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European Organisation for
Technical Assessment
Organisation Européenne pour
l'évaluation technique

European Technical Assessment

ETA 16/0932 of 03.01.17

(English language translation prepared by ITC CNR; original version in Italian)

GENERAL PART

Trade name of the construction product

FASSATHERM WOOD

Product family to which the construction product belongs

External Thermal Insulation Composite System with renderings for the use on timber frame buildings

Manufacturer

**Fassa S.r.l.
Via Lazzaris, 3 - I - 31027 Spresiano TV - Italy**

Manufacturing plant(s)

**Fassa S.r.l.
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This European Technical Assessment contains

12 pages

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

EAD 040089-00-04.04

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SPECIFIC PARTS

1. TECHNICAL DESCRIPTION OF THE PRODUCT

According to EAD 040089-00-04.04 (called EAD in the following text), the kit “FASSATHERM WOOD” realizes an External Thermal Insulation Composite Systems (ETICS) with renderings to be applied on timber frame buildings with external boards.

The insulation products are limited to EPS (hEN 13163) and to MW (hEN 13162) and, according to 1.2.1 of EAD, they are mounted on external boards on which they are mechanically fixed with the use of supplementary adhesive (required bonded surface: at least 40%). The external boards can be: wood-based panels (organic bonding), cement bonded particle boards, fibre-cement panels (cement bonded fibre boards), gypsum bonded particle boards, gypsum plaster boards, fibre-gypsum panels (gypsum bonded fibre boards) and similar products.

The mechanical fixings are anchors.

The insulation product is faced with a rendering consisting of two layers, one of which contains reinforcement. The rendering is applied directly to the insulating panels, without any air gap or disconnecting layer. The ETICS is totally site applied.

The ETICS include special fittings (e.g. base profiles, corner profiles, ...) to connect it to adjacent building structures (apertures, corners, parapets, etc, ...).

The ETICS comprises components which are factory-produced by the ETA-holder or by the components' suppliers. ETICS are designed and installed in accordance with the ETA Holder's design and installation instructions.

The kit comprises the components described in the following Table 1 which are factory-made by the ETA Holder or by his suppliers. The ETA Holder is ultimately responsible for the kit.

The components of the kit are specified by the ETA Holder as follows:

	Component	Trade name	Installation information	
			Coverage	Thickness
Insulation material with associated method of fixing	Mechanically fixed ETICS with supplementary adhesive			
	Insulation product 1 (expanded polystyrene panels) (see further description at § 4.1)	“EPS 100” ¹	//	min: 60 mm max: 300 mm
	Insulation product 2 (mineral wool panels) (see further description at § 4.2)	“Mineral Wool” ²	//	min: 100 mm max: 200 mm
	Adhesive (cement ³ based powder requiring addition of 25- 27 % of water); particle size: 1.2 mm	“A96” ⁴	3 - 4 kg/m ²	//
	Anchors (plastic sleeve with a collar and a galvanized steel screw). Length: different, in relation to insulation thickness	“Fassa Wood Fix” ⁵	//	Ø of the collar: 60 mm Ø of the nail: 6 mm
Base coat	Cement⁶ based powder requiring addition of 25- 27 % of water); particle size: 1.2 mm	“A96” ⁷	6 – 7 kg/m ²	4.0 - 6.0 mm

¹ Manufacturer: Ecoespansi S.r.l.

² Manufacturer: Knauf Insulation S.p.A.

³ CEM I 52.5 R

⁴ Manufacturer: Fassa S.r.l.

⁵ Manufacturer: Ejot GmbH.

⁶ CEM I 52.5 R

⁷ Manufacturer: Fassa S.r.l.

Reinforcement	Glass fibre mesh (mesh size: 3.8 x 4.15 mm)	“Fassanet 160” ⁸	//	//
Key coat 1 for finishing coat 1	Watery solution of acril-silicon resins	“FX526” ⁹	0.10-0.15 l/m ²	100 -120 µ
Key coat 2 for finishing coat 2	Watery solution of silicon resins	“FS 412” ¹⁰	0.10-0.15 l/m ²	100 -120 µ
Finishing coat 1 to be used on EPS	Ready to use paste based on acril-silicon resin - particle size: 1.0, 1.5, 2.0 mm	“RX 561” ¹¹	2 – 4 kg/m ² (prepared product)	1.0 - 2.0 mm
Finishing coat 2 to be used on MW	Ready to use paste based on siliconic resin particle size: 1.0, 1.5, 2.0, 3.0 mm	“RSR 421” ¹²	2 - 4 (prepared product)	1.0 - 3.0 mm
Ancillary materials	Base profiles in aluminium U profiles (length 250 cm - different sections)	“Profilo di partenza con gocciolatoio” ¹³	//	1
	Corner profiles in PVC L profiles + mesh (length 250 cm – different sections)	“Paraspigolo in PVC con rete” ¹⁴	//	1

