Centre Scientifique et Technique du Bâtiment
4, avenue du Recteur Poincaré
F-75782 PARIS Cedex 16
Tél. : (33) 01 40 50 28 28
Fax : (33) 01 45 25 61 51

Autorisé et notifié conformément à l'article 10 de la directive 89/106/EEC du Conseil, du 21 décembre 1988, relative au rapprochement des dispositions législatives, réglementaires et administratives des Etats membres concernant les produits de construction.

CSTB
le futur en construction
**MEMBRE DE L'EOTA**

# European Technical Approval ETA-03/0027

(English language translation, the original version is in French language)

| | |
|---|---|
| **Trade name:**<br>Nom commercial : | **Sto Therm Classic 1** |
| **Holder of approval:**<br>Titulaire : | **Sto AG**<br>**Ehrenbachstrasse 1**<br>**D-79780 STÜHLINGEN WEIZEN** |
| **Generic type and use of construction product:**<br><br>Type générique et utilisation prévue du produit de construction : | **External Thermal Insulation Composite Systems with rendering on polystyrene for the use as external insulation to the walls of buildings.**<br>Système d'isolation thermique extérieure par enduit sur polystyrène expansé destiné à l'isolation thermique extérieure des murs de bâtiments. |
| **Validity from / to:**<br>Validité du :<br>au : | **08.06.2004**<br>**07.06.2009** |
| **Manufacturing plant:**<br>Usine de fabrication : | **Sto AG**<br>**Ehrenbachstrasse 1**<br>**D-79780 STÜHLINGEN WEIZEN** |
| **This European Technical Approval contains:**<br>Le présent Agrément Technique Européen contient : | **32 pages including 5 annexes which form an integral part of the document**<br>32 pages incluant 5 annexes faisant partie intégrante du document. |

# I LEGAL BASES AND GENERAL CONDITIONS

1 - This European Technical Approval is issued by the Centre Scientifique et Technique du Bâtiment in accordance with:

- Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products[1], modified by the Council Directive 93/68/EEC of 22 July 1993[2];

- Décret n° 92-647 du 8 juillet 1992[3] concernant l'aptitude à l'usage des produits de construction;

- Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex of Commission Decision 94/23/EC[4];

- Guideline for European Technical Approval of « External Thermal Insulation Composite Systems with rendering » ETAG no. 004, edition 2000.

2 - The Centre Scientifique et Technique du Bâtiment is authorised to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant (for example concerning the fulfilment of assumptions made in this European Technical Approval with regard to manufacturing). Nevertheless, the responsibility for the conformity of the products with the European Technical Approval and for their fitness for the intended use remains with the holder of the European Technical Approval.

3 - This European Technical Approval is not to be transferred to manufacturers or agents of manufacturer other than those indicated on page 1; or manufacturing plants other than those announced to Centre Scientifique et Technique du Bâtiment.

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6 - The European Technical Approval is issued by the approval body in its official language. This version fully corresponds to the version circulated within EOTA. Translations into other languages have to be designated as such.

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1 Official Journal of the European Communities no. L 40, 11.2.1989, p. 12
2 Official Journal of the European Communities no. L 220, 30.8.1993, p. 1
3 Journal officiel de la République française du 14 juillet 1992
4 Official Journal of the European Communities no. L 17, 20.1.1994, p. 34

# II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

## 1 Definition of product and intended use

The External Thermal Insulation Composite System "Sto Therm Classic 1" called ETICS in the following text, is designed and installed in accordance with the ETA-holder design and installation instructions, deposited with the "Centre Scientifique et Technique du Bâtiment". The ETICS comprises the following components, which are factory-produced by the ETA-holder or a supplier. The ETA-holder is ultimately responsible for the ETICS.

Depending on the European market, different trade names are used for same component. To simplify, only the "German" trade names appear in the following text. The Annex 1 gives the corresponding "French" and "English" trade names.

1.1 Definition of product

| | **Components** (see § 2.3 for further description, characteristics and performances of the components) | **Coverage (kg/m²)** | **Thickness (mm)** |
|---|---|---|---|
| **Insulation materials with associated methods of fixing** | **Bonded ETICS** | | |
| | • Insulation product<br>Expanded polystyrene panels without (Sto-Polystyrol Hartschaumplatte PS 15 SE) or with (Sto-Bossenplatte) groove on the face to be covered by the base coat | / | 20 to 200 (Sto Bossen-platte: 50 to 200) |
| | • Adhesives<br>- Sto-Baukleber (cement based powder requiring addition of 22-26% water)<br>- StoLevell Beta (cement based powder requiring addition of 23-27% water)<br>- StoLevell Uni (cement based powder requiring addition of 20-23% water)<br>- Sto-Dispersionskleber (ready to use paste–acrylic binder) | 3.0 to 4.5 (powder)<br>3.0 to 4.5 (powder)<br>3.0 to 4.3 (powder)<br>1.0 to 1.5 (paste) | / |
| | **Mechanically fixed ETICS with profiles:** | | |
| | • Insulation product<br>Expanded polystyrene panels (Sto-Polystyrol Hartschaumplatte PS 15 SE Typ M) | / | 60 to 150 |
| | • Profiles (Sto-Halteleiste and Sto-Verbindungsleite)<br>Polyvinyl chloride (PVC) profiles | / | / |
| | • Anchors (Sto-Dübel)<br>Ejotherm SK-U | /<br>/ | /<br>/ |

| | **Components** (see § 2.3 for further description, characteristics and performances of the components) | **Coverage (kg/m²)** | **Thickness (mm)** |
|---|---|---|---|
| **Insulation materials with associated methods of fixing** | **Mechanically fixed ETICS with anchors and supplementary adhesive (see § 2.2.8.3 b) for possible association EPS/anchors):** | | |
| | • Insulation product<br>Expanded polystyrene panels wiithout (Sto-Polystyrol Hartschaumplatte PS 15 SE) or with (Sto-Bossenplatte) groove on the face to be covered by the base coat | / | 60 to 200 (see § 2.2.8.3 b)) |
| | • Supplementary adhesives<br>- Sto-Baukleber (cement based powder requiring addition of 22-26% water)<br>- StoLevell Beta (cement based powder requiring addition of 23-27% water)<br>- StoLevell Uni (cement based powder requiring addition of 20-23% water)<br>- Sto-Dispersionskleber (ready to use paste–acrylic binder) | 3.0 to 4.5 (powder)<br>3.0 to 4.5 (powder)<br>3.0 to 4.3 (powder)<br>1.0 to 1.5 (paste) | / |
| | • Anchors (Sto-Dübel)<br>- Ejotherm ST-U<br>- Fischer TERMOZ 8 U<br>- Fischer TERMOZ 8 N<br>- Hilti SX-FV<br>- Hilti SD-FV8<br>- Hilti X-IE6<br>- Spit ISO | / | / |
| | **Mechanically fixed ETICS with anchors through inserts:** | | |
| | • Insulation product<br>Expanded polystyrene panels (Sto-Iso F.I.X) with two plastic (ABS or shock polystyrene) crosses inserted in the panel | / | 60, 80, 100 or 120 |
| | • Anchors (Sto-Chevilles Iso F.I.X)<br>Specific anchors introduced through the middle of the inserts | / | / |
| **Base coat** | StoArmat Classic : ready to use paste (without cement) consisting of an acrylic copolymer binder in watery dispersion, silica particles, fibres and specific additives | About 3.7 (paste) | Mean (dry): 2.0<br>Minimal (dry): 1.8 |
| **Glass fibres meshes** | • Standard meshes:<br>- Sto-Glasfasergewebe<br>- Sto-Glasfasergewebe F | / | / |
| | • Reinforced meshes:<br>Sto-Panzergewebe (implemented in addition of the standard mesh to improve the impact resistance) | / | / |
| | • Special meshes:<br>- Sto-Bossengewebe (strip implemented in the groove of the Sto-Bossenplatte)<br>- Sto-Abschirmgewebe AES (including a thin stainless yarn to reduce radiation of electric fields) | / | / |

