ALPOL®

professional construction chemicals

Instructions of use

Thermal insulation system

ALPOL EKO PLUS

Thermal insulation of external building walls using Styrofoam slabs within the jointless BSO insulation system

nr 4/2008

The thermal insulation system ALPOL EKO PLUS is designed for thermal insulation of the external walls of buildings by means of expanded polystyrene (EPS) boards using ETICS, that is External Thermal Insulation Composite System technology (formerly referred to as the "light wet method" or EIFS).

The particular stages of this method are:

- *attaching a thermal insulation layer constituted by EPS boards to the outer surface of the walls by means of a special adhesive mix and a set of mechanical fasteners,*

- *making a reinforcing layer incorporating adhesive and glass fibre mesh,*

- *and finishing the surface with a coat of thin-layered stucco.*

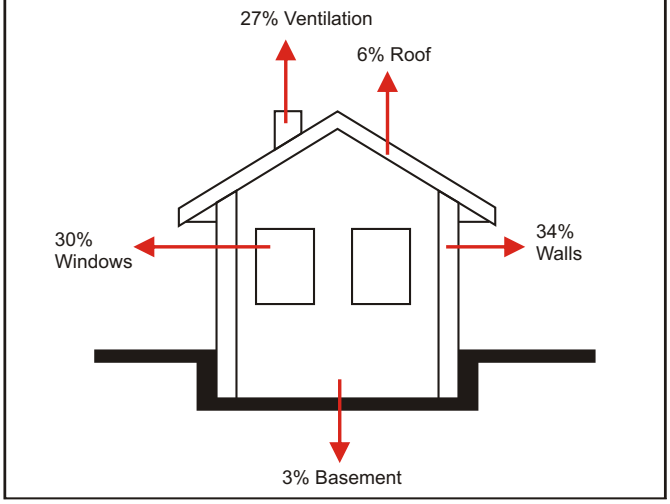
*A well-insulated house has a proper microclimate. In winter the walls are not too cold and in summer it is nice and cool inside. Such a building structure is not exposed to temperature fluctuation. The external layer of plaster protects the thermal insulation against weather and makes the walls of the building look aesthetic. Moreover, the thermal insulation of the building contributes to reducing the consumption of energy needed for heating **(Tab. 1)**, and thus, it helps protect the natural environment. Using the heat calculation formulas according to PN-EN ISO 6946:1999 and the "Technical Requirements" in the Ruling of the Minister of Infrastructure dated 12.04.2004, the heat-transfer coefficient **(U)** may be determined.*

Tab.1

Sample heat-transfer coefficient values (W/m²•K) and the heating energy requirement
for a single-family house with an area of approx. 130 m²

Building	Window [W/m²·K]	Floor [W/m²·K]	External walls [W/m²·K]	Basement floor [W/m²·K]	Annual gas requirement [m³]	Annual energy requirement [kWh/m²]	Economy [%]
No thermal insulation	3,0	2,17	1,30	1,85	7858	317	0
Average insulation	2,6	0,58	0,58	0,56	3451	139	56
Good insulation	1,9	0,24	0,29	0,33	2025	82	75
Energy-saving house	1,3	0,15	0,20	0,30	1192	48	85

Sample share of windows, walls and other barriers in the loss of heat in a single-family house

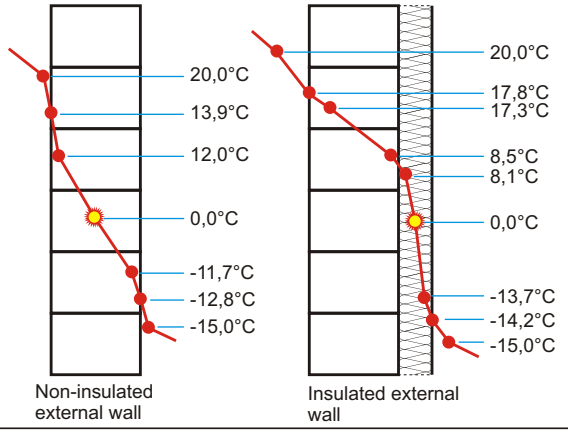


Check the thickness of EPS boards applicable to specific types of insulated walls in Table 2.

Tab.2

Thickness of expanded polystyrene board insulation **EPS 70-040 (FS 15) [mm]**	**Heat transfer resistance** of the EPS layer R [m²·K/W]	**U coefficient [W/m²•K]** for a partition structure with one-sided 1.5 cm thick cement and lime mortar layer incorporating: 25 cm full brick	38 cm full brick	chequer brick	structural clay tiles (max. thickness 29 cm)	cellular concrete (700) 24 cm	core silicate brick	Reinforced concrete 25 cm
0	0	1,94	1,46	1,24	1,17	0,72	1,99	3,34
20	0,52	0,98	0,84	0,73	0,74	0,52	0,99	1,25
50	1,35	0,56	0,51	0,47	0,47	0,37	0,57	0,64
60	1,62	0,49	0,45	0,42	0,42	0,34	0,49	0,55
80	2,16	0,39	0,37	0,34	0,35	0,29	0,40	0,43
100	7,70	0,33	0,31	0,29	0,29	0,25	0,33	0,35
120	3,24	0,28	0,27	0,25	0,26	0,22	0,28	0,30
150	4,05	0,23	0,22	0,21	0,21	0,19	0,23	0,24

Distribution of temperatures in external walls



Key to units of measure:

W - power
kWh - energy
m - length
m² - area
m³ - volume
K- temperature

*Four varieties of **ALPOL EKO PLUS** system are available:*
- *the **M** variety using decorative mineral plaster,*
- *the **N** variety using decorative acrylic plaster,*
- *the **SIS** variety using decorative silicate and silicone plaster,*
- *and the **WINTER** variety using wintertime adhesive **ALPOL AK 534**.*

The system is designed for use in residential (single and multi-family) buildings, public utility and industrial buildings, including both existing and newly built structures up to 25 m in height and in buildings erected before 1st April 1995 up to the 11th floor (inclusive). The construction works should be rendered exclusively by specialised contractors. The use of uniform insulation system components from one manufacturer is a guarantee of the proper quality of thermal insulation.

***ALPOL EKO PLUS** system components and the consumption of materials per 1m² of the insulation layer:*

Cement adhesives	*Cement adhesives for bonding Styrofoam boards* ***ALPOL AK 530***, ***ALPOL AK 531*** *(white),* ***ALPOL AK 532***, ***ALPOL AK 534 WINTER***	***od 3 do 4 kg/m²***
	Styrofoam boards EPS 70-040	***1 m²/m²***
Other materials	*Underplaster fabric* ***ALPOL 145***, ***AKE 145 A***	***1,1 m²/m²***
Cement adhesives	*Cement adhesives for embedding mesh* ***ALPOL AK 531*** *(white),* ***ALPOL AK 532***, ***ALPOL AK 534 WINTER***	***od 3,5 do 4,5 kg/m²***
Primers	*Prime for mineral plasters* ***ALPOL AG 701*** *Prime for acrylic plasters* ***ALPOL AG 705*** *Primer for silicate plasters* ***ALPOL AG 706***	***od 0,25 do 0,3 kg/m²***
Plasters	*Mineral plasters* ***ALPOL AT 320-338*** *Acrylic plasters* ***ALPOL AT 350-358*** *Silicate and silicone plasters* ***ALPOL AT 370-378***	***od 2 do 4 kg/m²*** ***od 1,8 do 3,7 kg/m²*** ***od 1,7 do 3,6 kg/m²***
Paints	*Acrylic paints* ***ALPOL AF 640*** *Silicate paints* ***ALPOL AF 660*** *Silicon paints* ***ALPOL AF 680***	***od 0,25 do 0,33 l/m²***

