ALPOL®

professional construction chemicals

Instructions of use

Thermal insulation system

ALPOL EKO PLUS WM

Thermal insulation of external building walls using mineral wool board slabs within the jointless BSO insulation system

nr 2/2008

ALPOL EKO PLUS WM *system is intended for thermal insulation of external building walls or internal wall and ceiling surfaces, e.g. in garages and cellars, using mineral wool board within the jointless BSO insulation system (previously known as "lightweight wet method").*

The method consists in:

bonding, with special adhesive mortar or adhesive and mechanical fasteners, the thermal insulation course composed of mineral wool boards of suitable thickness,

application of the reinforcing layer of fibre glass mesh and adhesive,

finishing the surface with a premium thin-coat plaster.

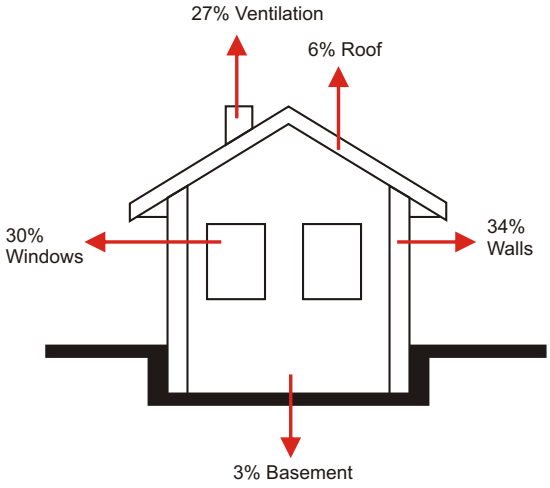
Proper thermal insulation ensures appropriate microclimate inside the building, the walls are not cold in the winter, and the interior remains comfortably cool in the summer. The building structure is thus not exposed to temperature variations, as the external plaster protects the thermal insulation from weather conditions and ensures an attractive appearance of the building façade. Moreover, thermal insulation allows the energy used for building heating to be cut down (see table 1), and, as a consequence, less harm is done to the environment. The heat transfer coefficient U can be obtained Based on the formulas for thermal calculations contained in PN-EN ISO 6946:1999 standard and pursuant to the "Technical Conditions" Ordination of the Minister of Infrastructure of 2004-04-12. a required overall heat-transfer coefficient ***U*** *can be calculated.*

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

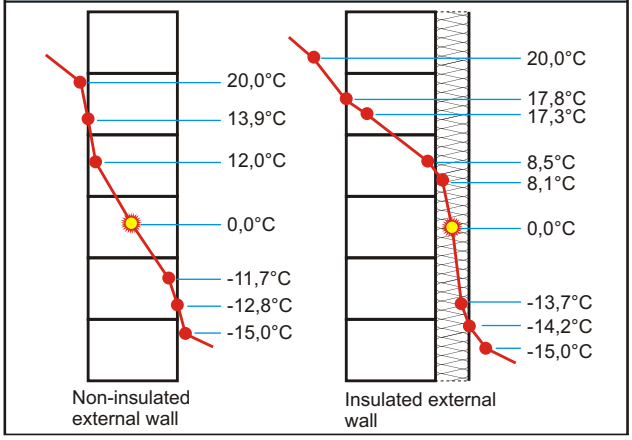


Refer to table 2 to select the conventional wool thickness depending on the type of wall to be insulated.

Tab.2

Mineral wool board insulation thickness [mm]	**Heat resistance** of the mineral wool 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	25 cm chequer brick	38 cm chequer brick	24 cm cellular concrete	25 cm full silicate brick	concrete 20 cm
0	0	2,02	1,51	1,62	1,18	0,88	2,29	3,47
50	1,25	0,57	0,52	0,54	0,48	0,42	0,59	0,65
60	1,50	0,50	0,46	0,47	0,43	0,38	0,52	0,56
80	2,05	0,39	0,37	0,38	0,34	0,31	0,40	0,43
100	2,55	0,33	0,31	0,32	0,29	0,27	0,33	0,35
120	3,05	0,28	0,27	0,27	0,26	0,24	0,29	0,30
140	3,55	0,25	0,24	0,24	0,23	0,21	0,25	0,26
150	3,80	0,23	0,22	0,22	0,21	0,20	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 WM system are availables:

- *the **M** variant using decorative mineral plaster, intended for insulation of external building walls and structural floors at ceiling and walls in unheated rooms, such as: garages, cellars, above which heated rooms are located,*
- *the **SIS** variant using decorative silicate and silicone plaster, intended for insulation of external building walls,*
- *the **K** variant without plaster, intended for insulation of structural floors at ceiling and walls in unheated rooms, such as: garages, cellars, above which heated rooms are located,*
- *the **WINTER** variant designed for application in low ambient temperatures.*

The system is intended for residential (one or multi family), public utility and industrial buildings, in either existing or newly built structures.
Civil works using the components of ALPOL EKO PLUS WM system should be carried out by professional companies only.
Proper insulation requires the use of insulation system components supplied by one manufacturer.

***ALPOL EKO PLUS WM** components and use per 1 m² insulation:*

Cement adhesives	*Adhesive for mineral wool Insulation **ALPOL AK 533*** *Adhesive for thermal insulation systems WINTER **ALPOL AK 534*** *- while bonding boards* *- while embedding mesh*	***od 3,5 do 5,5 kg/m²*** ***od 4 do 6 kg/m²***
	Conventional mineral wool boards for façades or lamellas	***1 m²/m²***
Other materials	*Underplaster fabric **ALPOL 145**, **AKE 145 A***	***1,1 m²/m²***
Primers	*Prime for mineral plasters **ALPOL AG 701*** *Primer for silicate plasters **ALPOL AG 706***	***od 0,25 do 0,3 kg/m²***
Plasters	*Mineral plasters **ALPOL AT 320-338*** *Silicate and silicone plasters **ALPOL AT 370-378***	***od 2 do 4 kg/m²*** ***od 1,7 do 3,6 kg/m²***
Paints	*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***
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

It is unacceptable to carry out works during rainfalls, on façades exposed to strong sunlight, during strong wind and when the temperature may drop below +5°C within the next 24 hours.
While using ALPOL AK 534 winter adhesive, it is allowed to carry out insulation works in mild winter conditions, in air temperature close to 0°C.

