

DESIGNING AND ASSEMBLY MANUAL
for external thermal insulation composite systems
of **STX.THERM**[®] series

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STX.THERM[®]

DESIGNING, ASSEMBLY, MAINTANACE, USAGE INSTRUCTIONS

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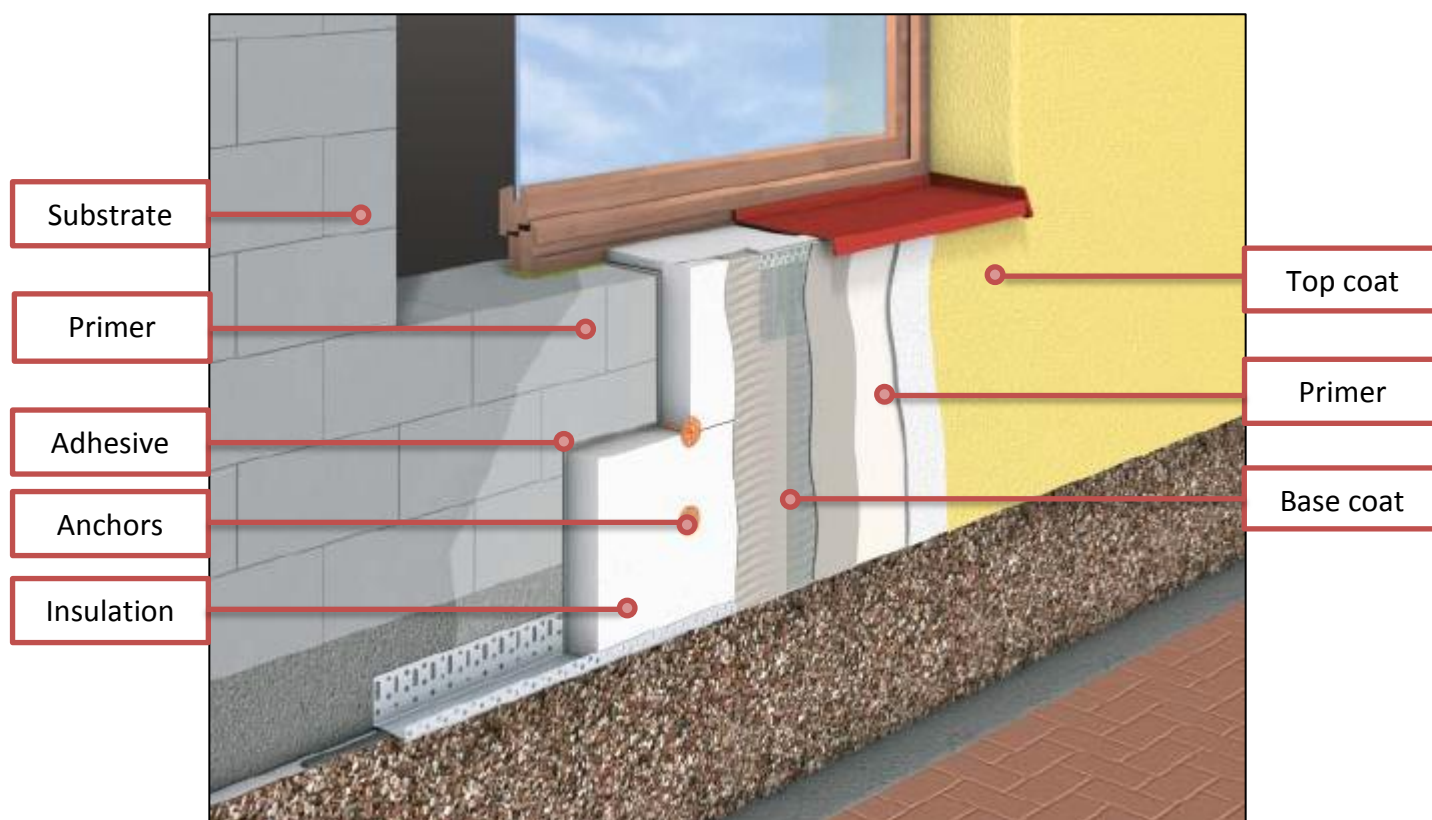
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NOTICE

The professional and technical information in these instructions reflect the current state of scientific and practical knowledge of the materials of company STOMIX, spol. s r. o. The data are subject to technological development and innovation. Data changes are reserved. By issuing these instructions, the previous loses validity.

Local legal requirements are superior to this document.

GENERAL COMPOSITION OF ETICS



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RECOMMENDED COMPOSITIONS FOR SELECTED SUBSTRATES AND CONSTRUCTIONS

*Masonry and concrete substrate – composition **STANDARD***

Technological operation	Insulation EPS (white only)	Insulation MW
Primer	NL or EH	NL or EH
Adhesive	ALFAFIX® S2	ALFAFIX® S2
Anchors	NTK U (or PTH-X)	PTH-S (or PTH-EX)
Base coat	ALFAFIX® S101 + glass mesh VT1	ALFAFIX® S101 + glass mesh VT1
Primer	HC-4	HC-4
Top coat	BETADEKOR® AF/AD	BETADEKOR® AF/AD

*Masonry and concrete substrate – composition **EXPERT***

Technological operation	Insulation EPS	Insulation MW
Primer	NL or EH	NL or EH
Adhesive	ALFAFIX® S101	ALFAFIX® S101
Anchors	PTH-SX	PTH-S
Base coat	ALFAFIX® S101 + glass mesh VT1	ALFAFIX® S101 + glass mesh VT1
Primer	HC-4	HC-4
Top coat	BETADEKOR® SAF/SAD	BETADEKOR® SAF/SAD

*Masonry and concrete substrate – composition **EXPERT PLUS***

Technological operation	Insulation EPS	Insulation MW
Primer	NL or EH	NL or EH
Adhesive	ALFAFIX® S1	ALFAFIX® S1
Anchors	Ejotherm STR-U 2G	Ejotherm STR-U 2G
Base coat	ALFAFIX® S1 + glass mesh VT1	ALFAFIX® S1 + glass mesh VT1
Primer	HC-5	HC-5
Top coat	BETADEKOR® SIF/SID	BETADEKOR® SIF/SID

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Composition for plinth area

Technological operation	Insulation Perimetr	Insulation XPS
Primer	EH	EH
Adhesive	ALFAFIX® S101	ALFAFIX® S11
Anchors	NTK U (nebo PTH-X)	NTK U (nebo PTH-X)
Base coat	ALFAFIX® S1 + glass mesh R330	ALFAFIX® S1 + glass mesh R330
Primer	ALFAFIX® S1 + glass mesh VT1	ALFAFIX® S1 + glass mesh VT1
Top coat	HC-4 or BETAFORM H-01 below ground level	HC-4 or BETAFORM H-01 below ground level
	ALFADEKOR G	ALFADEKOR G

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CONDITIONS FOR THE IMPLEMENTATION OF ETICS OF STX.THERM[®] SERIES

- Installation works must be carried out in a temperature range of 5-30 degrees (air and substrate). EPS with added graphite may be applied to a maximum temperature of 25 degrees (air and substrate).
- Work can not be performed in the rain or strong wind. Applied material must be protected from the rain, frost, strong wind and direct sunlight for at least 72 hours after application, paints and colors for 24 hours.
- Too fast drying of the individual layers of the system may result in unwanted visual defects.
- EPS with added graphite, base coat or final top coat must not be applied on the sunlit areas.
- EPS with added graphite must be protected from direct sunlight all the time during the installation of ETICS.
- Those conditions are necessary to ensure by appropriate technical measures and organization of work (for example: shielding of the sunlit areas).

PREPARATION BEFORE START OF CONSTRUCTION WORK

- Thickness and type of insulation boards, quantity, type, position towards reinforcement and (in case of need) layout of dowels, base coat, top coat and accessories including solution of details always in accordance with specification of particular ETICS determines the project and / or construction documentation.
- Main technological operations at application of ETICS onto prepared substrate can be divided in the following phases:
 - a) adhesion of insulation boards
 - b) anchoring by dowels
 - c) realisation of base coat
 - d) realisation of top coat
- At connecting of ETICS with adjacent constructions and with details of permeating elements creation of cracks and in-leak of water to ETICS must be avoided. Sealing tapes, dilatation profiles or sealing formed by means of flexible bonding agents are designed for this purpose. Decreasing gradient of permeating elements in direction from the substrate to external surface of ETICS functions as a measure against water in-leak.
- Flashing is bedded according to the building documentation before or during installation of ETICS according the valid standard. Structurally and materially the flashing must take into account eventual negative corrosion interaction of various materials. With cementitious base coats or adhesives and other materials containing cement it is recommended to use a separation layer with zinc, titanium-zinc and galvanised materials.
- Newly-installed plumbing components must be installed so that the drip edge is advanced at least 40 mm (when using a copper plate min. 50mm) and in the desired slope in front of face top coat of future ETICS.
- At attic flashing it is suitable to apply the following recommendations for drip mould height in dependence on building: height above the terrain:
 - building height to 8 m ... drip mould height 50 mm
 - building height to 8 -20 m ... drip mould height 80 mm
 - building height above 20 m ... drip mould height 100 mm
- For elements on the substrate, as vent hole openings, bells, switches, switchgear boxes and other external wiring, external lighting, house numbers, plate names of streets, laundry racks, holder of flowers etc. a new way of embedding. should be prepared.
- At fixing of elements and flashing no damage may happen to wiring on the ground or in building construction. It is recommended to mark and document areas of the wiring.

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SUBSTRATE

General requirements for substrate

- ETICS can be applied on external walls of buildings on the bases listed in the table:

Type of substrates

Concrete and masonry substrates
<ul style="list-style-type: none"> new or existing exterior walls of buildings or sloping walls and ceilings that are not exposed to precipitation Substrates: <ul style="list-style-type: none"> bricks blocks of stones concrete (monolith and prefabricated elements). Fire Class of the substrate must be A1 or A2-s1,d0 acc. to EN 13501-1 or A1 according to additional Decision EC 96/603/EC.

- Concrete and masonry substrates can be provided with lime-cement, cement, polymer-cement, dispersion, silicone, silicate plasters with any facade paints depending on the ETICS fixing (see chapter - Design Fixing ETICS to the Substrate).
- Average substrate cohesion is recommended at least 200 kPa. The smallest individual allowable value is 80 kPa. Local leveling or re-profiling of the substrate is performed with appropriate material to ensure consistency of at least 250 kPa.

Ensuring the suitability of the base

- ETICS shall not be applied on unsuitable substrates - such as contaminated (with efflorescence, grease, dust, demoulding oils and others), chalking, biotically contested, constantly moistened or showing increased steady humidity. The mentioned conditions of the substrate can be redeveloped by appropriate methods before application of ETICS. Individual technical measures are presented in the table.

Measures for preparation of substrate

Substrate initial status	Recommended measure
Wet substrate (for example earth humidity)	Upon analysis either maintenance of causes of the humidity and ensuring of drying or just ensuring of drying.
Dusty substrate	Sweeping or washing by power water ¹⁾
Greasy substrate	Removal of greasiness with pressurized water with addition of suitable cleaning agents ²⁾ , washing by pressurized water. ¹⁾
Contamination by demoulding agents or other separating means	Removal of remnants of demoulding agents or other separating means by water vapour with use of cleaning agents ²⁾ ; washing by pressurized water. ¹⁾
Spurs on dried substrate	Mechanical removal; sweeping, washing by pressurized water ¹⁾
Blisters and peeling places	Mechanical removal; sweeping; eventually local squaring off or re-profiling by a suitable material ensuring consistency of the substrate by at least 0.25 MPa; always ensure drying of the used materials.
Moss, lichen other biotic attack	Mechanical removal after moisturising or chemical treatment of the substrate; eventually ensure drying.
Non-active cracks ³⁾	Airtight (eg caused by render shrinkage) can be left untreated. Open non-active cracks are sealed with a suitable material.
Active cracks ⁴⁾	ETICS may not be applied until the causes for cracks are not removed.
Insufficient consistency	Mechanical removal of loose layers with eventual precedent moisturising; ensure drying and eventual levelling of the substrate.
Insufficient flatness ⁵⁾	Local or full-area levelling by a suitable material ensuring consistency of the substrate. ⁴⁾
Heterogeneity, excessive absorbency	Impregnation of the substrate by appropriate primer.

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¹⁾ After cleaning by pressurized water the substrate must sufficiently dry off before application of ETICS.

²⁾ Before use of any chemical cleaning agent contact the ETICS producer in order to consult its usage.

³⁾ Joints between panels shall be treated as open non-active cracks

⁴⁾ Active cracks caused for example by movements of the object or inadequate dilation. Open non-active cracks are filled with adhesive material.

Shrinkage cracks in plaster (if not plaster is not loose on substrate) are not at fault. The original dilatation joints in the substrate must be maintained, if necessary, redeveloped.

⁵⁾ Maximum permitted flatness tolerances depending on the ETICS fixing method:

- max. 10 mm / m ... if it is bonded ETICS (partially or fully) with supplementary mechanical fixing
- max. 20 mm / m ... if it is mechanically fixed ETICS by dowels with supplementary adhesive

- Recommended methods and procedures for the initial assessment of the substrate suitability:
 - A visual survey for cracks, roughness and peeling places in the substrate, detection of the substrate and areas with similar damaged substrate, obvious damp spots, etc.
 - To assess the consistency of the substrate with tapping - used to detect hollow places with low cohesion of the substrate
 - Assess the degree of degradation of the substrate with scratching or scratching through by hard pointed object - used to test the consistency and strength of the substrate (eg. coating adhesion by cross-cut test according to ISO 2409, tape test)
 - Assess the substrate with rubbing by hands or dark fabric - used to verify dusting, efflorescence or chalking of final treatment
 - Assessing the moisture content by indirect methods „in situ“, such as by electrical resistance
 - Assessment of the expansion joints in the substrate
 - Assessment of flatness with a meter lath
 - Screening test cohesion - for substrates with finishes smooth a glass mesh on the base – at least with 300 x 300 mm adhesive from the considered system. Only the reinforcement may be released when teared after 3 days. Decisive is always the result of measurable test of cohesion of the substrate.
- There are the following test methods to determine the measurable properties of the substrate:
 - EN 1542 to determine the cohesion of the substrate
 - EN ISO 12570 to determine the moisture content
 - ETAG 014, Annex D to determine the characteristic tensile resistance of the dowel
- There is a record of the substrate examination issued after the substrate assessment, will become a part of the ETICS construction documents.
- All elements on the substrate, which make the ETICS installation impossible or could cause undesirable thermal bridges must be dismantled. The re-assembly must not impair the functionality of the system such as the creation of thermal bridges, leaking water into the system, etc.
- Any works increasing the substrate humidity must be done at least 72 hours before start of the ETICS installation.
- Prior to mounting ETICS the roof should be completed as well as all building work, resulting in the increase of moisture within building insulation construction, at least 14 days before the start of bonding sheets of heat insulating material.