Additional materials:

Mortars	*Multipurpose masonry mortars:* *cement and lime mortar* ***ALPOL AZ 102*** *cement mortar* ***ALPOL AZ 104*** *Special purpose masonry mortars:* *quick-setting mortar* ***ALPOL AZ 130*** *levelling mortar* ***ALPOL AZ 135***
Plasters	*Conventional external plasters* *grey cement-lime plaster mortar applied by hand* ***AT 310*** *grey cement-lime plaster mortar for machine application* ***AT 311*** *Decorative mosaic plasters* *natural mosaic plaster* ***ALPOL AT 390*** *coloured mosaic plaster* ***ALPOL AT 396-AT 397***
Primers	*Deep penetrating primer* ***ALPOL AG 700*** *Stained isolating primer for absorbing substrates* ***ALPOL AG 703*** *Silicate-polymer primer for mineral substrates* ***ALPOL AG 707***

NOTE

Insulation works must not be carried out when it is raining or snowing, on walls excessively exposed to sunlight, during strong wind and if the temperature is expected to drop below +5°C over the following 24 hours.
*If the wintertime adhesive **ALPOL AK 534** is used, thermal insulation may be applied in mild winter conditions at ambient temperatures close to 0°C.*

ALPOL EKO PLUS system chart

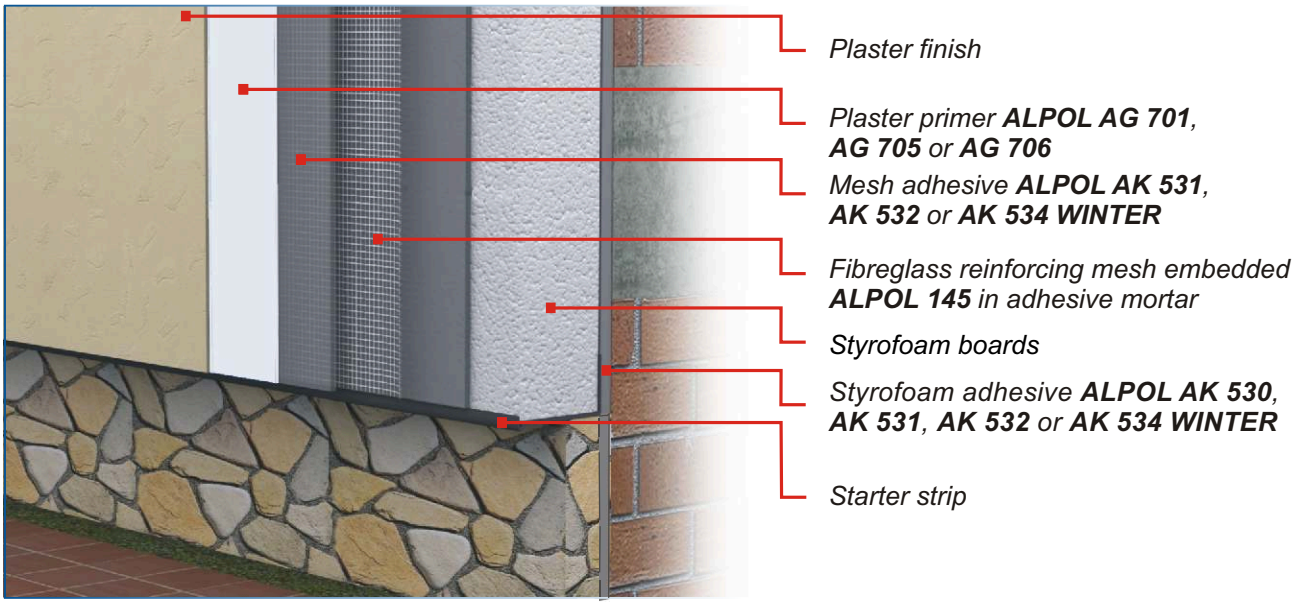


Fig. 1. *External wall insulated with expanded polystyrene with a stone plinth.*

Prior to commencing the insulation works, it is necessary to read and understand the technical specifications related to thermal insulation and prepare the materials and necessary tools and equipment according to the bill of materials. Moreover, the contractors should ensure that they will have access to electricity and water supplies and secure the materials storage area against weather conditions, and in particular against precipitation or excessive sunlight. It is recommended that the external walls should be made from single batch materials. The contractors should check the date of manufacture, product life and numbers of the production batches. They should also read and understand the engineering descriptions and data on the product packaging.

Preparing the substrate

The substrate for applying ***ALPOL EKO PLUS*** *thermal insulation should be:*

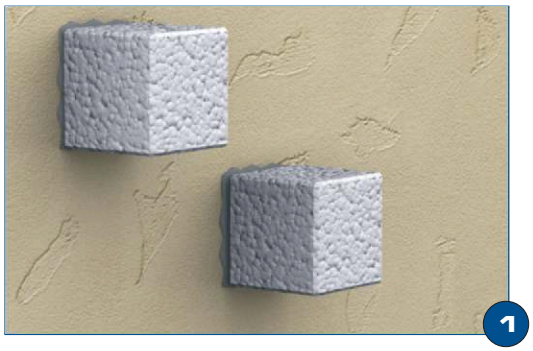
- ***capable of load-bearing, dry and cleared of loose particles and poorly-adhering coats,***
- ***free of biological and chemical contaminants,***
- ***and sufficiently adhesive.***

New concrete and plaster layers must be bound and seasoned. All weak, loosening paint and plaster coats based on organic resin should be removed using mechanical or chemical methods or washed away with a pressurised water jet. If the substrate is highly absorptive, it is necessary to prime the surface with ***ALPOL AG 703*** *primer. The works must be performed like brushwork using a paintbrush. The primer should be applied onto the surface of the wall and rubbed into the substrate. The primer is a product supplied as a ready-to-use mix. No substances whatsoever, including water, must be added to primer.*

NOTE

Faulty evaluation of the substrate may result in serious consequences, including a failure caused by the loosening of the insulation layer. Therefore, the condition of the substrate should be evaluated by an authorised expert, and the recommendations included in the technical specifications must be absolutely observed. Should the levelling or local repairs of the substrate become necessary, it is recommended to use ***ALPOL*** *mortars or plasters (see p. 14).*

The fresh primed surface must be protected against moisture. If the substrate continues to be highly absorptive, repeat the priming procedure.
The insulation designer should test the tensile strength of the substrate, which should be at least 0.08 MPa. If the strength of the substrate is doubtful, a "pull off" tensile strength test must be performed. At a construction site, the strength of the substrate may be tested by attempting to pull off 10 x 10 x 10 cm EPS cubes fully attached at different locations to the external wall (8-10 samples) ***(Fig. 1 and 2)****. The pull-off test should be performed following at least 72 hours from the moment of application.*
It is assumed that the strength of the substrate is sufficient if, when pulled off manually, the expanded polystyrene is ripped off and the part adhering to the substrate remains intact. ***The test is not to be applied with new non-plastered walls.***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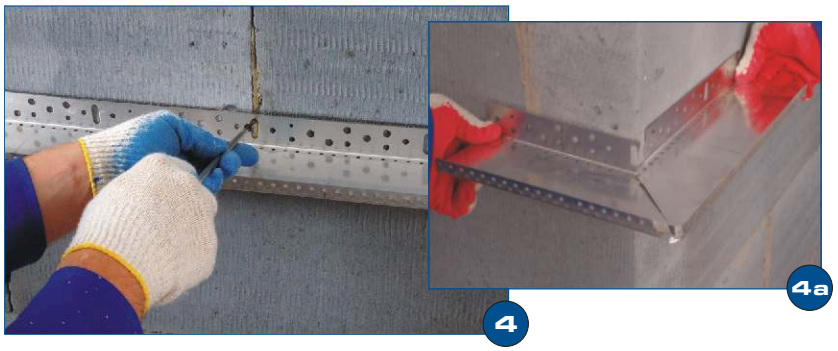
Installation of the starter strip