Tab 1: Components of the kit

2. SPECIFICATION OF THE INTENDED USE IN ACCORDANCE WITH EUROPEAN ASSESSMENT DOCUMENT N° EAD 040089-00-04.04

“FASSATHERM WOOD” in its alternatives is intended for use as external thermal insulation composite system with renderings to be applied on timber frame buildings. The insulation products are limited to EPS (hEN 13163), MW (hEN 13162); according to EAD, the external boards on which FASSATHERM WOOD can be applied are: wood-based panels (organic bonding), cement bonded particle boards, fibre-cement panels (cement bonded fibre boards), gypsum bonded particle boards, gypsum plaster boards, fibre-gypsum panels (gypsum bonded fibre boards).

The kit can be used on vertical walls. It can also be used on horizontal or inclined surfaces which are not exposed to precipitation. It is made of non load-bearing construction elements and the installed system 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 installed system is not intended to ensure the air tightness of the building structure.

The provisions made in this ETA are based on an assumed intended working life of at least 25 years, provided that the conditions laid down in section 2.2, 2.3, 2.4 of this ETA for the 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 or by the Assessment Body, but should only be regarded as a mean for choosing the appropriate products in relation to the expected economically reasonable working life of the works.

⁸ Manufacturer: Gavazzi Tessuti Tecnici S.p.A.

⁹ Manufacturer: Fassa S.r.l.

¹⁰ Manufacturer: Fassa S.r.l.

¹¹ Manufacturer: Fassa S.r.l.

¹² Manufacturer: Fassa S.r.l.

¹³ Manufacturer: VWS Befestigungstechnik GmbH.

¹⁴ Manufacturer: VWS Befestigungstechnik GmbH.

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

The tests for the assessment of the performances of "FASSATHERM WOOD" were carried out according to the tests mentioned in EAD; the performances are valid only if the kit's components are exactly the ones mentioned at § 1 of this ETA.

3.1 SAFETY IN CASE OF FIRE

3.1.1 Reaction to fire "FASSATHERM WOOD" with EPS

The reaction to fire has been determined according with § 2.2.1.1 and to Annex A of EAD; the following test were performed:

- SBI test
- Test according to EN 11925-2

The system, as defined under clause 1, reached the following Euroclass according to EN 13501-1:

	Organic content of the rendering system (%)	Flame retardant content of the rendering system (%)	Maximum thickness (mm)	Class
FASSATHERM WOOD on EPS, with Base coat A96 + finishing coat RX561 (1 mm and 2 mm)	base coat: 3% finishing coat: 9.50%	0	200	B- s2, d0

Tab. 2: Reaction to fire FASSATHERM WOOD with EPS

Mounting and fixing

(for all end use applications given in 2 of this ETA)

The assessment of reaction to fire is based on tests with a maximum insulation layer thickness of SBI/200 mm, a minimum insulation layer thickness of SBI/40 mm, EN 11925-2/60 mm and a maximum insulation material (EPS) density of 16.5 kg/m³, as well as a rendering system with a maximum organic content of 12.50% and a thickness of 7 mm. For the SBI test the system was mounted directly to wooden particle boards (D-s2, d0) with a minimum density of 630 kg/m³.

The mounting of the specimen was carried out at ITC-CNR Laboratory by the Manufacturer following the specifications given in his ETA Technical Dossier and in his Recommendations, using a single layer of the glass fibre mesh all over the specimen (without overlapping the mesh). The specimen included anchors; the panel edges were rendered, excluding the bottom edge and the top of the specimen.

Extended application

The test result covers arrangements with:

- base coats and finishing coats:
 - with equal or less organic content,
 - with thickness between those evaluated in the test if the organic content is higher than 5%.
- key coats:
 - with equal or less organic content,
- adhesives:
 - with equal or less organic content and equal or less thickness if the organic content is to or less than 15%,
- reinforcements:
 - with an equal or less PCS_S-value per unit area
 - with equal or higher weight per unit area.
- External boards: according to § 5.3.2.3 of EN 13238, the result can be extend to the following substrates: cement bonded particle boards, fibre-cement panels (cement

bonded fibre boards), gypsum bonded particle boards, gypsum plaster boards, fibre-gypsum panels (gypsum bonded fibre boards).