| | **Components** (see § 2.3 for further description, characteristics and performances of the components) | **Coverage (kg/m²)** | **Thickness (mm)** |
|---|---|---|---|
| **Finishing coats** | • Ready to use pastes - acrylic binder:<br>- Stolit K (particles size 1.0 – 1.5 – 2.0 – 3.0 and 6.0 mm)<br>- Stolit R (particles size 1.5 – 2.0 – 3.0 and 6.0 mm)<br>- Stolit MP (fine/middle or thick structure) | 2.0 to 6.5*<br>2.2 to 6.1*<br>2.2 to 4.7* | Regulated by particles size<br>1.5 to 3.5 |
| | • Ready to use paste - acrylic binder (application between 0° and 15°C):<br>- Stolit QS K (particles size 1.0 – 1.5 – 2.0 and 3.0 mm)<br>- Stolit QS R (particles size 1.5 – 2.0 and 3.0 mm) | 2.0 to 4.8*<br>2.2 to 4.5* | Regulated by particles size |
| | • Ready to use paste - acrylic/siloxane binder:<br>- StoSilco K (particles size 1.0 – 1.5 – 2.0 and 3.0 mm)<br>- StoSilco R (particles size 1.5 – 2.0 and 3.0 mm)<br>- StoSilco MP (fine/middle or thick structure) | 2.0 to 5.0*<br>2.9 to 4.5*<br>2.2 to 4.7* | Regulated by particles size<br>1.5 to 3.5 |
| | • Ready to use paste - acrylic/siloxane binder:<br>- StoSilco QS K (particles size 1.0 – 1.5 – 2.0 and 3.0 mm)<br>- StoSilco QS R (particles size 1.5 – 2.0 and 3.0 mm) | 2.0 to 5.0*<br>2.9 to 4.5* | Regulated by particles size |
| | • Ready to use paste - acrylic binder - with marble particles:<br>Sto-Superlit (particles size 1.5 and 2.0 mm) | 4.5 to 6.0* | Regulated by particles size |
| | • Ready to use paste associated with a paint:<br>StoNivellit (acrylic binder )<br>+ StoSilco Color (acrylic/siloxane binder) | 3.0 to 3.5<br>+ 0.2 to 0.4 (l/m²) | 1.0 to 1.5 |
| | • Ready to use paste associated with synthetic briquettes:<br>Sto-Klebe und Fugenmörtel (acrylic binder) + Sto-Flachverblender (synthetic binder) | 3.0 to 4.0<br>+ 48 to 73 peaces | 5.0 to 6.5 |
| | * All particles size grading or structure (Stolit MP and StoSilco MP) comprised | | |
| **Paint** | Paint to cover the base coat in the groove of the Sto-Bossenplatte: StoColor Maxicryl (acrylic binder) | 0.20 to 0.35 (l/m²) | / |
| **Ancillary materials** | Descriptions in accordance with § 3.2.2.5 of the ETAG no. 004<br>Remain under the ETA-holder responsibilities | | |

1.2 Intended use

This ETICS is intended for use as external insulation of buildings' walls. The walls are made of masonry (bricks, blocks, stones …) or concrete (cast on site or as prefabricated panels) **with a reaction to fire classification A1 or A2-s2, d0 according to EN 13501-1 and a minimum density of 820 kg/m$^3$ or A1 according to the EC decision 96/603/EC as amended.** The ETICS is designed to give the wall to which 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 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 (see § 7.2.1 of the ETAG no. 004). It remains under the responsibility of the ETA-holder in accordance with the national instructions.

The provisions made in this European Technical Approval (ETA) are based on an assumed intended working life of at least 25 years, provided that the installed ETICS is subjected to an appropriate use and maintenance. The indications given as to the working life cannot be interpreted as a guarantee given by the manufacturer or the Approval Body, 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 Characteristics of product and methods of verification

2.1 General

The identification tests and the assessment of the fitness for the intended use of this ETICS according to the Essential Requirements were carried out in compliance with the "ETA Guidance no. 004" concerning External Thermal Insulation Composite Systems with rendering (called ETAG no. 004 in this ETA).

The ETA is issued for the ETICS on the basis of agreed data, deposited with the Centre Scientifique et Technique du Bâtiment, which identifies the ETICS that has been assessed and judged. Changes to the ETICS production process or the ETICS, which could result in this deposited data being incorrect, should be notified to the Centre Scientifique et Technique du Bâtiment before the changes are introduced. The Centre Scientifique et Technique du Bâtiment 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, and /or alteration to the ETA, shall be necessary.

The characteristics (of the components as well as the ETICS) not mentioned in this ETA nor in the annexes shall correspond to the respective values laid down in the technical documentation of this ETA, checked by the Centre Scientifique et Technique du Bâtiment.

2.2 ETICS characteristics

2.2.1 Reaction to fire

| Configuration | Maximum declared organic content of the rendering system | Declared flame retardant content of the rendering system | Euroclass according to EN 13501-1 |
|---|---|---|---|
| • Sto-Hartschaumplatte PS 15 SE 140 mm to 180 mm thick, bonded with StoLevell Beta<br>• Base coat: StoArmat Classic<br>• Finishing coat: Stolit K2.0 mm | Base coat: 0.8 kg/m²<br>Finishing coat: 0.5 kg/m² | Base coat: 0.8 kg/m²<br>Finishing coat: 0.3 kg/m² | B s2 d0 |
| All other configurations | / | / | F: No performance determined |

Mounting and fixing (for all end use applications given in clause 1.2 of the ETA)

The assessment of reaction to fire is based on tests with a maximum insulation layer thickness of SBI / 180 mm, EN ISO 11925-2 / 60 mm and a maximum insulation material (EPS) density of 18 kg/m$^3$ as well as a render system (binder type – synthetic resin) with maximum organic content (1.3 kg/m²) and thickness (8 mm).

For the SBI test, this ETICS is mounted to a calcium silicate substrate according to EN 13238 and the whole sample (ETICS + substrate) is fixed directly in front of the backing board of the test apparatus.

For the EN ISO 11925-2 test, this ETICS is mounted directly to a calcium silicate substrate.

The installation of the ETICS was carried out by the ETA-holder following the manufacturer's specifications (instruction sheet) using a single standard mesh all over the test specimen (no overlapping glass fibre mesh).

The test specimens were prefabricated and did not include any joints. The panel edges were rendered.

Anchors were not included in the tested ETICS as they have no influence on the test result.

*Note: In some Member States the Classification on the basis of SBI test is not accepted. Additional tests might be required e.g. large scale tests to demonstrate compliance with a Member States´s fire regulation.*

2.2.2. Water absorption (capillarity test)

- Base coat StoArmat Classic:
  - Water absorption after 1 hour < 1 kg/m²
  - Water absorption after 24 hours < 0.5 kg/m²

- Rendering systems:

| | | Water absorption after 24 hours | |
|---|---|---|---|
| | | **< 0.5 kg/m²** | **≥ 0.5 kg/m²** |
| **Rendering systems:**<br>StoArmat Classic<br>+<br>finishing coat indicated hereafter: | Stolit K<br>Stolit R<br>Stolit MP | X | |
| | Stolit QS K<br>Stolit QS R | X | |
| | StoSilco K<br>StoSilco R<br>StoSilco MP | X | |
| | StoSilco QS K<br>StoSilco QS R | X | |
| | Sto-Superlit | X | |
| | StoNivellit<br>+ StoSilco Color | X | |
| | Sto-Klebe und Fugenmörtel<br>+ Sto-Flachverblender | X | |

2.2.3 Hygrothermal behaviour

The hygrothermal behaviour has been assessed on 2 rigs.

None of the following defects occur during the testing:
- blistering or peeling of any finishing
- failure or cracking associated with joints between insulation product boards or profiles fitted with system
- detachment of render
- cracking allowing water penetration to the insulation layer

The ETICS is so assessed **as resistant to hygrothermal cycles**.

2.2.4 Freeze / thaw behaviour

The water absorptions of both base coat and the rendering systems are less that 0.5 kg/m² after 24 hours and so the ETICS is assessed **as freeze/thaw resistant.**

2.2.5 Impact resistance

The resistances to hard body impacts (3 Joules and 10 Joules) and to perforation lead to the following categories:

| | | | **Single standard mesh** | **Double standard mesh** | **Reinforced mesh + standard mesh** |
|---|---|---|---|---|---|
| **Rendering systems:** StoArmat Classic + finishing coat indicated hereafter: | Stolit K<br>Stolit R<br>Stolit MP | | Category II | | Category I |
| | Stolit QS K<br>Stolit QS R | | | | |
| | StoSilco K<br>StoSilco R<br>StoSilco MP | | | | |
| | StoSilco QS K<br>StoSilco QS R | | | | |
| | Sto-Superlit | | Category II | Category I | |
| | Sto-Nivellit<br>+ StoSilco Color | | Category II | | Category I |
| | Sto-Klebe und Fugenmörtel<br>+ Sto-Flachverblender | On the briquettes | Category I | | |
| | | Between the briquettes (joint) | Category II | | Category I |

2.2.6 Water vapour permeability

| | | **Equivalent air thickness (m)** |
|---|---|---|
| **Rendering systems:** StoArmat Classic + finishing coat indicated hereafter: | Stolit K<br>Stolit R<br>Stolit MP | ≤ 1.0<br>(Test result obtained with Stolit K particles size 2 mm : 0.4) |
| | Stolit QS K<br>Stolit QS R | ≤ 1.0<br>(Test result obtained with Stolit QS K particles size 2 mm : 0.5) |
| | StoSilco K<br>StoSilco R<br>StoSilco MP | ≤ 1.0<br>(Test result obtained with StoSilco K particles size 2 mm : 0.4) |
| | StoSilco QS K<br>StoSilco QS R | ≤ 1.0<br>(Test result obtained with StoSilco QS K particles size 2 mm : 0.5) |
| | Sto-Superlit | ≤ 1.0<br>(Test result obtained with particles size 2 mm: 0.7) |
| | StoNivellit<br>+ StoSilco Color | ≤ 1.0<br>(Test result obtained : 0.6) |
| | Sto-Klebe und Fugenmörtel<br>+ Sto-Flachverblender | ≤ 2.0<br>(Test result obtained : 1.0) |

2.2.7 Dangerous substances

The external thermal insulation composite system complies with the provisions of guidance paper H (A harmonized approach related to dangerous substances under the construction products directive - Revision August 2002).