ALPOL EKO PLUS WM system chart

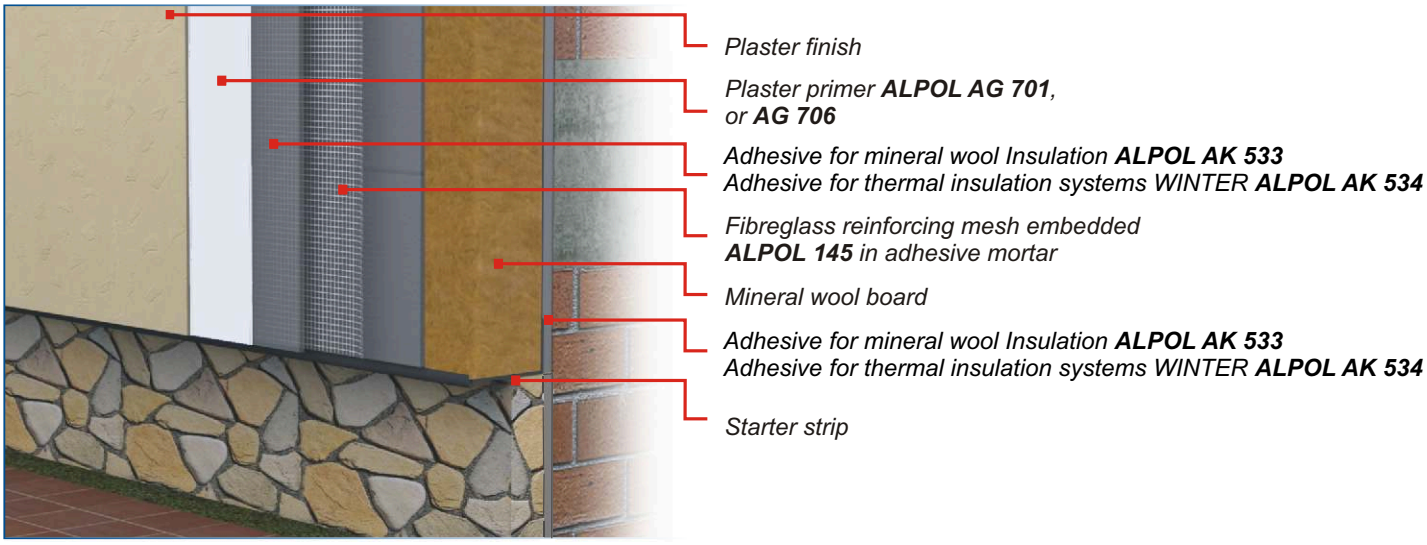


Fig. 1. *Façade wall insulated with mineral wool with stone finish.*

Read the technical documentation and prepare indispensable insulation materials and tools as specified, before starting to perform the insulation works. Moreover, the contractor should secure the electricity and water supply and protect stored materials from weather conditions, especially from rain and excessive sunlight. It is recommended that the façade is made of materials of the same batch. The contractor should observe the production / expiry date and batch numbers. Technical descriptions and instructions provided on the packages should be read.

Substrate preparation

*The surface for **ALPOL EKO PLUS WM** thermal insulation should be:*

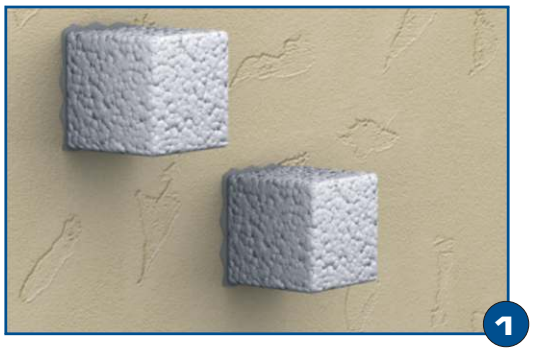
- ***sound, dry, cleaned of loose particles or coats of poor adhesion***
- ***free from biological and chemical contamination***
- ***of sufficient adhesion***

New concrete and plaster must be bonded and seasoned. Any loose and peeling paint as well as organic resin-based plaster should be removed mechanically, chemically or by washing with a jet of pressurised water.
*If highly absorptive, treat the surface with **ALPOL AG 703** primer. Apply painting techniques using a paintbrush or brush. The primer is applied by spreading and rubbing into the wall surface. The primer is delivered as a ready to use mix. Do not add water or any other substances.*
Protect freshly primed surface from moisture. Repeat priming if high surface absorption persists.
The thermal insulation designer should assess the surface tensile strength which should not be less than 0.08 MPa. In case of doubts as to the substrate strength, test its tensile strength with a "pull-off" method.

NOTE

Wrong surface evaluation may lead to serious problems including insulation flaking. For that reason, the surface should be assessed by an authorised person, and the instructions given in the technical documentation should be strictly observed. If levelling or local surface patching is needed, ALPOL masonry or plaster mortars are recommended (see p.. 16).

*Substrate strength can be tested on-site by a pull-off test (e.g. Styrofoam) by pulling off 10 x 10 x 10 cm pieces bonded by their entire surface to various points of the façade **(8-10 samples) (photo 1 and 2)**. The pulling off test should be performed at least 72 hours after bonding the material. The substrate strength is regarded sufficient if, when pulled off by hand, the Styrofoam is torn, and the part bonded to the surface remains intact. **The test is not to be performed on new, raw walls.***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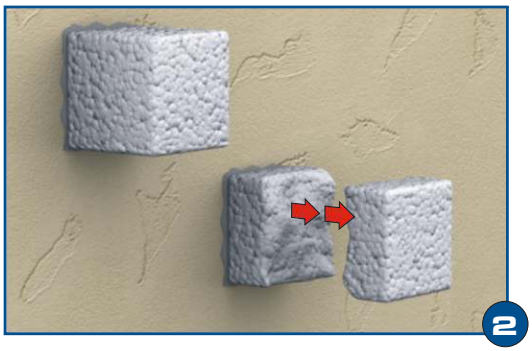
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Mounting the skirting

*Carefully level and fix the skirting matched to the insulation board thickness before bonding the mineral wool boards **(fig. 3)**. Fix the skirting with either expansion bolts or nail plugs, using at least three bolts per 1 metre of skirting **(fig. 4)**.*


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4


4a

Preparing the adhesive for bonding mineral wool boards

***ALPOL AK 533** and **ALPOL AK 534 WINTER** adhesives for thermal insulation systems are delivered in 25 kg bags as a dry mix composed of cement, sand and additives.*
*Pour the whole package content to a container with 5.2 to 6 litres (for AK 533) or around 4.5 litre of water (for AK 534) to prepare the adhesive. Cold, clean and drinkable water is preferred. In low temperatures (up to + 5°C) warm water is recommended for **ALPOL AK 534 WINTER** adhesive. Stir the product mechanically with an electric drill with basket mixer until homogenous mix of required consistency is achieved **(fig. 5)**. Allow 5 minutes and stir the prepared mix again. **ALPOL AK 533** adhesive should be used within 1 hour from mixing at 20°C, and **ALPOL AK 534 WINTER** at temperatures close to 0°C should be used within 1.5 hour. If the adhesive thickens in that period of time, stir it thoroughly without adding water. Adding too much water impairs all adhesive characteristics: adhesion, peel strength, setting time etc.*


5

NOTE

Skirting must be joined together. Make a cut or use special joiners to join the skirting in corners (fig. 4a).