3.1.2 Reaction to fire “FASSATHERM WOOD” with MW

The reaction to fire has been determined according with § 2.2.1.1 and to Annex A of EAD; the following test were performed:

- SBI test
- Test according to EN 11925-2
- Test for determination of gross heat of combustion (calorific value), according to § 3 of EAD.

The system, as defined under clause 1, reached the Euroclass according to EN 13501-1.

	Organic content of the rendering system (%)	Flame retardant content of the rendering system (%)	Maximum thickness (mm)	Class
FASSATHERM WOOD with MW A96 + RSR 421 (1 mm and 3 mm)	base coat: 3% finishing coat: 9.80%	0	200	A2 – s1, d0

Tab. 3: Reaction to fire FASSATHERM WOOD with MW

Mounting and fixing

(for all end use applications given in 2 of this ETA)

The assessment of reaction to fire is based on tests with a maximum insulation layer thickness of SBI/200 mm, EN 11925-2/60 mm and a maximum insulation material (MW) density of 130 kg/m³, as well as a rendering system with a maximum organic content of 12.80% and a thickness of 7 mm. For the SBI test the system was mounted directly to a wooden particle boards (D-s2, d0) with a minimum density of 630 kg/m³.

The mounting of the specimen was carried out at ITC-CNR Laboratory by the Manufacturer following the specifications given in his ETA Technical Dossier and in his Recommendations, using a single layer of the glass fibre mesh all over the specimen (without overlapping the mesh). The specimen didn't include any joints; the panel edges were rendered, excluding the bottom edge and the top of the specimen.

Extended application

The test result covers arrangements with:

- base coats and finishing coats:
 - with equal or less organic content,
 - with thickness between those evaluated in the test if the organic content is higher than 5%.
- key coats:
 - with equal or less organic content,
- adhesives:
 - with equal or less organic content and equal or less thickness if the organic content is to or less than 15%,
- reinforcements:
 - with an equal or less PCS_S-value per unit area
 - with equal or higher weight per unit area.
- External boards: according to § 5.3.2.3 of EN 13238, the result can be extend to the following substrates: cement bonded particle boards, fibre-cement panels (cement bonded fibre boards), gypsum bonded particle boards, gypsum plaster boards, fibre-gypsum panels (gypsum bonded fibre boards).

3.2 HYGIENE, HEALTH AND THE ENVIRONMENT

3.2.1 Water absorption (capillarity test)

The water absorption has been determined in accordance with § 2.2.2.1 of EAD.

Water absorption of base coat on Insulation Products	after 1 hour	after 24 hours
Base coat "A96" on EPS	< 1.0 kg/m ²	< 0.5 kg/m ²
Base coat "A96" on MW	< 1.0 kg/m ²	< 0.5 kg/m ²

Tab. 4: Water absorption of base coat on all the insulation products

Water absorption of	after 1 hour	after 24 hours
Rendering system made of: - base coat "A96" on EPS - key coat "FX 526" - finishing coat "RX 561" (2 mm)	< 1.0 kg/m ²	< 0.5 kg/m ²
Rendering system made of: - base coat "A96" on MW - key coat "FS 412" - finishing coat "RSR 421"	< 1.0 kg/m ²	< 0.5 kg/m ²

Tab. 5: Water absorption of rendering systems

3.2.2 Water tightness: Hygrothermal behaviour_(heat-rain and heat-cold cycles)

In accordance with the method envisaged in § 2.2.2.2 of EAD, the kit has been applied on rig and the hygrothermal behaviour of the system has been assessed.

None of the following defects occurred:

- blistering or peeling of any paint finishing,
- failure or cracking associated with joints between insulation products boards or profiles fitted with the system,
- detachment of the render,
- cracking allowing water penetration to the insulation layer.

Assessment: the system "FASSATHERM WOOD" is resistant to hygrothermal cycles.

3.2.3 Water tightness: Moisture content and gradient

The moisture content and gradient has been determined in accordance with § 2.2.2.4 of EAD; according to EAD, the test was performed only on alternative with MW.

The test was performed on the system made of:

- base coat "A96" on MW
- key coat "FS 412"
- finishing coat "RSR 421".

