



**KLEIB SYSTEM
APPLICATION INSTRUCTIONS**

03.01.2019 (ISSUE 2)

1. KLEIB SYSTEM

The KLEIB construction product is an External Thermal Insulation Composite System (ETICS) with rendering – a set comprising components (elements) factory produced by the manufacturer or by component suppliers. The manufacturer of the kit is responsible for all of its components as defined in the European Technical Assessment ETA - 16/0978.

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**European Technical
Assessment**

**ETA-16/0978
of 26/11/2018**

General Part

Technical Assessment Body issuing the European Technical Assessment: ICiMB

| | |
|---|--|
| Trade name of the construction product | KLEIB |
| Product family to which the construction product belongs | External Thermal Insulation Composite Systems (ETICS) with rendering |
| Manufacturer | KLEIB Sp. z o.o. Pikutkowo 43, 87-880 Brześć Kujawski, POLAND |
| Manufacturing plant | Pikutkowo 43, 87-880 Brześć Kujawski, POLAND |
| This European Technical Assessment contains | 20 pages including 3 Annexes which form an integral part of this assessment. Annex No 4 Control Plan contains confidential information and is not included in the European Technical Assessment when that assessment is publicly available. |
| This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of | ETAG 004 used as EAD, 2013 |
| This European Technical Assessment replaces | ETA 16/0978, version 2, issued on 09/04/2018 |

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2. INTENDED USE

The KLEIB composite thermal insulation system is intended for use as an external insulation of building walls. Walls may be:

- unplastered, made of masonry elements (bricks, blocks, stone etc.) or concrete (poured on the construction site or in the form of prefabricated panels),
- plastered,
- covered with paint coatings or thin coat plasters.

The system has been designed for walls on which appropriate thermal insulation will be applied. The system can be used both on new vertical walls as well as while renovating existing ones. It is also possible to use the system on horizontal and inclined surfaces that are not exposed to atmospheric precipitation. The KLEIB system is a non-bearing construction element. It does not directly contribute to the stability of the walls to which it is applied, but can affect their durability by insulating them from climatic factors. The purpose of the KLEIB system is not to ensure the air-tightness of a structure.

3. SYSTEM CHARACTERISTICS

The KLEIB system is the external thermal insulation composite system (ETICS). The thermal insulation technology consists in fixing EPS (expanded polystyrene) panels to the wall from the outside and applying to these a layer of mortar reinforced with a fibreglass mesh, and then applying an outer layer of thin coat plaster.

4. ELEMENTS OF THE KLEIB SYSTEM

KLEIB system declared parameters are fully put to use when all its elements are applied in accordance with the technology for correct execution, the construction art and the technical documentation.

The system consists of:

4.1. Adhesive mortar for attaching EPS panels: KLEIB C1, KLM-10.

4.2. Adhesive mortar for attaching white and graphite EPS panels and for embedding a mesh: KLEIB C2, KLM-20

4.3. Adhesive mortar for attaching EPS panels and for embedding a mesh: KLEIB C2 EXTRA, KLM-23.

4.4. White adhesive mortar for attaching EPS panels and for embedding a mesh: KLEIB C2B.

4.5. A primer KLEIB C3, for priming the reinforced layer beneath the mineral, acrylic, siloxane and mosaic rendering.

4.6. A primer KLEIB C3S, for priming the reinforced layer beneath a silicate-silicone rendering.

4.7. A primer KLEIB C3SIL, GP-30SIL, for priming the reinforced layer beneath a silicone rendering.

4.10. Acrylic plaster KLEIB C5, for rendering purposes.

4.11. Silicate-siloxane plaster KLEIB C6, for rendering purposes.

4.12. Silicone plaster KLEIB C7, SP-70, for rendering purposes.

4.13. Siloxane plaster KLEIB C8, for rendering purposes.

4.14. Mosaic plaster KLEIB M9, for protective and decorative rendering purposes.

4.15. Mosaic plaster KLEIB M10, for protective and decorative purposes.

4.16. Acrylic paint KLEIB Q1, for painting of acrylic rendered surfaces.

4.17. Silicone paint KLEIB Q3, for painting of mineral or silicone rendered surfaces.

4.18. Siloxane paint KLEIB Q4, for painting of mineral or siloxane rendered surfaces.

4.19. EPS panels according to EN 13163 with the following minimum parameters:

| | |
|--|---|
| Reaction to fire / EN 13501-1 | Euroclass - E maximum density: 25 kg / m ³ |
| Thermal resistance | Specified on CE marking according to EN 13163 (m ² ·K)/W |
| Thickness / EN 823 | ± 1 mm [EN 13163 - T(1)] |
| Length / EN 822 | ± 2 mm [EN 13163 - L(2)] |
| Width / EN 822 | ± 2 mm [EN 13163 - W(2)] |
| Rectangularity / EN 824 | ± 5 mm/m [EN 13163 - S(5)] |
| Flatness / EN 825 | 5 mm [EN 13163 - P(5)] |
| Dimensional stability under specified conditions EN 1603 | ± 0,2 % [EN 13163 - DS(N)2] |
| Dimensional stability under specified conditions EN 1604 | 2 % [EN 13163 - DS(70,-)2] |
| Flexural strength / EN 12089 | ≥ 75 kPa [EN 13163 - BS75] |
| Water vapour permeability, diffusion resistance factor (μ) / EN 12086 - EN 13163 | 20 to 40 |
| Tensile strength perpendicular to face surfaces / EN 1607 | ≥ 80 kPa [EN 13163 - TR80] |
| Shear strength / EN 12090 - EN 13163 | ≥ 35 kPa |

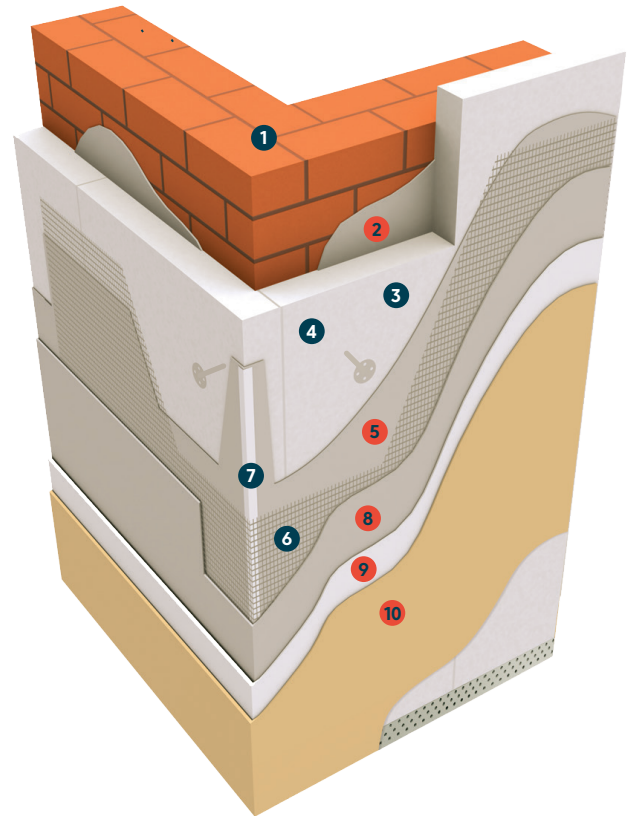
4.20. Fibreglass mesh according to ETA 16/0546 with the trade name 122 and the following parameters:

| Trade name of the mesh | Description | Resistance to alkalis | |
|------------------------|--|---------------------------------------|--|
| | | Tensile strength after aging (N / mm) | Relative tensile strength after aging in relation to the condition on delivery (%) |
| 122 | Area weight: 165 g/m ² or 160 g/m ² size of mesh opening: 4.6 x 4.2 mm | ≥20 | ≥50 |

4.21 4.21 Plastic fasteners covered by relevant ETAs.

