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Designated according to Article 29 of Regulation (EU) No 305/2011

Member of EOTA
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# European Technical Assessment

# ETA 22/0427 of 14/09/2022

General Part

| | |
|---|---|
| **Technical Assessment Body issuing the ETA:** | **TECNALIA RESEARCH & INNOVATION** |
| **Trade name of the construction product** | FASSATHERM RIVESTO CLASSIC |
| **Product family to which the construction product belongs** | External thermal insulation composite system (ETICS) with panels as thermal insulation product and discontinuous cladding as exterior skin. |
| **Manufacturer** | **FASSA srl**<br>Via Lazzaris 3<br>IT-31027 Spresiano (TV), Italy |
| **Manufacturing plants** | Plant 1: Via Fornaci, 8<br>IT-31207 Spresiano (TV), Italy<br><br>Plant 2: Autovía del Mediterráneo, Sal. 537<br>E-04628 Antas (Almería), Spain |
| **This European Technical Assessment contains** | 18 pages including one Annex 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 040287-00-0404 Kits for external thermal insulation composite system (ETICS) with panels as thermal insulation product and discontinuous cladding as exterior skin. |

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

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Specific parts

## 1. Technical description of the product

This ETA refers to the external thermal insulation composite system with ceramic cladding on expanded polystyrene (EPS) board for use as external insulation of building walls.

This product is an ETICS (External Thermal Insulation Composite System) with rendering – a kit comprising components which are factory-produced by the manufacturer or component suppliers. The ETICS manufacturer is ultimately responsible for all components of the ETICS specified in this ETA (European Technical Assessment).

The FASSATHERM RIVESTO CLASSIC kit comprises a prefabricated insulation product of expanded polystyrene (EPS) to be bonded and mechanically fixed onto the wall. 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 layer (site applied), which contains a reinforcement mesh. The rendering is applied directly to the insulating panels, without any air gap or disconnecting layer. Finally, the ceramic cladding elements are fixed to the rendering by means of a ceramic adhesive and grout.

The ETICS may include special fittings (e.g. base profiles, corner profiles) to treat details such as connections, apertures, corners, parapets, sills, etc. Assessment and performance of these components is not addressed on 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.

The components of the kit are:

| | **Components** | **Coverage ($kg/m^2$)** | **Thickness (mm)** |
|---|---|---|---|
| | **ETICS fixed by adhesive with mechanical fixings (Fully adhered. Following the instructions of the ETA holder, the bonding surface must be 100% and with minimum 13 supplementary mechanical fixings per $m^2$. National application documents shall be taken into account).** | | |
| **Insulation material with associated method of fixing** | **Insulation product:** | | |
| | Factory prefabricated expanded polystyrene (EPS) board according to EN 13163 | ** | 60-200 |
| | **Adhesive:** | | |
| | **A96** Cement based mortar in powder, according to EN 998-1, requiring addition of 22%-27% water. | 6-10 | 10 (dry) |

| | Components | Coverage (kg/m²) | Thickness (mm) |
|---|---|---|---|
| **Base coat** | **A96** Cement based mortar in powder, according to EN 998-1, requiring addition of 22%-27% water. | 12-13 | 10 (dry) |
| **Glass fibre mesh** | **FASSANET ZR 185** Alkali resistant glass fibre mesh with mass per unit area of about 185 g/m² and mesh size of about 16.7 x 16.7 mm. | -- | -- |
| **Mechanical fixings** | Fixing **EJOT STR-U 2G** | -- | -- |
| | Fixing **FASSA TOP FIX 2G** | -- | -- |
| **Discontinuous cladding element** | **Ceramic tiles, according to EN 14411:** | | |
| | Ceramic tiles: Group AIa, BIa, BIb, AIIa; BIIa, AIIb, BIIb, BIII)<br>Dimensions: from 116 to 300 cm² | ≤17 | ≤10 |
| **Cladding adhesive** | **AT99 MAXYFLEX** Cement based adhesive in powder, according to EN 12004. Requiring addition of 26%-30% water. | 5-6 | 5 |
| | **FASSAFLEX** Cement based adhesive in powder, according to EN 12004. Requiring addition of 26%-29% water. | 5-6 | 5 |
| **Grout** | **FASSAFILL MEDIUM** Cement based grout in powder, according to EN 13888. Requiring addition of 18%-20% + **LATEX DR 843**[1]. | Regulated by joint width | ≤10 |
| **Ancillary materials** | **Supplementary profiles:** | | |
| | Polyvinyl chloride (PVC) or aluminium profiles for corners, expansion joints, junctions with doors and windows, balconies, etc.). | Remain under the ETA holder responsibility | |