Moisture content in	Percentage	Time
MW	2.3	Summer cycle
Wood	8.0	Summer cycle

Tab. 6: Moisture content

Moisture gradient in	Percentage	Time
MW	2.7	Winter cycle

Tab. 7: Moisture Gradient

Assessment: No cracking, no blistering, no peeling detachment of render and no loss of adhesion was observed neither during, nor at the end of climatic cycles.

3.2.4 Water vapour permeability (Resistance to water vapour diffusion)

The water vapour permeability has been determined in accordance with § 2.2.2.6 of EAD.

Water vapour permeability of the system	Equivalent air thickness (m)
Rendering system made of: - base coat "A96" on EPS - key coat "FX 526" - finishing coat "RX 561" (2 mm)	0.50
Rendering system made of: - base coat "A96" on MW - key coat "FS 412" - finishing coat "RSR 421"	0.46

Tab. 8: Water vapour permeability

3.3 SAFETY IN USE

3.3.1 Bond strength between the base coat and the insulation products

The bond strength has been determined in accordance with § 2.2.3.1 of EAD.

Bond strength between:	
base coat "A96" and insulation products: EPS - under dry conditions - after ageing in the rig	≥ 0.08 MPa ≥ 0.08 MPa
base coat "A96" and insulation products: MW - under dry conditions - after ageing in the rig	≥ 0.08 MPa ≥ 0.08 MPa

Tab. 9: Bond strength between the base coat and the insulation products

3.3.2 Pull through: fixing strength for ETICS with EPS panels fixed with anchors fixed through the insulation only.

The following failure loads only apply to the listed combination (EPS panel's characteristics) / (anchor plate's characteristics FASSA WOOD FIX (EJOT STR-H) and the characteristics of the insulation product given in § 4.1 of this ETA.

Apply to anchors listed in Tab. 1 of this ETA mounted on the insulation EPS panels surface			
Characteristics of the insulation product	Thickness (mm)		≥ 60 mm
	Tensile strength perpendicular to the face (kPa)		≥ 150 kPa
	Shear modulus		≥ 1.00 N/mm ²
Plate diameter (mm)			≥ 60
Failure loads (N)	Anchors not placed at the panel joints (Pull-through test)	R_{panel}	Minimal: 742 Average: 753

Tab. 10: Failure loads (N)

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

Anchor	Thickness of EPS [d]	Conditions of installation
FASSA WOOD FIX (Ejot STR h)	100 mm > d ≥ 80 mm (for standard EPS)	- Maximum installation depth of the anchor plate: 15 mm (~ thickness of insulation cover) - Maximum depth of die: 5 mm
	≥ 100 mm (for standard EPS)	- Maximum installation depth of the anchor plate: 15 mm (~ thickness of insulation cover) - Maximum depth of die: 20 mm

Tab. 11: Conditions of installation

The wind load resistance of the ETICS R_d is calculated as follow:

$$R_d = (R_{\text{panel}} \times n_{\text{panel}}) / \gamma$$

where:

n_{panel} : number (per m^2) of anchors not placed at the panel joint

γ : national safety factor

3.3.3 Pull through: fixing strength for ETICS with MW panels fixed with anchors fixed through the insulation only

The tensile strength of MW insulation product in wet conditions is more than 80% of that determined in dry conditions, therefore the Pull-through test has been carried out in wet conditions according to § 2.2.3.8 /"28 days exposure" of EAD.

The following failure loads only apply to the listed combination (MW panel's characteristics) / (anchor plate's characteristics) and the characteristics of the insulation product given in § 4.2 of this ETA.

Apply to all anchors listed in Tab. 1 of this ETA mounted on the insulation panels surface			
Characteristics of the insulation product	Thickness (mm)		≥ 100 mm
	Tensile strength perpendicular to the face (kPa) in wet conditions		2.1 kPa
	Shear modulus		≥ 1.13 N/mm ²
Plate diameter (mm)			≥ 60
Failure loads (N)	Anchors not placed at the panel joints (Pull-through test)	R_{panel}	Minimal: 426 Average: 459

Tab. 12: Failure loads (N)

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

Anchor	Thickness of MW [d]	Conditions of installation
FASSA WOOD FIX (Ejot STR H)	≥ 100 mm (for standard MW)	– Maximum installation depth of the anchor plate: 15 mm (~ thickness of insulation cover) – Maximum depth of die: 20 mm

Tab. 13: Conditions of installation

The wind load resistance of the ETICS R_d is calculated as follow:

$$R_d = (R_{\text{panel}} \times n_{\text{panel}}) / \gamma$$

where:

n_{panel} : number (per m^2) of anchors not placed at the panel joint

γ : national safety factor.