Set of products to perform EPS thermal insulation of external walls of buildings

1. Insulated wall
2. KLM-23 adhesive mortar
3. Polystyrene panel
4. Mechanical fastener for polystyrene panels
5. KLM-23 adhesive mortar
6. Fibreglass mesh
7. Protective corner with fibreglass mesh
8. KLM-23 adhesive mortar
9. GP-30 SIL priming agent
10. SP-70 silicone render



5. REQUIREMENTS WITH REGARD TO INSULATION WORKS

During insulation work, the temperature should not be lower than +5° C. Work should not be carried out during precipitation, strong winds or strong sunlight. The use of cover screens on scaffoldings at every stage of work is recommended.



6. PREPARATION OF THE SUBSTRATE

The substrates beneath each layer of the system should be stable, load-bearing, even, dry, clean, and cleared of any layers that might weaken the adhesion of materials (e.g. dust, loose materials and oils). The substrate may not be made of or contain any material whose chemical reaction with any component of the KLEIB system will result in the loss of its function or the effectiveness of the entire set of products. The substrate should be prepared in such a way that it meets the standard or contractual tolerance criteria for surface and edge variances contained, for example, in the thermal insulation design. Please note: localised substrate surface levelling using thermal insulation panels is not permissible. In the case of dusty, crumbling and excessively absorbent substrates, the KLEIB G2 primer should be used. If there is any doubt about the load-bearing capacity of the substrate, an adhesion test is recommended.

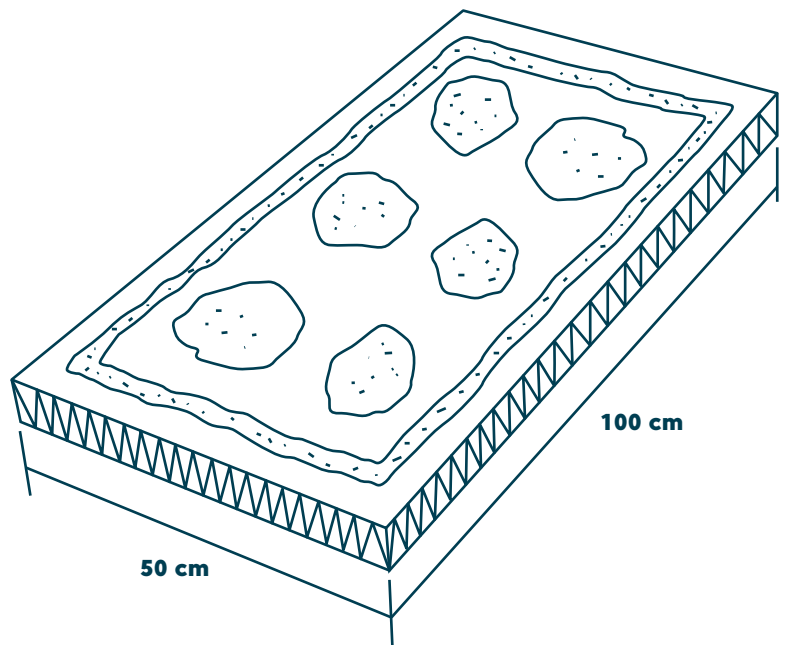
7. PREPARATION OF MORTARS, PLASTERS AND PAINTS

To prepare adhesive mortars, pour the entire contents of the bag into a container with a measured amount of water and then mix until a homogeneous mass without lumps is obtained. It is best to perform this operation mechanically, using a drill with a mixer attachment. Wait 5 minutes and then re-mix the substance – mortars should be ready for use. The whole amount should be used within approx. 2 hours. Do not add more water than the quantity recommended by the manufacturer, as it may have a negative effect on the mortar's properties. To prepare dry Rendering, pour the entire contents of the bag into a container with a measured amount of water and then mix until a homogeneous mass without lumps is obtained. It is best to perform this operation mechanically, using a drill with a mixer attachment. Wait 5 minutes and remix the substance – plaster mortar should be ready for use. The whole amount should be used within approx. 2 hours. It is recommended to mix several bags at the same time and to cover a whole separate surface with one mixed amount. Do not add more water than the quantity indicated in the instructions, as this can negatively affect the product's features such as: its colour, increased shrinkage, diminished strength, longer binding time etc. Do not add other ingredients, e.g. sand, cement etc. Dispersive plasters, primers and paints are supplied in a ready-to-use form. They must not be combined with other materials, diluted or thickened. After opening buckets, mix their contents to equalize the consistency.