**Table 1: Components FASSATHERM RIVESTO CLASSIC**

1. **LATEX DR 843.** Aqueous emulsion used instead of water in the mix FASSAFILL MEDIUM.

## 2. Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

### 2.1. Intended use

FASSATHERM RIVESTO CLASSIC is intended for use as external insulation of building walls. The walls are made of masonry (bricks, block, stones…) or concrete (cast on site or as prefabricated panels). The characteristics of the walls shall be verified prior to use of the ETICS, especially regarding conditions for reaction to fire classification and for fixing of the ETICS either by bonding or mechanically. The ETICS is designed to give the wall, to which it is applied, satisfactory thermal insulation.

The ETICS is made of non load-bearing construction elements. It does not contribute directly to the stability of the wall on which it is installed, but it can contribute to its durability by providing enhanced protection from the effect of weathering.

The ETICS can be used on new or existing (retrofit) vertical walls. It can also be used on horizontal or inclined surfaces which are not exposed to precipitation.

The ETICS is not intended to ensure the airtightness of the building structure.

The choice of the method of fixing depends on the characteristics of the substrate, which could need preparation and shall be done in accordance with the national instructions.

The provisions made in this ETA are based on an assumed working life of 25 years as minimum, provided that the conditions laid down in the sections below (manufacturing, transport, installation, use, maintenance, etc) are met. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, but should only be regarded as a means for choosing the appropriate products in relation to the expected economically reasonable working life of the works.

### 2.2. Manufacturing

The ETA is issued for FASSATHERM RIVESTO CLASSIC system, on the basis of agreed data/information, deposited at Tecnalia Research & Innovation, which identifies the ETICS that has been assessed and judged. Changes to the ETICS or the components or their production process, which could result in this deposited data/information being incorrect, shall be notified to Tecnalia Research & Innovation before the changes are introduced. Tecnalia Research & Innovation will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and, if so, whether further assessment or alterations to the ETA shall be necessary.

### 2.3. Design and installation

Installation. The ETICS is installed on site. The installation instructions, including special installation techniques and provisions for the qualification of the personnel, are given in the manufacturer´s technical documentation. It is responsibility of the manufacturer to guarantee that the information about design and installation is easily accessible to the concerned people.

This information can be given using reproductions of the respective parts of the ETA. Besides, all the data concerning the execution shall be clearly indicated on the packaging and/or the enclosed instruction sheets, using one or several illustrations.

The wall on which the FASSATHERM RIVESTO CLASSIC system is applied shall be sufficiently stable and airtight. Its stiffness shall be large enough to ensure that the ETICS is not subjected to deformations, which could lead to damage.

Design. In any case, the user shall comply with the national regulations and particularly concerning fires and wind load resistance. Only the components described in Table 1 with characteristics according to Annex 1 of this ETA can be used for the ETICS.

The works including the details (connection, joint…) shall be designed to avoid water penetration behind the system. The minimal surface area for the bonded ETICS, and the method of bonding shall comply with the characteristics of the ETICS as well as the national regulations. In any case, the bonded surface shall be 100% with a minimum of 13 supplementary fixing per $m^2$.