Before the EPS boards are applied, a skirting board (starter strip) matching the thickness of the insulation panels must be carefully levelled and attached ***(Fig. 3)****. The starter strip may be attached by means of at least three drive anchors or quick connectors per 1 running m* ***(Fig. 4)****.*


3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Preparing the adhesive mortar for the application of EPS boards

The ***ALPOL AK 530****,* ***ALPOL AK 531*** *(white),* ***ALPOL AK 532*** *and* ***ALPOL AK 534 WINTER*** *adhesives are supplied in 25 kg bags as a dry mix of cement and sand with various additives and admixtures.*
To prepare the adhesive, pour all contents of the packaging into a container with a pre-prepared water batch of 5 to 5.5 litres (for AK 530) and 5 to 6 litres (for AK 531, AK 532 and AK 534). Use cool and clean water, preferably of potable quality. Use hot water for the wintertime adhesive ***ALPOL AK 534*** *at low temperatures (up to +5°C). Use an electrical low-speed drill with a basket mixer to obtain a homogenous mixture and expected consistence.*
Stir the mixture again after 5 minutes. At an ambient temperature of approx. 20°C all adhesives must be used up within 1 hour after they have been mixed with water. The ***ALPOL AK 534 WINTER*** *adhesive, at a temperature close to zero must be used up within 1.5 hours. If the adhesive becomes thick over that time, it must be stirred again intensely using no water to dilute it. An overdose of water will deteriorate all the parameters of the adhesive including its adhesion to the substrate, pull-out strength, binding time, etc.*

NOTE

The skirting boards must be interconnected. Corner connections of starter strips are made by means of relevant notches or special connectors ***(Fig. 4a)****.*

Application of EPS boards

EPS boards should meet the requirements of PN-EN 13163:2004. At the construction site the boards should not be exposed to weather conditions longer than for 7 days. Before the board is applied, its surface, which is yellowed due to weather conditions, must be sanded and cleared of dust.
*Insulation making use of the **ALPOL EKO PLUS** system should involve EPS 70-040 (FS 15) boards with a thickness provided for in the insulation design. However, their thickness should ensure a heat transfer resistance of at least 2 [m K/W].*

a) application of the adhesive on the EPS board surface

*It is recommended to apply the adhesive onto the boards using one of the following methods: spot and edge application **(Fig. 5)** or combing **(Fig. 6)**. When using the spot and edge method, **ALPOL AK 530**, **ALPOL AK 531**(white), **ALPOL AK 532** and **ALPOL AK 534 WINTER** adhesives must be dabbed onto the boards with a trowel and spread around the edge. The band of adhesive around the edge of the board should be from 3 to 5 cm wide. Dab from 3 to 6 spots with the diameter of 8-12 cm on the remaining surface of the board **(Fig. 5)**. The amount of adhesive applied should ensure at least 40% of effective adherence of the board to the substrate. This method is recommended for slightly rough substrates.*

5

*For the combing method use a trowel to apply the adhesive and a smooth long float to spread it. Then, smooth it out with a toothed float with 10 x 10 or 12 x 12 mm teeth **(Fig. 6)**. This method ensures effective adhesion over a larger area but it may be used on even surfaces only.*


6

b) attaching the EPS boards to the substrate

*Butt the side edges of each EPS board coated with adhesive with the edges of previously installed adjacent boards or the starter strip. Press the board to the wall and move it slightly so that the adhesive can be spread evenly **(Fig. 7)**. Attach the boards from bottom to top in horizontal strips (oriented along the longer edge), using corner lacing and preserving staggered vertical joints. Do not make cross joints **(Fig. 2)**. The joints of the boards should not overlap wall cracks and the connection joints of different wall materials. At all times use whole boards or their halves with lacing. Do not use dented, crushed and broken boards. The protruding fragments of boards at wall corners may be cut off only when the adhesive is bonded **(Fig. 8)**. Press the boards to the wall evenly, e.g. using a polystyrene or wooden float, and check the surface perpendicularity and evenness by means of a long level or a derby float (**Fig. 9,10)**.*


7


8

NOTE

Always apply the adhesive mortar on the surface of EPS boards and never on the substrate itself.

The edges of the boards must adhere completely to the substrate. Over the entire insulated surface of the wall, the side edges of the adjacent boards should fit tightly with no gaps. Any gaps larger than 2 mm must be "dry" filled by inserting cut-to-size EPS strips, using no adhesive ***(Fig. 11)****. Smaller gaps must be gun-filled with polyurethane foam. No adhesive is allowed in the joints. To prevent the adhesive from coming out and smearing the side edges, when the board is pressed, remove excessive adhesive before another board is installed* ***(Fig. 12)****.*


9


10

When the boards have been installed, their position may still be adjusted within 10 minutes. To reposition the boards after 10 minutes, you will need to tear them off and remove the adhesive from their surface. The boards may be reinstalled when the adhesive is reapplied, the boards are butted and pressed to the wall and faced. The maximum time allowed for the attachment of boards is 20 minutes from the application of the adhesive onto the board.


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All corners of wall openings should be filled with whole, properly cut boards ***(Fig. 2)****. Thus, corner cracking will be limited.*

NO **YES**

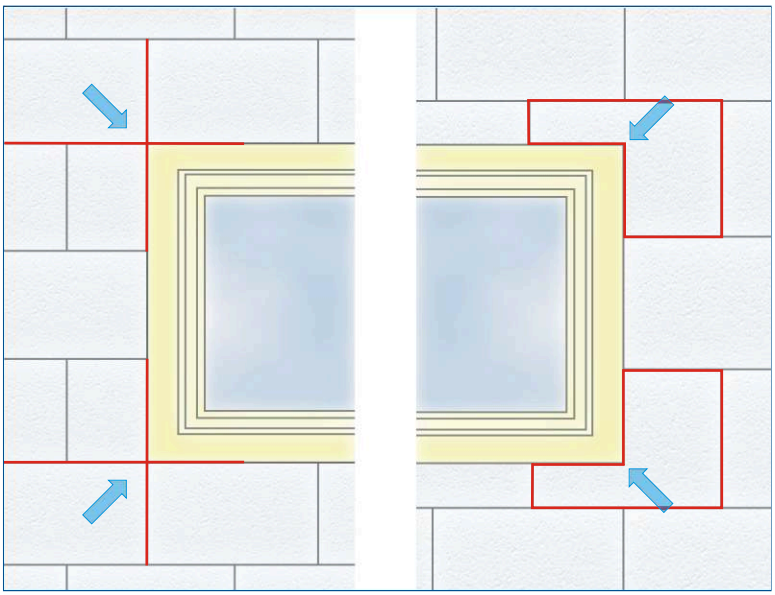

Fig. 2. *Attachment of EPS boards within wall openings.*

NOTE

Before another board is attached, remove excessive adhesive coming out of board sides to eliminate the formation of thermal bridges.