Bonding mineral wool boards

Mineral wool boards or lamellas should conform to PN-EN 13162:2002. While storing on site, avoid exposure of not installed boards to weather conditions.
*Mineral wool boards used with **ALPOL EKO PLUS WM** system should comply with the technical approval and the insulation design, whereas their thickness should ensure heat resistance not less than 2 [m^2 K/W].*
*Spread a thin coat of adhesive on the board points to which the fixing coat is to be applied **(fig. 6 and 9)**. There are two methods for adhesive application: on spots and edges **(fig. 7)** or comb application with a notched trowel **(fig. 8 and 10)**.*

a) adhesive application on conventional mineral wool board of irregular fibre structure

*After preliminarily smoothing the mineral wool board surface with adhesive, apply the **ALPOL AK 533** or **ALPOL AK 534 WINTER** in "spots" and around board edges. The adhesive strip around board edges should be between 3 and 5 cm. Apply 3 to 6 spots of 8 to 12 cm in diameter on the remaining board surface **(fig. 7)**.*


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*The amount of adhesive applied should ensure at least 40% effective bonding surface. This method is recommended in case of slight surface irregularities. Apply the adhesive with a trowel and spread it with a plain float. Then, spread it with a notched trowel of notch size 10 x 10 or 12 x 12 mm, in order to obtain combed texture **(fig. 8)**. This method ensures greater effective bonding area, but can be applied on even surfaces only.*

b) comb adhesive application on mineral wool lamella surface

*Smoothen and apply the adhesive on lamellas **(fig. 9 and 10)** by combing, in a similar manner to the conventional boards. Due to the boards size (200 mm x 1200 mm) and the need to bond them on the entire surface, no spot and edge application method is used in this case.*


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10

NOTE

Apply the adhesive on the boards only, never on the substrate.
Always preliminarily smoothen the mineral wool board surface before adhesive application.

c) bonding conventional mineral wool boards and lamellas

The first installation phase for both wool types is similar. The differences occur while mounting with mechanical fasteners. Lean each mineral wool board (conventional or lamella) with the adhesive on the edges against the adjacent, already fixed, boards or skirting, press it against the wall and slide it a little for uniform spreading of the adhesive ***(fig. 11 conventional wool, fig. 12 lamella)****. Fix the boards in an upward direction in horizontal lines (along the longer edge) in staggered arrangement of vertical joints, with board ends crossing in the corners. Do not form crossing joints* ***(fig. 2)****. Board joints should not be aligned with wall cracks or the joints of other wall components. Always use whole boards or halves in staggered arrangement. Do not use damaged, broken or dented boards.*


11


12

Press the boards evenly against the wall, e.g. with the use of a Styrofoam or wooden float ***(fig. 13)****. Constantly check the surface verticality and levelling using a long level or a darby* ***(fig. 14, 15)****. Board edges must be fully bonded. Edges of the boards on the surface being insulated should adjoin each other with no gaps. Any possible gaps between the boards, larger than 2 mm should be plugged "dry" by pressing mineral wool strips cut to size without using adhesive. Larger gaps should be filled with polyurethane foam using a gun applicator. No adhesive is acceptable in the gaps.*


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*Boards protruding out of wall corners can be trimmed only after the adhesive has set (****fig. 17*** *conventional wool,* ***fig. 16*** *lamella).*


16


17

*To avoid adhesive leak through the joints and contaminating board edges, remove the adhesive excess after pressing the board before fixing next one **(fig. 18)**.*

*Board position can be adjusted for 10 minutes after bonding. To adjust board position after 10 minutes from bonding, pull it off the wall and remove the adhesive layer. Reapply the adhesive to fix the board correctly again. Press it and align with the plane. Bond the boards within max. 20 minutes from spreading adhesive on the surface. All corners of façade openings should be insulated with one-piece mineral wool boards that are cut to size **(fig. 2)**. This will reduce cracks in the opening corners.*

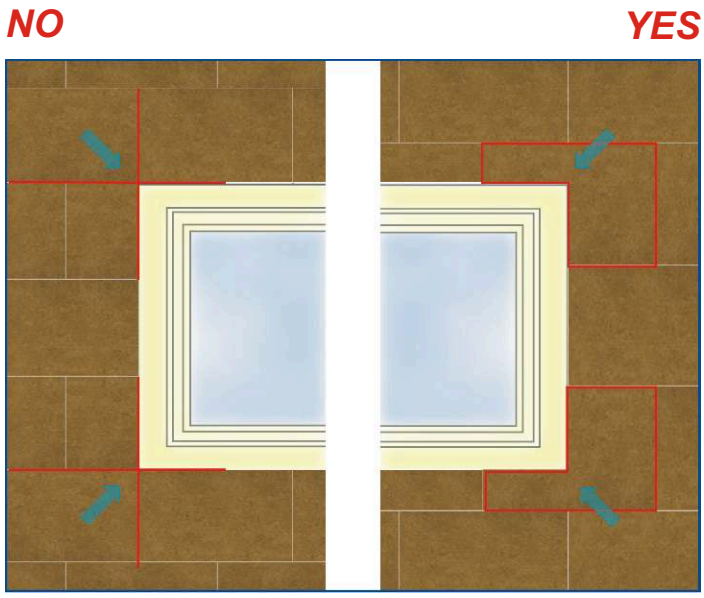
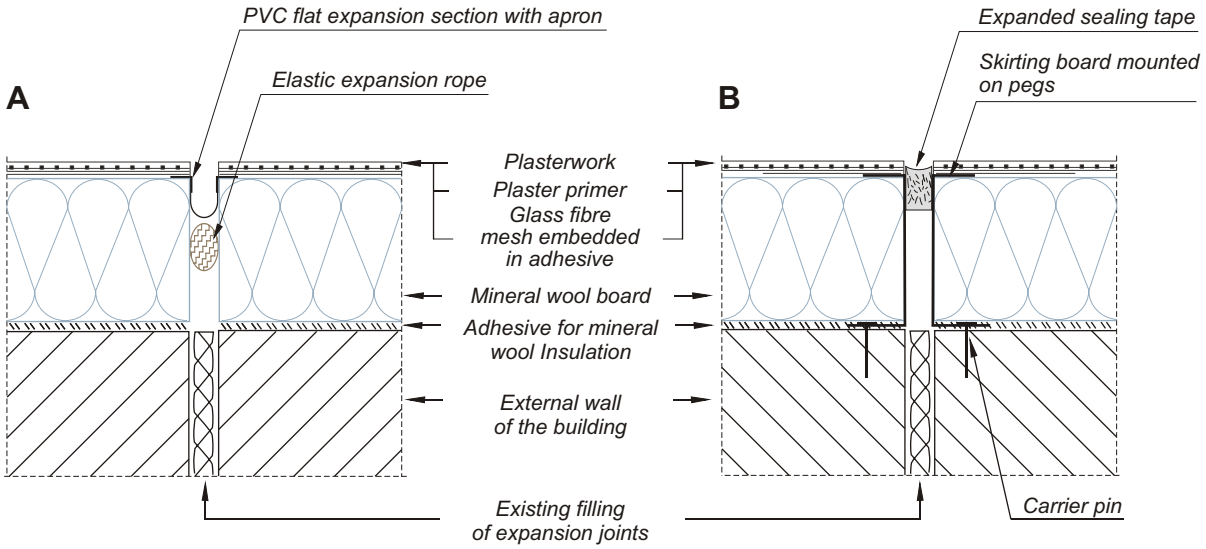