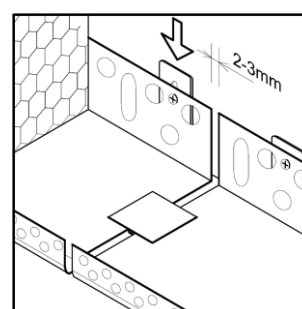
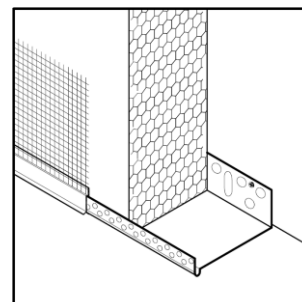
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FOUNDATION OF THE SYSTEM

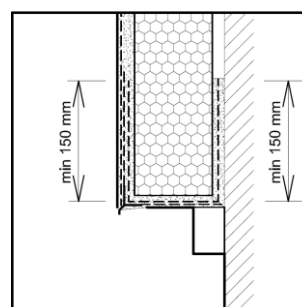
Founding a system using foundation lath

- Foundation lath or possibly finishing profiles must be installed before bonding the insulation boards.
- Foundation lath must be straight and fitted horizontally.
- Aluminum foundation lath shall be provided with drip cap with a mesh to ensure a firm connection of the foundation lath with the insulant.
- Flange width must correspond to the thickness of the insulation boards.
- Laths are connected by plastic couplings. Gap 2-3 mm must be left between the laths for dilatation.
- Foundation lath is attached to the substrate by the dowels with spacing of approximately 300 mm. Any unevenness are offset by spacers.
- The method of anchoring of foundation to the substrate must take in account the possibility of electrochemical corrosion.
- The corners of the lath are dragged at least 250 mm over the edge.
- The gap between the lath and the substrate is sealed with adhesive or other suitable material (after the bonding of insulation boards).



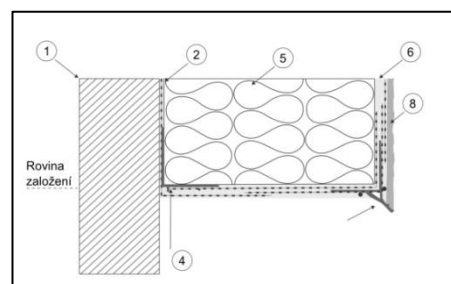
Founding a system with mounting lath

- Strip of glass fiber mesh is attached to the substrate by adhesive material. Width of the stripe is such so that measured from the lower edge of the future of insulation boards at least 150 mm exceeds after dragging over the bottom edge of on the outer surface.
- After gluing the boards and removing the mounting lath the glass fibre mesh is pulled over the bottom edge of the insulation boards and pressed into a layer of levelling substance applied to the required thickness.
- PVC lath with drip edge is attached on the outside bottom edge of the ETICS on the previously applied layer of base coat to ensure drip nose.
- Base coat is applied on the bottom edge of the ETICS including reinforcement with glass fibre mesh.



Founding a system using ETICS foundation set

- The foundation lath with reinforcing mesh is fixed to the prepared surface at the point of establishing. There is a gap 2-3 mm left between the laths. The foundation lath is attached to the substrate with dowels spacing of approximately 300 mm. Any unevenness are set right with distance spacers. A part of the mesh placed under the lath is left free.
- Glass fiber mesh over the foundation lath is pushed into the previously applied layer of leveling/adhesive materials.
- Insulation board are bonded to the substrate (see Chapter Bonding of Insulation Boards). The following steps can be performed after adhesive hardening and alternative dowels mounting, but no earlier than 24 hours.
- Glass fiber mesh attached to the front of the founding lath is pushed into the previously applied layer of leveling substance on the lower and outer surface of the insulation boards. The excess of extruded mass spread through the mesh loops is smoothed by using stainless smoother.
- After the initial drying of leveling substance is the bottom facing edge fitted with the appropriate drip lath. It is installed by pushing into the previously applied layer of leveling substance. The excess of extruded mass spread through the mesh loops is smoothed with stainless smoother.
- In the final step, a part of mesh located below the angle lath is pressed into a layer of leveling substance applied on the underside of the insulation boards. The excess of extruded mass spread through the mesh is smoothed with stainless smoother.
- Thickness of leveling substance applied on the underside of the insulating boards surface should be more than 9 mm.



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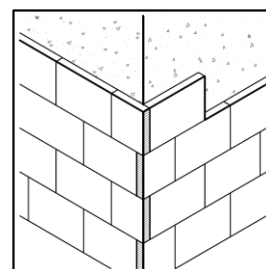
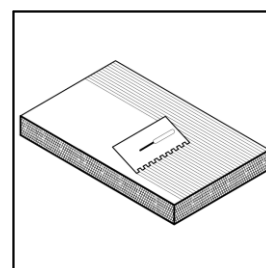
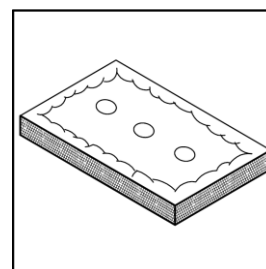
BONDING OF INSULATION BOARDS

Preparation before bonding

- If it is determined by construction documentation. It shall be provided immediately prior the bonding of boards to the continuing part of the structure, pervasive elements and flashing by sealing tape.
- A method of preparing an adhesive material determines the appropriate Technical data sheet and is listed on the original packaging.

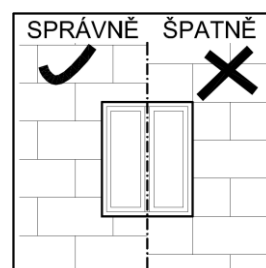
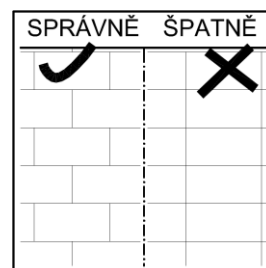
Application of the adhesive material on the insulant

- The adhesive is applied to the back of the insulation board either as a continuous band around the perimeter and at least three targets middle or fully with toothed smoother. The height of the tooth depends on uneven surfaces, at least 6 mm.
- ETICS fixed to the substrate purely with bonding (optionally with supplementary anchoring) contact with the base shall be at least 40 % of the board surface. In the case of mechanically fixed ETICS with dowels supplementary bonding must be in contact with the base at least 40% of the board (unless specified in the construction documents otherwise). Mineral wool with transverse orientation of fibers (lamellas) are always fully bonded.
- To increase the final adhesion it is recommended to apply in the first place a thin layer of adhesive in the place of bonding and after that to apply the desired amount of material for bonding (directly after another)) on the thermal insulation of mineral wool.
- The surface of extruded polystyrene with no surface treatment shall be thoroughly grind before bonding.
- Boards Frontrock MAX E of mineral wool with a characteristics two-layer are bonded with soft side to the substrate so the solid layer labeled TOP is at position outwardly from the base after bonding.
- Adhesive may not be applied to the lateral surfaces of boards nor may be squeezed into the joints between them.



Bonding boards to the base

- The first line of insulation boards is bonded to the foundation lath with mounting laths or foundation set ETICS (see Chapter Foundation of the System).
- Insulation boards must fit tightly with the front flange of the foundation lath, it may not exceed or be recessed.
- Insulating boards are bonded from the bottom up by pressing to the substrate with the longer side horizontally to the binding of horizontal bands, over the corner. The emergence of cross joints and joints in the corners of the openings is not allowed. Insulation boards under the foundation lath are bonded from top to bottom. Unless construction documents say otherwise are the dimension stocks of insulation boards bonded on the lining, window sills and lintels building openings. Insulation boards on the corner is suitable to bond with overlap (5-10 mm) and after hardening of adhesive materials (at least 1 day) to cut and grind.
- We recommend no interlacing of the Internal corners. In cases where there is the inner corner to change the thickness of the insulator or a significant disproportion of insulated surfaces (eg insulation of balconies and loggias), it is advisable to solve the detail by dilation.
- The insulation boards are always bonded close. Any gaps above 2 mm are filled with dimension stock from the used insulating material. Joints up to 4 mm may be filled with PUR foam in case of EPS boards. It is always necessary to keep the flatness of the outer surface of the insulant.
- It is recommended to bond the entire insulation board. You can also use leftovers if their width is at least 150 mm, and place it individually in ETICS surface but never on corners, angles, at the end of ETICS and fillings for



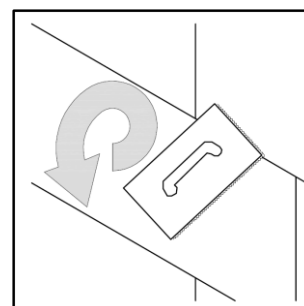
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- openings. The vertical dimension of the placed board can not be provided by folding board residues above the other.
- Joints between insulation boards must be at least 100 mm from modified inactive cracks and joints in the substrate, from changes in the thickness of the structure reflecting on the surface of the substrate and from the interface of the material on the substrate.
 - The original expansion joints in the substrate must be maintained
 - The joints connection between insulation boards must be at least 100 mm from the corners of the building openings.
 - There is recommendation for openings to fit insulation boards with such an overlap to cover up the dimension stocks of the insulation bonded to the lining of the openings.
 - To use a method "floating - buttering" is advisable especially for the last row of boards when pitched roofs are being insulated. This will prevent the chimney effect. The first step is to apply an adhesive material on the board with a toothed trowel (tooth least 10 mm depending on the substrate) in perpendicular direction to its longer side. In the second step, the adhesive material is applied to base in the horizontal direction. After that, the insulation board is fitted.

Other

- The protruding parts such as built-deposit box of blinds or ceiling fronts should be covered with boards with no contact of these boards. The excess of the insulating material can be removed from the back side of the insulation boards to the residual thickness of 30 mm. The cover with insulating material, however, should constitute at least 1/3 of the original thickness of the insulation board.
- Thermal bridge reduction on the lining of building openings will be achieved by using boards with a low coefficient of thermal conductivity λ_D . These include PUR, PIR or phenolic boards. Their use and design of connection details on the insulator ETICS surface is recommended to consult with the manufacturer.
- The EPS boards surface is usually levelled with grinding smoother fully and properly swept after hardening adhesive materials (at least after 1 day). Unless within 14 days provided with the basic layer must be reginded.
- Consistent grinding of bonded boards is required for boards made of extruded polystyrene with no surface treatment. If you can not reliably ensure control of reginding, it is recommended to use EPS type Perimeter.



ANCHORING INSULATION BOARDS

Selection of dowels

- The construction documents determine the type, number, anchoring length, position with respect to reinforcement, placement of dowels in the area of insulation boards and at the point of contact and/or on the entire surface of ETICS.
- The procedure for calculating the amount of the dowels on the surface is given in Chapter Design ETICS Attaching to the Substrate.
- Dowels with metal stud or screw must be used in ETICS with mineral wool for masonry and concrete substrates.

Installation of dowels

- The dowels are installed at earliest after 2 days of insulating boards bonding. Base coat that covers the dowels must be applied within 6 weeks, otherwise the dowels may be damaged by UV radiation.
- The axis of the hole for the dowel must be perpendicular to the substrate.
- The dowel length, diameter and minimum distance from the edges of the substrate, ceiling or expansion joints depends on the type of dowel.
- Insulation mineral wool boards must be always first pierced with the drill before drilling to substrate.
- Dowels for anchoring ETICS with insulating material with a double layer of mineral wool is recommended to equip with the suitable plate.

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- Drill diameter and depth of the borehole performed depends on the type of the dowel.
- Into the base with a cavity or into the base of highly porous materials is fundamentally Drilling without hammering is necessary for substrate from porous materials and vertically perforated clay bricks.
- The dowel plate must not interfere with the flatness of the base coat.
- Poorly fitted (loosely doweled, projecting, etc.), deformed or in another way damaged dowels must be replaced with new in near position. Poorly fitted dowel is removed, the hole in the insulation is filled with used insulating material. The remaining hole is levelled with filling compound. If you can not remove the dowel, it must be adjusted not to disturb the flatness of the base coat.

Installation of Spiral ANKSYS SA15+ anchors

- Anchors are installed at least 2 days after bonding of the insulation boards. Base coat must be applied latest 14 days after installation of the anchors. Otherwise the anchors may be damaged by the UV radiation.
- First the drill hole to substrate is drilled. It is performed with the drill with diameter 14 – 15 mm. The depth of the drill hole is 10 mm deeper than anchorage depth of the anchor. Drilling is always provided with the hammering. The hole is cleaned using the drill by inserting it several times into the drill hole.
- Anchor Spiral Anksys is inserted to the drill hole using an application tool ECORAW® with a distance ring which ensures the correct depth location of the anchor in the insulation. Anchor must be inserted at least 10 mm under the front surface of insulation boards.
- Grouting of the drill hole can be done only with grouting material SAF1 or SAF 3 according to specification of ETICS. Preparation of grouting material is described in relevant technical datasheet.
- Working temperature range is +5 °C to +30 °C. Temperature of grouting material must be higher than 10 °C.
- Grouting material is applied from the bottom of the drill hole. The biggest part is inserted in here. With continuous lifting of the application hose of appropriate length towards surface of insulation boards the whole drill hole is filled with grouting material.
- Each packaging of grouting material is equipped with application hoses in length respecting the length of the anchor.
- Cured expanded grouting material exceeding from the surface of the insulation boards is removed with a knife. It can be done first 24 hours after installation of the anchors.
- Application of the base coat can be done after curing of expanded grouting material (at first 24 hours after installation of anchors).
- Following rules must be followed:
 - Axis of the drill hole must be perpendicular to substrate;
 - Depth of drill hole is related to the type and length of the anchor;
 - Anchor must not disrupt the flatness of the base coat;
 - Poorly fitted (loosely doweled, projecting, etc.), deformed or in another way damaged dowels must be replaced with new in near position. Poorly fitted dowel is removed, the hole in the insulation is filled with used insulating material. The remaining hole is levelled with filling compound. If you can not remove the dowel, it must be adjusted not to disturb the flatness of the base coat.