A declaration of conformity in this respect was made by the manufacturer.

In addition to the specific clauses relating to dangerous substances contained in this ETA, there may be other requirements applicable to the ETICS falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Product Directive, these requirements need also to be complied with, when and where they apply.

2.2.8 Safety in use

2.2.8.1 Bond strength

- Base coat StoArmat Classic onto the expanded polystyrene

| **Conditionings** | | |
|---|---|---|
| **Initial state** | **After the hygrothermal cycles (on rig)** | **After the freeze/thaw cycles (on samples)** |
| ≥ 0.08 MPa | ≥ 0.08 MPa | Test not required because freeze/thaw cycles not necessary |

- Adhesives onto substrate and expanded polystyrene (safety in use of the bonded ETICS)

| | | **Conditionings** | | |
|---|---|---|---|---|
| | | **Initial state** | **48 h immersion in water + 2 h 23°C/50% RH** | **48 h immersion in water + 7 days 23°C/50% RH** |
| - Sto-Baukleber | Concrete | ≥ 0.25 MPa | ≥ 0.08 MPa | ≥ 0.25 MPa |
| - StoLevell Beta<br>- StoLevell Un<br>- Sto-Dispersionskleber | Expanded polystyrene | ≥ 0.08 MPa | ≥ 0.03 MPa | ≥ 0.08 MPa |
| Sto-Dispersionskleber | Brick | ≥ 0.25 MPa | ≥ 0.08 MPa | ≥ 0.25 MPa |

The ETICS can so be installed on the substrante with application of the adhesive on a **minimal surface area of 20%.**

2.2.8.2 Fixing strength (displacement test)

Test not required because the ETICS fulfils the following criteria:
E.d < 50 000 N/mm
(E: modulus of elasticity of the base coat
d: mean dried thickness of the base coat).

2.2.8.3 Wind load resistance

a) Safety in use of mechanically fixed ETICS **using profiles**

| **Sto-Polystyrol Hartschaumplatte PS 15 SE Typ M** | | | | | |
|---|---|---|---|---|---|
| **Characteristics of the EPS panels for which the following failure loads apply** | Thickness (mm) | | | ≥ 60 | |
| | Tensile strength perpendicular to the face (kPa) | | | ≥ 180 | ≥ 150 |
| | Shear strength (N/mm²) | | | ≥ 0.05 | ≥ 0.02 |
| | Shear modulus (N/mm²) | | | ≥ 1.5 | ≥ 1.0 |
| Failure loads (N) (Static Foam Block Test) | Horizontal profiles fixed every 30 cm + 43 to 49 cm long connection profiles | 500 x 500 mm EPS panels | Minimal:<br>Average: | 1250<br>1320 | 950<br>1010 |
| | Horizontal profiles fixed every 30 cm + 20 cm long vertical fixed profiles with a fixing in the middle | | Minimal:<br>Average: | 1440<br>1710 | 1060<br>1260 |
| | Horizontal profiles fixed every 30 cm + 40 cm to 43 cm long vertical fixed profiles with 2 fixings at 30 cm interval | | Minimal:<br>Average: | 1850<br>1890 | 1430<br>1470 |

b) Safety in use of mechanically fixed ETICS **using anchors**

The following values only apply for the combination (anchor's trade name) / (EPS panel's characteristics) mentioned in the first lines of each table.

| **Anchors for which the following failure loads apply** | Trade name | | **Ejotherm ST-U<br>Hilti SX-FV<br>Hilti SD-FV8<br>Hilti X-IE** |
|---|---|---|---|
| | Plate diameter (mm) | | 60 |
| **Characteristics of the EPS panels for which the following failure loads apply** | Thickness (mm) | | ≥ 60 |
| | Tensile strength perpendicular to the face (kPa) | | ≥ 100 |
| Failure loads (N) | Anchors not placed at the panel joints *(Static Foam Block Test)* | $R_{panel}$ | Minimal: 510<br>Average: 520 |
| | Anchors placed at the panel joints *(Pull-through Test)* | $R_{joint}$ | Minimal: 400<br>Average: 430 |

| | | | |
|---|---|---|---|
| **Anchors for which the following failure loads apply** | Trade name | | **Fischer TERMOZ 8U Fischer TERMOZ 8N** |
| | Plate diameter (mm) | | 60 |
| **Characteristics of the EPS panels for which the following failure loads apply** | Thickness (mm) | | ≥ 60 |
| | Tensile strength perpendicular to the face (kPa) | | ≥ 150 |
| Failure loads (N) | Anchors not placed at the panel joints *(Pull-through Test)* | $R_{panel}$ | Minimal: 440<br>Average: 460 |
| | Anchors placed at the panel joints *(Pull-through Test)* | $R_{joint}$ | Minimal: 400<br>Average: 410 |

| | | | |
|---|---|---|---|
| **Anchors for which the following failure loads apply** | Trade name | | **Spit ISO** |
| | Plate diameter (mm) | | 50 |
| **Characteristics of the EPS panels for which the following failure loads apply** | Thickness (mm) | | ≥ 60 |
| | Tensile strength perpendicular to the face (kPa) | | ≥ 180 |
| Failure loads (N) | Anchors not placed at the panel joints *(Pull-through Test)* | $R_{panel}$ | Minimal: 470<br>Average: 490 |
| | Anchors placed at the panel joints *(Pull-through Test)* | $R_{joint}$ | Minimal: 400<br>Average: 410 |

$$R_d = \frac{R_{panel} \times n_{panel} + R_{joint} \times n_{joint}}{\gamma}$$

$n_{panel}$: number (per m²) of anchors not placed at the panel joints
$n_{joint}$: number (per m²) of anchors placed at the panel joint
$\gamma$: safety factor

c) Safety in use of mechanically fixed ETICS **using anchors through inserts**

| | | |
|---|---|---|
| | | **Sto-Iso F.I.X** |
| Characteristics of the EPS panels for which the following failure loads apply | Thickness (mm) | ≥ 60 |
| | Tensile strength perpendicular to the face (kPa) | ≥ 200 |
| Failure load per insert (N) (*Pull-through test of fixings*) | | Minimal: 1200<br>Average: 1550 |

2.2.9 Thermal resistance

The thermal transmittance of the substrate wall covered by the ETICS is calculated in accordance with the standard EN ISO 6946:
$U = U_c + \chi_p.n$

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

= 0.004 W/K for anchors with a galvanized steel screw with the head covered by a plastic material ( $\chi_{p.n}$ 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 (see CE marking in reference to EPS EN 13 163) ((m².K)/W)

$R_{render}$: 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)

The impact of the PVC profiles is negligible.

2.2.10 Aspect of durability and serviceability: Bond strength after ageing

| | | |
|---|---|---|
| **Rendering systems :**<br><br>StoArmat Classic<br>+<br>finishing coat<br>indicated hereafter: | Stolit K<br>Stolit R<br>Stolit MP | ≥ 0.08 MPa |
| | Stolit QS K<br>Stolit QS R | |
| | StoSilco K<br>StoSilco R<br>StoSilco MP | |
| | StoSilco QS K<br>StoSilco QS R | |
| | Sto-Superlit | |
| | StoNivellit<br>+ StoSilco Color | |
| | Sto-Klebe und Fugenmörtel<br>+ Sto-Flachverblender | |

2.3 Components' characteristics

2.3.1 Insulation product

Factory-prefabricated, uncoated boards made of expanded polystyrene (EPS), having the description, characteristics and performances defined in the table below. They are exclusively sold by Sto companies.

a) Sto-Polystyrol-Hartschaumplatte PS 15 SE, according to EN 13163, for bonded ETICS and mechanically fixed ETICS by anchors:

- Even EPS panels

  - Panels with right, tongued-and-grooved or rabbetted edges
  - Panels with right edges and groove on the surface to be covered by the rendering system (Sto-Bossenplatte):
    * Type I: trapezoidal groove [see annex 2 (1/4)]
    * Type II: trapezoidal groove [see annex 2 (2/4)]
    * Type III: triangular groove [see annex 2 (3/4)]

- Curved EPS panels

  Panels, cut case by case with a suitable radius of curvature to adjust them to curved surfaces. The cutting of these panels is executed in the manufacture in the same large blocks of EPS as the even panels.

