Thermal resistance and thermal transmittance of ETICS		