***Fig.2** Fixing mineral wool boards around façade openings.*

d) expansion joints

*All existing expansion joints in the wall being insulated should be followed in the insulating course. Prefabricated PVC profiles can be used for expansion joints (flat or angular) or special kits consisting of a skirting (PVC or aluminium) and filling of sealing tape or expansion joint rope with flexible compound. Leave around 15 mm wide gap in the insulating material layer (along the wall expansion joint). The gap edge should be worked similarly to the wall edges and façade openings **(fig. 5)**. Examples of expansion gap used, depending on the method of edge finishing and filling type, are shown in figures **(3A, B,C)**.*



NOTE

Remove excess of adhesive flowing out of the side of board being bonded to avoid formation of thermal bridges.

C

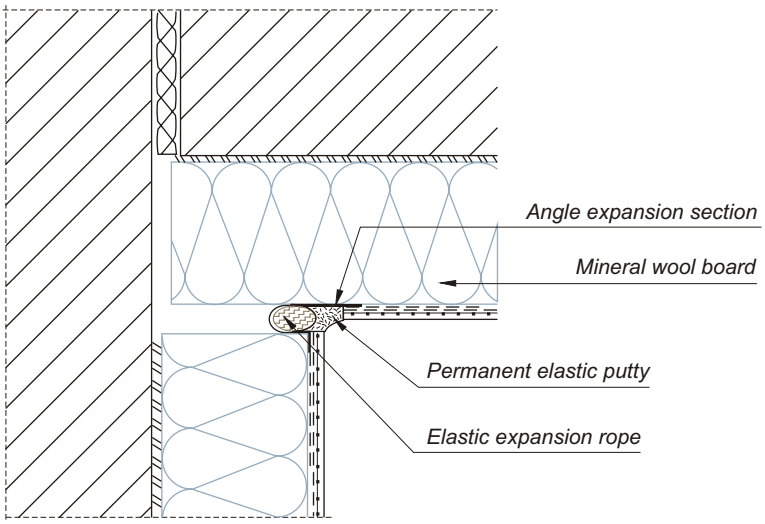
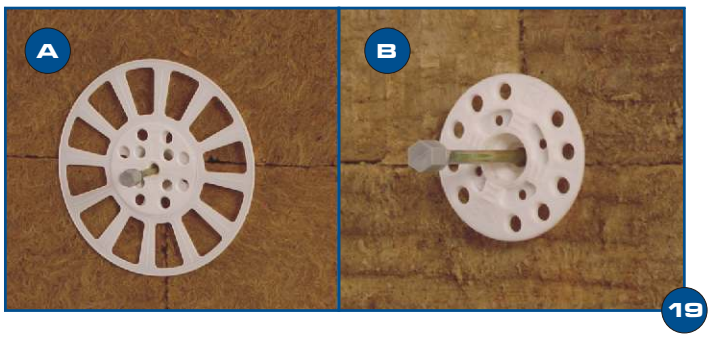


Fig. 3. *Methods for filling expansion gaps using:*
A *- flat PVC profile with an apron,*
B *- skirting and sealing tape,*
C *- angular PVC profile with an apron.*

Fixing mineral wool boards with mechanical fasteners

Fixing with fasteners depends on the wool type ***(M, SIS, K)*** *and* ***ALPOL EKO PLUS WM*** *system type involved. The fasteners used should have stainless pins made of metal. While using conventional wool (irregular fibre structure) in all system versions always use suitable fasteners whether walls or ceilings are insulated. While using wool lamellas on walls up to 20 m high, the mechanical fasteners are not required; above that height apply them all over the insulated area. To insulate concrete and beam-and-block floors (without plaster) with lamellas, only adhesive mortar can be used. Plastered floors to be insulated with wool lamellas require additional use of mechanical fasteners. Additional mounting with mechanical fasteners depends on the recommendations of the thermal insulation producer. The design should specify the number, type and arrangement of the fasteners. It is recommended to use at least 4 to 8 fasteners per 1 m2 in the middle part of the wall and 10 to 12 fasteners per 1 m^2 at the edge area* ***(fig. 4)****. The length of the fasteners depends on the substrate type and insulation thickness, whereas the anchoring depth h in the substrate should be at least 6 cm in high-density material (concrete, silicate, heavy ceramics), and at least 9 cm in low-density material (e.g. aerated concrete, porous ceramics). Fastener spacing should be also matched to the building height and edge areas. Recommended types, quantities and anchoring depth of the fasteners depending on the material and wall height are given in the table.*

Fig. 19. *Examples of mechanical fasteners:*
A *- with additional flare for fixing mineral wool lamellas,*
B *- for fixing conventional mineral wool.*



The existing plaster coats are not included in the anchoring depth ***h****. The required number of fasteners* ***L*** *should be calculated by adding the following components:* ***h***, a_1, a_2, ***d****;*

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

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

NOTE

Do not allow the expansion profile gap to get contaminated with adhesive. To prevent this, "close" the profile by e.g. pressing a strip of mineral wool in the gap.

RECOMMENDED SELECTION OF MECHANICAL FASTENERS

Conventional mineral wool boards			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, solid ceramic bricks, solid silicate bricks	with steel rammed or screwed pin	≥ 60 mm	6	8	6	10	8	12
perforated ceramics, perforated silicate, lightweight concrete blocks,ceramsite concrete	with steel rammed or screwed pin, with extended expansion zone	≥ 90 mm						
cellular concrete (aerated concrete)	with steel screwed pin, with extended expansion zone	≥ 90 mm						

Mineral wool insulating lamellas			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, solid ceramic bricks, solid silicate bricks	with steel rammed or screwed pin, with a thrust flare dia. 140 mm	≥ 60 mm	4	7	4	7	4	10
perforated ceramics, perforated silicate, lightweight concrete blocks,ceramsite concrete	with steel rammed or screwed pin, with extended expansion zone, with a thrust flare dia. 140 mm	≥ 90 mm						
cellular concrete (aerated concrete)	with steel screwed pin, with extended expansion zone, with a thrust flare dia. 140 mm	≥ 90 mm						

NOTE

While bonding wool lamellas to new, sound substrates of up to 20 m high, no additional fixing with fasteners is required.