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DESIGNING ATTACHING OF ETICS TO THE SUBSTRATE

In general

- ETICS series STX.THERM® are in terms of attaching to the substrate differentiated to following categories:
 - Bonded ETICS with supplementary mechanical fixings
 - purely bonded ETICS
 - mechanically fixed ETICS with supplementary adhesive.
- Method of ETICS attachment depends on the type of the substrate, the substrate preparation, type of ETICS and conditions resulting from EN 1991.
- Suitable adhesive materials for appropriate ETICS are listed in Annex 1 - Specification of ETICS series STX.THERM®.
- Adhesion of the adhesive materials to the substrate must be at least 80 kPa. It is verified with a pull out test at the construction site according to internal test code STOMIX, spol. s r.o., eventually according to EN 1542 standard.
- Adhesion of the adhesive materials to the substrate can be increased by coating the substrate with a suitable primer (eg, EH, Primer HC-4 0103). Additional operations can be performed only after the primer has dried.
- Thermal insulation of EPS with the addition of graphite, and Perimeter and plinth boards can be bonded to the substrate only with those materials - ALFAFIX® S1, ALFAFIX® S101, ALFAFIX® S11, ALFAFIX® TIS, ALFAFIX® PUR, if it is approved by in the system.
- XPS boards can be bonded to the substrate only with adhesive ALFAFIX® S11, ALFAFIX® TIS and ALFAFIX® PUR.
- Mechanical properties of insulators are indicated in Annex 2.

Mechanically fixed ETICS with supplementary adhesive

- Dowels appropriate for the individual systems are listed in the Specifications of ETICS series STX.THERM®. The use of dowels depends on the type of ETICS and the type of the substrate.
- Dowels with a metal stud or screw must be used in ETICS where the sum of the weights of the facial layers is more than 10 kg/m² and in ETICS series STX.THERM® BETA.
- Minimum thickness of the thermal insulation of expanded polystyrene is 50 mm. When using anchors Spiral Anksys SA15+ the minimum thickness of insulation board is 80 mm.
- Using flush mounted dowels Ejothorm® STR U 2G, PTH-SX, PTH-S, Wkret-met eco-drive 8, Wkret-met eco-drive 8S, Koelner TFIX 8 ST, Termoz 8 SV the minimum thickness of the thermal insulation of expanded polystyrene is 100 mm.
- The minimum thickness of the thermal insulation of mineral wool depends on the insulation product and type of dowel. Possible combinations are described in Annex 3.
- The maximum allowable unevenness of the substrate is 20 mm/m
- At least 30% of the insulation board must be bonded by an adhesive material to the substrate (40 % for STX.THERM® BETA) unless it is said otherwise by ETICS specification or construction documentation.
- To determine the type, number, position relative to reinforcement and placement of dowels based on the conditions and test results related to the stability of the substrate made according ETAG 004 in ETICS stability for wind uplift, and the dowels test results according to ETAG 014.
- Fixing is designed for 100 % of the wind load. They do not contribute to transfer of any other loads. Number of anchors per m² is determined by static calculation. $R_d \geq S_d$ condition must be met where:
 - R_d is value of designed resistance of ETICS fixing against wind load.
 - S_d is designed value of wind load calculated according to EN 1991-1-4.
- Value R_d is calculated according to following equation:
 - $R_d = k_k \times (R_{panel} \times n_{panel} + R_{joint} \times n_{joint}) / \gamma_{Mb}$, where
 - k_k – a factor to determine characteristic values of resistance of anchors to pull through insulation boards ($k_k = 0,8$)
 - R_{panel} – pull through value in the area of the panel
 - n_{panel} – number of anchors located in the area of panel

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R_{joint} – pull through value in the joints between the insulation boards

n_{joint} – number of anchors located in the joints

γ_{Mb} – safety factor.

Safety factor γ_{Mb} according to used insulation, resp. system

Insulation	Safety factor γ_{Mb}
EPS 70 F, EPS 100 F, EPS F with added graphite	1,2
MW TR10, MW TR15	1,5

ETICS	Safety factor γ_{Mb}
STX.THERM® ALFA	1,2
STX.THERM® BETA	1,5

resp. according to equation $R_d = N_{Rk} \times (n_{panel} + n_{joint}) / \gamma_{Mc}$, where

N_{Rk} – value of resistance to pull out from the substrate according to ETAG 014 or tested on site according to internal test method or according to ETAG 014

γ_{Mc} – safety factor – see table below.

Safety factor γ_{Mc}

Type of the substrate	Screw-in dowels	Hammered-in dowels	Spiral Ansys SA15+
Concrete or reinforced concrete of class at least C 12/15, minimum thickness at least 100 mm	1,5	2,1	2,0
Top concrete layer of sandwich panels with minimum thickness 50 mm ¹⁾	1,6	2,3	2,0
Masonry from full brick or stones ²⁾	2,1	2,9	2,0
Masonry or elements from vertically perforated bricks or panels	1,8	2,5 ³⁾	2,0
Masonry or elements from lightweight concrete from porous fillers	2,4	3,2 ³⁾	2,0
Masonry or elements from aerated concrete	1,8	2,5	2,0
Other substrates	2,4	3,2	2,0

¹⁾ Values for vertically perforated bricks are used for lower thickness of top panel

²⁾ Bricks with hollows area up to 15 % of total area are considered as full bricks.

³⁾ Hammered-in dowels can be used only for those substrates where achievement of full performance in time was tested.

Lower R_d value is used for the calculation.

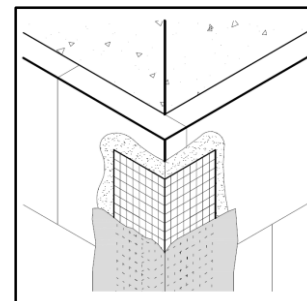
- Table values for the design of mechanical attachment of Etics are in Annex 3.
- Adhesive ALFAFIX® PUR can be used only for buildings with height up to 9 m above terrain level.

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Bonded ETICS

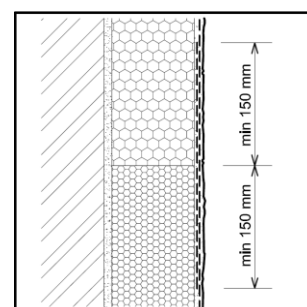
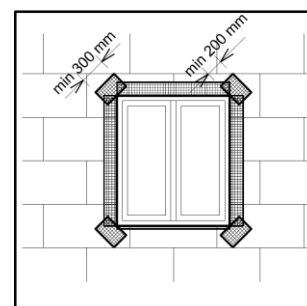
- Requirements are valid for ETICS purely bonded or bonded ETICS with supplementary mechanical fixings
- Maximal allowed unevenness of the substrate is 10 mm/m.
- Substrate can not be treated with paint or plaster.
- Unevenness can be levelled only locally with a mortar with adhesive strength at least 250 kPa.
- At least 40 % of the board surface should be in contact with the substrate. Mineral wool with transverse orientation of fibers (lamellas) are always fully bonded.
- Maximal height of the building is 25 m above terrain level.



BASE COAT

In general

- Leveling substance and glass mesh placed in the outer half of the layer is used for a base coat.
- The type of leveling substance and glass mesh forming a base coat is determined by the construction documents as specified by the ETICS (see Annex 1 - Specifications ETICS series STX.THERM®).
- Preparing process of the leveling substance is determined by appropriate technical data sheet.
- The minimum thickness of the base coat is 2.8 mm, the maximum thickness is 5 mm.
- Levelling up to the required thickness can be done by applying another layer on smoothed, not hardened layer applied initially.
- The base coat must be reinforced throughout all its area.
- Reinforcement of the base coat must be covered by a layer of leveling substance at least 1 mm thick (or 0.5 mm in areas of mutual overlap of individual strips of glass mesh).
- Reinforcing mesh overlaps on the surface (the contact of two strips of glass mesh), on corners, on edges of dilatation fields, at the start of the tiles using a mounting lath.
- Linings and corners are reinforced with corner profiles.
- Stronger reinforcement (such as diagonal stripes) must be designed in areas with expected stress concentrations.
- Increase of the system resistance against mechanical damage (e.g. in the plinth area) is achieved by means of stronger reinforcing with reinforcing mesh VT1 or using armored mesh R 330 (laid on the first layer with contact) and the reinforcing mesh VT1 in the second layer, or a double reinforcement base layer in the desired area.
- Category of resistance against the mechanical damage for different types of final surface treatments and types of reinforcement are listed in Annex 4



Reinforcement

- There are mounted ending-, corner- and dilatation-profiles on the insulation boards to reinforce the base coat. Profiles and reinforcements are pressed into the applied layer of leveling substance to avoid air cavities under the profile.
- Areas with an expected concentration of stress – lining corners - is reinforced by glass fiber mesh dimensions of at least 300x200 mm located diagonally in the corners.
- The contact of two different ETICS differing only in the type of thermal insulant, without the visible joint, must be reinforced with a reinforcing strip within a distance of at least 150 mm on each side of the contact.

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- To increase ETICS resistance to mechanical damage in the surface area of ETICS the selected reinforcement mesh is placed without overlaps prior application of the base coat.

Creating a base coat

- Adjacent structures, plating, mounted and pervasive elements must be protected from contamination (e.g. with tapes or foils). Removal of residues of dried material is difficult.
- The base coat is started to apply at first 2 days after bonding of the thermal insulation and after mounting the anchors. It is performed by applying leveling substance on dry and clean insulation boards.
- The base coat is reinforced by pushing the reinforcing mesh into the leveling substance. Leveling material pervaded through the mesh loops is after a possible addition of levelling substance smoothen. The reinforcing mesh is usually imposed from the top down, overlapping of the strips must be at least 100 mm wide. In the case of double reinforcement, the whole procedure is repeated before the previous layer dries. Mutual overlapping strips of each layer of the double mesh reinforcement must not overlap. When it is dried the glass mesh is cut over the outside edge of the sheet /profile on the foundation lath, ending- and corner- profile.
- The base coat must contain a reinforcing mesh over the entire surface up to its edges.
- The reinforcing mesh must be placed without folds in the outer half of the base coat, covered by at least 1 mm of leveling material (in the mesh overlap at least 0,5 mm).
- Basic details how to perform a base coat are shown in Annex 6

Decorative elements

- Stucco profiles RP, and other decorative elements are bonded to the complete base layer.
- Joint after their perimeter is sealed with a flexible sealant.

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TOP COAT

In general

- Top coat is created from coloured render or misaic render or coloured organic tiles. Type, structure and colour is determined by construction documentation – see chapter Structure and colour of top coat.
- Materials are prepared and applied accaording to relevant technical data sheet.

Preparation of base coat before work starts

- Base coat from levelling substance ALFAFIX® S101, ALFAFIX® S1 must be treated with pigmented primer before application of top coat.

Primer for top coats:

Render	Suitable promer
BETADEKOR® AF/AD	HC-4 – tinted to the colour shade corresponding to render colour
BETADEKOR® SAF/SAD	HC-4 – tinted to the colour shade corresponding to render colour
BETADEKOR® SIF/SID	HC-5 – tinted to the colour shade corresponding to render colour
BETADEKOR® VF/VD	HC-5 – tinted to the colour shade corresponding to render colour
ALFADEKOR G	HC-4 – tinted to the colour shade corresponding to render colour – see Annex 7
BRICK FLEXY	EH
ALFADEKOR F/S	HC-4 – tinted to the colour shade corresponding to render colour – see Annex 7

- Primer must be applied on dry base coat, no sooner than 2 days after application of base coat. Drying times can be prolonged when drying conditions are bad.

Application of base coat

- Top coat is applied on dry and clean base coat with dry primer, first 4 hours after application of primer. Drying time of the primer can be prolonged due to bad drying conditions.
- Visually coherent areas must be done in in one working width with a sufficient number of workers. Interruption of work is allowed on the edge of one coloured area, on the corners of building and other edges.
- Adjacent structures, plating, mounted and pervasive elements must be protected from contamination (e.g. with tapes or foils which are removed immediately after application). Removal of residues of dried material is difficult.
- Split laths are recommended to use for connecting and splitting of coloured areas.
- One batch of coloured material must be used for one visually coherent area.
- Stucco profiles RP are painted with GAMADEKOR® SIL or GAMADEKOR® SA. At least two layers of the paint are used. Je potrebné dbať na dobré rozotrenie náteru, aby nedochádzalo v záhyboch k praskaniu náteru. It is important to ensure a good spread of the paint to avoid cracking in the folds of the paint.

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Structure and colour of top coat

Render structures overview:

F – Stippled structure



D – rilled structure



Mosaic structure



Available renders according to insulation material

EPS	MW
BETADEKOR® AF/AD	BETADEKOR® AF/AD
BETADEKOR® SAF/SAD	BETADEKOR® SAF/SAD
BETADEKOR® SIF/SID	BETADEKOR® SIF/SID
BETADEKOR® VF/VD	BETADEKOR® VF/VD
ALFADEKOR G	
BRICK FLEXY	

Labeling of top coats according to grain size

Stippled structure				
Maximal grain size	BETADEKOR® AF	BETADEKOR® SIF	BETADEKOR® SAF	BETADEKOR® VF
1,5 mm	AF15	SIF15	SAF15	VF15
2,0 mm	AF20	SIF20	SAF20	VF20
3,0 mm	AF30	SIF30	SAF30	VF30
Rilled structure				
Maximal grain size	BETADEKOR® AD	BETADEKOR® SID	BETADEKOR® SAD	BETADEKOR® VD
2,0 mm	AD20	SID20	SAD20	VD20
2,5 mm	AD25	SID25	SAD25	VD25
3,0 mm	AD30	SID30	SAD30	VD30

- Colour range is determined by colour chart STOMIX® ETICS, partially it is possible to use colour charts STOMIX® COLOR, STOMIX® COLLECTION a STOMIX® COLLECTION 2016. There is value of solar reflectance and material limitations printed for each colour shade in each colour chart. Colour shades signed with mark "a" is not possible to use for products BETADEKOR® SIF/SID, VF/VD, HC-5.
- Other colour shades is possible to use only after approval of producer of ETICS.
- Colour shades with solar reflectance higher than 30 % is recommended to use.

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Banned colour shades for ETICS

Base coat	ALFAFIX® S101		ALFAFIX® S1	
The world side orientation	N, NW, NE, permanently shaded areas	Other world sides	N, NW, NE, permanently shaded areas	Other world sides
Minimal solar reflectance KO	10	26	10	20
Banned patterns of ALFADEKOR	None	108, 110, 116 - 119, 203-205, 215 - 222 404, 410, 411, 412	None	108, 110, 116 - 119, 203-205, 215 - 222 404, 410, 411, 412
Banned patterns of BRICK FLEXY	None	104, 108	None	104, 108

- Using of banned colour shades and patterns may lead to decreased lifetime of ETICS.
- Colour shades in colour chart are related to the dry renders and paint. The colour shade is changed during drying process.
- Colour shade of the product is always checked during production process. Nevertheless small deviation from the standard may occur between the batches. Colour shade is also influenced by other factors during application such as water uptake, structure and overall quality of the substrate, structure of the top coat, technological procedure and climatic conditions during application, drying process and curing process.
- Colour shade deviations can be also created by different consistency of buckets (dilution, different storage conditions or batch) or by uneven application or drying of the top coat.
- Façade tiles BRICK FLEXY are produced from natural based raw materials and it is not possible to ensure the same colour shade for several batches and deliveries.
- Structure of renders with higher grain size cause visual darkening of the colour shade (due to shading of the light). It is also necessary to consider effects of gloss.
- It is recommended to create sample area of 1 m² before the start of application using the same application technology that will be used on construction site due to different perception of colours by customers.