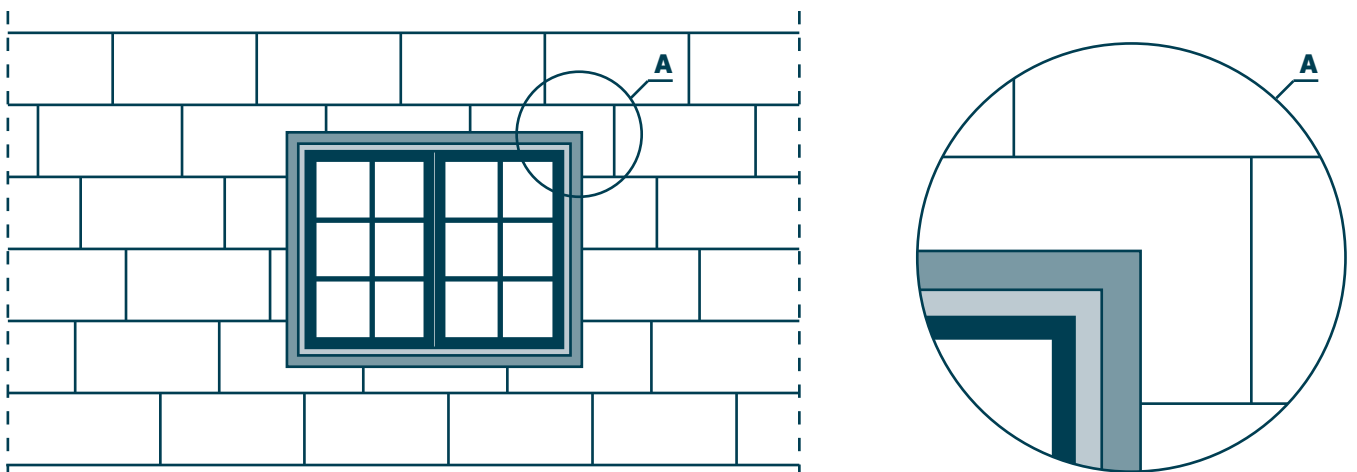
8. ATTACHING HEAT INSULATION PANELS

In the case of even substrates, it is recommended to apply the adhesive mortar plaster to the EPS over the entire surface of the insulation panels and then spread it with a 10-12 mm wide notched trowel. In the case of an uneven substrate, the mortar should be applied to the panel to form thick rolls of mortar along the edges of the panel, approx. 5 cm from the edge with 3 to 6 patches of mortar spread evenly over its surface. As a result, a minimum 60% of the panel's surface must be effectively attached to the substrate. The panels should be placed close to each other starting from the bottom of the façade – from the levelled skirting panel. The vertical joints between the panels should be placed in a staggered arrangement with a minimum 15 cm displacement between panels. The edges of panels should be kept tight against each other. Any gaps resulting from acceptable tolerances in thermal insulation panels should be filled with wedges of the same insulation. The edges of the panels should be completely attached. The surface of insulation thus applied must form an even plane. Further work, i.e. possible use of appropriate anchors – mechanical fasteners (in accordance with the technical design), sanding of any faults and unevenness of the panel surface, and the laying of the reinforced mesh layer, cannot be performed earlier than 72 hours after the insulation was attached (depending on humidity and temperature conditions).