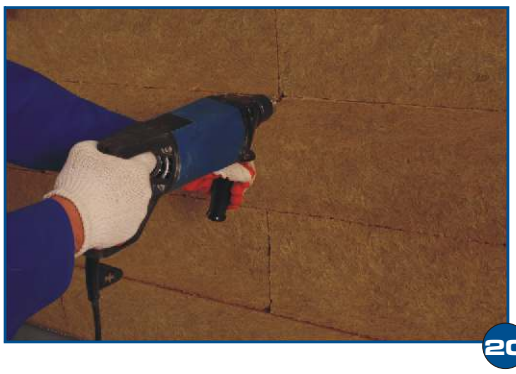
See the table for recommended and practice-proven quantity of fasteners in typical solutions. The proper type and number of fasteners as well as the anchoring depth are specified each time in the insulation design.

The term “anchoring depth” refers to the effective anchoring depth in the wall structural material. In case of plastered walls, the anchoring depth should be increased by the plaster depth.

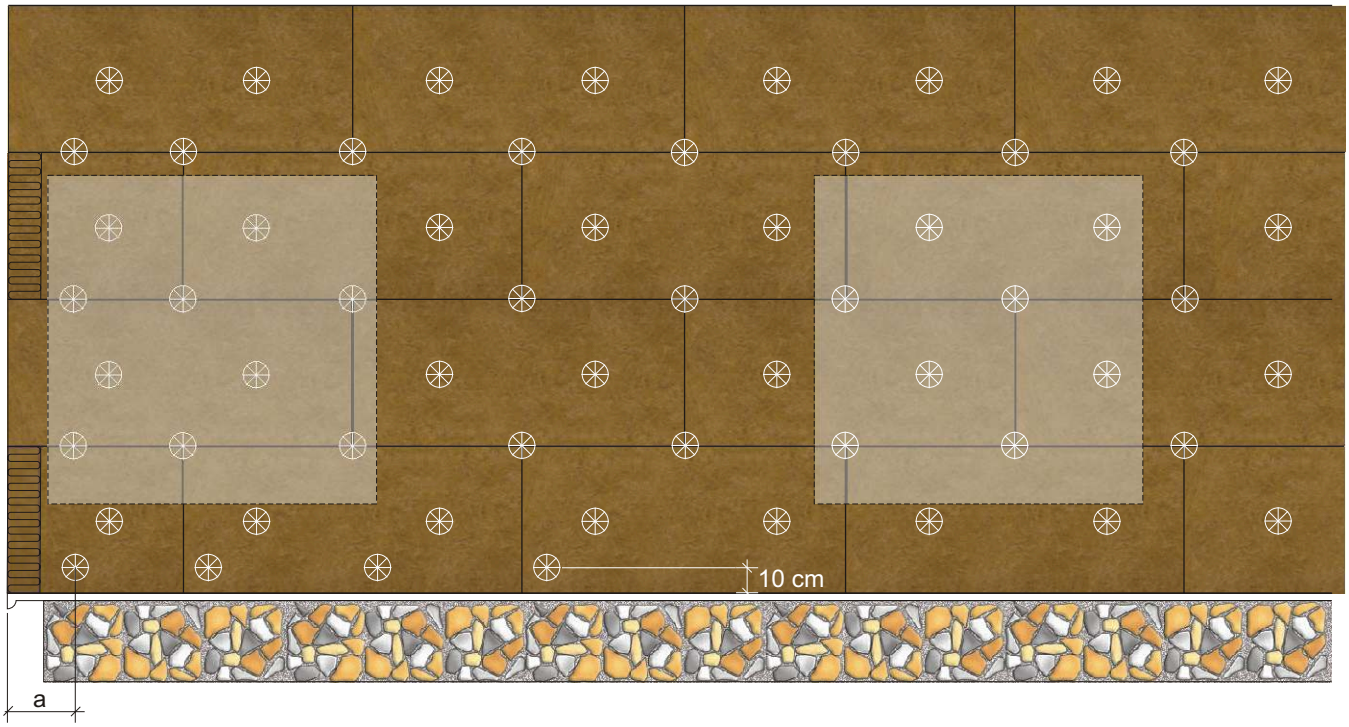
The edge area width in which an increased number of fasteners is required, depends on the building geometry, and equals 1/8 shorter building dimension, not less, however, than 1 m and maximum 2 m.

The fasteners used should be certified for use pursuant to appropriate technical approvals.

Make sure the adhesive under the boards has set and hardened sufficiently (normally after min. 1 day, in lower temperatures after min. 3 days from bonding), before installing the mechanical fasteners. Nevertheless, any time before attempting to install the fasteners, first make sure that the adhesive under the boards has sufficiently set and hardened. The fasteners must be installed prior to application of the reinforcing layer.



*The fasteners are installed in pre-drilled holes by plugging them in and driving a metallic pin with a hammer or by screwing (**fig. 20** and **21** lamellas, **fig. 22** conventional wool).*



a = 10 cm + insulation thickness

Fig. 4. *Sample arrangement of fasteners holding the mineral wool boards.*

NOTE

The insulation design should contain a detailed description of installation method of the fasteners, their spacing, number and depth of anchoring in wall. The use of fasteners must not cause the boards to swell or deform.