Execution. The recognition and preparation of the substrate as well as the generalities about execution of the ETICS shall be carried out in compliance with:

- Manufacturer recommendations, with imperative removal of any existing paint finish or renders which may reduce the bond resistance of the system.
- Corresponding national regulations.
- The particularities in execution linked to the method of bonding/mechanical fixing and the application of the rendering system shall be handled in accordance with manufacturer prescriptions. In particular it is suitable to comply with the quantities of rendering applied, the thickness regularity and the drying periods between layers.

### 2.4. Packaging, transport and storage

The information on packaging, transport and storage is given in the manufacturer's technical documentation. It is responsibility of the manufacturer to ensure that this information is easily accessible for the concerned people.

### 2.5. Use, maintenance and repair

The finishing coat shall normally be maintained in order to fully preserve the ETICS's performance. Maintenance includes at least:

- Visual inspections of the ETICS.
- The repairing of localised damaged areas due to accidents.

Necessary repairs should be performed as soon as the need has been identified.

It is important to be able to carry out maintenance as far as possible using readily available products and equipment, without spoiling appearance. Only products which are compatible with the ETICS shall be used.

The information on use, maintenance and repair is given in the manufacturer's technical documentation. It is the responsibility of the manufacturer to ensure that this information is made know to the concerned people.

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

The identification tests and the assessment according to the Basic Requirements for the intended use of FASSATHERM RIVESTO CLASSIC system, were carried out in compliance with the European Assessment Document EAD 040287-00-0404 “Kits for external thermal insulation composite system (ETICS) with panels as thermal insulation product and discontinuous cladding as exterior skin”.

### Safety in case of fire (BWR 2)

3.1 Reaction to fire (EAD 040287-00-0404, Clause 2.2.1)

The reaction to fire of FASSATHERM RIVESTO CLASSIC, according to EN 13501-1 is class B-s1, d0.

Note: A European reference fire scenario has not been laid down for facades. In some Member States, the classification of ETICS according to EN 13501-1 might not be sufficient for the use in facades. An additional assessment of ETICS according to national provisions (e.g. on the basis of a large-scale test) might be necessary to comply with Member State regulations, until the existing European classification system has been completed.

3.2 Façade fire performance (EAD 040287-00-0404, Clause 2.2.2)

Performance not assessed.

### Hygiene, health and environment (BWR 3)

3.3 Water absorption (EAD 040287-00-0404, Clause 2.2.3)

| FASSATHERM RIVESTO CLASSIC SYSTEM | Water absorption (kg/m²) | | |
|---|---|---|---|
| | After 3 min | After 1 h | After 24 h |
| Without skin | 0 | 0.134 | 0.394 |
| With skin | 0 | 0.042 | 0.307 |

**Table 2**

3.4 Water vapour permeability (resistance to water vapour diffusion) (EAD 040287-00-0404 Clause 2.2.4)

The equivalent resistance to water vapour diffusion of the ETICS systems has been assessed by calculation following the calculation method stated in EAD 040287-00-0404 Annex D (using water vapour permeability of individual components of the ETICS).

The resistance to water vapour diffusion (Z) and the water vapour diffusion-equivalent air layer thickness ($S_d$) of the components of the FASSATHERM RIVESTO CLASSIC ETICS are the following:

| FASSATHERM RIVESTO CLASSIC Components | | Thickness (mm) | μ | Z ($m^2$.s.Pa)/kg) | Sd (m) |
|---|---|---|---|---|---|
| **Adhesive** | **A96** | 10 | 25 | $1.0x10^9$ | 0.2 |
| **Insulation** | **EPS** | 60-200 | 20-40 | $6.0x10^9$- $2.0 x10^{10}$ | 1.2 -4 |
| **Base coat** | **A96 + mesh FASSANET ZR 185** | 10 | 25 | $1.0x10^9$ | 0.2 |
| **Cladding adhesive** | **AT 99 MAXYFLEX/FASSAFLEX** | 5 | 5-20 | $1.3x10^8$- $5.0 x10^8$ | 0.025 – 0.1 |
| **Ceramic cladding** | **Ceramic tile** | 10 | ∞ | $4.0x10^{11}$- $7.5 x10^{11}$ | 80 - 150 |
| **Grout** | **FASSAFILL MEDIUM** | 10 | 15-35 | $7.5x10^8$- $1.0 x10^9$ | 0.15- 0.2 |