| **Description and characteristics** | | **Sto-Polystyrol-Hartschaumplatte PS 15 SE and Sto - Bossenplatte** |
|---|---|---|
| Reaction to fire / EN 13501-1 | | Euroclass E (thicknesses 60 to 200 mm – density 15 to 20 kg/m$^3$) |
| Thermal resistance ((m².K)/W) | | Defined in the CE marking in reference to EN 13163 "Thermal insulation products for buildings" - Factory made products of expanded polystyrene |
| Thickness (mm) / EN 823 | | ± 0.5 |
| Length (mm) / EN 822 | | ± 1.0 |
| Width (mm) / EN 822 | | ± 1.0 |
| Squareness (mm) / EN 824 | | ≤ 1,0 |
| Flatness (mm) / EN 825 | | ≤ 1,0 |
| Surface condition | | Cut surface (homogeneous and without « skin ») |
| Dimen-sional stability under: | specified temperature and humidity / EN 1604 | EPS-EN 13163 - DS (70,-)1 DS (70,90)1 |
| | laboratory condition / EN 1603 | EPS-EN 13163 - DS (N) 2 |
| Water absorption (partial immersion) / EN 1609 | | EPS-EN 13163 - WL (T) 1 |
| Water vapour diffusion resistance factor (μ) / EN 12086 – EN 13163 | | 20 to 60 |
| Tensile strength perpendicular to the faces in dry conditions / EN 1607 | | ≥ 100 (EPS-EN 13163 - TR100, TR150 and TR200) |
| Shear strength (N/mm²) / EN 12090 | | ≥ 0.02 |
| Shear modulus (N/mm²) / EN 12090 | | ≥ 1.0 |

b) Sto-Polystyrol-Hartschaumplatte PS 15 SE Typ M, according to EN 13163, with grooved edges for mechanically fixed ETICS with profiles

| **Description and characteristics** | | **Sto-Polystyrol – Hartschaumplatte PS 15 SE Typ M** |
|---|---|---|
| Reaction to fire / EN 13501-1 | | Euroclass E (thicknesses 60 to 200 mm – density 15 to 20 kg/m$^3$) |
| Thermal resistance ((m².K)/W) | | Defined in the CE marking in reference to EN 13163 "Thermal insulation products for buildings" - Factory made products of expanded polystyrene |
| Thickness (mm) / EN 823 | | ± 0.5 |
| Length (mm) / EN 822 | | ± 1.0 |
| Width (mm) / EN 822 | | ± 1.0 |
| Squareness (mm) / EN 824 | | ≤ 1,0 |
| Flatness (mm) / EN 825 | | ≤ 1,0 |
| Surface condition | | Cut surface (homogeneous and without « skin ») |
| Dimen-sional stability under: | specified temperature and humidity / EN 1604 | EPS-EN 13163 - DS (70,-)1 DS (70,90)1 |
| | laboratory condition / EN 1603 | EPS-EN 13163 - DS (N) 2 |
| Water absorption (partial immersion) / EN 1609 | | EPS-EN 13163 - WL (T) 1 |
| Water vapour diffusion resistance factor (μ) / EN 12086 – EN 13163 | | 20 to 60 |
| Tensile strength perpendicular to the faces in dry conditions / EN 1607 | | ≥ 0.150 (EPS-EN-13163 - TR150 and TR200) |
| Shear strength (N/mm²) / EN 12090 | | ≥ 0.02 |
| Shear modulus (N/mm²) / EN 12090 | | ≥ 1.0 |

c) Sto-Iso F.I.X for mechanically fixed ETICS with anchors through inserts:

600 x 450 mm moulded type panels with sanded down surface, tongued-and-grooved edges in which two prefabricated plastic (ABS or shock polystyrene) crosses are inserted at the time of the moulding [see Annex 2 (4/4)].

| **Description and characteristics** | | **Sto-Iso F.I.X** | | |
|---|---|---|---|---|
| Reaction to fire / EN 13501-1 | | Euroclass F | | |
| Thermal resistance ((m².K)/W) | | Thickness | 60 mm | 1.45 |
| | | | 80 mm | 1.95 |
| | | | 100 mm | 2.45 |
| | | | 120 mm | 2.90 |
| Thickness (mm) / EN 823 | | ± 0.5 | | |
| Length (mm) / EN 822 | | ± 0.5 | | |
| Width (mm) / EN 822 | | ± 0.5 | | |
| Squareness (mm) / EN 824 | | ± 0.5 | | |
| Flatness (mm) / EN 825 | | ± 0.5 | | |
| Surface condition | | Sanded down surface (homogeneous and without “skin”) | | |
| Dimensional stability under: | specified temperature and humidity / EN 1604 | EPS-EN 13163 - DS (70,-)1 DS (70,90)1 | | |
| | laboratory condition / EN 1603 | EPS-EN 13163 - DS (N) 2 | | |
| Water absorption (partial immersion) / EN 1609 | | EPS-EN 13163 - WL (T) 1 | | |
| Water vapour diffusion resistance factor (μ) / EN 12086 – EN 13163 | | 20 to 40 | | |
| Tensile strength perpendicular to the faces in dry conditions / EN 1607 | | ≥ 0.200 (EPS-EN 13163 - TR200) | | |
| Shear strength (N/mm²) / EN 12090 | | ≥ 0.08 | | |
| Shear modulus (N/mm²) / EN 12090 | | ≥ 1.5 | | |

2.3.2 Anchors

- Anchors for profiles: “Sto-Dübel”

  Anchors made of a plastic expansion sleeve with a collar (minimal diameter 16 mm) and of a galvanized or stainless screw with flat head with dimensions adapted to the profile’s perforation diameter.

  Characteristic resistance in the substrate: ETA 02/0018 (Ejotherm SK-U).

- Anchors for Sto-Iso F.I.X panels: “Sto-Chevilles Iso F.I.X”

  Anchors made of a plastic expansion sleeve (diameter 8 mm) with a cylindrical milled collar (diameter 13 mm) and of a galvanized nail with milled head.

Characteristic resistance in the substrate: awaiting justifications in accordance with ETAG 014 “plastics anchors” on such anchors, refer to any national prescriptions.

- Anchors for expanded polystyrene panels “Sto-Dübel”

  Anchors made of a plastic expansion sleeve with a plate and of a plastic or galvanized / stainless steel nail or of galvanized / stainless steel screw.

| Trade name | Plate diameter (mm) | Description and characteristic resistances in the substratre |
|---|---|---|
| Ejotherm ST-U | 60 | See ETA 02/0018 |
| Fischer TERMOZ 8U | | See ETA 02/0019 |
| Fischer TERMOZ 8N | | See ETA 03/0019 |
| Hilti SX-FV | | See ETA 03/0005 |
| Hilti SD-FV8 | | See ETA 03/0028 |
| Hilti X-IE6 | | See ETA 00/0007 |
| Spit ISO | 50 | See Annex 5 (Evaluated according to ETAG 014) |

2.3.3 Profiles

- Polyvinyl chloride (PVC) profiles (see Annex 3) marked sto
  - horizontal fixed profiles Sto-Halteleiste: 2,5 to 3,0 m long
  - vertical connection profiles Sto-Verbindungsleiste: 0,43 to 0,49 m long
  - vertical fixed profiles Sto-Halteleiste: 0,20 or 0,40 to 0,43 m long

- Pull-through resistance of fixings from profile ≥ 500 N.

2.3.4 Render

Width of crack (Render Strip Tensile Test): Test not performed

2.3.5 Glass fibres meshes

- Standard meshes

| | Residual resistance after ageing (N/mm) | | Relative residual resistance after ageing (%) | |
|---|---|---|---|---|
| | **Warp** | **Weft** | **Warp** | **Weft** |
| Sto-Glasfasergewebe F: White and yellow (two 10 cm wide slips on each sides) glass fibres meshes with mesh size between 3 to 5 mm and some black “Sto“ printings | ≥ 25 | ≥ 35 | ≥ 55 | ≥ 55 |
| Sto-Glasfasergewebe: White and yellow (two 10 cm wide slips on each sides) glass fibre meshes with mesh size of about 6 mm and some black „Sto“ printings | ≥ 20 | ≥ 20 | ≥ 50 | ≥ 50 |

- Special meshes

| | Residual resistance after ageing (N/mm) | | Relative residual resistance after ageing (%) | |
|---|---|---|---|---|
| | **Warp** | **Weft** | **Warp** | **Weft** |
| Sto-Abschirmgewebe AES: Black glass fibres mesh with mesh size of about 4 mm comprising a thin stainless yarn to reduce the radiation of electric fields. | ≥ 20 | ≥ 20 | ≥ 55 | ≥ 50 |
| Sto-Bossengewebe: Preformed glass fibres meshes cut into Sto-Glasfasergewebe F (see above), 2,0 m long. | | | | |

## 3 Evaluation of Conformity and CE marking

3.1 Attestation of conformity system

Considering the Euroclasses B and F for reaction to fire, the system of attestation of conformity specified by the European Commission, regarding the continuous surveillance, assessment and approval of the factory production control, is system 2+. This system is described in the Council Directive 89/106/EEC Annex III, 2 (ii), First possibility, as follows:

Declaration of conformity of the ETICS by the manufacturer on the basis of:

a) Tasks of the manufacturer:
   1. Initial type testing of the ETICS and the components,
   2. Factory Production Control, including testing of samples taken at the factory in accordance with a control plan[1)]

b) Tasks of the Notified Body:
   3. Certification of factory production control on the basis of:
      - Initial inspection of factory and of factory production control,
      - Continuous surveillance, assessment and approval of factory production control.