THERMAL PROPERTIES

In general

- Composition of the ETICS must fulfill criteria of related thermal standards including the balance of condensed and vaporated water vapour.
- Calculation is recommended to perform by appropriate software for each type of construction and substrate.
- Thermal and diffusion properties are listed in Annex 5 for individual components of the ETICS.
- Influence of thermal bridges caused by anchors is calculated according to equation $U = U_c + \chi_p \cdot n$
 - $\chi_p \cdot n$ – consider this if higher than $0,04 \text{ W} \cdot \text{m}^{-2} \cdot \text{K}^{-1}$
 - U – coefficient of thermal transmission [$\text{W} \cdot \text{m}^{-2} \cdot \text{K}^{-1}$]
 - n – number of anchors per 1 m^2
 - χ_p – Point thermal transmittance [$\text{W} \cdot \text{K}^{-1}$] – see Annex 3
 - U_c – coefficient of thermal transmission of the construction (without thermal bridges) [$\text{W} \cdot \text{m}^{-2} \cdot \text{K}^{-1}$]
- Point thermal transmittance for selected anchors according to TR-025 test method is listed in Annex 3.

FIRE PERFORMANCE

In general

- Fire performance must meet relevant national standards
- Reaction to fire of the ETICS of STX.THERM® series – classification according to EN 13501-1

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Type of STX.THERM®	Adhesive	Base coat	Top coat BETADEKOR®	Reaction to fire
ALFA	ALFAFIX® S2 ALFAFIX® S101 ALFAFIX® S1 ALFAFIX® S11	ALFAFIX® S101 ALFAFIX® S1	AF, AD, SIF, SID, SAF, SAD, VF, VD	B-s1, d0
BETA	ALFAFIX® S2 ALFAFIX® S101 ALFAFIX® S1 ALFAFIX® S11	ALFAFIX® S101 ALFAFIX® S1	AF, AD, SIF, SID, SAF, SAD, VF, VD	A2-s1, d0
Other compositions				F (NPD)

Classification is valid for following substrates: concrete, masonry (possible with paint or plaster), boards – CTD, Cement fiber boards, gypsum fiber boards.

- Reaction to fire of EPS boards – E
 Reaction to fire of EPS boards with added graphite – E
 Reaction to fire of MW boards – A1

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OTHER DESIGNING REQUIREMENTS

- The design of ETICS must take into account static properties of insulated construction.
- Dilatation of ETICS must respect original dilatation segments of the building.
- Connection of ETICS to opening fillings must take into account diffusion parameters of original joint.
- Construction details must be designed to ensure thermal engineering requirements according to valid standards, to prevent water penetration under the surface of ETICS, to eliminate corrosive action of materials in contact with ETICS.
- Foundation of ETICS must be done above the drip water zone – see details of ETICS of STX.THERM® series.

DEFINITION OF MAINTENANCE MEASURES

Preventive protective coating

- Exposure to weather conditions causes the outer layer of ETICS to be stressed. Effective preventive measures for increased resistance of the outer layer to weather conditions are the application of protective coating after 15 to 20 years from system implementation. The ETICS coating effectively extends the morale life and eliminates minor drawbacks in the original implementation.

Clenaing using pressure water

- Soiled ETICS finishes - plasters or coatings - as a result of contaminated environment, do not reduce the thermal insulation properties of the system. Its unacceptability is due to visual action. The negative visual effect is improved by cleaning with hot pressure water or hot pressure water with the addition of surfactants (eg detergent).

Repair of mechanical damage

- Intended use may result in intentional or unintentional mechanical damage to the ETICS. The purpose of the measure is to eliminate the damage incurred so as not to create conditions for a relatively rapid deterioration of the system due to weather conditions and to achieve satisfactory appearance in the damaged site.

Algae

- The occurrence of algae on the surface of ETICS is mainly due to the cooling of the outer layer below the dew point of the ambient air. This results in full surface condensation of water on the surface of the system, which, together with the substances contained in the air and rainwater, is the nutrient medium for the algae. Algae alone do not cause ETICS failures and are rather an aesthetic problem. Their dead cells, however, create suitable conditions for the growth of other organisms, Mosses and fungi, which by their action can mechanically damage the surface layer of ETICS because they have their own root system.
- BETADEKOR® and GAMADEKOR® paints intended for use on the ETICS contain an film protection agent. In order for this preparation to be effective and penetrate into the interior of microorganisms, it must be soluble in water. Thus the agent is consequently washed out of the mass and its surface protection is limited in time. All used products are in compliance with EU regulations.

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PRODUCTS AND MATERIALS FOR MAINTENANCE MEASURES

Preventive protective coating

- The following products are intended to carry out the preventive protective coating:
 - GAMADEKOR® SA and GAMADEKOR® SIL water-dilutable paints including the corresponding primers.

Cleaning using pressure water

- Optional use of surfactant should be approved by the STX.THERM® ETICS manufacturer.

Repair of mechanical damage

- For repairs, always use the same ETICS components as they were used in the original application, or components of the ETICS recommended by the manufacturer of the ETICS of STX.THERM® series.
- The color finish of the top coat should be taken always in cooperation with the ETICS manufacturer's service technician and should be based on a realistic sample.

Algae

- For the removal of algae it is recommended to use the specified preparation supplied by the system manufacturer - SMP FORTE. Use of an unapproved preparation or inappropriate use may result in damage to the ETICS.

IMPLEMENTATION OF MAINTENANCE MEASURES

Preventive protective coating

- Preparation of material and application is carried out according to the GAMADEKOR® SA and GAMADEKOR® SIL technical data sheet.

Cleaning using pressure water

- Cleaning is carried out by high-pressure cleaners with hot water. The water pressure needs to be adapted to the conditions - based on the cleaning test carried out to prevent the ETICS from being ruled out. Decreasing the pressure is done by increasing the distance of the nozzle from the cleaned surface. The maximum possible water temperature is + 60 ° C.
- When using surfactants approved by the ETICS manufacturer, the residue on the surface of the cleaned surface must not remain on completion of cleaning. For this purpose, it is necessary to thoroughly wash it with water.
- Cleaning is recommended during summer. It can not be realized in a period characterized by the risk of frost.

Repair of mechanical damage

- In the case of mechanical damage to the system, a regular part containing damage, usually to the full depth of the thermal insulation, is cut. In the vicinity min. 10 cm from the perimeter of the cut, the system finishes are thoroughly removed to the base coat is reinforcement. The same kind of thermal insulation of a suitable shape is bonded to the prepared substrate. Once the adhesive has hardened, a possible joint between the original and the new thermal insulation is filled with insulating material of the same type, if necessary sanded. The resulting joints with a width of more than 2 mm are filled with insulating cutouts. Joints between EPS boards can be filled with PUR foams up to 4 mm wide. On the leveled surface, a new base coat with a min. 10 cm over the original reinforcement is applied. Increased attention should be paid to not to break the original reinforcement and to maintain the plane of the new base coat with the original reinforcement. Upon drying of the new base coat, finishing layers are added. It is best to carry out the local damage repair at the earliest possible date after damage so as not to cause secondary damage to moisture penetrating the damaged surface of the system or to widen the area of damage

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Algae

- A precautionary measure against the occurrence of algae is the cleaning of the façade by pressure water according to item no. 2 at first signs of algal attack. However, even if they occur, you can remove them using the diluted SMP FORTE product according to the relevant technical data sheet. System manufacturer recommends 10 to 20% dilution, depending on ETICS attack status.
- In the case of high attack (continuous growing), the soil and the microorganisms are removed mechanically or by means of a high-pressure cleaner.
- With the SMP FORTE solution paint the substrate (no breaks, wet, at least 2x) several times so that the active ingredients penetrate the organisms deep within the substrate. After 7 to 10 days, dead remains of microorganisms are removed from the surface by pressurized water.
- Work can not be done before and during rain. The treated surface must be protected from rain for at least 24 hours.
- The treated facade should be treated with a preventive protective coating.

External Thermal Insulation Composite Systems (ETICS) can be used to achieve thermal energy savings or to achieve minimum temperature parameters for human activities or stay.

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USING ETICS OF STX.THERM[®] SERIES TO ACHIEVE SAVINGS OF THERMAL ENERGY

- Using ETICS of STX.THERM[®] series to achieve energy savings needs:
 1. Measurement and regulation of thermal energy consumption
 2. Modification of heat system in case of application of ETICS
 3. Compliance with the intended use of insulated space
 4. Protection against arbitrary interference
 5. Following the maintenance instructions
- When using ETICS in apartment buildings, it is recommended to set up an energy management activity.

Measurement and regulation of thermal energy consumption for heating

- Implementation of the ETICS causes a reduction in thermal transfer through the construction. Without the possibility of measurement and especially without the possibility of regulation of consumption, its use in terms of energy savings does not have any meaning - only the temperature of the interior spaces increases.

Adjustment of the heating system

- In the case of additional heating, the hydraulic regulation of the heating system and its verification by the heating test must be omitted.

Observe the purpose of use of insulated premises

- When using the ETICS, there must be no significant change in the original moisture parameters in the interior of the insulated building, due to the risk of thermal deficiencies - increased water vapor condensation on the inside of the structure.

Protection against arbitrary interference

- When using, it is not possible to admit any arbitrary policy to the ETICS, Installation of satellite dishes, clothes hangers, etc. All necessary interventions in the system must be done professionally, excluding the possibility of entering water into the system and minimizing the thermal bridges that arise.

Following the maintenance instructions

- Follow the ETICS maintenance instructions for STX.THERM[®]. The introduction of energy management ensures a regular evaluation of energy consumption and leads to the achievement of the expected savings.

Use the ETICS of the STX.THERM[®] series in order to achieve the minimum temperature parameters for activities or people stay

- Using ETICS of the STX.THERM[®] series in order to achieve the minimum temperature parameters for the activity or stay of the people requires, in addition to measuring and controlling, all the requirements listed in Part I of these instructions (maintenance).

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RELATED TECHNICAL DOCUMENTATION

ETICS documentation

ETA-05/0054	STX.THERM [®] ALFA
ETA-05/0173	STX.THERM [®] BETA

Standards and related regulations

ETAG 004	External Thermal Insulation Composite Systems with rendering
ETAG 014	Plastic Anchors for ETICS
EN 634	Cement-bonded particle boards. Specification. General requirements
EN 300	Oriented strand boards (OSB). Definitions, classification and specifications
EN 312	Particleboards. Specifications
EN 13986	Wood-based panels for use in construction. Characteristics, evaluation of conformity and marking
EN 13501-1	Fire classification of construction products and building elements. Classification using test data from reaction to fire tests
EC 96/603/EC	establishing the list of products belonging to Classes A 'No contribution to fire'
EN 1542	Products and systems for the protection and repair of concrete structures. Test methods. Measurement of bond strength by pull-off
EN 1015-12	Methods of test for mortar for masonry. Determination of adhesive strength of hardened rendering and plastering mortars on substrates
EN ISO 12570	Hygrothermal performance of building materials and products. Determination of moisture content by drying at elevated temperature
EN 1991	Eurocode 1: Actions on structures
EN 1991-1-4	Eurocode 1. Actions on structures. General actions. Wind actions
EN 13163	Thermal insulation products for buildings. Factory made expanded polystyrene (EPS) products. Specification
EN 13162	Thermal insulation products for buildings. Factory made mineral wool (MW) products. Specification.

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ANNEX 1 – SPECIFICATION OF ETICS OF STX.THERM® SERIES

Components for STX.THERM® ALFA (ETA-05/0054)		Consumption	Thickness
Partially or fully bonded ETICS (minimum adhesive area must be 40% of the EPS surface).			
Insulation	Boards of expanded polystyrene (EPS, EPS with graphite addition) according to EN 13162 + A1:2015 – see Annex 2 for closer specs.		50 - 400 mm
Adhesive	ALFAFIX® S2 ALFAFIX® S101 ALFAFIX® S1 ALFAFIX® S11	4 – 5 kg/m ²	1 – 20 mm
	ALFAFIX® PUR - ETICS BOND (producer SOUDAL N.V.) - Thermo Kleber (producer Autra Den Braven Aerosol) - Thermo Kleber WINTER (producer Autra Den Braven Aerosol) - Illbruck PU 010 (producer Tremco Illbruck s.r.o.)	5 – 10 m ² /packaging	Apply adhesive band approx. 3 cm wide
Mechanically fixed ETICS with supplementary adhesive (minimum adhesive area must be 30 % of EPS surface).			
Insulation	Boards of expanded polystyrene (EPS, EPS with graphite addition) according to EN 13162 + A1:2015 – see Annex 2 for closer specs.		50 – 340 mm
Adhesive	ALFAFIX® S2 ALFAFIX® S101 ALFAFIX® S1 ALFAFIX® S11	2,1 – 5 kg/m ²	1 – 20 mm
	ALFAFIX® PUR - ETICS BOND (producer SOUDAL N.V.) - Thermo Kleber (producer Autra Den Braven Aerosol) - Thermo Kleber WINTER (producer Autra Den Braven Aerosol) - Illbruck PU 010 (producer Tremco Illbruck s.r.o.)	5 – 10 m ² /packaging	Apply adhesive band approx. 3 cm wide
Fixing	Ejotherm STR U 2G – with metal screw Ejotherm NTK U – with plastic nail Ejotherm H1 eco – with metal nail Ejot H3 – with plastic screw PTH-KZ – with metal nail PTH-S – with plastic screw PTH-SX – with plastic screw PTH-X – with plastic nail PTH-EX – with metal nail Termoz SV II ecotwist – with metal screw Termoz CS 8 – with screw in combination plastic - metal Termoz CN 8 – with nail in combination plastic - metal Termoz PN 8 – with plastic nail TERMOFIX CF 8 – with metal nail Koelner TFIX 8 S – with metal screw u Koelner TFIX 8 M – with metal nail Koelner TFIX 8 ST – with metal screw Wkret-met WK THERM-8 – with metal nail Wkret-met WK THERM-8S – with metal screw Wkret-met eco-drive 8 – with metal screw Wkret-met eco-drive 8S – with metal screw Wkret-met LTX-8 – with plastic nail Wkret-met LMX-8 – with metal nail Wkret-met LFM-8 – with metal screw Wkret-met FIXPLUG-8 – with plastic nail Spiral Anksys SA15+ – injected anchors Hilti SD-FV 8 – with plastic nail	According to project documentation (min. 6 pcs/m ²)	