c) expansion joints

*All the existing expansion joints in the insulated wall of the building must be repeated in the insulating layer. The joints may be made from ready PVC expansion sections (flats and angles) or special sets of materials incorporating a (PVC or aluminium) skirting board and fillers such as sealing tape or expansion rope and permanent elastic sealant. Leave a gap of approx. 15 mm in the insulating material layer (aligned with the expansion joint in the wall). The gaps must be edged similar to the walls and wall openings **(Fig. 5)**. Some methods of expansion joint making, depending on the type of edging and filling, are presented in the illustrations **(Fig. 3; A,B,C)**.*

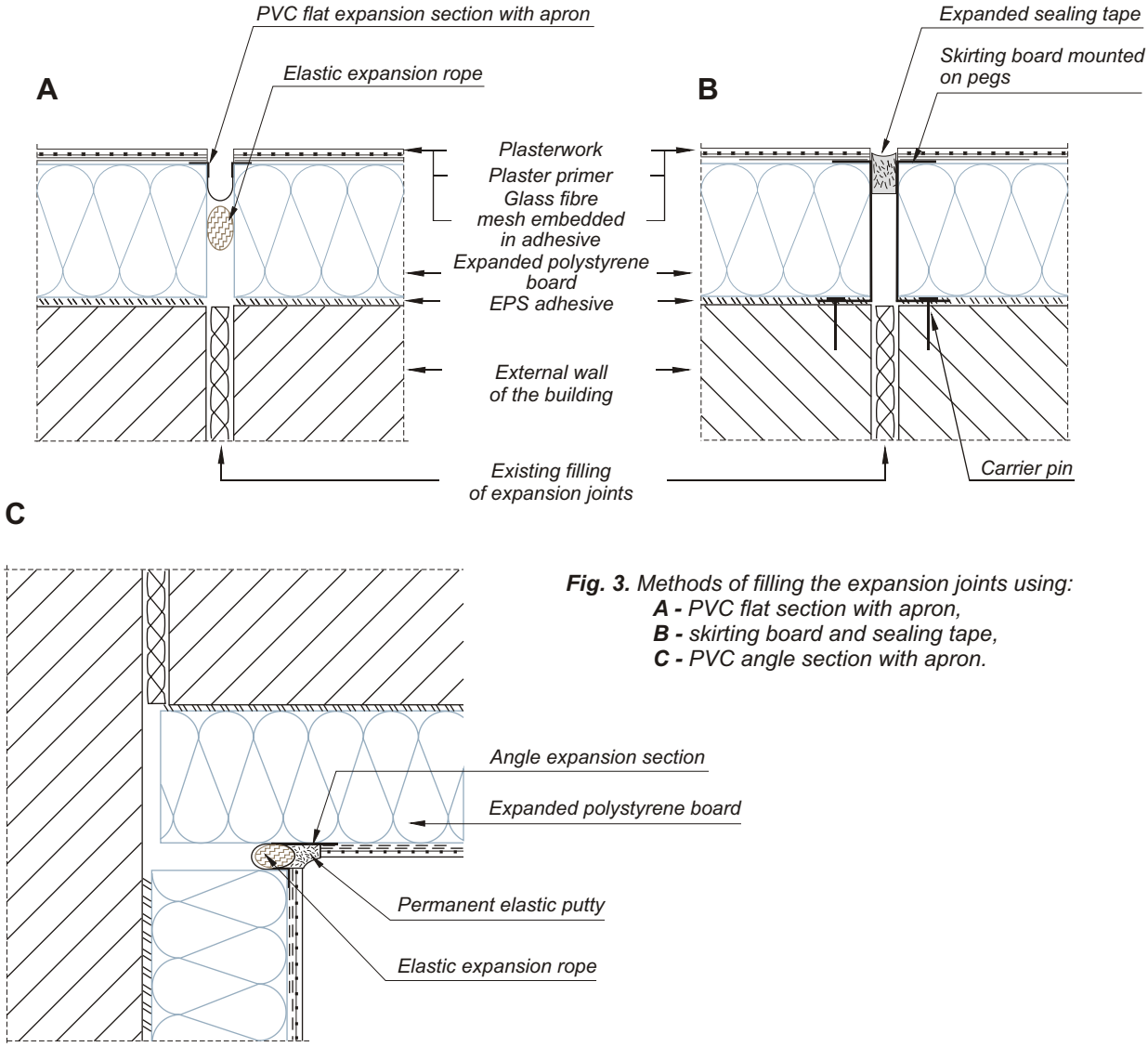

***Fig. 3.** Methods of filling the expansion joints using:*
***A -** PVC flat section with apron,*
***B -** skirting board and sealing tape,*
***C -** PVC angle section with apron.*

Additional mechanical fastening of EPS boards

*The requirements concerning the use of additional mechanical fasteners are determined by the insulation designer. The design should specify the number and type of fasteners and the method of their distribution. **It is recommended to use at least 4 fasteners per 1 m^2 in the central part of the wall and 8 fasteners per 1 m^2 in the edge zone (Fig. 4).** The length of fasteners is determined by the type of substrate and the thickness of thermal insulation material, whereas the depth of anchoring **(h)** in the substrate should be at least 5 cm in high thickness materials (concrete materials, silicate elements, hard tiles) and at least 8 cm in low thickness materials (including aerated concrete, porous tiles). The distribution of fasteners should also take into consideration the height of the building and the edge zones. The recommended types, amounts and anchoring depths of fasteners for different structural materials and wall heights are given in the table below.*

NOTE

Avoid smearing of the gaps in the expansion section with adhesive. To this end, the section must be temporarily "closed", e.g. by inserting an EPS strip inside the gap.

RECOMMENDED SELECTION OF MECHANICAL FASTENERS								
EPS-EN 13163-CS(10)70 insulation boards or CS(10)80 insulation boards according to PN EN 13163:2004 dimensions 100 x 50 cm			Recommended number of fasteners depending on the height above ground level					
Substrate	Type of fastener	Anchoring depth	less than 8 m		from 8 to 20 m		more than 20 m	
			wall	edge	wall	edge	wall	edge
concrete and concrete blocks, full ceramic brick, full silicate brick	with plastic or steel drive-in or screw-in shank	≥ 50 mm	4	6	6	8	8	12
cavity ceramic brick, cavity silicate brick, lightweight concrete hollow bricks, keramsite concrete, cellular concrete	with plastic or steel drive-inor screw-in shank with an extended anchorage zone	≥ 80 mm						

NOTE

If EPS boards are mounted on new, load-bearing substrates up to 8 metres above ground level by means of **ALPOL AK 531**, **AK 532** and **AK 534** adhesives, given the adhesive and substrate contact area ≥ 60%, the use of additional mechanical fasteners is not required.

The table gives the recommended and practicable number of fasteners used in typical solutions. The adequate type and number of fasteners and the depth of anchoring are at all times determined by the technical design of the insulation.

"Depth of anchoring" denotes the effective depth of anchoring in the structural wall material. For plastered walls, the depth of anchoring should be increased by adding the thickness of plaster.

The width of the edge (side) zone in which more fasteners must be used is determined by the geometry of the building and it is equivalent to 1/8 of the shorter dimension of the building, but it is a minimum of 1 metre and a maximum of 2 metres.

The fasteners used should have relevant technical approvals based on which they can be marketed and used.