3.3.4 Impact resistance

The tests have been performed on the rig after the hygrothermal cycles, in accordance with § 2.2.3.19 of EAD. The system was made with one single standard mesh. The resistance of the system to hard body impacts (3 Joules and 10 Joules) leads to the following description:

"FASSATHERM WOOD" in all its alternatives Single standard mesh	Rendering not cracked and not penetrated
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Tab. 14: Impact resistance of "FASSATHERM WOOD"

3.3.5 Bond strength after ageing

The bond strength of the system after ageing has been determined following the method envisaged in § 2.2.3.20 of EAD.

Bond strength after ageing on the rig	Level
Bond strength between rendering system and EPS insulation products	≥ 0.08 MPa
Bond strength between rendering system and MW insulation products	failure occurred into insulation

Tab. 15: Bond strength after ageing

3.4 ENERGY ECONOMY AND HEAT RETENTION

3.4.1 Thermal resistance

The thermal transmittance of the substrate wall covered by the ETICS is calculated in accordance with the standard EN ISO 6946:

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

Where:

$\chi_p \cdot n$ has only to be taken into account if it is greater than 0,04 W/(m².K);

U: global thermal transmittance of the covered wall (W/ (m².K));

n: number of anchors (through insulation product) per m²;

χ_p : local influence of thermal bridge caused by an anchor. The value listed below can be taken into account if not specified in the eventual anchor's ETA:

= 0.002 W/K for anchors with a stainless steel screw with the head covered by a plastic material and for anchors with an air gap at the head of the screw ($\chi_p \cdot n$ negligible for n < 20);

= 0.004 W/K for anchors with a galvanized steel screw with the head covered by a plastic material ($\chi_p \cdot n$ negligible for n < 10);

= negligible for anchors with plastic nails (reinforced or not with glass fibres ...).

U_c: thermal transmittance of the current part of the covered wall (excluding thermal bridges) (W/ (m².K)) determined as follows:

$$U_c = \frac{1}{R_i + R_{render} + R_{substrate} + R_{se} + R_{si}}$$

Where:

R_i: thermal resistance of the insulation product;

R_{render}: thermal resistance of the render (about 0.02 (m².K)/W);

R_{substrate}: thermal resistance of the substrate of the building (concrete, brick ...) ((m².K)/W);

R_{se}: external superficial thermal resistance ((m².K)/W);

R_{si}: internal superficial thermal resistance ((m².K)/W).

4. COMPONENT'S CHARACTERISTICS AND PARAMETERS¹⁵

The tests on components have been carried out in accordance with EAD.

4.1 INSULATION PRODUCT: EPS PANELS

Expanded Polystyrene panels with right edges. Their characteristics are given in the following table.

Characteristic	Test Method	Level/Class
Reaction to fire maximum thickness: 200 mm minimum density: 14.5 kg/m ³	EN 11925-2	Euroclass E (EN 13501-1)
Water absorption by partial immersion thickness: 60 mm density: 18 kg/m ³	EN 1609	0.065 kg/m ²
Water vapour permeability thickness: 60 mm	EN 12086	30.9 μ
Tensile strength	EN 1607	150 KPa
Shear strength	EN 12090	0.07 N/mm ²
Shear modulus of elasticity	EN 12090	1.32 N/mm ²
Conductivity (λ)	EN 12667	0.036 W/mK
Thermal resistance for the minimum thickness (60 mm)	EN 12667	1.7 m ² K/W
Dimensional stability (23° ± 2°C, 50 ± 5% RH)	EN 1603	< 0.2 % DS(N) 2 (EN 13163)
Dimensional stability (70° ± 2° C for 7 days)	EN 1604	< 0.5 % DS(70,-)1 (EN 13163)

Tab. 16: Characteristics of Insulation product "EPS"

4.2 INSULATION PRODUCT: MW PANELS

Mineral Wool panels with right edges. Their characteristics are given in the following table.