**Table 3**

The minimum and maximum values of the resistance to water vapour diffusion (Z) calculated for FASSATHERM RIVESTO CLASSIC ETICS are the following:

| ETICS | $Z_{min}$ ($m^2$.s.Pa)/kg) | $Z_{max}$ ($m^2$.s.Pa)/kg) |
|---|---|---|
| **FASSATHERM RIVESTO CLASSIC** | $9.1x10^9$ | $2.4x10^{10}$ |

**Table 4**

3.5 Accelerated ageing behaviour

3.5.1 Hygrothermal behaviour (EAD 040287-00-0404 Clause 2.2.5.1)

The hygrothermal performance of FASSATHERM RIVESTO CLASSIC ETICS has been assessed on the wall.

None of the following defects occurred on the assessed skins or the base coat during and after the hygrothermal cycles:

- Deterioration such as cracking or delamination of the skin that allows water penetration to the internal layers.
- Deterioration or cracking of grout.
- Detachment of the skin.
- Irreversible deformation.

Therefore, the ETICS is considered resistant to hygrothermal cycles.

Mean values of the measured bond strength (according to clause 2.2.5.1 of EAD 040287-00-0404) before and after hygrothermal cycles are given in Table 6.

3.5.2 Freeze-thaw behaviour (EAD 040287-00-0404 Clause 2.2.5.2)

Water absorption of the base coat with the skin is lower than 0.5 kg/m$^2$ after 1 hour and 24 hours. Based on these test results, the FASSATHERM RIVESTO CLASSIC system can be considered freeze-thaw resistant and there is no need for further testing.

**Safety and accessibility in use (BWR 4)**

3.6 Wind load resistance EAD 040287-00-0404 Clause 2.2.6)

Not relevant for FASSATHERM RIVESTO CLASSIC ETICS.

3.7 Impact resistance (EAD 040287-00-0404 Clause 2.2.7)

| ETICS | Impacts | Test result | Use category (*) |
|---|---|---|---|
| **FASSATHERM RIVESTO CLASSIC SYSTEM** | Hard body (0.5 kg), 3 Joules impacts | No defects | I |
| | Hard body (1.0 kg), 10 Joules impacts | No defects | |
| | Soft body (3.0 kg), 60 Joules impact | No defects | |
| | Soft body (50.0 kg), 400 Joules impact | No defects | |

**Table 5**

(*) Category I: This category means that the degree of exposure in use should be a zone readily accessible at ground level to the public and vulnerable to hard body impacts but not subjected to abnormally rough use.
Category II: This category means that the degree of exposure in use should be a zone liable to impacts from thrown or kicked objects, but in public locations where the height of the kit will limit the size of the impact; or at lower levels where access to the building is primarily to those with some incentive to exercise care.
Category III: This category means that the degree of exposure in use should be a zone not likely to be damaged by normal impacts caused by people or by thrown or kicked objects.
Category IV: This category means that the degree of exposure in use should be a zone out of reach from ground level.

## 3.8 Bond strength

### 3.8.1 Bond strength between skin, reinforced base coat and insulation material (EAD 040287-00-0404 Clause 2.2.8)

| FASSATHERM RIVESTO CLASSIC SYSTEM | Ageing | Mean value (MPa) | Minimum value (MPa) | Rupture (*) | Ratio (%) (**) |
|---|---|---|---|---|---|
| **EPS panel + base coat A96 + mesh FASSANET ZR 185 + cladding adhesive AT99 MAXYFLEX/FASSAFLEX + ceramic tile + grout FASSAFIL MEDIUM** | In dry conditions | 0.087 | 0.084 | 100% CS | … |
| | After 2 d. in $H_2O$ + 2 h drying | 0.082 | 0.081 | 80% CS 20% CA | 94 |
| | After 2 d. in $H_2O$ + 7 d. drying | 0.084 | 0.083 | 100% CS | 97 |
| | After hygrothermal cycles | 0.080 | 0.064 | 100% CS | 92 |
| | After freeze-thaw cycles | According to water absorption test results, system can be considered freeze-thaw resistant | | | |

**Table 6**

(*) Rupture Type: AS = adhesive rupture. CS = cohesive rupture in support. CA = cohesive rupture in adhesive.
(**) Value after ageing vs. value in dry conditions.