METHOD OF APPLYING THE ADHESIVE MORTAR TO THE EPS PANEL



PROPER POSITIONING OF PANELS AT OPENINGS

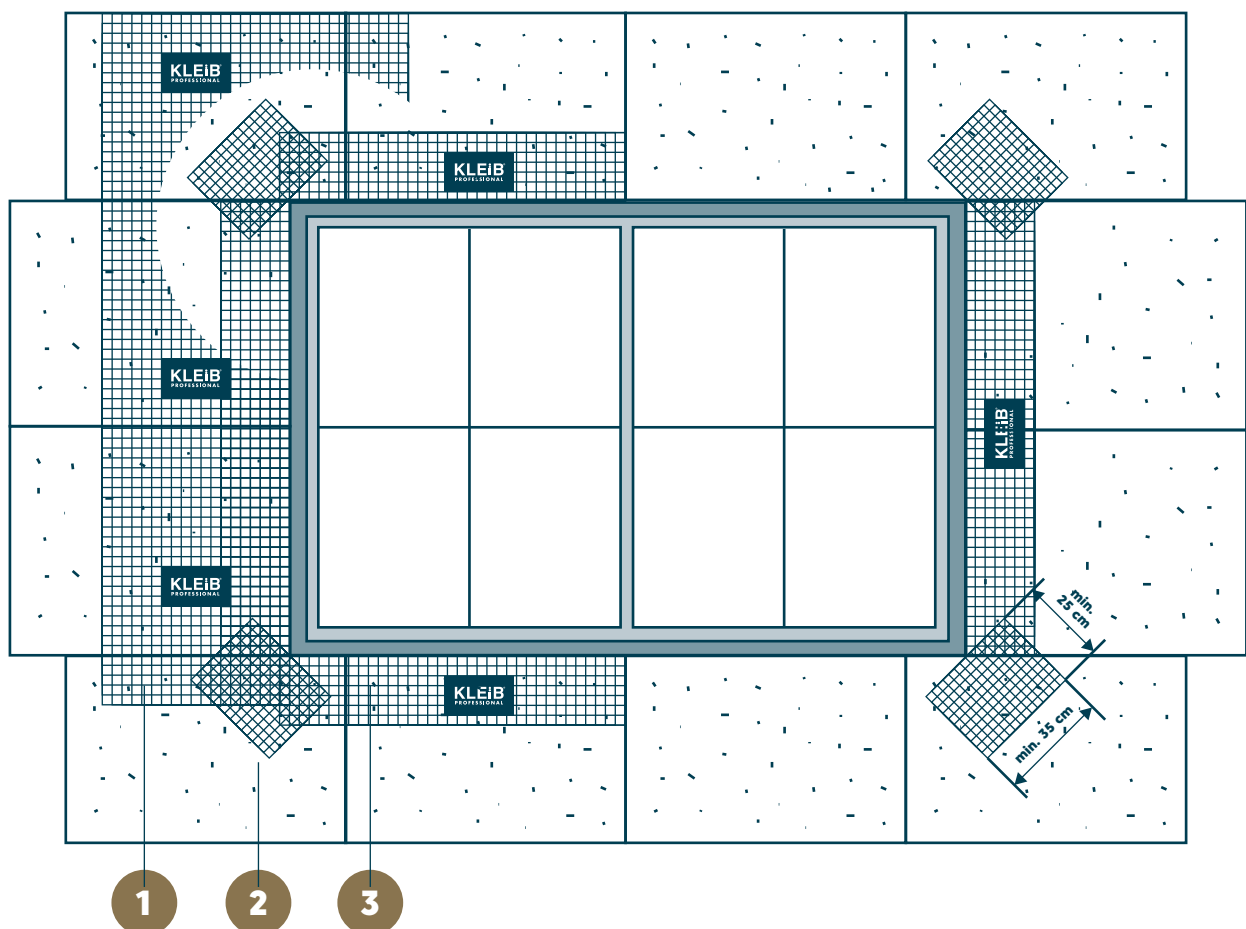


9. ADDITION OF A REINFORCED LAYER

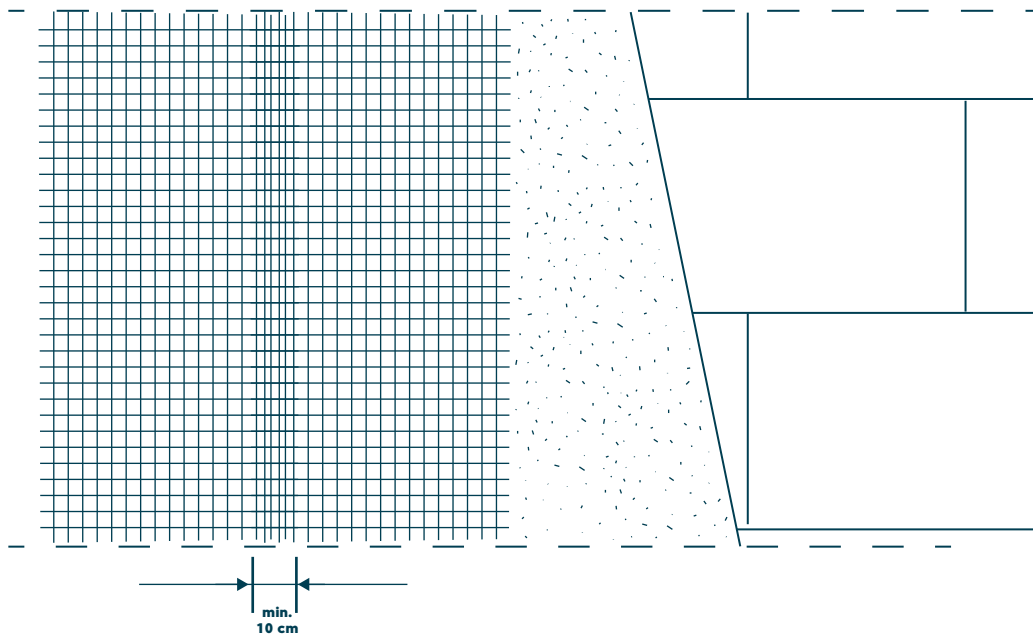
In order to make a reinforced layer on the surface of the attached EPS panels, the adhesive mortar should be spread over the mesh with a notched trowel to a thickness of a minimum 3 mm, so that it immediately sinks into the reinforcing mesh. It is recommended that the adhesive mortar is spread and sunk in vertical strips and towelled smooth so that the mesh is completely invisible and at the same time does not come into direct contact with the EPS panels. The mesh should be taut and completely covered with a mortar layer of a minimum 1 mm. The mesh strips should be combined by means of overlaps with a minimum width of 10 cm. The corners of window and door openings should be secured with a mesh strip measuring at least 25 x 35 cm, attached to the thermal insulation layer at the angle of 45°. Priming of the reinforced surface with primer cannot be performed earlier than after 72 hours.

METHOD OF ADHERING THE FIBREGLASS MESH AROUND WINDOW AND DOOR OPENINGS

1. Fibreglass mesh (cut the mesh strip to meet the edge of the corner)
2. Pieces of mesh to reinforce the corners of the opening.
3. Protective corner with fibreglass mesh.



Drawing of a section of a wall with a visible approx. 10 cm wide mesh overlap



10. PLASTERING OF FAÇADES