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Components for STX.THERM ® ALFA (ETA-05/0054)		Consumption	Thickness
Base coat	ALFAFIX® S1 ALFAFIX® S101	3,8 kg/m ²	average 3 mm
Reinforcement	VT1 – mesh size 3 – 5 mm (Vertex R131 A101, Vertex R131 A102, SSA-1363 SM, 122) VT1/1 – mesh size 3 – 5 mm (Vertex R117 A101, SSA-1363 145)		
Primer	HC-4 – for BETADEKOR® A-, SA-, ALFADEKOR G HC-5 – for BETADEKOR® SI-, V- EH – for BRICK FLEXY	0,2 – 0,24 kg/m ² 0,2 – 0,24 kg/m ² 0,09 – 0,18 kg/m ²	
Top coat	BETADEKOR® AF, AD – paste, organic	2,4 – 4,0 kg/m ²	1,5 – 3,0 mm
	BETADEKOR® SAF, SAD – paste, silicon	2,4 – 4,0 kg/m ²	
	BETADEKOR® SIF, SID – paste, silicon-resin	2,4 – 4,0 kg/m ²	
	BETADEKOR® VF, VD – paste, silicate	2,4 – 4,0 kg/m ²	
	ALFADEKOR G – paste, mosaic render	4 – 6 kg/m ²	2 mm
	BRICK FLEXY – ready to use plaster strips	66 ks/m ²	3 mm
	ALFAFIX® BS – Adhesive material for BRICK FLEXY	2,2 – 2,5 kg/m ²	1–2 mm

- In addition to the listed anchors, other ETA types may be used in the assembly according to ETAG 014, provided that they meet the following requirements:
 - Anchor diameter ≥ 60 mm
 - plate stiffness ≥ 0.3 kN / mm for surface mounting or ≥ 0.6 kN / mm for recessed assembly
 - the force at break is greater than the greater of R_{panel} and R_{joint} values - see annex 3

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ANNEX 1 – SPECIFICATION OF ETICS OF STX.THERM® SERIES

Components for STX.THERM® BETA (ETA-05/0173)		Consumption	Thickness
Fully bonded ETICS with supplementary fixing.			
Insulation	Mineral wool (MW) TR80 („lamella“) - see Annex 2 for closer specs		50 – 400 mm
Adhesive	ALFAFIX® S2 ALFAFIX® S101 ALFAFIX® S1 ALFAFIX® S11	4 – 5 kg/m ²	2 – 20 mm
Mechanically fixed ETICS with supplementary adhesive (minimum adhesive area must be 30 % of MW board surface).			
Insulation	Mineral wool (MW) TR10, TR15 („board“) - see Annex 2 for closer specs.		60 – 400 mm
Adhesive	ALFAFIX® S2 ALFAFIX® S101 ALFAFIX® S1 ALFAFIX® S11	2,1 – 5 kg/m ²	2 – 20 mm
Fixing	Ejotherm STR U 2G – with metal screw Ejotherm H1 eco – with metal nail PTH-KZ – with metal nail PTH-S – with metal screw PTH-EX – with metal nail Termoz CS 8 – with screw in combination plastic - metal Termoz CN 8 – with nail in combination plastic - metal TERMOFIX CF 8 – with metal nail Koelner TFIX 8 S – with metal screw Koelner TFIX 8 M – with metal nail Koelner TFIX 8 ST – with metal screw Wkret-met WK THERM-8 – with metal nail Wkret-met WK THERM-8S – with metal screw Wkret-met eco-drive W 8 – with metal screw Wkret-met LMX-8 – with metal nail Wkret-met LFM-8 – with metal screw	According to project documentation (min. 6 pcs/m ²)	
Base coat	ALFAFIX® S1 ALFAFIX® S101	5,2 kg/m ²	average 3 mm
Reinforcement	VT1 – mesh size 3 – 5 mm (Vertex R131 A101, Vertex R131 A102, SSA-1363-160, 122) VT1/1 – mesh size 3 – 5 mm (Vertex R117 A101, SSA-1363-145)		
Primer	HC-4 – for BETADEKOR® A-, SA- HC-5 – for BETADEKOR® SI-, V-	0,2 – 0,24 kg/m ² 0,2 – 0,24 kg/m ²	
Top coat	BETADEKOR® AF, AD – paste, organic BETADEKOR® SAF, SAD – paste, silicon BETADEKOR® SIF, SID – paste, silicon-resin BETADEKOR® VF, VD – paste, silicate	2,4 – 3,6 kg/m ² 2,4 – 3,6 kg/m ² 2,4 – 3,6 kg/m ² 2,4 – 3,6 kg/m ²	1,5 – 3,0 mm

- In addition to the listed anchors, other ETA types may be used in the assembly according to ETAG 014, provided that they meet the following requirements:
 - Anchor diameter ≥ 60 mm
 - plate stiffness ≥ 0.3 kN / mm for surface mounting or ≥ 0.6 kN / mm for recessed assembly
- the force at break is greater than the greater of R_{panel} and R_{joint} values - see annex 3

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ANNEX 2 – SPECIFICATION OF INSULATION MATERIAL

EPS boards (EPS 70 F, EPS 100 F, EPS with graphite addition)

EPS boards for purely bonded ETICS or for mechanically fixed ETICS according to EN 13163+A1:2015.

Properties	Standard	Class according to EN 13163+A1:2015	Value
Reaction to fire	EN 13501-1+A1:2010	E	Density 14-20 kg/m ³
Thermal resistance	EN 12667	Defined at CE marking according to EN 13163+A1:2015	
Thickness	EN 823	T(1)	± 1 mm
Length	EN 822	L(2)	± 2 mm
Width	EN 822	W(2)	± 2 mm
Squareness	EN 824	S(2)	± 2 mm/m
Flatness	EN 825	P(5)	5 mm
Surface	ETAG 004	Cut surface (homogeneous, uncoated)	
Dimensional stability under specified thermal conditions and humidity conditions	EN 1604	DS(70,-)1	1%
Dimensional stability under constant laboratory conditions	EN 1603	DS(N)2	0,2%
Short-term absorption in partial immersion	EN 1609	-	< 1 kg/m ²
Diffusion factor	EN 13163	MU 20 – 40 MU 30 – 70	20 – 70
Tensile strength perpendicular to the plane of the board	EN 1607	TR100	≥ 100 kPa
Shear Strength	EN 12090	SS20	≥ 20 kPa
The elastic modulus	EN 12090	GM1000	≥ 1000 kPa

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ANNEX 2 – SPECIFICATION OF INSULATION MATERIAL

MW boards TR10

MW boards with tensile strength perpendicular to the plane of the board at least 10 kPa (TR10) for mechanically fixed ETICS with supplementary adhesive.

Properties	Standard	Class according to EN 13162+A1:2015	Value
Reaction to fire	EN 13501-1+A1:2010	A1	Density $14 \leq 150 \text{ kg/m}^3$
Thermal resistance	EN 12667	Defined at CE marking according to EN 13162+A1:2015	
Thickness	EN 823	T4	-3 % or -3 mm*, +5 % or +5 mm
Length	EN 822	-	$\pm 2 \%$
Width	EN 822	-	$\pm 1,5 \%$
Squareness	EN 824	-	$\leq 5 \text{ mm/m}$
Flatness	EN 825	P(5)	$\leq 6 \text{ mm}$
Surface	ETAG 004	Cut surface (homogeneous, uncoated)	
Dimensional stability under specified thermal conditions and humidity conditions	EN 1604	DS(70,90)	1 %
Short term water uptake	EN 1609	WS	$\leq 1 \text{ kg/m}^2$
Long term water uptake	EN 12087	WL(P)	$\leq 3 \text{ kg/m}^2$
Diffusion factor	EN 12086 – EN 13162 :2012	MU1	1
tensile strength perpendicular to the plane of the board in dry conditions	EN 1607	TR10	$\geq 10 \text{ kPa}$
tensile strength perpendicular to the plane of the board in wet conditions	ETAG 004	-	$\geq 5 \text{ kPa}$
Shear Strength	EN 12090	-	-
The elastic modulus	EN 12090	-	-

* Grater value is used

Classes and levels match the properties of EN 13162+A1:2015

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ANNEX 2 – SPECIFICATION OF INSULATION MATERIAL

MW lamellas TR80

MW lamellas with tensile strength perpendicular to the plane of the board at least 80 kPa (TR80) fully bonded ETICS with supplementary fixing.

Properties	Standard	Class according to EN 13162+A1:2015	Value
Reaction to fire	EN 13501-1+A1:2010	A1	Density ≤ 150 kg/m ³
Thermal resistance	EN 12667	Defined at CE marking according to EN 13162+A1:2015	
Thickness	EN 823	T5	-1 % or -1 mm*, +3 mm
Length	EN 822	-	± 2 %
Width	EN 822	-	± 1,5 %
Squareness	EN 824	-	≤ 5 mm/m
Flatness	EN 825	P(5)	≤ 6 mm
Surface	ETAG 004	Cut surface (homogeneous, uncoated)	
Dimensional stability under specified thermal conditions and humidity conditions	EN 1604	DS(70,90)	1 %
Short term water uptake	EN 1609	WS	≤ 1 kg/m ²
Long term water uptake	EN 12087	WL(P)	≤ 3 kg/m ²
Diffusion factor	EN 12086 – EN 13162 :2012	MU1	1
tensile strength perpendicular to the plane of the board in dry conditions	EN 1607	TR80	≥ 80 kPa
tensile strength perpendicular to the plane of the board in wet conditions	ETAG 004	-	≥ 50 kPa
Shear Strength	EN 12090	-	≥ 20 kPa
The elastic modulus	EN 12090	-	≥ 1000 kPa

* Grater value is used

Classes and levels match the properties of EN 13162+A1:2015

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ANNEX 2 – SPECIFICATION OF INSULATION MATERIAL

MW boards TR15

MW boards with tensile strength perpendicular to the plane of the board at least 15 kPa (TR15) for mechanically fixed ETICS with supplementary adhesive.

Properties	Standard	Class according to EN 13162+A1:2015	Value
Reaction to fire	EN 13501-1+A1:2010	A1	Density ≤ 150 kg/m ³
Thermal resistance	EN 12667	Defined at CE marking according to EN 13162+A1:2015	
Thickness	EN 823	T5	-1 % or -1 mm*, +3 mm
Length	EN 822	-	± 2 %
Width	EN 822	-	± 1,5 %
Squareness	EN 824	-	≤ 5 mm/m
Flatness	EN 825	P(5)	≤ 6 mm
Surface	ETAG 004	Cut surface (homogeneous, uncoated)	
Dimensional stability under specified thermal conditions and humidity conditions	EN 1604	DS(70,90)	1 %
Short term water uptake	EN 1609	WS	≤ 1 kg/m ²
Long term water uptake	EN 12087	WL(P)	≤ 3 kg/m ²
Diffusion factor	EN 12086 – EN 13162 :2012	MU1	1
tensile strength perpendicular to the plane of the board in dry conditions	EN 1607	TR15	≥ 15 kPa
tensile strength perpendicular to the plane of the board in wet conditions	ETAG 004	-	≥ 6 kPa
Shear Strength	EN 12090	-	-
The elastic modulus	EN 12090	-	-

* Grater value is used

Classes and levels match the properties of EN 13162+A1:2015

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ANNEX 3 – TABLE VALUES FOR DESIGNING OF MECHANICAL FIXING OF ETICS

 R_{panel} and R_{joint} values for calculation of pull through resistance R_d :

Insulation EPS

Anchor description	Trade name		Ejotherm NT U Ejotherm STR U 2G Ejotherm NTK U Termoz 8 UZ Termoz 8 NZ PTH-KZ	Ejotherm H1 eco Ejot H3 PTH-S PTH-SX PTH-X PTH-EX Termoz CS 8 Termoz CN 8 Termoz PN 8 Termoz LO 8 TERMOFIX CF 8 Koelner TFIX 8 S Koelner TFIX 8 M Koelner TFIX 8 ST WK THERM-8 WK THERM-8S Wkret-met eco-drive 8 Wkret-met eco-drive 8S Wkret-met LTX-8 Wkret-met LMX-8 Wkret-met LFM-8 Wkret-met LFN-8 Wkret-met FIXPLUG-8 Hilti SD-FV 8	Ejotherm STR U 2G PTH-SX PTH-S Wkret-met eco-drive 8 Wkret-met eco-drive 8S Koelner TFIX 8 ST Termoz 8 SV
	Type of fixing				
Properties of EPS	Plate diameter (mm)		≥ 60		
	Thickness (mm)		≥ 60	≥ 50	≥ 100
	Tensile strength perpendicular to the plane of the board (kPa)		≥ 100		
Maximum load	In panel	R_{panel}	0,51 kN	0,41 kN	0,47 kN
	In joint	R_{joint}	0,40 kN	0,36 kN	0,36 kN

Anchor description	Trade name		Termoz SV II ecotwist
	Type of fixing		
Properties of EPS	Plate diameter (mm)		≥ 60
	Thickness (mm)		≥ 100
	Tensile strength perpendicular to the plane of the board (kPa)		≥ 100
Maximum load	In panel	R_{panel}	0,49 kN
	In joint	R_{joint}	0,44 kN

Anchor description	Trade name		SpiralAnsys SA15+
	Type of fixing		
Properties of EPS	Plate diameter (mm)		14
	Thickness (mm)		≥ 80
	Tensile strength perpendicular to the plane of the board (kPa)		≥ 100
Maximum load	In panel	R_{panel}	0,79 kN
	In joint	R_{joint}	0,73 kN

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Insulation MW TR15

Anchor description	Trade name		Ejotharm STR U 2G Ejotharm H1 eco PTH-KZ PTH-S PTH-EX Termoz CS 8 Termoz CN 8 TERMOFIX CF 8 Koelner TFIX 8 S Koelner TFIX 8 M Koelner TFIX 8 ST Wkret-met WKTHERM-8 Wkret-met WKTHERM-8S Wkret-met LMX-8 Wkret-met LFM-8	
	Type of fixing		Surface mounting	Flush mounting
	Plate diameter (mm)		≥ 60	
	Thickness (mm)		≥ 50	≥ 100
Properties of MW TR15	Tensile strength perpendicular to the plane of the board (kPa)		≥ 15	
Maximum load	In panel	$R_{\text{panel Dry}}$	0,44 kN	0,44 kN
	In joint	$R_{\text{joint Dry}}$	0,41 kN	0,41 kN
	In panel	$R_{\text{panel Wet}}$	0,32 kN	0,32 kN
	In joint	$R_{\text{joint wet}}$	0,24 kN	0,24 kN

Izolant Frontrock MAX E (TR10)