Application of the reinforcing layer

*The primary purpose of the reinforcing layer is the protection of insulation and compensating thermal stress and dynamic load attributable to various external factors, in the insulation front. The reinforcing layer is applied identically for all systems and wool types. The reinforcing layer should be applied after removing dust from the mineral wool boards, at least 3 days from bonding. Before adhesive application onto the board surface, smoothen it with the adhesive **(fig. 23)**.*
*The first stage recommended is to embed aluminium or plastic corner profiles on wall edges and façade openings. The profile must be installed in the wool underneath the reinforcing mesh **(fig. .5; A, B)**.*

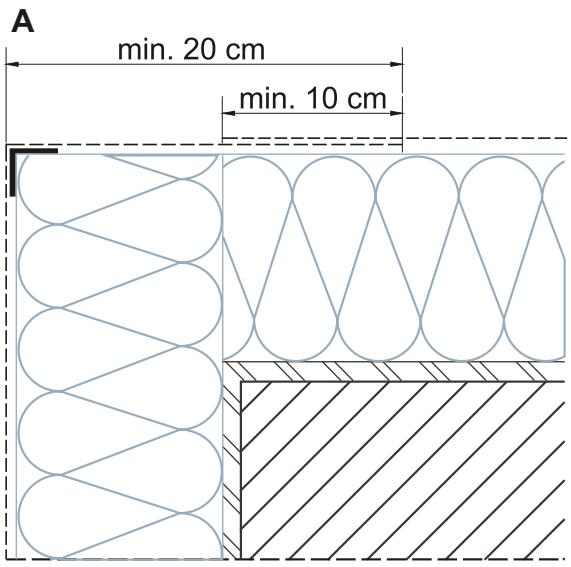
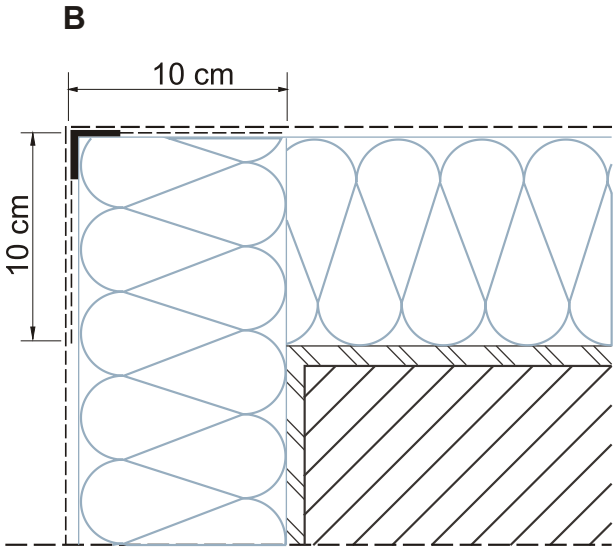
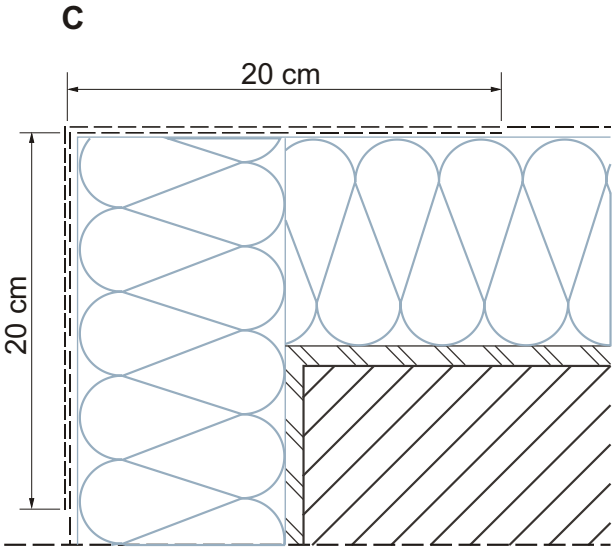


***Fig. 5.** Reinforcing wall edges and façade openings:*
***A** - with a corner profile without mesh,*
***B** - with a corner profile with the mesh,*
***C** - additional mesh layer.*





*It is also allowed to reinforce wall edges and façade openings with a doubled mesh layer **(fig. 5C)**.*

NOTE

All corner aluminium or PVC profiles should always be covered with the mesh and adhesive.

Then, reinforce all opening corners in the façade by embedding rectangular strips of fibreglass mesh sized at least 25 x 35 cm above and below the openings, at the angle of 45°. The additional reinforcement prevents skew cracks formation developing from the corners due to increased stress ***(fig. 6, detail A)****.*

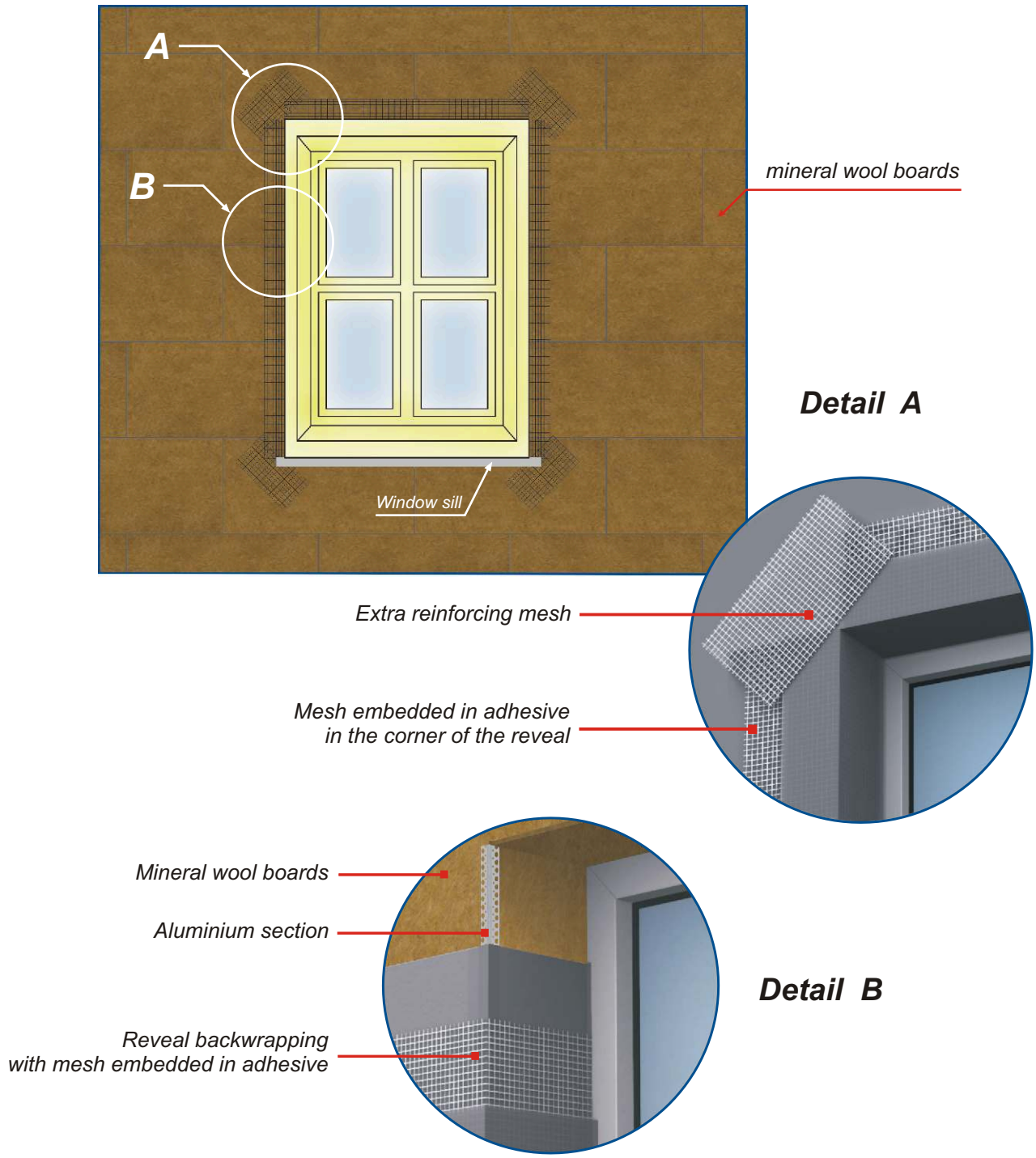


Fig. 6. *Additional mesh reinforcement of façade openings:*
A *- corner reinforcement detail,*
B *- edge reinforcement detail.*