Primers applied to reinforced layers should be spread on the prepared substrate with a brush, evenly over the entire surface. Priming of the reinforced layer of the thermal insulation system cannot be performed earlier than 72 hours after its completion. Do not apply the primer at the temperature below +5° C. Plastering of the surface can be performed after the primer has dried completely, however, not later than within 72 hours. After this time, the surface should be primed again.

Plasters should be applied by hand using a stainless steel trowel or mechanically. Plaster must be smoothed while it is being applied and always in the same manner. It is recommended to work on a given surface in one technological cycle (without interruptions). This should be carried out up to 72 hours after the surface has been primed.

Paint should be spread evenly, with a thin layer over the entire surface, using brush, roller or spray method. The paint can be applied in multiple layers depending on the absorbency and structure of the substrate. Each subsequent layer can be applied only after the previous one has dried, i.e. after approx. 2–6 hours (depending on the substrate, temperature and relative humidity of the air). Grey and dark substrates must be painted over with a layer of white paint before painting the final colour. In the case of structural plasters, it is possible to apply the first layer of paints that are thinned, depending on the type of paint, with either water or other thinners (up to a maximum 10% by volume). The dilution ratio used should be maintained over the entire painting surface. It is advisable to paint "crosswise" in a continuous manner and to avoid breaks in work. Before painting, fresh cement-lime plasters should be seasoned at least 6 weeks. The general technology of painting with wall paints should be maintained. On south and west elevations, we recommend using light colour coatings.