### 3.8.2 Bond strength between insulation material and adhesive (EAD 040287-00-0404 Clause 2.2.8)

| FASSATHERM RIVESTO CLASSIC SYSTEM | Ageing | Mean value (MPa) | Minimum value (MPa) | Rupture (*) | Ratio (%) (**) |
|---|---|---|---|---|---|
| **Adhesive A96 + EPS panel** | In dry conditions | 0.087 | 0.080 | 100% CS | … |
| | After 2 d. in $H_2O$ + 2 h drying | 0.080 | 0.071 | 100% CS | 91 |
| | After 2 d. in $H_2O$ + 7 d. drying | 0.084 | 0.068 | 80% CS 20% CA | 97 |

**Table 7**

(*) Rupture Type: AS = adhesive rupture. CS = cohesive rupture in support. CA = cohesive rupture in adhesive.
(**) Value after ageing vs. value in dry conditions.

3.8.3 Bond strength between substrate and adhesive (EAD 040287-00-0404 Clause 2.2.8)

| FASSATHERM RIVESTO CLASSIC SYSTEM | Ageing | Mean value (MPa) | Minimum value (MPa) | Rupture (*) | Ratio (%) (**) |
|---|---|---|---|---|---|
| **Concrete substrate + adhesive A96** | In dry conditions | 0.906 | 0.851 | 100% CA | … |
| | After 2 d. in $H_2O$ + 2 h drying | 0.791 | 0.786 | 100% CA | 87 |
| | After 2 d. in $H_2O$ + 7 d. drying | 0.913 | 0.870 | 100% CA | 101 |

**Table 8**

(*) Rupture Type: AS = adhesive rupture. CS = cohesive rupture in support. CA = cohesive rupture in adhesive.
(**) Value after ageing vs. value in dry conditions.

3.9 Tensile strength of thermal insulation panel (EAD 040287-00-0404 Clause 2.2.9)

Tensile strength of thermal insulation panels in dry conditions has been obtained from the DoP of the thermal insulation panels according to EN 13163. See Annex 1 for declared values.

Tensile strength of thermal insulation panels in wet conditioning has not been assessed.

3.10 Shear strength and shear modulus of thermal insulation panel (EAD 040287-00-0404 Clause 2.2.10)

See Annex 1 for values of shear strength and shear modulus of thermal insulation panel in dry conditions.

Shear strength and shear modulus of thermal insulation panel in wet conditioning has not been assessed.

3.11 Dead load behaviour (EAD 040287-00-0404 Clause 2.2.11)

Maximum dead load applied has been 500 N and the maximum difference of displacement has been 0,21 mm. Deflection curves in function of time for FASSATHERM RIVESTO CLASSIC are the following:

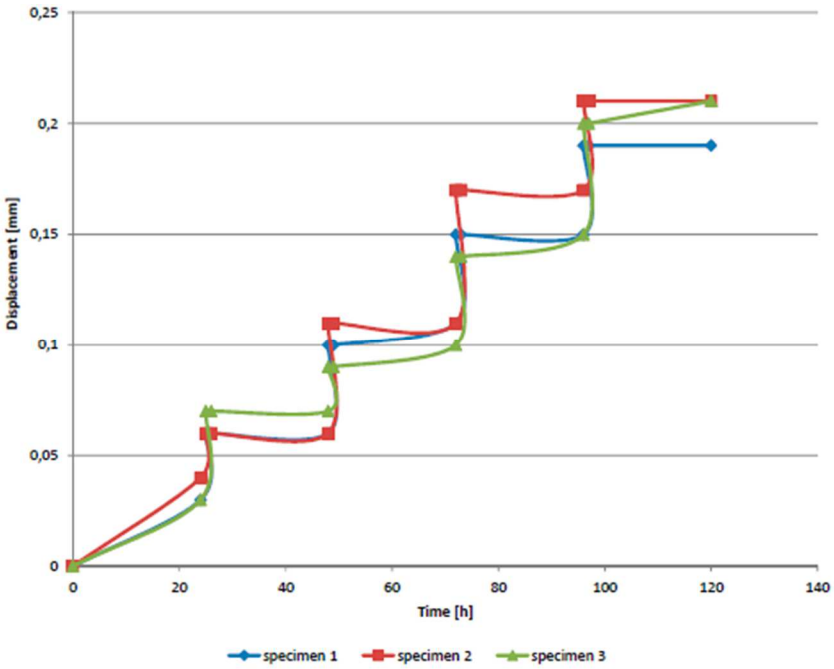


**Figure 1: Deflection curve in function of time**

3.12 Pull-through resistance (EAD 040287-00-0404 Clause 2.2.12)

Not relevant.

3.13 Pull-out resistance (foam block test) (EAD 040287-00-0404 Clause 2.2.13)

Not relevant.

**Protection against noise (BWR 5)**

3.14 Improvement of airborne sound insulation (EAD 040287-00-0404 Clause 2.2.14)

No performance assessed.

## Energy economy and heat retention (BWR 6)

3.15 Thermal conductivity and thermal resistance (EAD 040287-00-0404 Clause 2.2.15)

Thermal resistance (R) of the FASSATHERM RIVESTO CLASSIC SYSTEM has been calculated using the thermal values and geometry of the components of the system (see Annex 1) according to the section 6.2 of EN ISO 6946 and the Annex K of EAD 040287-00-0404.

| FASSATHERM RIVESTO CLASSIC | Minimum value $R_{ETICS}$ $(m^2.K)/W$) | Maximum value $R_{ETICS}$ $(m^2.K)/W$) |
|---|---|---|
| **FASSATHERM RIVESTO CLASSIC SYSTEM (standard EPS)** | 1.71 | 5.60 |
| **FASSATHERM RIVESTO CLASSIC SYSTEM (EPS with graphite)** | 1.98 | 6.50 |

**Table 9**

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

According to the European Commission Decision 1997/556/EC system AVCP 2+ applies.

The AVCP system 2+ is described in Annex V of Regulation (EU) Nº 305/2011, as amended by Delegated Regulation (EU) Nº 568/2014.

## 5. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the Assessment and Verification of Constancy of Performance (AVCP) system are laid down in the control plan deposited at Tecnalia Research & Innovation.

The Control Plan is a confidential part of the ETA and is only handed over to the notified body involved in the assessment and verification of constancy of performance.

Issued in Azpeitia, on 14/09//2022

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Innovation and Conformity Assessment Point

Tecnalia Research & Innovation

## ANNEX 1: Characteristics of the components

Detailed information on the chemical composition and other identifying characteristics of the FASSATHERM RIVESTO CLASSIC System, according to EAD 040287-00-0404, has been deposited at Tecnalia Research & Innovation. Further information can be observed from the products data sheets, which are part of the Technical Documentation of this ETA.

### Adhesive and base coat

**A96** Cement based mortar in powder, according to EN 998-1, requiring addition of 22%-27% water.

| Characteristics | Reference | Value |
|---|---|---|
| Designation | EN 998-1 | GP |
| Water percentage (%) | - | 22-27 |
| Coverage (kg/m$^2$ for 1 mm thickness) | - | 1.5 |
| Hardened mortar density (kg/m$^3$) | EN 1015-10 | 1550 ± 100 |
| Water absorption (kg/m$^2$.min$^{0,5}$) | EN 1015-18 | W2 (≤ 0.2) |
| Water vapour permeability, μ | EN 1015-19 | < 25 |
| Shrinkage (mm/m) | EAD 040287-00-0404 (L.6) | < 2 |
| Compressive strength (MPa) | EN 1015-11 | ≥ 6 (CS Iv) |
| Thermal conductivity, $\lambda_d$ (W/m.K) | EN 1745 | $\lambda_{10,\,dry}$ 0.71 (P=50%) |
| Reaction to fire | EN13501-1 | A1 |
| Ash content at 450ºC (%) | EAD 040287-00-0404 (L4.1) | 96.7-97.9 |
| Organic content (%) | - | < 5 |