The fasteners are inserted into pre-drilled holes and driven in by tapping the plastic shank with a hammer ***(Fig.* 13,14,15)**.

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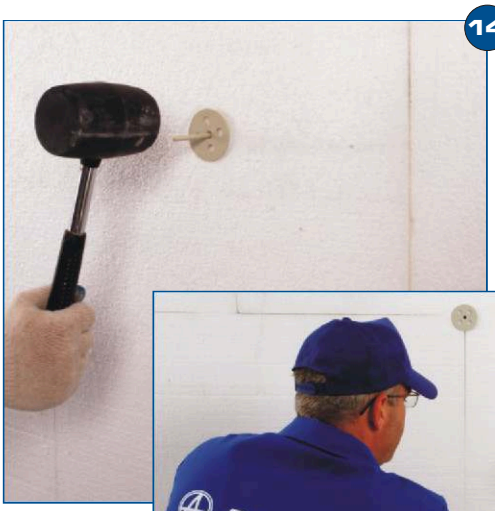
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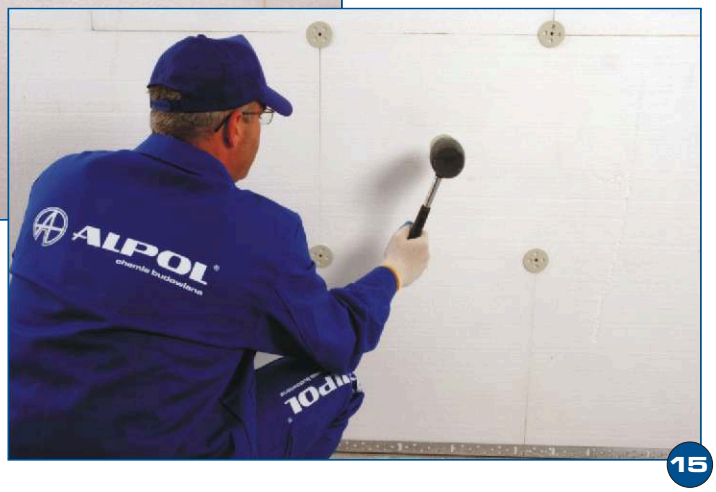

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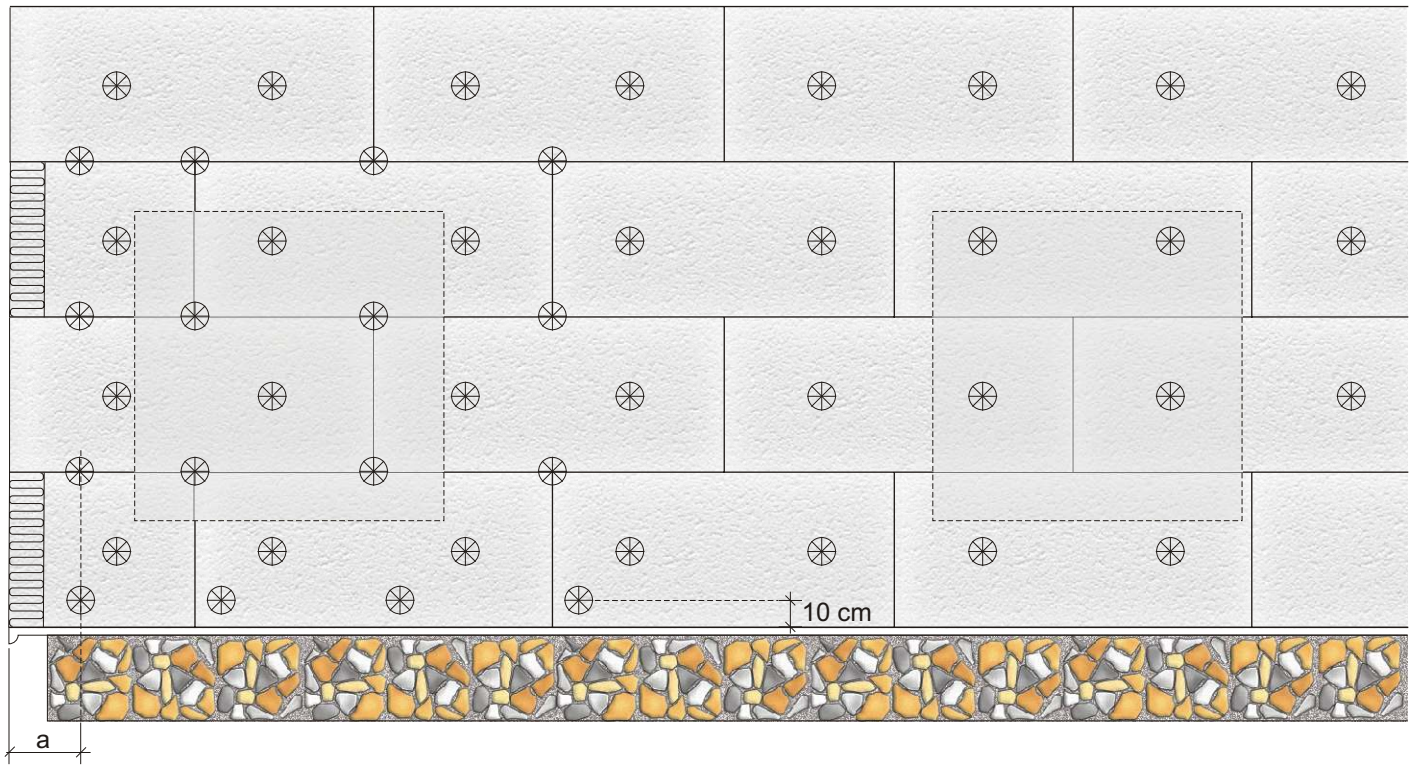

a = 10 cm + thickness of the insulating material

Fig. 4. *Sample distribution of mechanical fasteners for EPS boards*

*The depth of anchoring **(h)** is exclusive of the existing layers of plaster. The required length **(L)** of mechanical fasteners must be calculated as a sum of the following components: **h** , **a_1**, **a_2**, **d**.*

where:
h *- minimum depth of anchoring in the building material,*
a_1 *- overall thickness of the existing layers of plaster,*
a_2 *- thickness of the layer of adhesive,*
d *- thickness of the thermal insulation material,*
L *- overall length of the fastener.*

$$L \geq h + a_1 + a_2 + d$$

The fasteners should be fixed when the adhesive sets sufficiently; on average after a minimum of 1 day from the installation of the boards, and at low temperatures after a minimum of 3 days. However, in each case, prior to fixing the mechanical fasteners, ensure that the adhesive under the EPS boards is sufficiently firm and bonded. Make use of mechanical fasteners admitted to market and use in building industry. The fasteners must be fixed before the reinforcing layer is laid.

NOTE

The technical design of insulation should include a detailed description of the method of fastening, distribution of mechanical fasteners, their number and depth of anchoring in the wall.