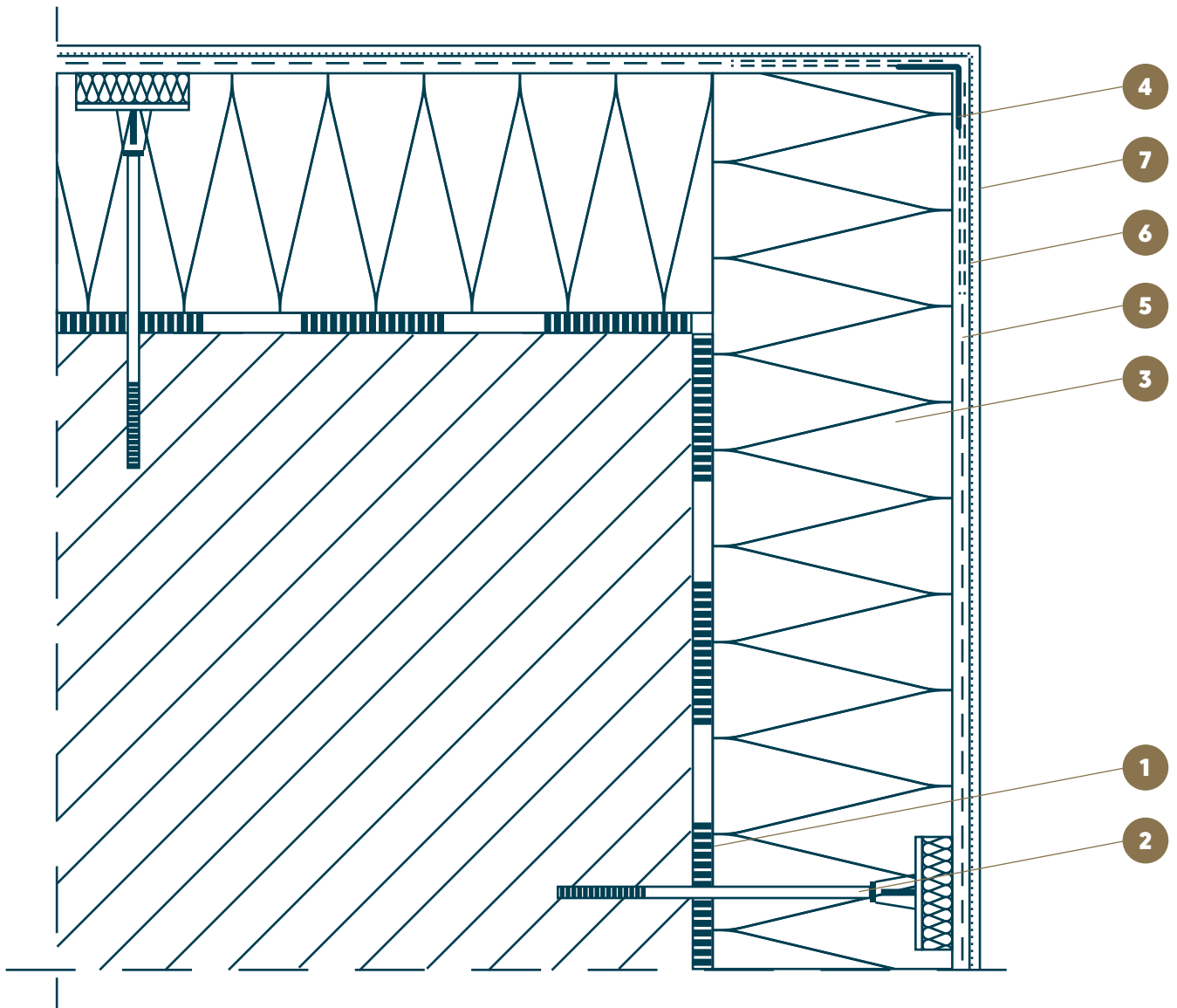


We recommend using
Wagner company aggregates
for airless hydrodynamic spraying.