Anchor description	Trade name		Ejotharm STR U 2G Ejotharm H1 eco PTH-KZ PTH-S PTH-EX Termoz CS 8 Termoz CN 8 TERMOFIX CF 8 Koelner TFIX 8 S Koelner TFIX 8 M Koelner TFIX 8 ST Wkret-met WKTHERM-8 Wkret-met WKTHERM-8S Wkret-met LMX-8 Wkret-met LFM-8	
	Type of fixing		Surface mounting	
	Plate diameter (mm)		≥ 60	
	Thickness (mm)		≥ 100	
Properties of Frontrock MAX E	Tensile strength perpendicular to the plane of the board (kPa)		≥ 10	
Maximum load	In panel	$R_{\text{panel dry}}$	0,60 kN	
	In joint	$R_{\text{joint dry}}$	0,48 kN	

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Anchor description	Trade name		Ejotherm STR U 2G Ejotherm H1 eco PTH-KZ PTH-S PTH-EX Termoz CS 8 Termoz CN 8 TERMOFIX CF 8 Koelner TFIX 8 S Koelner TFIX 8 M Koelner TFIX 8 ST Wkret-met WKTHERM-8 Wkret-met WKTHERM-8S Wkret-met LMX-8 Wkret-met LFM-8		Ejotherm STR U 2G + extended plate VT 2 G	Eco-drive W
	Type of fixing		Flush mounting		Special mounting	
	Plate diameter (mm)		≥ 60		112,5	
Properties of Frontrock MAX E	Thickness (mm)		≥ 100		110	
	Tensile strength perpendicular to the plane of the board (kPa)		≥ 10			
Maximum load	In panel	$R_{\text{panel dry}}$	0,31 kN	0,81 kN	1,29 kN	
	In joint	$R_{\text{joint dry}}$	0,33 kN	0,83 kN	0,83 kN	

Insulation MW TR10

Anchor description	Trade name		Termoz CN 8 TERMOFIX CF 8 Wkret-met LMX-8 Wkret-met LFM-8		Ejotherm STR U 2G Ejotherm H1 eco PTH-KZ PTH-S PTH-EX Termoz CS 8 Koelner TFIX 8 S Koelner TFIX 8 M Koelner TFIX 8 ST Wkret-met WKTHERM-8 Wkret-met WKTHERM-8S	
	Plate stiffness		≥ 0,3 kN/mm		≥ 0,6 kN/mm	
	Type of fixing		Surface mounting	Flush mounting	Surface mounting	Flush mounting
Properties of MW TR10	Plate diameter (mm)		≥ 60	≥ 60	≥ 60	≥ 60
	Thickness (mm)		≥ 60	≥ 100	≥ 50	≥ 100
	Tensile strength perpendicular to the plane of the board (kPa)		≥ 10			
Maximum load	In panel	$R_{\text{panel dry}}$	0,37 kN	0,37 kN	0,48 kN	0,48 kN
	In joint	$R_{\text{joint dry}}$	0,27 kN	0,27 kN	0,39 kN	0,39 kN
	In panel	$R_{\text{panel wet}}$	0,19 kN	0,19 kN	-	-
	In joint	$R_{\text{joint wet}}$	0,18 kN	0,18 kN	-	-

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Anchor description	Trade name		PTH-KZ PTH-S PTH-EX + BRAVOLL IT PTH 100	PTH-KZ PTH-S PTH-EX + BRAVOLL IT PTH 140	Koelner TFIX 8 S + Koelner KWL 090
	Type of fixing		Surface mounting		
	Plate diameter (mm)		100	140	90
	Thickness (mm)		≥ 100		
Properties of MW TR10	Tensile strength perpendicular to the plane of the board (kPa)		≥ 10		
Maximum load	In panel	$R_{\text{panel dry}}$	0,61 kN	0,80 kN	0,54 kN
	In joint	$R_{\text{joint dry}}$	0,44 kN	0,56 kN	0,47 kN

Anchor description	Trade name		Termoz CN 8 + talířek DT 110N	PTH-KZ PTH-S PTH-EX + BRAVOLL ZT 100	Ejotharm STR U 2G + Ejotharm VT 90 2G
	Type of fixing		Surface mounting	Flush mounting	
	Plate diameter (mm)		110	100	112,5
	Thickness (mm)		≥ 100		
Properties of MW TR10	Tensile strength perpendicular to the plane of the board (kPa)		≥ 10		
Maximum load	In panel	$R_{\text{panel dry}}$	0,56 kN	0,63 kN	0,78 kN
	In joint	$R_{\text{joint dry}}$	0,37 kN	0,58 kN	0,60 kN

Anchor description	Trade name		Wkret-met eco-drive W 8
	Type of fixing		Special mounting
	Plate diameter (mm)		≥ 110
	Thickness (mm)		≥ 100
Properties of MW TR10	Tensile strength perpendicular to the plane of the board (kPa)		≥ 10
Maximum load	In panel	$R_{\text{panel dry}}$	0,63 kN
	In joint	$R_{\text{joint dry}}$	0,47 kN

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ANNEX 3 – TABLE VALUES FOR DESIGNING OF MECHANICAL FIXING OF ETICS

Anchor parameters

Anchor name	Use categories according to ETAG 014	Length L [mm]	Drill hole diameter d_0 [mm]	Cutting diameter of drill bit d_{cut} [mm]	Effective anchorage depth h_{ef} [mm]	Nominal anchorage depth h_{nom} [mm]	Depth of drill hole h_1 [mm]	Plate stiffness [kN/mm]	Point thermal transmittance $\chi_p^{(5)}$ [mW/K]	Valid ETA
Ejotherm STR U 2G	A,B,C,D,E	115 – 455	8	8,45	25 / 65 ⁽¹⁾		35 / 75 ⁽²⁾	0,6	0,002 / 0,001 ⁽⁷⁾	04/0023
Ejotherm NT U	A,B,C	95 – 215	8	8,45	25		35	0,6	0,002	05/0009
Ejotherm NTK U	A,B,C	90 – 210	8	8,45	40		50	0,6	0	07/0026
Ejotherm H1 eco	A,B,C	95 – 295	8	8,45	25		35	0,6	0,001	11/0192
Ejot H3	A,B,C	75 – 235	8	8,45	25		35	0,6	0	14/0130
PTH	A,B,C	55 – 175	8	8,45	30	35	45	0,4	0 ⁽⁸⁾ / 0,001	05/0055
PTH-KZ	A,B,C	75 – 275	8	8,45	30	35	45	0,7	0,002	05/0055
PTH-S	A,B,C,D,E	95 – 455	8	8,45	25	25/65 ⁽¹⁾	35/75 ⁽¹⁾	0,9	0,002	08/0267
PTH-SX	A,B,C,D,E	115 – 225	8	8,45	35	35/55 ⁽¹⁾	45/65 ⁽¹⁾⁽³⁾	0,7	0	10/0028
PTH-X	A,B,C,D	115 – 255	8	8,45		35	45	0,6	0	13/0951
PTH-EX	A,B,C,D	115 – 355	8	8,45		25	35	0,6	0,001	13/0951
Termoz SV II ecotwist	A,B,C,D,E	-	8	8,45	35	-	55	0,96	0 – 0,002 ⁽⁸⁾	12/0208
Termoz 8 NZ	A,B,C,D	110 – 230	8	8,45	35		45	0,5	0,002	03/0019
Termoz 8 UZ	A,B,C	110 – 230	8	8,45	35		45	0,5	0	02/0019
Termoz CS 8	A,B,C,D,E	110 – 390	8	8,45		35	45	0,6	0,001 / 0,002 ⁽⁸⁾	14/0372
Termoz CN 8	A,B,C,D	110 – 390	8	8,45		35	45	0,4	0 ⁽⁸⁾ / 0,001	09/0394
Termoz PN 8	A,B,C	110 – 230	8	8,45		35	45	0,6	0	09/0171
Termoz LO 8	A,B	110 – 230	8	8,45		35	45	0,4	0	10/0460
Termoz CN 8	A,B,C,D	110 – 230	8	8,45		35	45	0,6	0 / 0,001 ⁽⁸⁾	09/0394
Termoz 8 SV	A,B,C,D,E	130 – 250	8	8,45	30	35	45	1,1	0,002	06/0180
TERMOFIX CF 8	A,B,C	100 – 240	8	8,45		27,5	35	0,5	0,002	07/0287
Koelner TFIX 8 S	A,B,C,D,E	95 – 295	8	8,45		25/65 ⁽¹⁾	40/80 ⁽¹⁾	0,6	0,002	11/0144
Koelner TFIX 8 M	A,B,C	75 – 295	8	8,45	25		35	1,0	0,002	07/0336
Koelner TFIX 8 ST	A,B,C,D,E	95 – 295	8	8,45		25/65 ⁽¹⁾	40/80 ⁽¹⁾	0,6	0,002	11/0144
Hilti D 8-FV	A,B,C	155 mm	8	8,45	25		45	-		07/0288
Hilti SD-FV 8	A,B,C	70 – 250	8	8,45	30	40	50	0,3	0	03/0028
Wkret-met eco-drive 8	A,B,C,D,E	130 – 490	8	8,45	35 / 55 ⁽¹⁾		45 / 65 ⁽¹⁾	0,6	0,002	13/0107
Wkret-met eco-drive 8S	A,B,C,D,E	130 – 490	8	8,45	35 / 55 ⁽¹⁾		45 / 65 ⁽¹⁾	0,6		13/0107
Wkret-met LTX-8	A,B,C,D,E	95 – 195	8	8,45	50		60	0,2	0	09/0001
Wkret-met LMX-8	A,B,C,D,E	95 – 195	8	8,45	50		60	0,2	0,003	09/0001
Wkret-met LFN-8	A,B	100 – 200	8	8,45	60		70			06/0080
Wkret-met LFM-8	A,B	100 – 200	8	8,45	60		70			06/0080
Wkret-met WK THERM 8	A,B,C	95 – 355	8	8,45	25		35	0,6	0,002	11/0232
Wkret-met WK THERM 8S	A,B,C,D,E	95 – 355	8	8,45	25 / 65 ⁽¹⁾		35 / 75 ⁽¹⁾	0,6	0,002	13/0724
Wkret-met FIXPLUG-8	A,B,C	99 – 299	8	8,45	40		60	0,6		11/0231
Spiral Anksys SA15+ ⁽⁴⁾	A,B,C,E,O	140 – 360	14		60	70	70	-	0,001 ⁽⁹⁾ / 0,002	13/0527

⁽¹⁾ – Valid for use category E

⁽²⁾ – Minimal drill hole h_1 for flush mounting is 50 mm, 90 mm for use category E

⁽³⁾ – Minimal drill hole h_1 for flush mounting is 60 mm, 80 mm for use category E

⁽⁴⁾ – Special anchor for injected mounting (len pre STX.THERM® ALFA)

⁽⁵⁾ – According to TR 025 issued by EOTA

⁽⁶⁾ – According to TR 026 issued by EOTA

⁽⁷⁾ – Valid for flush mounting with a cup (large plug)

⁽⁸⁾ – Depends on the thickness of insulation, fixing method and filling of the drill hole – see ETAs of anchor producer

⁽⁹⁾ – Valid for anchors flushed at least 14 mm below the surface of insulation

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ANNEX 3 - TABLE VALUES FOR DESIGNING OF MECHANICAL FIXING OF ETICS

 Safety factor γ_{Mc}

Type of the substrate	Ejotherm STR U 2G PTH-S PTH-SX Termoz 8 UZ Termoz 8 SV Termoz CS 8 Termoz SV II ecotwist Hilti D 8-FV Koelner TFIX 8 S Koelner TFIX 8 ST Wkret-met LFM-8 Wkret-met WKTHERM-8 S Wkret-met eco-drive 8 Wkret-met eco-drive 8S	Ejotherm NT U Ejotherm NTK U Ejotherm H1 eco Ejot H3 PTH-KZ PTH PTH-X PTH-EX Termoz LO 8 Termoz CN 8 Termoz PN 8 Termoz 8 NZ TERMOFIX CF 8 Hilti SD-FV 8 Koelner TFIX 8 M Wkret-met LTX-8 Wkret-met LMX-8 Wkret-met LFN-8 Wkret-met WKTHERM-8 Wkret-met FIXPLUG-8	Spiral Anksys SA15+ Including the filling material SAF1, or SAF3
Concrete or reinforced concrete of class at least C 12/15, minimum thickness at least 100 mm	1,5	2,1	2,0
Top concrete layer of sandwich panels with minimum thickness 50 mm ¹⁾	1,6	2,3	2,0
Masonry from full brick or stones ²⁾	2,1	2,9	2,0
Masonry or elements from vertically perforated bricks or panels	1,8	2,5 ³⁾	2,0
Masonry or elements from lightweight concrete from porous fillers	2,4	3,2 ³⁾	2,0
Masonry or elements from aerated concrete	1,8	2,5	2,0
Other substrates	2,4	3,2	2,0

¹⁾ Values for vertically perforated bricks are used for lower thickness of top panel

²⁾ Bricks with hollows area up to 15 % of total area are considered as full bricks.

³⁾ Hammered-in dowels can be used only for those substrates where achievement of full performance in time was tested.