Making the reinforcing layer

The fundamental task of the reinforcing layer is to protect the thermal insulation material and set off thermal stress and dynamic loads occurring in the top surfaces of insulation due to different factors.
Prior to making of the reinforcing layer, the whole surface of the fixed EPS boards must be smoothed out carefully with sandpaper or metal grate. The reinforcing layer must be applied onto EPS boards that are sanded and cleared of dust at the soonest after 3 days from fixing the boards.
The recommended first stage of making of the reinforcing layer is to fix the aluminium or plastic corner sections onto the edges of walls and wall openings. The section must be founded on expanded polystyrene under the glass fibre mesh ***(Fig. 5; A,B)****.*

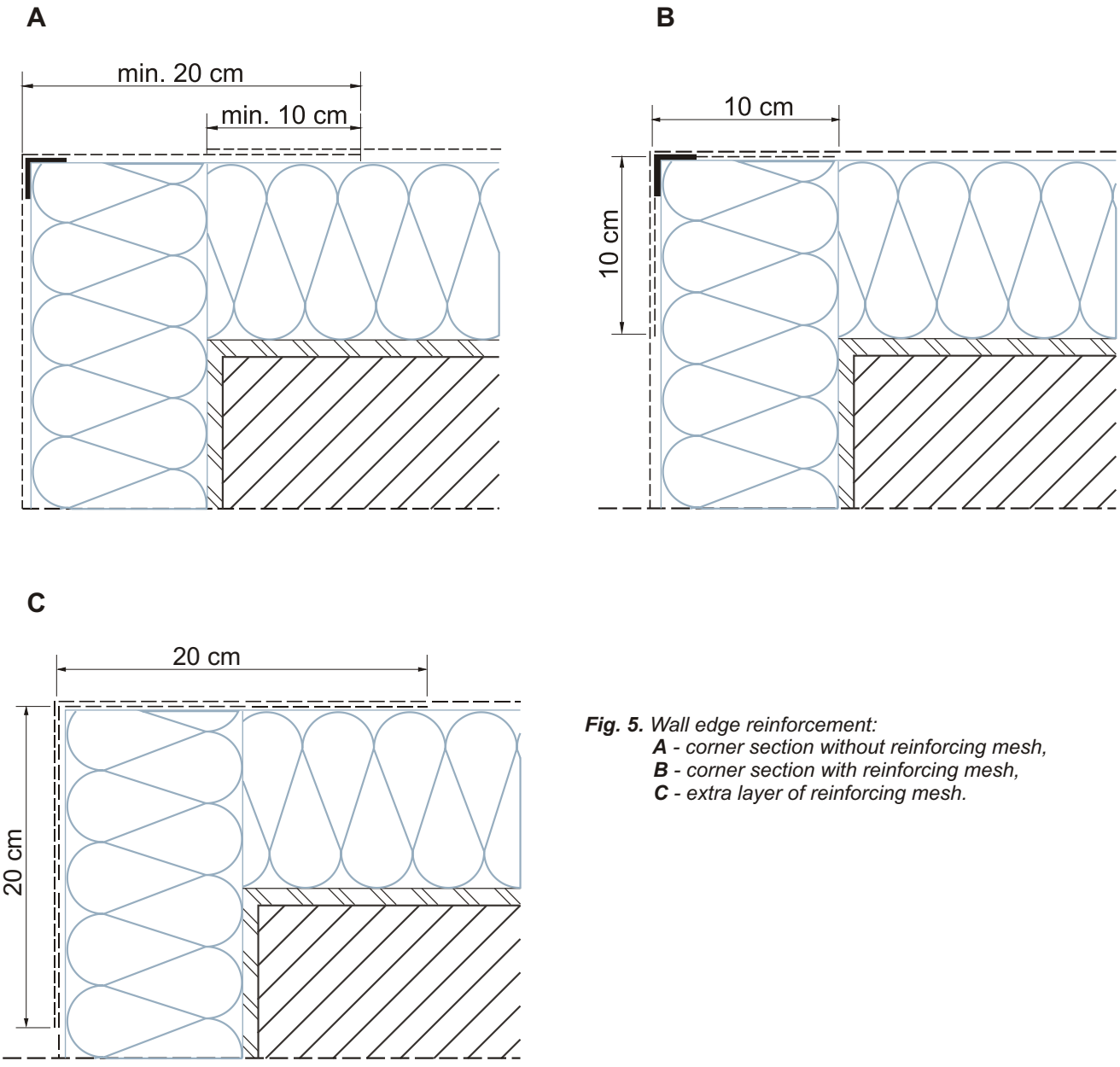

Fig. 5. *Wall edge reinforcement:*
A *- corner section without reinforcing mesh,*
B *- corner section with reinforcing mesh,*
C *- extra layer of reinforcing mesh.*

Wall and wall opening edges may also be reinforced by means of two layers of reinforcing mesh ***(rys.5C)****.*

NOTE

The use of mechanical fasteners must not cause the warping and bulging of EPS boards.

*The next stage will involve fixing extra reinforcement in all corners of wall openings by embedding rectangular strips of fibre glass with the minimum dimensions of 25×35 cm in a layer of adhesive above and below window and door openings at an angle of 45°. The extra reinforcement will prevent the formation of diagonal cracks starting in the corners due to increased stress **(Fig.6, detail A)**:*