### Thermal insulation panels

Expanded polystyrene panels (EPS) according to EN 13163.

| Characteristics | | Reference | Value | |
|---|---|---|---|---|
| Dimensions | Thickness (mm) | EN 822 EN 823 | 60-200 | |
| | Length (mm) | | 1000 | |
| | Width (mm) | | 500 | |
| | Squareness (mm) | | S(2) | |
| | Flatness (mm) | | P(3) | |
| Density (kg/m$^3$) | | EN 1602 | 15±1 | |
| Reaction to fire | | EN 13501-1 | E | |
| Water absorption (%) | | EN 12087 | ≤0.5 | |
| Water vapour resistance factor, μ | | EN 12086 | 20-40 | |
| Dimensional stability (%) under specific conditions | | EN 1604 | DS(70,-)1 | |
| Tensile strength perpendicular to the faces (kPa) | | EN 1607 | ≥ 100 | |
| Bending strength (for mechanical fixed panels) | | EN 12089 | ≥ 115 | |
| Shear strength (kPa) | | EN 12090 | > 20 | |
| Shear modulus (kPa) | | | ≥ 1000 | |
| Thermal conductivity, $\lambda_d$ (W/m.K) | | EN 13163 | Standard | ≤ 0.036 |
| | | | With graphite | ≤ 0.031 |

## Mesh

**FASSANET ZR 185** Alkali and slide resistant glass fibre mesh with mass per unit area of about 185 g/m$^2$ and mesh size of about 16.7 x 16.7 mm.

| Characteristics | | Reference | Value |
|---|---|---|---|
| Mass per unit area (g/m$^2$) | | | 190 ± 5% |
| Mesh size (mm) | | | 16.7 x 16.7 (±5) |
| Thickness (mm) | | | 0.9 ±0.2 |
| Ash content (625ºC) (%) | | | 76.5 |
| Organic content (%) | | | 23-28% |
| Heat of combustion (PCS-value) (MJ/kg) | | EN ISO 1716 | 9.6 |
| Tensile strength (N/mm) | Without ageing | | 33 (warp)<br>37 (weft) |
| | After ageing | | - |
| | Residual (%) | | - |
| Deformation n.c. (%) | | | 4 (warp)<br>3 (weft) |

## Cladding adhesive

**AT 99 MAXYFLEX** and **FASSAFLEX** Cement based adhesive for ceramic cladding. CE marked according to EN 12004. Designation C2TE S1

| Characteristics | | Reference | Value |
|---|---|---|---|
| Designation | | EN 12004 | C2TE S1 |
| Water percentage (%) | | - | 26 - 30 |
| Thickness (mm) | | - | 5 |
| Ash content (%) | | EAD 040287-00-0404 (L4.1) | 94 ± 1 |
| Organic content (%) | | - | < 7 |
| Reaction to fire | | EN 13501-1 | Euroclass F |
| Slip (mm) | | EN 12004-2 | ≤ 0.5 |
| Hardened mortar | Hardened mortar density (kg/m$^3$) | EN 1015-10 | 1450 ± 100 |
| | Transverse deformation (mm) | EN 12004-2 | ≥ 2.5 and ≤ 5 |
| | Water vapour resistance factor, μ | EN 1745 (Table A.12) | 5/20 |
| | Thermal conductivity | | $\lambda_{10,\,dry} \leq 0.49$ (P=50%) |
| | Initial bond strength (N/mm$^2$) | EN 12004-2 | ≥ 1 |
| | Bond strength after water immersion (N/mm$^2$) | EN 12004-2 | ≥ 1 |
| | Bond strength after heat ageing (N/mm$^2$) | EN 12004-2 | ≥ 1 |
| | Bond strength after freeze/thaw cycles (N/mm$^2$) | EN 12004-2 | ≥ 1 |
| | Open time: bond strength after 20 min | EN 12004-2 | ≥ 0.5 |