Considering the Euroclass B for reaction to fire, the system of attestation of conformity specified by the European Commission, regarding Euroclass characteristics for reaction to fire, is system 1. This system 1 is described in the Council Directive 89/106/EEC Annex III, 2 (i), as follows:

Certification of the conformity of the ETICS by a Notified certification Body on the basis of:

a) Tasks of the manufacturer:
   1. Factory Production Control
   2. Further testing of samples taken at the factory by the manufacturer in accordance with a control plan[1)]

b) Tasks of the Notified Body:
   3. Initial type testing of the ETICS and the components,
   4. Initial inspection of factory and of factory production control,
   5. Continuous surveillance, assessment and approval of factory production control.

[1)] The control plan has been deposited with the Centre Scientifique et Technique du Bâtiment and is only made available to the Notified Bodies involved in the conformity attestation procedure.

3.2. Responsibilities

3.2.1 Tasks of the manufacturer

3.2.1.1 Initial type testing (System 2+)

For initial type testing, the results of the tests performed as part of the assessment for the European Technical Approval can be used unless there are changes in the production line or plant. In such cases, the necessary initial type testing has to be agreed between the CSTB and the Notified Bodies involved.

These tests could be taken over by the manufacturer for Declaration of Conformity.

3.2.1.2 Factory production control

The ETA-holder has a factory production control system in its plant (manufacturing of the adhesives, the base coat and the finishing coats) and exercises permanent internal control of production, including testing of samples in accordance with a control plan[1)].

For the components of the ETICS which the ETA-holder does not manufacture by himself, he makes sure that factory production control carried out by the other manufacturers gives the guaranty of the components compliance with the European Technical Approval. In this aim, he relies on national certification bodies and carries out himself controls on these components.

The control plan[1)] and the provisions taken by the ETA-holder for components not produced by himself has been agreed and deposited with the CSTB. This control plan[1)] will be given to the Notified Body chosen by the ETA-holder to perform the foreseen tasks on attestation of conformity.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the control plan[1)]. The incoming raw materials are subjected to verifications by the manufacturer before acceptance.

All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures. This production control system ensures that the ETICS and the components are in conformity with the European Technical Approval.

The results of factory production control are recorded and evaluated. The records include at least the following information:

- designation of the product, raw material and components
- type of control or testing
- date of the product's manufacture and date of testing of the product or raw materials and components
- results of controls and testing and, if appropriate, comparison with requirements
- signature of person responsible for factory production control.

The records shall be presented to the inspection body during the continuous surveillance. On request, they shall be presented to the Centre Scientifique et Technique du Bâtiment.

Details of the extent, nature and frequency of testing and controls to be performed within the factory production control shall correspond to the control plan[1)] which is part of the technical documentation of this European Technical Approval.

[1)] The control plan has been deposited with the Centre Scientifique et Technique du Bâtiment and is only made available to the Notified Bodies involved in the conformity attestation procedure.

3.2.2 Tasks of the Notified Bodies

3.2.2.1 Initial type testing (System 1)

For initial type testing, the results of the tests performed as part of the assessment for the European Technical Approval can be used unless there are changes in the production line or plant. In such cases, the necessary initial type testing has to be agreed between the CSTB and the Notified Bodies involved.

These tests could be taken over by the manufacturer for Declaration of Conformity.

3.2.2.2 Initial inspection of factory and factory production control

The Notified Body shall ascertain that, in accordance with the control plan[1)], the factory (in particular the employees and the equipment) and the factory production control are suitable to ensure continuous and orderly manufacturing of the components according to the specifications mentioned in clause 2 of this ETA.

3.2.2.3 Continuous surveillance, assessment and approval of factory production control

The Notified Body shall visit the factory at least one a year for surveillance because this manufacturer has a FPC system complying with ISO 9001 covering the manufacturing of the ETICS components. It has to be verified that the system of factory production control and the specified automated manufacturing process are maintained taking account the control plan[1)].

Continuous surveillance and assessment of factory production control have to be performed according to the control plan[1)].

During each visit, the Notified Body shall examine:

- the control register of raw materials, products in course of manufacture and finished products,
- the document attesting the application of the control frequencies,
- the conformity of the products subjected to this ETA.

The results of continuous surveillance shall be made available on demand by inspection body, to the Centre Scientifique et Technique du Bâtiment. In cases where the provisions of the European Technical Approval and the control plan[1)] are no longer fulfilled, the EC conformity certificate of Factory Production Control shall be withdrawn.

3.3 CE marking

The CE marking shall be affixed on the commercial documents accompanying the components of the ETICS. The symbol « CE » shall be followed by the identification number of the Notified Body involved and shall be accompanied by the following information:

- name and address or identifying mark of the ETA-holder,
- the last two digits of the year in which the CE marking was affixed,
- number of the EC certificate of conformity of Factory Production Control,
- number of the European Technical Approval,
- ETICS trade name,
- number of the ETAG.

[1)] The control plan has been deposited with the Centre Scientifique et Technique du Bâtiment and is only made available to the Notified Bodies involved in the conformity attestation procedure.

## 4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The components of this ETICS shall correspond as far as their composition and manufacturing process is concerned to the products subject to the approval tests. Manufacturing process is deposited with the Centre Scientique et Technique du Bâtiment.

4.2 Installation

4.2.1 General

It is the responsibility of the ETA-holder to guarantee that the information about design and installation of this ETICS are effectively communicated to the concerned people. These information can be given using reproductions of the respective parts of the European Technical Approval. 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.

In any case, it is suitable to comply with the national regulations and particularly concerning fires and wind load resistance.

Only the components described in clause 1.1 with characteristics according to clause 2 of this ETA can be used for the ETICS.

The requirements given in ETAG 004, chapter 7, have to be considered.

4.2.2 Design

- To bond the ETICS, the minimal surface area and the method of bonding shall comply with characteristics of the ETICS (see § 2.2.8.1 of this ETA) as well as the national regulations. In any case, the minimal surface shall be at least 20%.

- To mechanically fix the ETICS, the choice and the rate of the fixings shall be determined considering:

  - the design wind load suction and the national regulations (taking into account the national safety factors, the design rules, …),
  - the characteristic resistance of the anchors into the considered substrate (see installation parameters - effective anchorage, characteristics resistance … - in the ETA of the anchor and/or in the annex 5 of this ETA),
  - the safety in use of the ETICS (cf. § 2.2.8), according to the method of fixing.

4.2.3 Execution

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

- chapter 7 of the ETAG no. 004,
- national regulations in effect.

The particularities in execution linked to the different methods of fixing and the application of the rendering system shall be handled in accordance with ETA-holder prescriptions. In particular it is suitable to comply with the quantities of rendering applied, the thickness regularity and the drying periods between 2 layers.

## 5 Recommendations

5.1 Packaging, transport and storage

Packaging of the components has to be such that the products are protected from moisture during transport and storage, unless other measures are foreseen by the manufacturer for this purpose.

The components are to be protected against damage.

5.2 Maintenance and repair of the works

It is accepted that the finishing coat shall normally be maintained in order to fully preserve the ETICS's performances.

Maintenance includes:

- the repairing of localised damaged areas due to accidents,
- the application of various products or paints, possibly after washing or ad hoc preparation.

Necessary repairs should be done rapidly.

It is important to be able to carry out maintenance as far as possible using readily available products and equipment, without spoiling appearance.

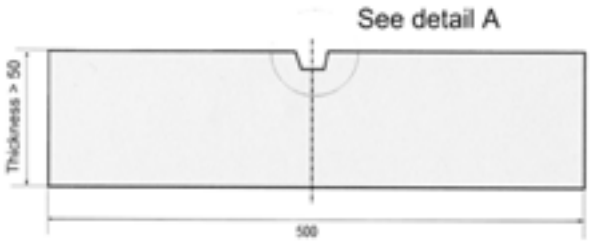
Comment: Care should be taken to use products which are compatible with the ETICS.