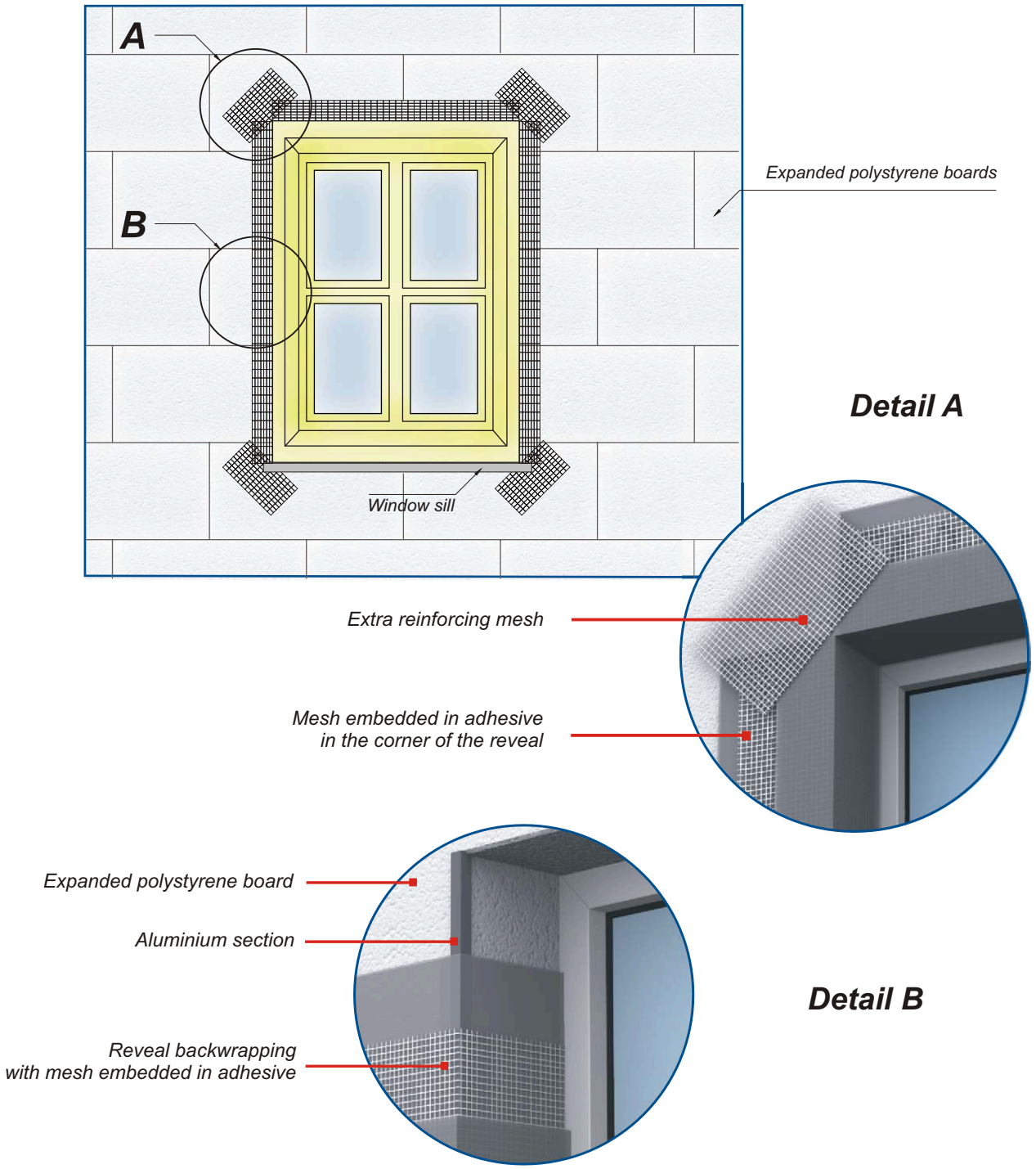

***Fig. 6.** Extra reinforcing mesh on wall openings:*
***A** - corner reinforcement detail,*
***B** - edge reinforcement detail.*

NOTE

Extra diagonal strips of reinforcing mesh must be applied (at an angle of 45°) in the corners of wall openings (such as windows and doors). They will provide a preventative measure against the formation of diagonal cracks starting at opening corners.

*The mesh must be embedded as a single operation, starting from the top of the wall. Having applied **ALPOL AK 531** (white), **ALPOL AK 532** or **ALPOL AK 534 WINTER** adhesive onto the EPS boards by means of a stainless steel toothed float with 10 × 10 or 12 × 12 mm teeth **(Fig. 16)**, immediately embed tense the reinforcing mesh very carefully in the adhesive with the smooth side of the long float **(Fig. 17)**. The embedded reinforcing mesh should be completely invisible. The reinforcing mesh must not be directly adjacent to EPS boards, but it must be embedded in the adhesive. The strips of reinforcing mesh should form approx. 10 cm wide "overlaps". The mesh overlaps must not be aligned with the joints between EPS boards. Unless corner sections are in use, the reinforcing mesh on outer corners should overlap at least 20 cm on both sides. At the ground floor level and on plinths (if insulated), apply two layers of reinforcing mesh. When insulating the plinth using a starter strip, cut off the embedded reinforcing mesh along the bottom edge of the strip.*


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17

Priming of the reinforcing layer prior to plastering

*To eliminate small irregularities, at the soonest after 2 days from the application of the reinforcing layer, sandpaper its surface **(Fig. 18)**. Afterwards, coat the entire surface with plaster primer. When using decorative mineral plaster, use **ALPOL AG 701** primer. Acrylic plaster requires the use of **ALPOL AG 705** primer, and silicate-silicone plaster **ALPOL AG 706** primer. Priming should be performed at temperatures above + 5°C when the adhesive is completely bonded and dry. The primer is supplied ready to use and it must be stirred carefully before application. It must not be diluted with water or mixed with other additives. The primer should be applied with a paint brush **(Fig. 19)**.*

18


19

Plastering

*Plasterwork should be applied at the soonest after twenty-four hours from priming and at the latest within 3 months from the application of the reinforcing layer. At low temperatures plaster may be applied after at least 6 days and if the temperature over the following 5 days does not drop below 5°C. Plasters used as part of **ALPOL EKO PLUS** system:*

- *decorative mineral plasters **ALPOL AT 320-338**, grey or white, rough cast, grained or pitted skin texture, grain size from 1.5 to 3 mm, supplied as dry mixes,*
- *decorative acrylic plasters **ALPOL AT 350-358**, colours according to **ALPOL COLOR** spectrum, grained or pitted skin texture, grain size from 1 to 2.5 mm, supplied as a ready-to-use mix,*
- *decorative silicate and silicone plasters **ALPOL AT 370-378**, colours according to **ALPOL COLOR** spectrum, grained or pitted skin texture, grain size from 1.0 to 2.5 mm, supplied as a ready-to-use mix.*

NOTE

Use fibreglass mesh with the minimum basis weight of 145 g/m allowed for marketing and use in building industry.

*Mineral plasters on cement and lime binders **ALPOL AT 320-338** must be prepared for application by mixing of the dry mix with water. To prepare the working mix, pour all contents of the bag into a container with pre-prepared batch of clean and cool water, that is, from 4.5 to 5.5 litres per 25 kg, and stir with an electrical low-speed drill with basket-type mixer to obtain homogenous mixture and expected consistence. Acrylic plaster **ALPOL AT 350-358** and silicate and silicone plaster **ALPOL AT 370-378** are produced as ready to use tinted mixes coloured according to **ALPOL COLOR** spectrum. Figure **20** presents sample plaster textures.*

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*Acrylic as well as silicate and silicone plasters do not require more than mixing before they are applied. Do not add water or other substances to ready mixes. All decorative plasters, irrespective of texture and binder types, must be applied onto the substrate with a steel straight-edged float. Having trowelled the plaster onto a long float, spread it quickly and efficiently over the surface of the wall, holding the float at an angle of approx. 20-30° **(Fig. 22)**. The successive layers must always be spread in the direction of the freshly applied layer **(Fig. 23)**. The thickness of plaster layer must be identical with the thickness of structural aggregate. Remove excessive mix with a long float **(Fig. 24)**.*

21

*Ensure that the number of workers is enough to perform continuous, uninterrupted plastering within the field on the wall marked out by the edges of the openings and the building. If plaster batches are to be connected, use the wet-on-wet technique. If it is impossible to comply with this requirement, use a double layer of painting tape first on the substrate **(Fig. 21, 23)**, and then on dry plaster. If these guidelines are observed, possible differences in colours and texture of plaster may be eliminated.*

22

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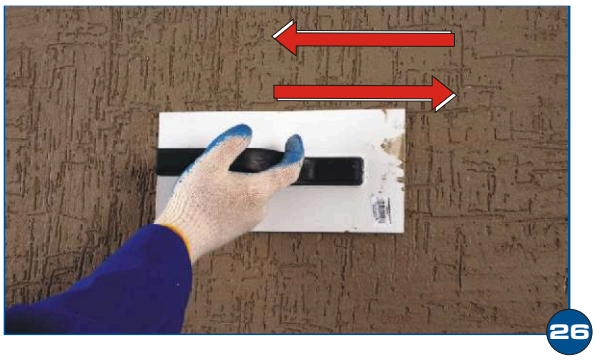
NOTE

Decorative plaster may not be applied on walls exposed to direct sunlight or on damp walls and on substrates without priming coats.
With regard to the alkalinity of certain products forming part of the insulation system (in particular silicate-based products), elements of door and window woodwork and steelwork must be secured against damage with protective foil.

*Depending on the type of plaster, when a layer of required thickness is applied, start applying the required texture of plaster. This is done by floating of plaster with a hard plastic float. Figures **25** to **27** present the ways to obtain pitted skin texture, and Figure **28** grained texture.*



While floating avoid excessive pressing of the float to the plaster which may cause overfloating. Remember that the quality of the plasterwork is affected by weather conditions during the works (temperature, wind).
For mineral plasters premature evaporation of batched water may render the obtainment of the expected plasterwork texture difficult. Due to excessive reduction of the hydration time, the strength parameters of plaster may become altered. Plaster containing hydraulic binding agents are particularly sensitive to excessive exposure to sunlight, therefore they should be applied under scaffolded screens or at the time of the day when the ambient temperature is lower than 20°C.
Similar rules must be applied with regard to silicate and silicone plaster. This type of plaster would be affected more by precipitation or increased air humidity and ambient temperature drops. Along with the fluctuations in the silication of silicate-based binder, salt bloom may from time to time appear on the surface of plaster. This is not a fault of plaster and will disappear with time.
The notes regarding plasterwork application conditions are also applicable to acrylic plaster. Low temperature and high humidity of air may increase working and drying times for this type of plaster. However, excessive temperature will render plaster texturing impossible.