NOTE

Place additional skew strips (45°) of the mesh on the corners of openings (door, windows). This prevents skew cracks formation starting from the opening corners.

*The mesh should be embedded in single operation starting from the wall top. Immediately after spreading **ALPOL AK 533** or **ALPOL AK 534 WINTER** adhesive on the boards with the use of stainless steel notched trowel (notch size 10 × 10 or 12 × 12 mm) **(fig. 24)**, carefully embed tensioned reinforcing mesh with straight edge of the trowel **(fig. 25)**. The reinforcing mesh should be completely invisible after embedding. The reinforcing mesh may not adhere to the boards in any point, but must be embedded in the adhesive. The mesh belts should be fixed with around 10 cm overlap. Mesh overlaps may not cover the joints between the boards. Overlap the mesh at least 20 cm on both sides of the corners if no edge profiles are used on the external corners **(fig. 5C)**. Use two layers of the reinforcing mesh in the ground floor and upstand portion of a building (if not insulated). Trim the embedded mesh on the low skirting edge when finishing the upstand using a skirting.*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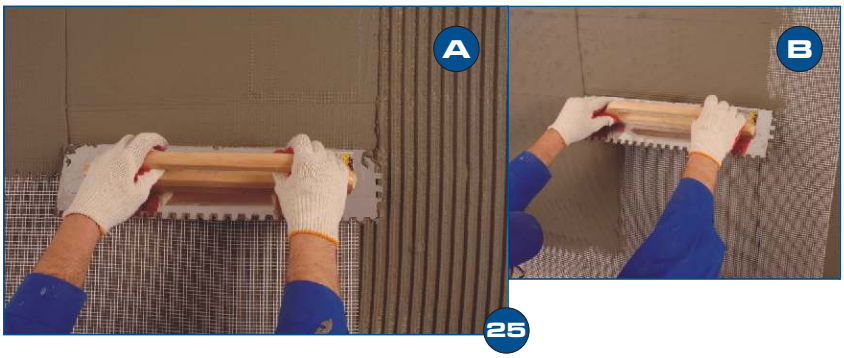

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*Depending on the insulation system type, the reinforcement layer is subject to further finishing operations. Only the **K** variant with adhesive finishing, requires no further operations. The surface finish achieved at this stage requires only smoothening and additional coat of **ALPOL AF 660** silicate or **ALPOL AF 68**0 silicone paint. Further operations are required for the **SIS** and M insulation, such as priming and plaster application.*

Priming the reinforcing layer to be applied under plaster

*Sand the reinforcement surface with sand paper to remove minor irregularities, at least 2 days after application. Then, treat the entire surface with plaster primer. Use **ALPOL AG 701** primer for decorative mineral plaster, **ALPOL AG 706** primer for acrylic plaster and **ALPOL AG 706** primer for silicone-silicate plaster. Priming should be performed in temperature above +5° after the adhesive has dried and set completely.*
*The primer is supplied in a ready-to-use form and should be stirred thoroughly prior to application. No thinning with water or use of additives is allowed. Apply the primer with a brush or a paintbrush **(fig. 27)**.*


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Application of plaster

*The plaster should be applied at least 24 hours after priming, not later however, than 3 months from application of the reinforcing layer. In lowered temperatures, the plaster can be applied after minimum 6 days and when the temperature during 5 following days is above +5°C. The following decorative plaster mortars in **ALPOL EKO PLUS WM** system are available:*

- ***ALPOL AT 320-338 M** series mineral, grey or white, dashed or pitted plaster, grain size from 1.5 to 3 mm, delivered as dry mix to be mixed with water,*
- ***ALPOL AT 370-378 SIS** series silicone-silicate, dashed or pitted plaster, colours according to **ALPOL COLOR** chart, grain size from 1 to 2.5 mm, delivered as ready-to-use mix.*

NOTE

Use fibreglass mesh of basis weight at least 145 g/m, approved and certified for use in building industry.

ALPOL AT 320-338 *mineral plaster with cement and lime binder have to be mixed with water prior to application. The mortar is prepared by pouring the whole content of the bag to a container with 4.5 to 5.5 litres of cold and fresh water for 25 kg dry mix, and stirring with the use of low-speed electric drill with a basket mixer until homogenous and required consistency is achieved.* ***ALPOL AT 370-378*** *silicate and silicone plaster is available as a ready-to-use compound, coloured according to* ***ALPOL COLOR*** *chart. The silicate and silicone plasters require stirring only prior to application. No water or any other substances can be added to ready-to-use products. See* ***fig. 28*** *for sample plaster textures available.*


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Use steel trowel with straight edges to apply all the decorative plaster mortars, regardless of the texture and binder, to spread them over the surface. Get some plaster onto the trowel and spread it on the wall surface, holding the trowel at the angle of 20° 30° ***(fig. 30)****. Next coats should always be spread in the direction of the freshly applied coat* ***(fig. 31)****.*

The thickness of the coat applied should be the same as that of the grain. Remove excess of the compound with a float ***(fig. 32)****. Ensure adequate number of workers, to continuously and without interruptions apply the plaster on façade area delimited by building opening edges and corners. Any possible joints of the plaster should be performed in the "wet to wet" technique. If this proves impracticable, provide the cut-off by sticking two strips of painting tape, one on the surface and then the other on the dry plaster* ***(fig. 29, 32)****. Observe those instructions to avoid differences in plaster appearance.*


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NOTE

Decorative plaster must not be applied on walls which are moist, exposed to direct sunlight or not primed.
Due to alkalinity of some products of the insulation systems (especially silicate-based), protect joinery components and flashings with protective film.