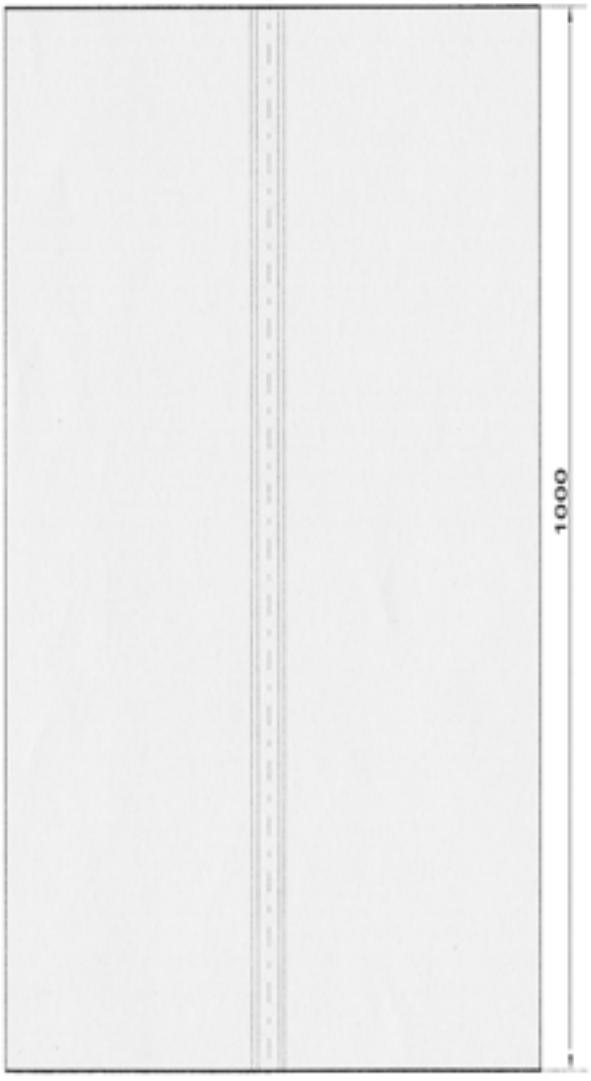
**The original French version is signed by**
**H. BERRIER**

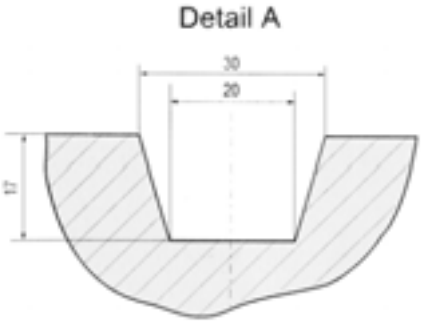
| Components | « German » trade name | « French » trade name | « English » trade name |
|---|---|---|---|
| **Adhesives** | Sto-Baukleber | Sto-Mortier Colle B | Sto ADH - B |
| | StoLevell Beta | | |
| | StoLevell Uni | | |
| | Sto-Dispersionskleber or StoPrefa Coll | Sto-Colle Dispersion or StoPrefa Coll | Sto-Dispersion Adhesive or StoPrefa Coll |
| **EPS Panels** | Sto-Polystyrol Hartschaumplatte PS 15 SE | Sto-Panneaux Polystyrène PS 15 SE | Sto EPS Board |
| | Sto-Polystyrol Hartschaumplatte PS 15 SE Typ M | Sto-Panneaux Polystyrène PS 15 SE Type M | Sto EPS Board M |
| | « Not available » | Sto-Iso F.I.X | « Not available » |
| | Sto-Bossenplatte | Sto-Panneaux pour Bossage | Sto Rustication Board |
| | « Not available » | Sto-Panneau polystyrène cintré | « Not available » |
| **Profiles** | Sto-Halteleiste | Sto-Profil Intermédiaire | Sto PVC Intermediate Track |
| | Sto-Verbindungsleiste | Sto-Profil Raidisseur | Sto T Splines |
| **Anchors for profiles** | Sto-Dübel | Sto-Tape Vis | Sto Dowel |
| **Anchors for EPS panels** | | Sto-Cheville Iso | |
| **Anchors for Sto-Iso F.I.X EPS panels** | « Not available » | Sto-Cheville Iso F.I.X | « Not available » |
| **Base coat** | StoArmat Classic | | |
| **Meshes** | Sto-Glasfasergewebe | « Not available » | Sto Glass Fibre Mesh |
| | Sto-Glasfasergewebe F | Sto-Fibre de verre Standard | « Not available » |
| | Sto-Panzergewebe | Sto-Fibre de verre de Blindage | Sto-Amour Mesh |
| | Sto-Abschirmgewebe AES | Sto-Fibre AES | Sto-Shield Mesh AES |
| | Sto-Bossengewebe | Sto-Fibre de verre pour polystyrène à bossage | Sto-Rustication Mesh |
| **Finishing coats** | Stolit K, R and MP<br>Stolit QS K and R<br>StoSilco K, R and MP<br>StoSilco QS K and R<br>Sto-Superlit<br>StoNivellit + StoSilco Color<br>StoColor Maxicryl | | |
| | Sto-Klebe-und Fugenmörtel + Sto-Flachverblender | Sto-Colle pour Briquette + Sto-Briquettes de parement | StoAdhesive and Joint Mortar + Sto-Brick Slips |

| | |
|---|---|
| **ETICS Sto Therm Classic 1** | **Annex 1 (1/1)** |
| **Trade names of the components** | of European Technical Approval **ETA-03/0027** |

**Dimensions in millimetres**

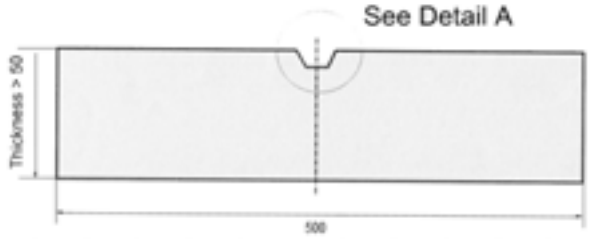


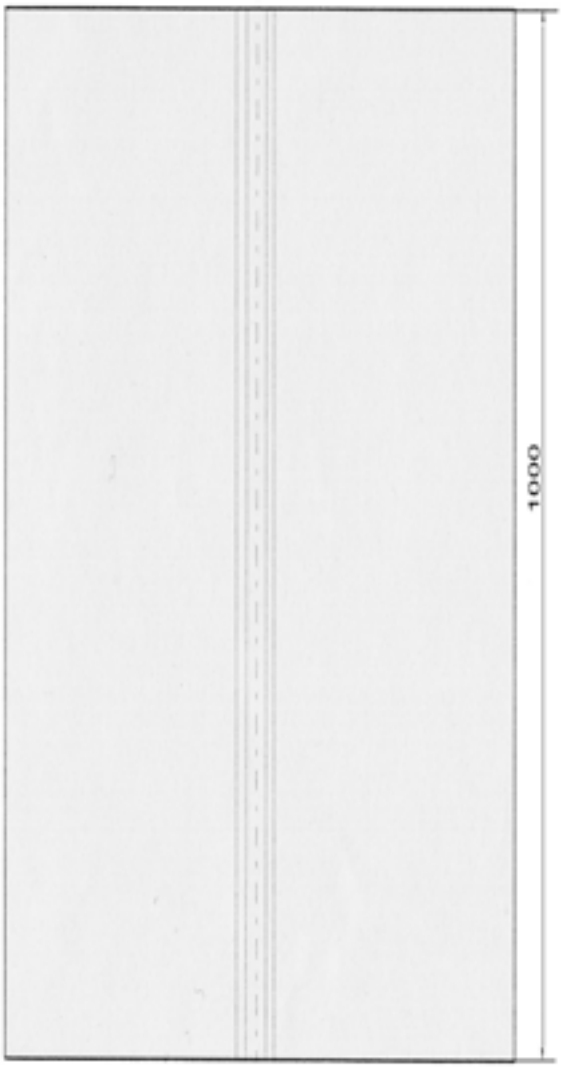



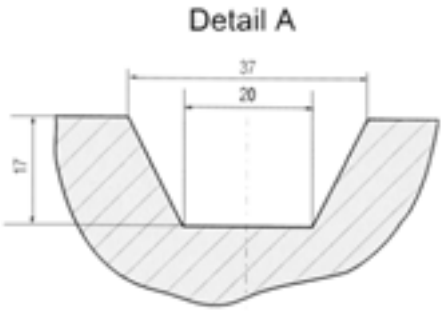




| | |
|---|---|
| **ETICS Sto Therm Classic 1** | **Annex 2 (1/4)** |
| **Bonded ETICS and mechanically fixed ETICS with anchors - Description of the EPS panels Sto-Bossenplatte Typ I** | of European Technical Approval **ETA-03/0027** |

**Dimensions in millimetres**

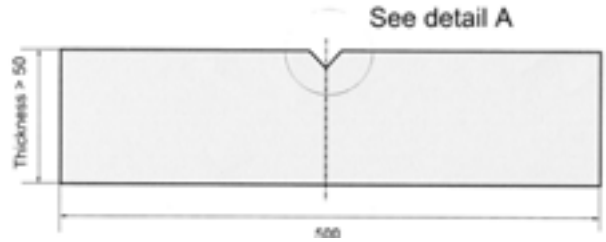


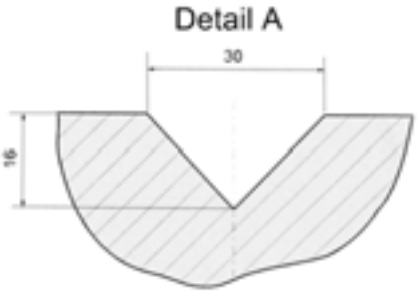




| | |
|---|---|
| **ETICS Sto Therm Classic 1** | **Annex 2 (2/4)** |
| **Bonded ETICS and mechanically fixed ETICS with anchors - Description of the EPS panels Sto-Bossenplatte Typ II** | of European Technical Approval **ETA-03/0027** |