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Placing of anchors

Substrate	Concrete	Solid clay bricks or silicate bricks	Vertically perforated clay bricks or silicate bricks, solid and perforated elements from lightweight concrete
Ejotherm STR U 2G, Ejotherm NT U, Ejotherm NTK U, Ejotherm H1 eco, Ejot H3, Termoz 8 NZ, Termoz 8 UZ, PTH-S, PTH-SX, PTH-X, PTH-EX, Termoz LO 8, Termoz CN 8, Termoz CS 8, Termoz PN 8, Termoz 8 SV, TERMOFIX CF 8, Koelner TFIX 8 S, Koelner TFIX 8 ST, Koelner TFIX 8 M, Wkret-met LTX-8, Wkret-met LMX-8, Wkret-met LFN-8, Wkret-met LFM-8, Wkret-met WKTHERM-8, Wkret-met WKTHERM-8S, Wkret-met eco-drive 8, Wkret-met eco-drive 8S, Wkret-met FIXPLUG-8, Hilti SD-FV 8, Hilti D 8-FV, Spiral Anksys SA15+			
Min. thickness of member [mm]*	100	100	100
Min. allowable spacing [mm]	100	100	100
Min. allowable edge distance [mm]	100	100	100
PTH-KZ, PTH			
Min. thickness of member [mm]*	100	115	115
Min. allowable spacing [mm]	100	100	100
Min. allowable edge distance [mm]	50	100	100
Koelner TFIX 8 S, Koelner TFIX 8 ST - pórobetón			
Min. thickness of member [mm]*	100		
Min. allowable spacing [mm]	100		
Min. allowable edge distance [mm]	110		

* - If the thickness of a member is smaller it is necessary to perform pull-out tests according to ETAG 014

DESIGNING AND ASSEMBLY MANUAL

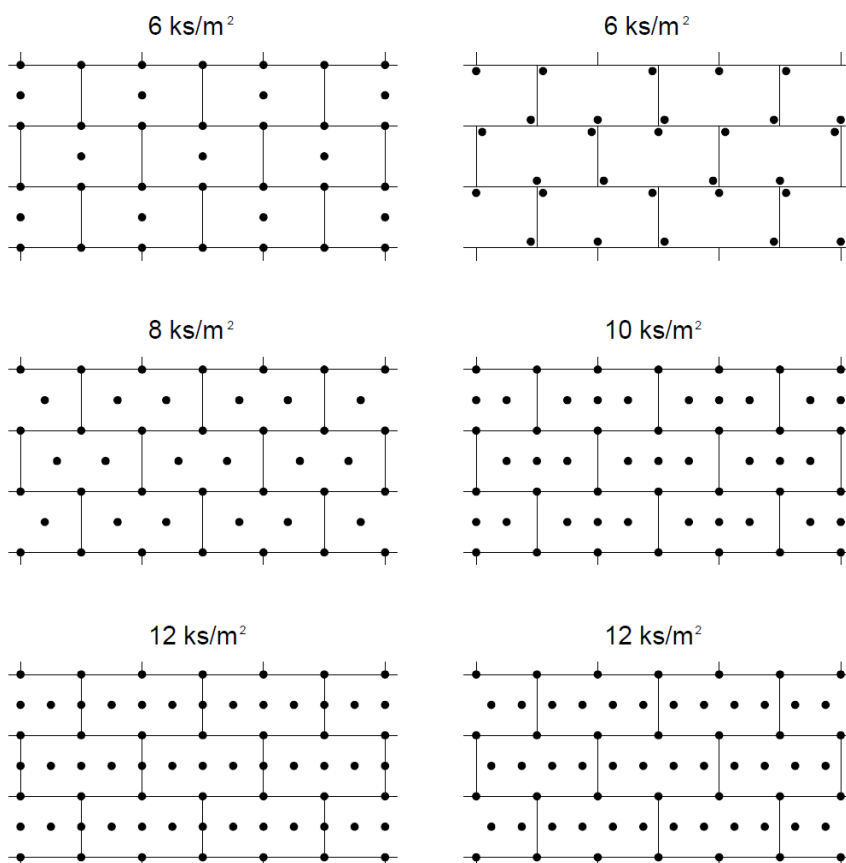
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ANNEX 3 - TABLE VALUES FOR DESIGNING OF MECHANICAL FIXING OF ETICS

Geometrical spacing of anchors



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ANNEX 4 – RESISTANCE TO MECHANICAL DAMAGE ACCORDING TO ETAG 004 ETAG 004

Insulation EPS (see Annex 2)

Base coat + top coat	1x mesh VT1	2x mesh VT1	1x mesh VT1 + reinforced mesh R330
BETADEKOR® A.15	II	I	I
BETADEKOR® A.20	II	I	I
BETADEKOR® A.30	II	I	I
BETADEKOR® SI.15	II	I	I
BETADEKOR® SI.20	II	I	I
BETADEKOR® SI.30	II	I	I
BETADEKOR® V.15	II	I	II
BETADEKOR® V.20	II	I	II
BETADEKOR® V.30	II	I	II
BETADEKOR® SA.15	II	I	
BETADEKOR® SA.20	II	I	
BETADEKOR® SA.30	II	I	
ALFADEKOR G	II / III ¹⁾	I	
BRICK FLEXY	I	I	I

¹⁾ Valid for base coat ALFAFIX® S1

Insulation MW deský (see Annex 2)

Base coat + top coat	1x mesh VT1	2x mesh VT1	1x mesh VT1 + reinforced mesh R330
BETADEKOR® A.15	II	I	I
BETADEKOR® A.20	II	I	I
BETADEKOR® A.30	II	I	I
BETADEKOR® SI.15	II		I
BETADEKOR® SI.20	II		I
BETADEKOR® SI.30	II		I
BETADEKOR® V.15	II		I
BETADEKOR® V.20	II		I
BETADEKOR® V.30	I ²⁾ / II		I
BETADEKOR® SA.15	II	II	
BETADEKOR® SA.20	II	II	
BETADEKOR® SA.30	II	II	

²⁾ Valid for base coat ALFAFIX® S101

Insulation MW lamellas (see Annex 2)

Base coat + top coat	1x mesh VT1	2x mesh VT1	1x mesh VT1 + reinforced mesh R330
BETADEKOR® A.15	II	I	I
BETADEKOR® A.20	II	I	I
BETADEKOR® A.30	II	I	I
BETADEKOR® SI.15	II		I
BETADEKOR® SI.20	II		I
BETADEKOR® SI.30	II		I
BETADEKOR® V.15	II		I
BETADEKOR® V.20	II		I
BETADEKOR® V.30	II		I

insulation Frontrock MAX E (see Annex 2)

Base coat + top coat	1x mesh VT1	2x mesh VT1	1x mesh VT1 + reinforced mesh R330
BETADEKOR® A.	II		
BETADEKOR® SI.	II		
BETADEKOR® V.	II		
BETADEKOR® SA.	II		

I – A ground level zone readily accessible to the public and exposed to the impact of hard objects but not subject to rough treatment

II – A zone exposed to impacts of tossed or kicked objects, but in such public spaces where the height of the system limits the extent of the impacts, or in lower levels, where the building is accessible mainly to persons who are interested in saving it

III – A zone which is most likely not exposed to human-induced or tossed or kicked objects

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ANNEX 5 – DIFFUSION CHARACTERISTICS OF ETICS OF **STX.THERM**[®] SERIES

Water vapour permeability of the outer layer of ETICS according to ETA 05/0054 and ETA 05/173

Outer layers: Base coat ALFAFIX [®] S101 + top coats with relevant primers	Water vapour permeability s_d
BETADEKOR [®] AF15	$\leq 0,25$ m
BETADEKOR [®] AF20 / AD20	$\leq 0,25$ m
BETADEKOR [®] AF30 / AD25 / AD30	$\leq 0,28$ m
BETADEKOR [®] SIF15	$\leq 0,14$ m
BETADEKOR [®] SIF20 / SID20	$\leq 0,14$ m
BETADEKOR [®] SIF30 / SID25 / SID30	$\leq 0,16$ m
BETADEKOR [®] SAF15	$\leq 0,29$ m
BETADEKOR [®] SAF20 / SAD20	$\leq 0,20$ m
BETADEKOR [®] SAF30 / SAD25 / SAD30	$\leq 0,21$ m
BETADEKOR [®] VF15	$\leq 0,10$ m
BETADEKOR [®] VF20 / VD20	$\leq 0,12$ m
BETADEKOR [®] VF30 / VD25 / VD30	$\leq 0,13$ m
ALFADEKOR G	$\leq 0,39$ m
BRICK FLEXY	$\leq 0,27$ m

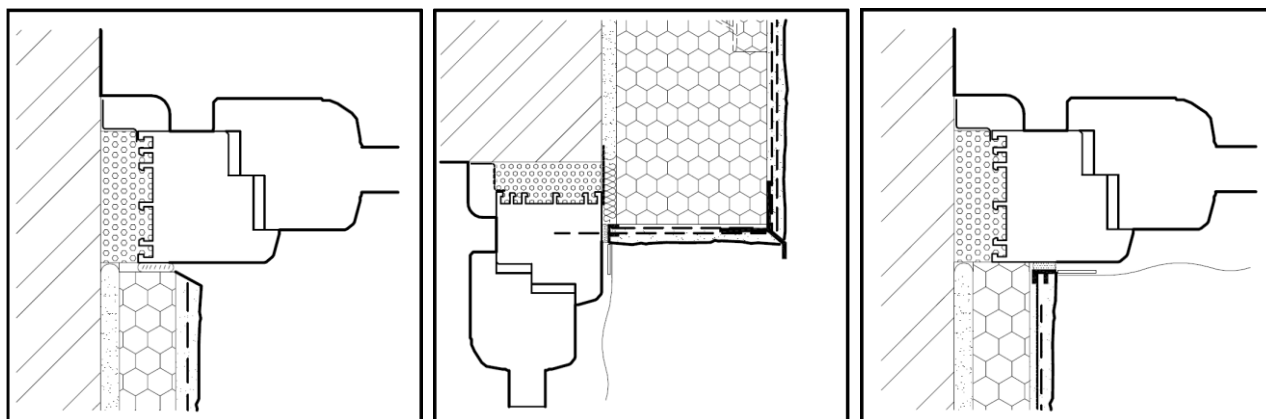
Outer layers: Base coat ALFAFIX [®] S1 + top coats with relevant primers	Water vapour permeability s_d
BETADEKOR [®] AF15	$\leq 0,37$ m
BETADEKOR [®] AF20 / AD20	$\leq 0,39$ m
BETADEKOR [®] AF30 / AD25 / AD30	$\leq 0,26$ m
BETADEKOR [®] SIF15	$\leq 0,16$ m
BETADEKOR [®] SIF20 / SID20	$\leq 0,18$ m
BETADEKOR [®] SIF30 / SID25 / SID30	$\leq 0,20$ m
BETADEKOR [®] SAF15	$\leq 0,19$ m
BETADEKOR [®] SAF20 / SAD20	$\leq 0,19$ m
BETADEKOR [®] SAF30 / SAD25 / SAD30	$\leq 0,21$ m
BETADEKOR [®] VF15	$\leq 0,09$ m
BETADEKOR [®] VF20 / VD20	$\leq 0,11$ m
BETADEKOR [®] VF30 / VD25 / VD30	$\leq 0,12$ m
ALFADEKOR G	$\leq 0,35$ m
BRICK FLEXY	$\leq 0,34$ m

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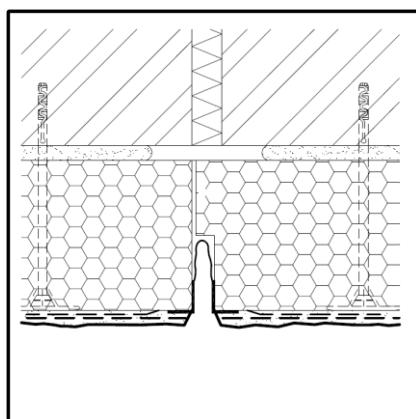
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ANNEX 6 – REALIZATION OF BASIC DETAILS OF ETICS

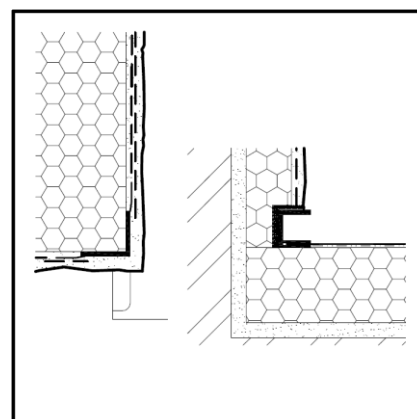
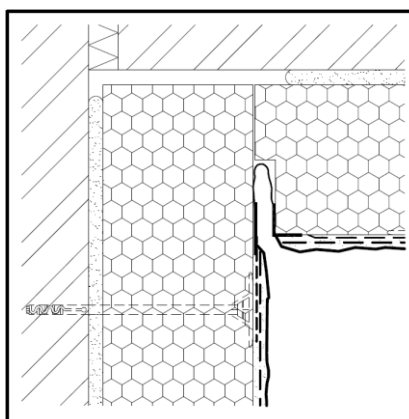
Ending with window frames linings



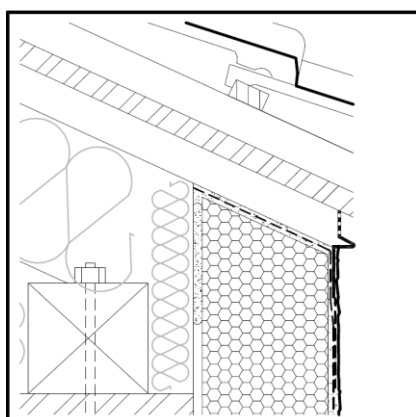
Dilatation joint in ETICS



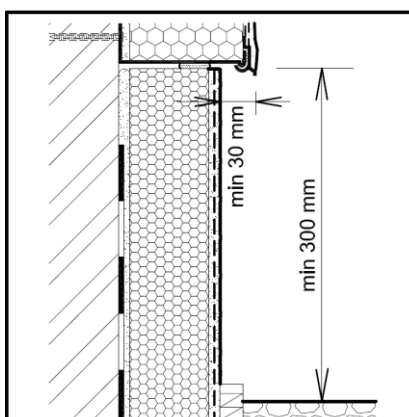
Window sills in linings



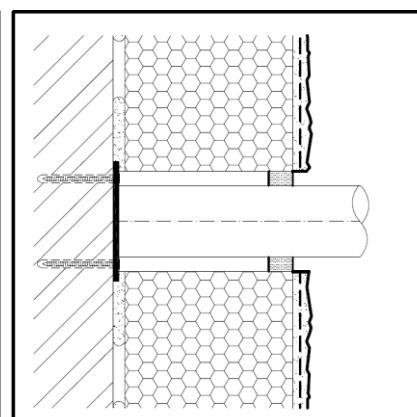
End by roof



Foundation above ground level



Penetration of the elements through ETICS



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ANNEX 7 – RECOMMENDED COLOUR SHADES OF PRIMER HC-4 FOR SELECTED PATTERNS OF MOSAIC RENDER ALFADEKOR

Pattern of ALFADEKOR F, ALFADEKOR G	Colour shade of primer
102	246-1
104	0100
105	304-1
106	0100
107	304-1
108	0100
109	0100
110	304-1
111	0100
114	331-C
115	0100
116	331-C
118	241-2
119	171-2
120	304-1
121	304-1
122	304-1
123	374-1
124	304-1
125	304-1
200	245-1
201	354-1
202	353-1
203	361-4
204	361-4
205	112-2
206	055-1
207	051-4
208	103-2
209	113-2
210	113-2
211	253-1
212	241-2
213	055-1
214	112-2

Pattern of ALFADEKOR F, ALFADEKOR G	Colour shade of primer
215	112-2
216	112-2
217	304-1
218	084-1
219	084-1
220	161-4
221	161-4
222	161-4

Pattern of ALFADEKOR S	Colour shade of primer
401	244-1
402	111-4
403	0100
404	331-C
405	055-1
406	254-1
407	083-1
408	071-H
409	103-2
410	092-2
411	182-4
412	252-1

Pattern of ALFADEKOR G T	Colour shade of primer
118G T	241-2
212G T	241-2
214G T	112-2
215G T	112-2
221G T	161-4
222G T	161-4

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ANNEX 8 – THE MANIPULATION AND HANDLING OF THE PRODUCTS AND ACCESSORIES OF ETICS

Transportation and storage

- Materials and products for the ETICS must be transported and stored in the original packaging. During storage, the storage life must be observed on the packaging.
- Adhesives, plasters and plasters supplied in a dry condition are stored in original packaging in a dry environment on a wood grate, a pallet.
- Plasters supplied in paste form are stored in original packages protected from frost and direct sunlight.
- Primers are stored in original packaging protected from frost and direct sunlight.
- Thermal insulation boards are stored in a dry environment placed horizontally on a flat pad. They must be protected from mechanical damage, UV radiation and the action of organic solvents. EPS boards with the addition of graphite are stored exclusively in their original packaging and must be protected from direct sunlight.
- Glass mesh is stored in rolls vertically. It must be stored in a dry environment, protected from UV radiation and away from pressure stress causing permanent deformation.
- Anchors must be protected from frost and UV radiation.
- Laths and profiles are stored in a longitudinal position on a flat pad. PVC profiles and profiles with integrated glass mesh must be protected against UV radiation. PVC profiles with PE adhesive tape may only be in tempered areas for limited time.