## Grout

**FASSAFILL MEDIUM**. Cement based grout according to EN 13888, requiring addition of 18-20% of LATEX DR 843.

| Characteristics | | | Reference | Value |
|---|---|---|---|---|
| Designation | | | EN 13888 | CG2WA |
| LATEX DR 843 percentage (%) | | | | 18 – 20 |
| Thickness (mm) | | | | 10 |
| Joint width (mm) | | | | 2-12 |
| Ash content (450ºC) (%) | | | EAD 040287-00-0404 (L4.1) | 94 ± 1 |
| Organic content (%) | | | - | < 7 |
| Hardened mortar | Hardened mortar density (kg/m$^3$) | | EN 1015-10 | 1850 ± 100 |
| | Water absorption (g) | Absorption 30 min | EN 12808-5 | ≤ 2 |
| | | Absorption 240 min | | ≤ 5 |
| | Water vapour permeability | | EN ISO 10456 | Not assessed |
| | Shrinkage (mm/m) | | EN 12808-4 | ≤ 3 |
| | Resistance to abrasion (mm$^3$) | | EN 12808-2 | ≤ 1000 |
| | Water vapour resistance factor, μ | | EN 1745 (Table A.12) | 15/35 |
| | Thermal conductivity | | | $\lambda_{10,\,dry}$ 0.89 (P=50%) |
| | Flexural and compressive strength n.c. | Flexural strength (N/mm$^2$) | EN 12808-3 | ≥ 2.5 |
| | | Compressive strength (N/mm$^2$) | | ≥ 15 |
| | Flexural and compressive strength after freeze/thaw cycles | Flexural strength (N/mm$^2$) | EN 12808-3 | ≥ 2.5 |
| | | Compressive strength (N/mm$^2$) | | ≥ 15 |

## Plastic fixings:

**EJOT STR-U 2G** and **FASSA TOP FIX 2G** Plastic fixing for external thermal insulation composite systems with render on concrete and masonry, use categories: A, B, C, D, E

| GENERAL CHARACTERISTICS | |
|---|---|
| Plate diameter (mm) | ≥ 60 |
| Load resistance (kN) | ≥ 2.08 |
| Plate stiffness (kN/m) | ≥ 0.60 |
| Thermal transmittance (W/K) | ≤ 0.002 |

## Cladding elements

Ceramic tiles CE marked according to EN 14411. Tiles could be from Group AIa, BIa, BIb, AIIa; BIIa, AIIb, BIIb, BIII

| Characteristics: | | Reference | Value |
|---|---|---|---|
| Dimensions | Thickness (mm) | EN ISO 10545-2 | ≤10 |
| | Length (mm) | | 108-300 |
| | Width (mm) | | 108-300 |
| | Area ($cm^2$) | | 116-300 |
| Reaction to fire | | | A1 |
| Water absorption (%) | | EN ISO 10545-3 | 10% < E |
| Relative apparent density ($kg/m^3$) | | | ≤ 2000 |
| Weight per $m^2$ ($kg/m^2$) | | | ≤ 17 |
| Frost resistance | | EN ISO 10545-12 | Pass |
| Moisture expansion (mm/m) | | EN ISO 10545-10 | ≤ 0.61 |
| Linear thermal expansion | | EN ISO 10545-8 | $< 24 \times 10^{-6}$ |
| Water vapour permeability, μ | | EN 12524 | $10^6$ |
| Thermal conductivity, λ (W/m.K) | | EN 12524 | 1.3 |
| Flexural strength (MPa) | | EN ISO 10545-4 | Acc. to EN 14411 |
| Breaking strength (N) | | | |