**Dimensions in millimetres**

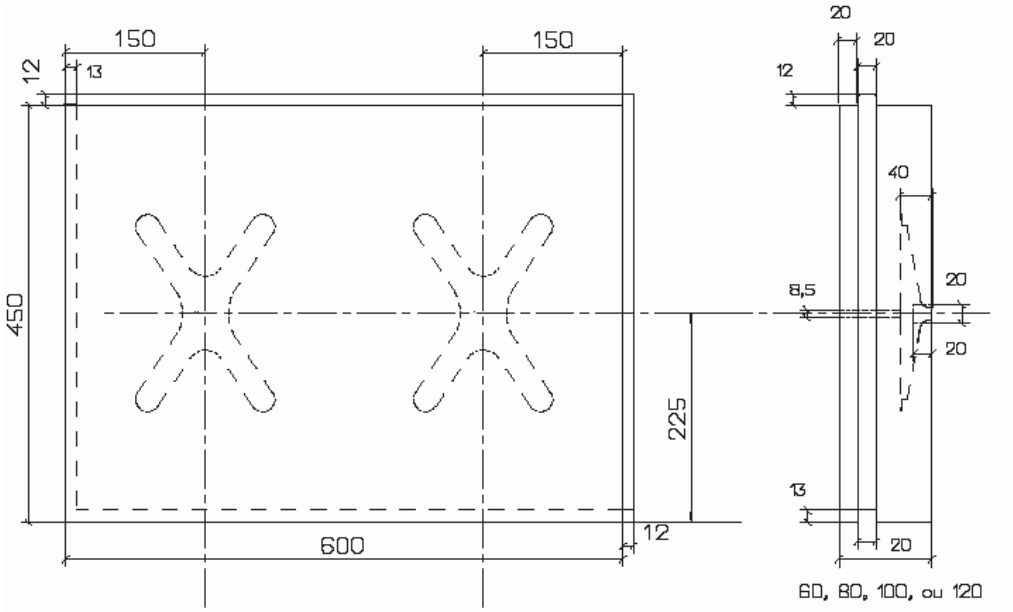




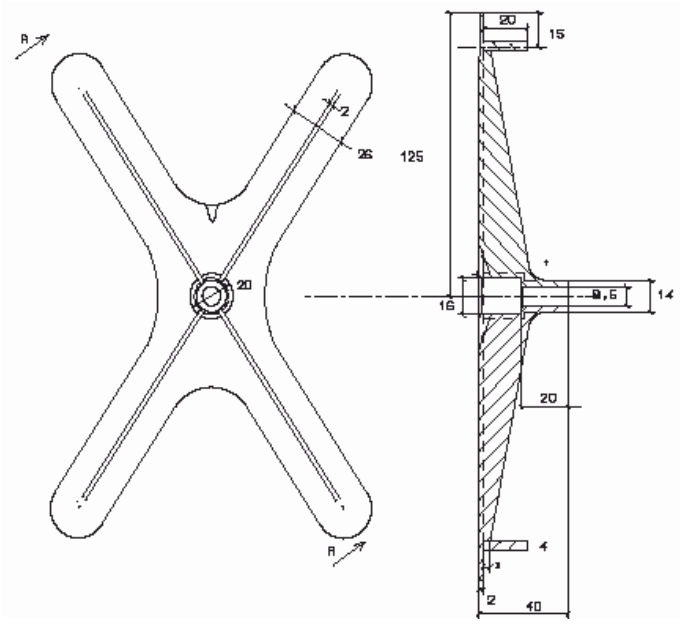



| | |
|---|---|
| **ETICS Sto Therm Classic 1** | **Annex 2 (3/4)** |
| **Bonded ETICS and mechanically fixed ETICS with anchors - Description of the EPS panels Sto-Bossenplatte Typ III** | of European Technical Approval **ETA-03/0027** |

**Dimensions in millimetres**



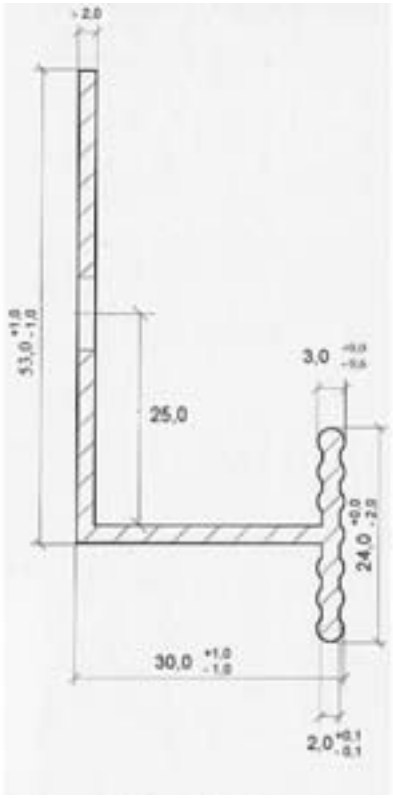

**Panels**

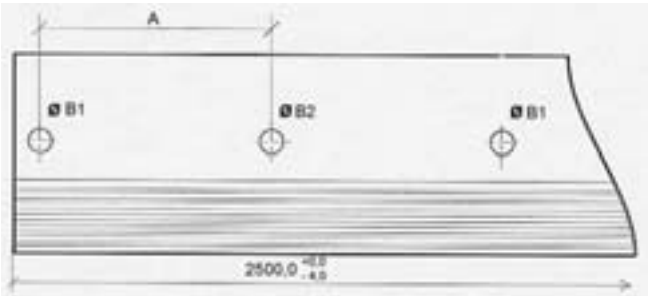



**Detail of the inserts**
**(prefabricated plastic (ABS or shock polystyrene) crosses)**

| | |
|---|---|
| **ETICS Sto Therm Classic 1** | **Annex 2 (4/4)** |
| **Mechanically fixed ETICS with anchors through inserts - Description of the EPS Sto-Iso F.I.X** | of European Technical Approval **ETA-03/0027** |

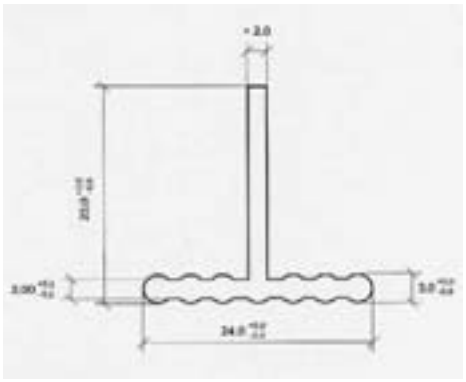
**Dimensions in millimetres**

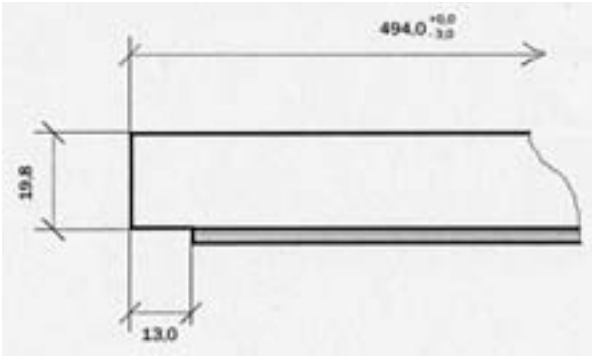



| | A (mm) | B1 (mm) | B2 (mm) |
|---|---|---|---|
| German and Austrian markets | 75 ± 1 | 8.2 | |
| English market | 50 ± 1 | 4 | 4 |

**Horizontal and vertical fixed profiles**

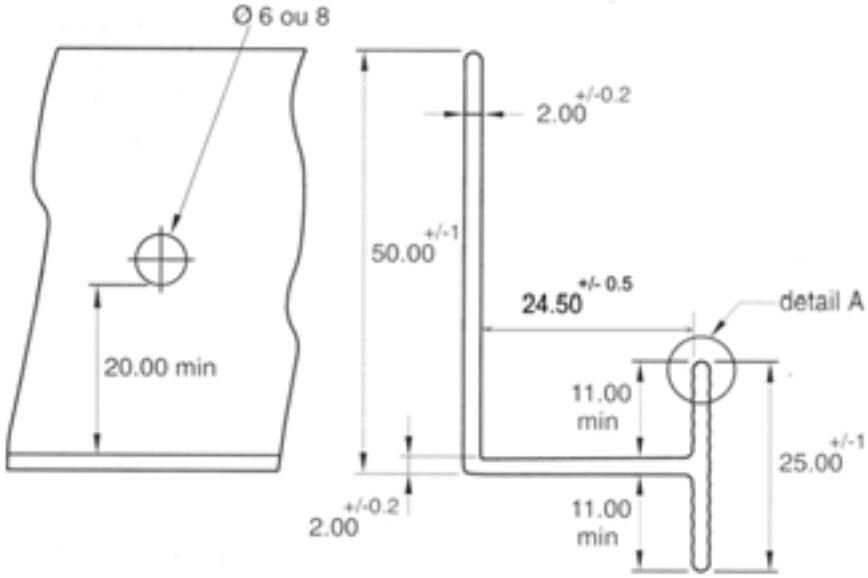




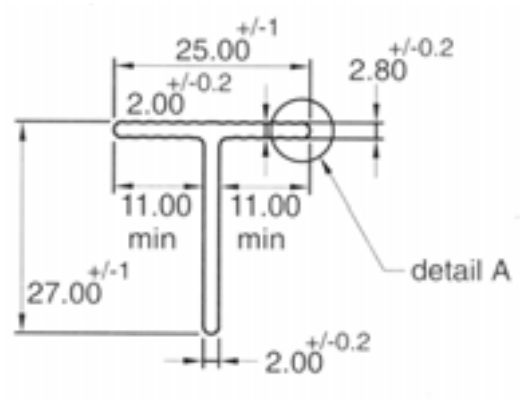

**Vertical connexion profiles**

| | |
|---|---|
| **ETICS Sto Therm Classic 1** | **Annex 3 (1/2)** |
| **Description of the horizontal and vertical PVC profiles (more particularly for German, Austrian and English markets)** | of European Technical Approval **ETA-03/0027** |