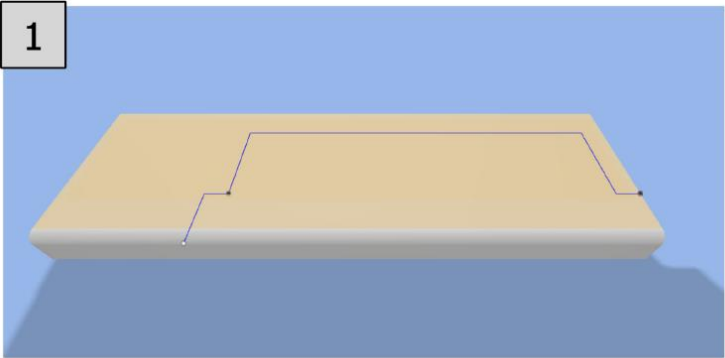
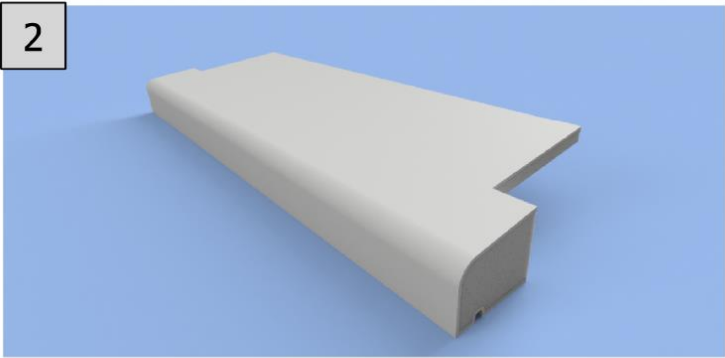
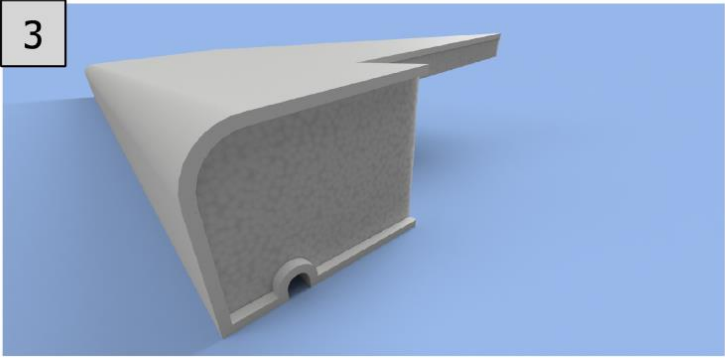
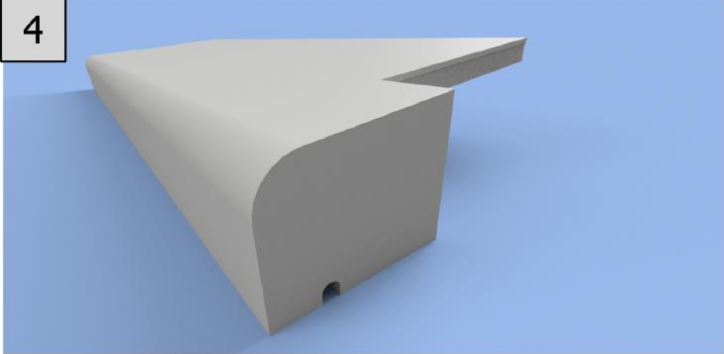
Waste treatment

- Disposal of waste materials and products is carried out in accordance with the respective safety data sheets of individual products and in accordance to valid legislation.

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ANNEX 9 – OVERSILL INSTALLATION GUIDE

<div data-bbox="272 504 336 571">1</div> 	<p>Mark out areas to be cut. The key considerations are as follows;</p> <ol style="list-style-type: none"> 1. Depth of the sill to window frame 2. Space between reveals (allowing for a gap of 3mm at each reveal for thermal expansion) 3. Overhang of the sill into the main wall area.
<div data-bbox="272 882 336 949">2</div> 	<p>Cut out the marked area using appropriate tools.</p> <p>A fine toothed handsaw should be fine for this purpose</p>
<div data-bbox="272 1261 336 1328">3</div> 	<p>Each end of the sill should be finished before proceeding with installation.</p> <p>Hollow out 3-4mm of the High Density EPS at either end of the sill using a sharp implement such as a stanley blade or wall board saw.</p> <p>Care should be taken not to damage the polymer coating</p>
<div data-bbox="272 1639 336 1706">4</div> 	<p>Finish the ends of the sill using the compound provided by Eco Celt.</p> <p>This should be built up in two layers allowing it to harden slightly between coats. The second coat should extend across the joint with the main polymer coating.</p> <p>When cured the ends can be sanded flat with a fine grit sandpaper</p>

DESIGNING AND ASSEMBLY MANUAL

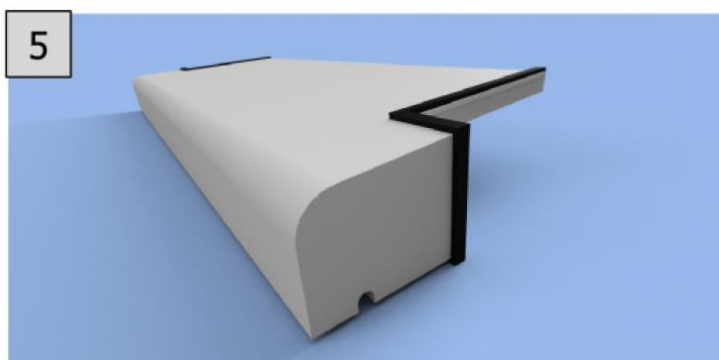
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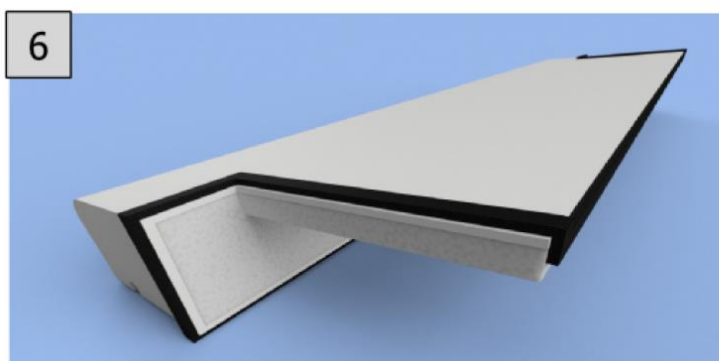
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Compression tape should now be applied to the oversill.

This tape with a sticky backing expands from a initial size of 2-3mm to a maximum of 15mm and will seal the junction between the oversill and the frame and the oversill and main External Wall Insulation

This will provide a good seal against the possibility of water ingress



The compression tape should extend around the sill forming a continuous barrier.

It should be positioned so that its outer edge is within a few millimetres of the outer edge of the main wall insulation layer, the outer edge of the eventual reveal insulation and the junction between the oversill and window frame

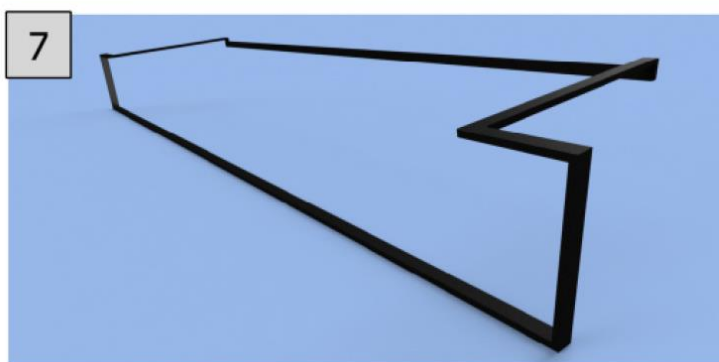



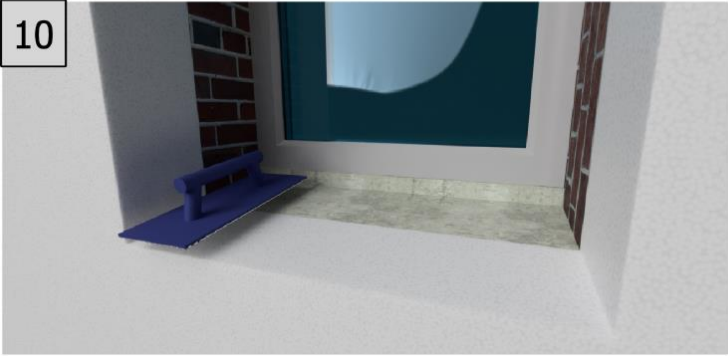

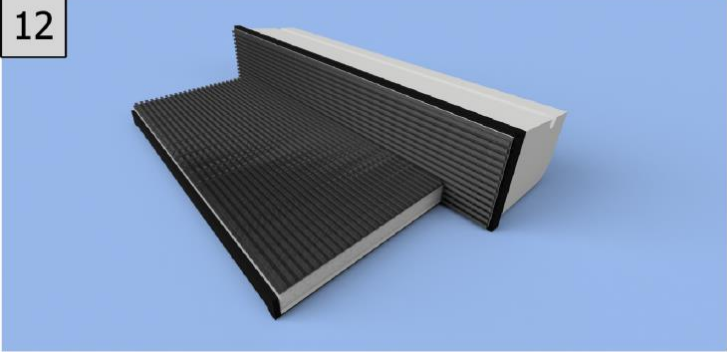
Illustration showing the continuity of the compression tape around the oversill



Cut existing window sill back so that it is flush with the plane of the wall.

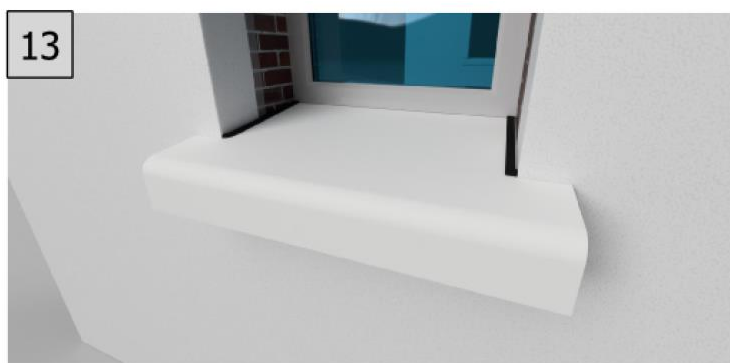
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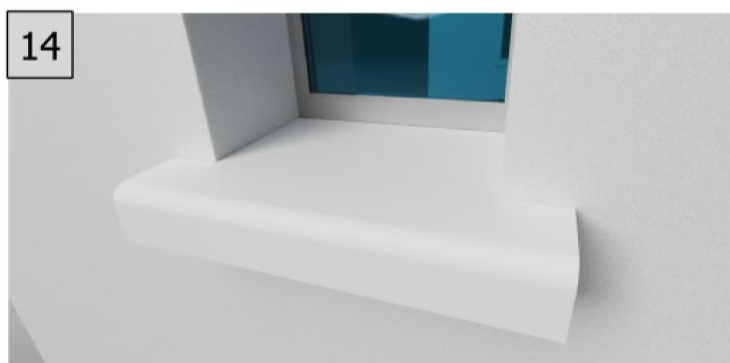
9		<p>Board out the project as per system manufacturers recommendations</p>
10		<p>Rasp the EPS to create a fall that will accommodate the new oversill</p>
11		<p>The insulation will now need to be cut to allow the oversill to be recessed approximately 20mm into the EWI insulation.</p> <p>A hot knife in combination with a straight edge or lath used as a jig will provide the cleanest cut.</p> <p>However, any method can be used provided that a fairly accurate cut can be made. The cut should be 3-5mm larger than the oversill at each edge.</p>
12		<p>Bonding of the oversill should be undertaken with the same adhesive cement used to bond the insulation boards.</p> <p>The entirety of the back of the oversill; i.e. the 20mm wing and the back of the main body should be coated.</p> <p>A 6mm notched trowel can be used to create an even coat</p>

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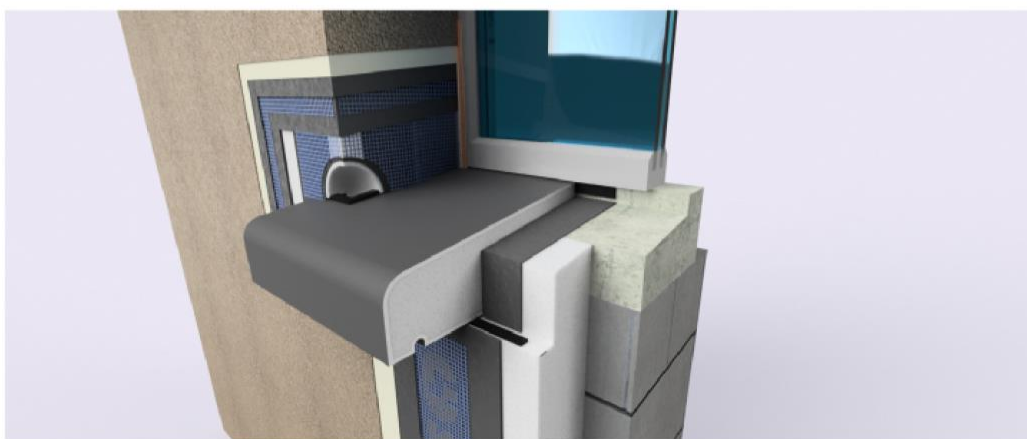
The oversill can now be pressed into place



20mm insulation can then be applied to the reveal (adhered in the normal way) and butted against the compression tape on the oversill.

The system can then be beaded, basecoated & finished as normal.

A mastic sealant should be applied to all oversill junctions for further protection against water ingress.



Oversill can be simply painted with silicone facade paints **GAMADEKOR**[®] SA and **GAMADEKOR**[®] SIL. Product is painted on the clean and dry surface. The same paint diluted with 15 % of water is used as a primer before application of the paint. Next layers are diluted according to the technical data sheets of the products.