All mineral, acrylic and silicate and silicone plasters may be coated with relevant wall paints.

***ALPOL** wall painting range:*

- *acrylic paints **ALPOL AF 640***
- *silicate paints **ALPOL AF 660***
- *silicone paints **ALPOL AF 680***

*available in many colours, according to **ALPOL COLOR** spectrum..*

NOTE

*Mineral as well as silicate and silicone plaster may be coated with all types of paint. Acrylic plaster may be painted with acrylic wall paint **ALPOL AF 640** and silicone paint **ALPOL AF 680**. Scaffolded screens should be used during all the works.*

Acceptance of the works

The quality of subsequent stages of the works is particularly significant with regard to the durability of EPS insulation. Works acceptance should be performed at the following stages:

- *preparing the substrate,*
- *fixing the thermal insulation layer taking into account the butting quality of insulating boards,*
- *making the reinforcing layer including corner reinforcement,*
- *priming before the application of plasterwork,*
- *applying decorative plasterwork,*
- *and paint coating.*

The works completed at subsequent stages should be accepted by a supervising inspector in the presence of the site manager, which should be recorded in the building log or partial acceptance reports. Upon completion of the task, the final acceptance should be confirmed by a works acceptance report. During acceptance pay particular attention to the quality of plasterwork, paintwork, steelwork, and the so-called insulating details.

ALPOL EKO PLUS component products

the M variety using decorative mineral plaster	**The N variety** using decorative acrylic plaster	**the SIS variety** using decorative silicate and silicone plaster	**The WINTER variety** using wintertime adhesive **ALPOL AK 534**
► Cement adhesives for bonding Styrofoam boards **ALPOL AK 530**, **ALPOL AK 531** (white), **ALPOL AK 532** ► Styrofoam boards **EPS 70-040** ► Underplaster fabric **ALPOL 145** and **AKE 145A** ► Cement adhesives for embedding mesh **ALPOL AK 531** (white), **ALPOL AK 532** ► Prime for mineral plasters **ALPOL AG 701** ► Mineral decorative plasters **ALPOL AT 320 - AT 338** ► Paints: acrylic **ALPOL AF 640** silicate **ALPOL AF 660** silicon **ALPOL AF 680**	► Cement adhesives for bonding Styrofoam boards **ALPOL AK 530**, **ALPOL AK 531** (white), **ALPOL AK 532** ► Styrofoam boards **EPS 70-040** ► Underplaster fabric **ALPOL 145** and **AKE 145A** ► Cement adhesives for embedding mesh **ALPOL AK 531** (white), **ALPOL AK 532** ► Prime for acrylic plasters **ALPOL AG 705** ► Acrylic decorative plasters **ALPOL AT 350 - AT 358** ► Paints: acrylic **ALPOL AF 640**	► Cement adhesives for bonding Styrofoam boards **ALPOL AK 530**, **ALPOL AK 531** (white), **ALPOL AK 532** ► Styrofoam boards **EPS 70-040** ► Underplaster fabric **ALPOL 145** and **AKE 145A** ► Cement adhesives for embedding mesh **ALPOL AK 531** (white), **ALPOL AK 532** ► Primer for silicate plasters **ALPOL AG 706** ► Silicate and silicone decorative plasters **ALPOL AT 370 - AT 378** ► Paints: silicate **ALPOL AF 660**	► Cement adhesive for bonding Styrofoam boards **ALPOL AK 534 WINTER** ► Styrofoam boards **EPS 70-040** ► Underplaster fabric **ALPOL 145** and **AKE 145A** ► Cement adhesive for embedding mesh **ALPOL AK 534 WINTER** ► Primes: - for mineral plasters **ALPOL AG 701*** - for acrylic plasters **ALPOL AG 705*** ► Mineral decorative plasters **ALPOL AT 320 – AT 338*** ► Paints: - mineral plaster paints akrylic **ALPOL AF 640*** silicate **ALPOL AF 660*** silikon **ALPOL AF 680*** - acrylic plaster primer acrylic **ALPOL AF 640***

** - materials used at ambient and substrate temperatures higher than +5°C*

Additional materials

► **Mortars**

ALPOL AZ 102 *- cement and lime mortar*

ALPOL AZ 104 *- cement mortar*

ALPOL AZ 130 *- quick-setting mortar*

ALPOL AZ 135 *- levelling mortar*

► **Primers**

ALPOL AG 700 *- deep penetrating primer*

ALPOL AG 703 *- stained isolating primer for absorbing substrates*

ALPOL AG 707 *- silicate polymer primer for use on mineral substrates*

► **Plasters**

Conventional exterior plasters

ALPOL AT 310 *- Grey cement-lime plaster mortar applied by hand*

ALPOL AT 311 *- Grey cement-lime plaster mortar for machine application*

Decorative mosaic plasters

ALPOL AT 390 - 391 *- natural mosaic plaster*

ALPOL AT 397 *- coloured mosaic plaster*

Formal and legal information

ALPOL EKO PLUS *is certified with Technical Approval No.* ***AT-15-5022/2007*** *of the Polish Building Research Institute (ITB) and related Certificate No. ITB-0178/Z confirming permanent compliance of parameters of the system component products. All the varieties of* ***ALPOL EKO PLUS*** *insulation system, that is, M, N and SIS, are classified as products not spreading fire.* ***ALPOL AZ 102****,* ***ALPOL AZ 104*** *,* ***ALPOL AZ 130*** *and* ***ALPOL AZ 135*** *mortars comply with the requirements of PN-EN 998-2:2004. For* ***ALPOL GIPS*** *mortars ITB Certificate No. 1488-CPD-0010 has been issued.* ***ALPOL AT 310*** *and* ***ALPOL AT 311*** *plasters comply with the requirements of PN-EN 998-1:2004. All the products described in this manual come with respective Declarations of Conformity, Hygienic Certificates of the National Institute of Hygiene and Material Safety Data Sheets.*

References

- *ITB Manual 334/2002 - External Thermal Insulation Composite System.*
- *Technical Approval by ITB No.* ***AT-15-5022/2007 ALPOL EKO PLUS*** *external thermal insulation products.*
- ***PN-EN 13163:2004*** *Thermal insulation products for buildings. Factory made products of expanded polystyrene (EPS). Specification.*
- *Building Law*
- *Law on Construction Products*

For more information regarding the technical properties and applications call the Technical Support and Applications Department at 041 372-11-22 or contact our Technical Consultants and Sales Representatives.

ALPOL®

professional construction chemicals

ALPOL GIPS Sp. z o.o.
Fidor, 26-200 Końskie
tel. + 48 41 372 11 00
fax + 48 41 372 12 84
e-mail: alpol.gips@alpol.pl
www.alpol.pl

Service Departament
tel. + 48 41 372 11 11
fax + 48 41 372 11 13
Export Departament
tel. + 48 41 372 11 06
Technical Consulting
and Application Departament
tel. + 48 41 372 11 22