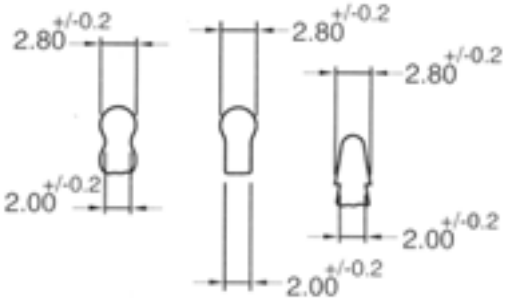
**Dimensions in millimetres**




**Horizontal and vertical fixed profiles**



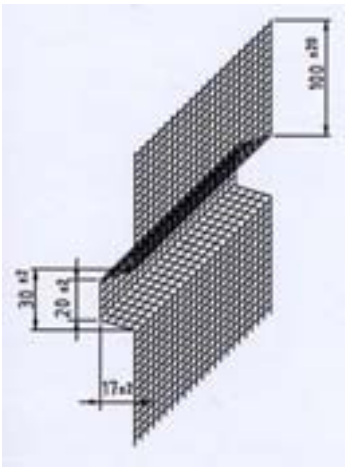

**Vertical connection profiles**



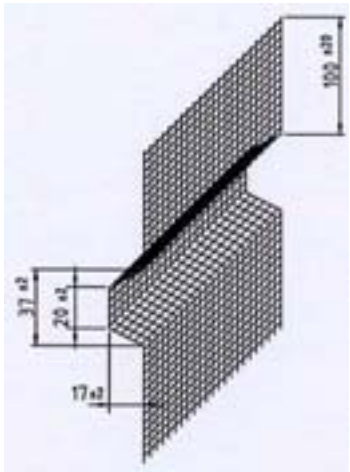

**Detail A**

| | |
|---|---|
| **ETICS Sto Therm Classic 1** | **Annex 3 (2/2)** |
| **Description of the horizontal and vertical PVC profiles (more particularly for French market)** | of European Technical Approval **ETA-03/0027** |

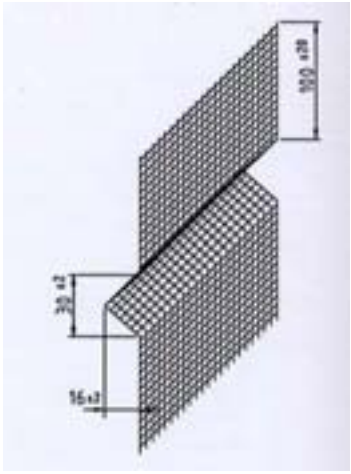
**Dimensions in millimetres**



**Type I**



**Type II**

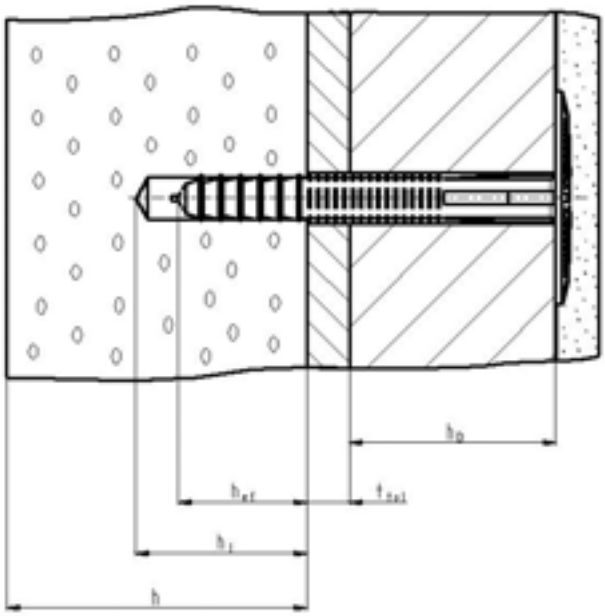


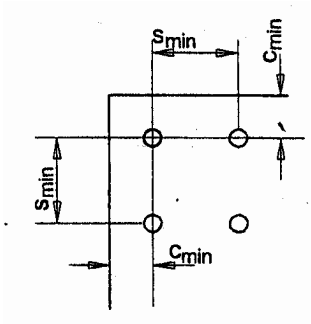
**Type III**

**Length : 2,0 m**

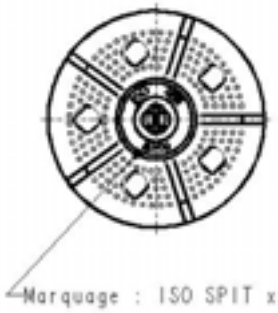
| | |
|---|---|
| **ETICS Sto Therm Classic 1** | **Annex 4 (1/1)** |
| **Description of the Sto-Bossengewebe** | of European Technical Approval **ETA-03/0027** |

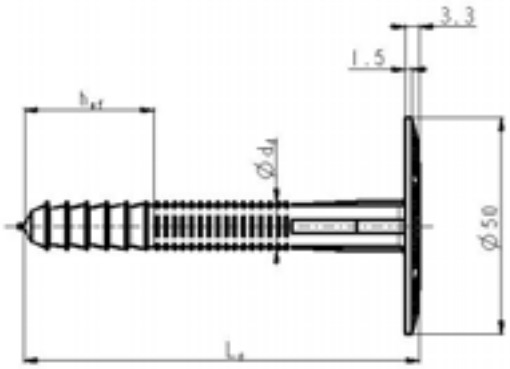
- Description of the anchor



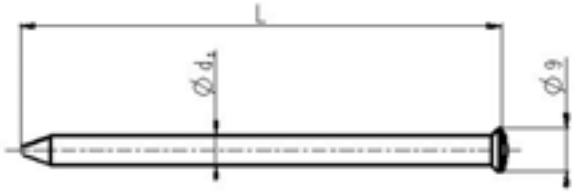



| | | |
|---|---|---|
| Minimum spacing | $s_{min}$ (mm) | 100 |
| Minimum edge distance | $c_{min}$ (mm) | 100 |
| Minimum thickness of member | h (mm) | 100 |




**Dimensions in millimetres**




| | |
|---|---|
| **ETICS Sto Therm Classic 1** | **Annex 5 (1/2)** |
| **Anchor Spit ISO** | of European Technical Approval **ETA-03/0027.** |

- Dimensions (measures in mm):

| | Sleeve | | | Nail | |
|---|---|---|---|---|---|
| Anchor type | $d_d$ | $h_{ef}$ | $L_a$ | $d_s$ | L |
| ISO 10 – 10/30 | 10 | 30 | 63 | 6 | 63 |
| ISO 10 – 40/60 | 10 | 30 | 93 | 6 | 100 |
| ISO 10 – 70/80 | 10 | 30 | 113 | 6 | 120 |
| ISO 10 – 90/100 | 10 | 30 | 133 | 6 | 140 |
| ISO 10 – 110/120 | 10 | 30 | 153 | 6 | 180 |

- Materials:

| **Designation** | **Material** |
|---|---|
| Sleeve | Polypropylene Stamylan P48M10 |
| Expansion pin | Polyamide 6 Heramid A Nat GF030 |

- Installation characteristics:

| | |
|---|---|
| **Drill hole diameter** | 10 mm |
| **Cutting diameter of drill bit** | ≤ 10.45 mm |
| **Depth of drill hole** | 50 mm |
| **Effective anchorage depth** | 30 mm |

- Characteristic resistances :

| **Base material** | **Characteristic resistance (kN)** |
|---|---|
| Concrete C15/20 | 0.20 |
| Concrete C20/25 to C50/60 | 0.30 |
| Clay brick | 0.30 |
| Aggregates concrete solid masonry units | 0.30 |
| Horizontally perforated clay bricks | 0.15 |
| Aggregates concrete hollows masonry units | 0.15 |

| | |
|---|---|
| Partial safety factor $\gamma_{Mc}$ | 2.0 (in absence of national regulation) |

| | |
|---|---|
| **ETICS Sto Therm Classic 1** | **Annex 5 (2/2)** |
| **Anchor Spit ISO** | **of European Technical Approval ETA-03/0027** |