	Test Method	Level/Class
Reaction to fire - (EN 11925-2) thickness: 100 - 200 mm - density: 90 -130 kg/m ³	EN 11925-2	Euroclass A1
Water absorption after 24 hours (kg/m ²) thickness: 100 mm - density: 130 kg/m ³	EN 1609	≤ 1
Water vapour permeability (μ) thickness: 100 mm	EN 12086	4.43
Tensile strength (kPa)	EN 1607	4.0
Tensile strength in wet conditions (kPa) - after 7 days - after 28 days	§ 2.2.3.8 of EAD	2.4 2.1
Shear Strength (N/mm ²)	EN 12090	0.02
Shear Modulus of Elasticity (N/mm ²)	EN 12090	0.8
Conductivity (λ)	EN 12667	0.035 W/mK
Thermal resistance for the minimum thickness 100 mm	EN 12667	2.9 (m ² K/W)
Dimensional stability (23° ± 2°C, 50 ± 5% RH)	EN 1603	< 0.2 %
Dimensional stability (70° ± 2° C for 7 days)	EN 1604	< 0.5 %

Tab. 17 Characteristics of Insulation product "MW"

¹⁵ The ETA Holder could change, under his own responsibility, some of the suppliers of a component, but only provided that the characteristics and the performances of the new components and the final performances of the system do not change at all. These changes must be fully recorded within the Factory Production Control documents in order to grant full traceability.

4.3 RENDERING SYSTEM (BASE COAT + REINFORCEMENT)

4.3.1 Rendering system strip tensile test

The test has been carried out in accordance with § 2.2.3.12 of EAD.

Rendering system strain value	mean value of cracks in warp direction (mm)	mean value of cracks in weft direction (mm)
0.3 %	$0.10 < w \leq 0.15$	$0.10 < w \leq 0.15$
0.5 %	$0.10 < w \leq 0.15$	$0.10 < w \leq 0.15$
0.8 %	$0.15 < w \leq 0.20$	$0.10 < w \leq 0.15$
1.0 %	$0.10 < w \leq 0.15$	$0.10 < w \leq 0.15$
1.5 %	$0.15 < w \leq 0.20$	$0.10 < w \leq 0.15$
2.0 %	$0.15 < w \leq 0.20$	$0.10 < w \leq 0.15$
n° of cracks	17 (mean value)	18 (mean value)

Tab. 18: Rendering system strip tensile test results (w = crack's width)

4.4 REINFORCEMENT (GLASS FIBRE MESH)

The reinforcement is a glass fibre meshes with the performances given in the following Table.

Strength after ageing	Results
Residual strength after ageing	≥ 20 N/mm
Relative residual resistance (% after ageing) of strength in the as delivered state	≥ 50 % of the value at as delivered state

Tab. 19: Residual strength after ageing

4.5 MECHANICAL FIXINGS

4.5.1 Reaction to fire

According to TR21 § 2.1, the fixings have not to be tested separately; anyway the fixing were part of the samples subjected to SBI test.

4.5.2 Pull-out strength of mechanical fixings

The test has been carried out, in accordance with § 2.2.3.14 of EAD, on anchors.

External Boards typology	Minimum screw-in depth of anchor "FASSA WOOD FIX" (ejotherm STR H) (mm)	Rated value of pull-out resistance Fax,90,Rd (N)
Solid wood , glued laminated timber or laminated timber of coniferous specie	35 o 24 (screwed through)	940
OSB-panels	15 (screwed through)	490
Resin bonded particleboards	16 (screwed through)	560
Cement bonded particleboards	16 (screwed through)	560

Tab.: 20: Pull-out strength of mechanical fixings

4.5.3 Protection against corrosion

Corrosion protection of metal fasteners corresponds to the requirements of the intended service class (see EN 1995-1-1 and the corresponding reference standards). For especially corrosive conditions consideration should be given to heavier hot dip coatings or stainless steel.

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

According to Decision 1997/556/EC¹⁶ of the European Commission amended by the Decision 2001/596/EC, the AVCP (see Annex V to Regulation (EU) 305/2011) given in the following table applies.

Product	Intended use	Level or class (reaction to fire)	System
External thermal insulation composite systems/kits (ETICS) with rendering	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+

Tab. 16: AVCP system

⁽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).

Considering the Euroclass B for the reaction to fire and that no stage in production process has been identified that corresponds to an improvement of the reaction to fire classification, the system of Attestation of Conformity is System 2+ (see Annex V to Regulation (EU) 305/2011 for tasks and responsibilities).

6. Technical details necessary for the implementation of the AVCP system, as provided for in EAD 040089-00-04.04.

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

For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between ITC CNR and the Notified Body.

**Issued in San Giuliano Milanese, Italy on 03.01.2017
by ITC – CNR**

**Prof. ing Antonio Occhiuzzi
Head of Institute ITC – CNR**

¹⁶ Official Journal of the European Communities L 254 of 8.10.1996