After spreading a coat of the thickness required, work on the desired plaster structure. This is done by trowelling the plaster with a hard plastic float.
*Refer to **fig. 33 - 35** on how to achieve the pitted structure and **fig. 36** on how to achieve dashed structure, respectively.*


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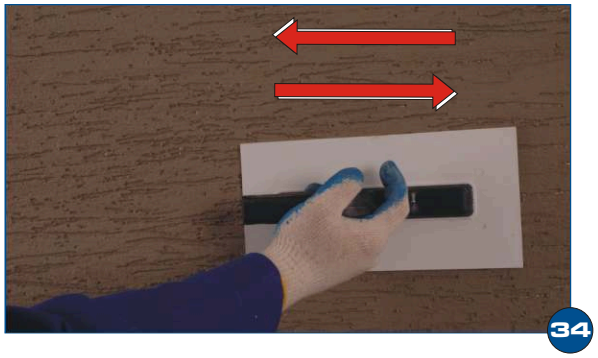
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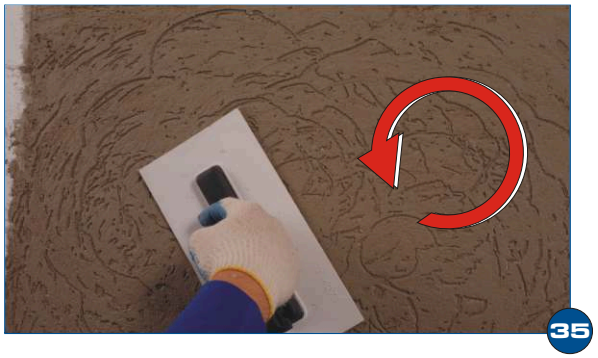
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Do not press the float against the plaster worked on too hard, otherwise the plaster will be scratched off. Remember that weather conditions affect the quality of the plasterwork (temperature, wind).
Premature evaporation of process water from mineral plaster may cause difficulty to achieve the desired plaster texture. As a result of too short hydration time, plaster strength characteristics may be impaired. Plaster compounds containing hydraulic binders are especially sensitive to excessive sunlight, hence they should be applied with shields on the scaffolding, or in such time of the day when the air temperature does not exceed 20°C.
Similar principles apply to the application of silicate and silicone plaster. For those plaster types rain, increased air humidity and lowered air temperature are even more harmful. The disturbance of the silicate binder silicatisation process may be accompanied by periodic appearance of salty stains (efflorescence) on the plaster surface. They are no proof of the plaster defect and will disappear themselves in the course of time.
*All mineral and silicate-silicone plaster types used with **ALPOL EKO PLUS WM** can be painted with **ALPOL AF 660** silicate or **ALPOL AF 680** silicone paint available in a broad range of colours according to **ALPOL COLOR** chart.*

NOTE

*Mineral and silicate-silicone plaster types used with **ALPOL EKO PLUS WM** can be painted with **ALPOL AF 660** silicate or **ALPOL AF 680** silicone paint.*
It is recommended to use protection shields on the scaffolding during all façade finishing works.

Acceptance of the works

As the quality of subsequent work stages is of vital importance for the durability of insulation with mineral wool, the following stages of works must be accepted:

- *Substrate preparation.*
- *Fixing the insulation, taking into consideration the quality of joints of the insulation boards.*
- *Application of the reinforcing layer including the corners.*
- *Priming prior to plaster application.*
- *Application of decorative plaster.*
- *Application of paint.*

The following phases of completed works should be accepted by a supervisor accompanied by the site manager and be duly recorded in the site log or partial acceptance acts. The final acceptance on completion of the works, should be confirmed in the acceptance act. Particular attention during the acceptance procedure should be paid to the quality of plaster and paint application, flashings and the so-called insulation accessories.

ALPOL EKO PLUS WM component products

the M variety using decorative mineral plaster	**the SIS variety** using decorative silicate and silicone plaster	**The K variety** using a coat of adhesive - without plaster	**The WINTER variety** using wintertime adhesive **ALPOL AK 534**
► Cement adhesive for bonding boards and embedding mesh **ALPOL AK 533** or **ALPOL AK 534 WINTER** ► Conventional mineral wool boards for façades or lamellas ► Underplaster fabric **ALPOL 145** and **AKE 145A** ► Prime for mineral plasters **ALPOL AG 701** ► Mineral decorative plasters **ALPOL AT 320 - AT 338** ► Paints: silicate **ALPOL AF 660** silikon **ALPOL AF 680**	► Cement adhesive for bonding boards and embedding mesh **ALPOL AK 533** or **ALPOL AK 534 WINTER** ► Conventional mineral wool boards for façades or lamellas ► Underplaster fabric **ALPOL 145** and **AKE 145A** ► 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 boards and embedding mesh **ALPOL AK 533** or **ALPOL AK 534 WINTER** ► Conventional mineral wool boards for façades or lamellas ► Underplaster fabric **ALPOL 145** and **AKE 145A** ► Paints: silicate **ALPOL AF 660** silikon **ALPOL AF 680**	► Cement adhesive for bonding boards and embedding mesh **ALPOL AK 534 WINTER** ► Conventional mineral wool boards for façades or lamellas ► Underplaster fabric **ALPOL 145** and **AKE 145A** ► Primers - for mineral plasters **ALPOL AG 701*** - for silicate **ALPOL AG 706*** ► Decorative plasters - mineral **ALPOL AT 320 – AT 338*** - silicate and silicone **ALPOL AT 370 – AT 378*** ► Paints: silicate **ALPOL AF 660*** silikon **ALPOL AF 680***

** - 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*

Formal and legal information

ALPOL EKO PLUS WM *has been issued the Technical Approval Certificate of the Building Research Institute no. AT-15-6540/2007 and the Certificate of Conformity no. ITB 0875/W stating the stability of the parameters of products incorporated in the system.*
Variants ***M*** *and* ***K*** *of* ***ALPOL EKO PLUS WM*** *insulation system and the* ***WINTER*** *type with mineral plaster have been classified as non-combustible (NP) and non-spreading fire (NRO), whereas the* ***SIS*** *type as non-spreading fire (NRO).*
ALPOL AZ 102, ***ALPOL AZ 104***, ***ALPOL AZ 130*** *and* ***ALPOL AZ 135*** *comply with PN-EN 998-2:2004.* ***ALPOL GIPS*** *is in possession of the ITB (Building Research Institute) Certificate no. 1488-CPD-0010 issues for the produced mortar compounds.*
ALPOL AT 310, ***ALPOL AT 311*** *plaster comply with PN-EN 998-1:2004.*
All products described herein have the Declarations of Conformity, Hygienic Certificates issued by 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-15-6540/2006 -*** *Set of products for thermal insulation with* ***ALPOL EKO PLUS WM*** *system.*
- *PN-EN 13162:2002 Standard - Thermal insulation products for building industry. Mineral wool products (MW) are produced in a factory. 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.

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