INSULATION WORK DETAILS

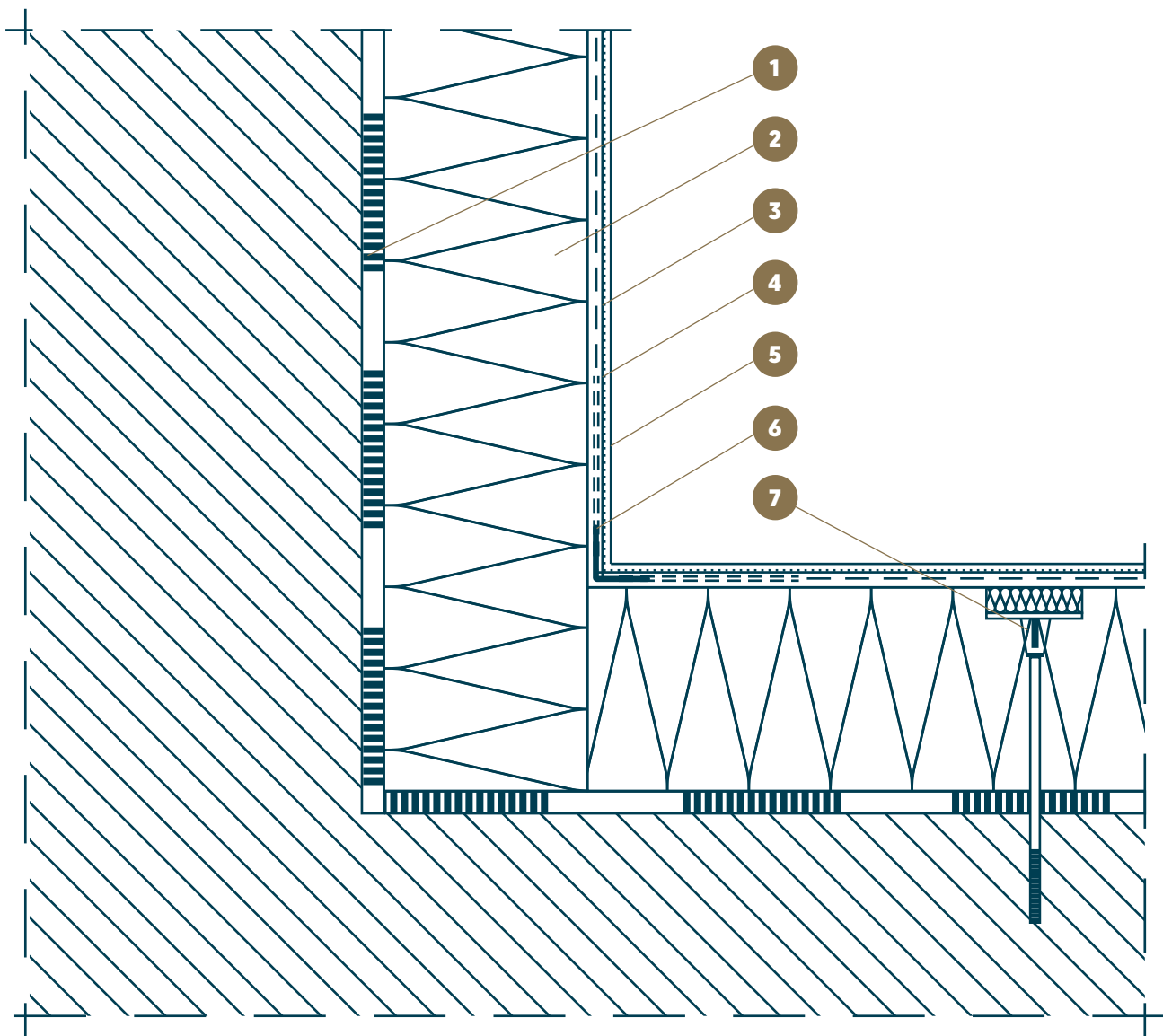
INSULATION OF CONVEX CORNERS SECTIONS

1. Adhesive mortar.
2. Mechanical fastener.
3. Thermal insulation.
4. Protective corner sections with fibreglass mesh.
5. Reinforcing layer with a 160 g/m² KLEIB mesh
6. Priming under plaster.
7. Rendering.



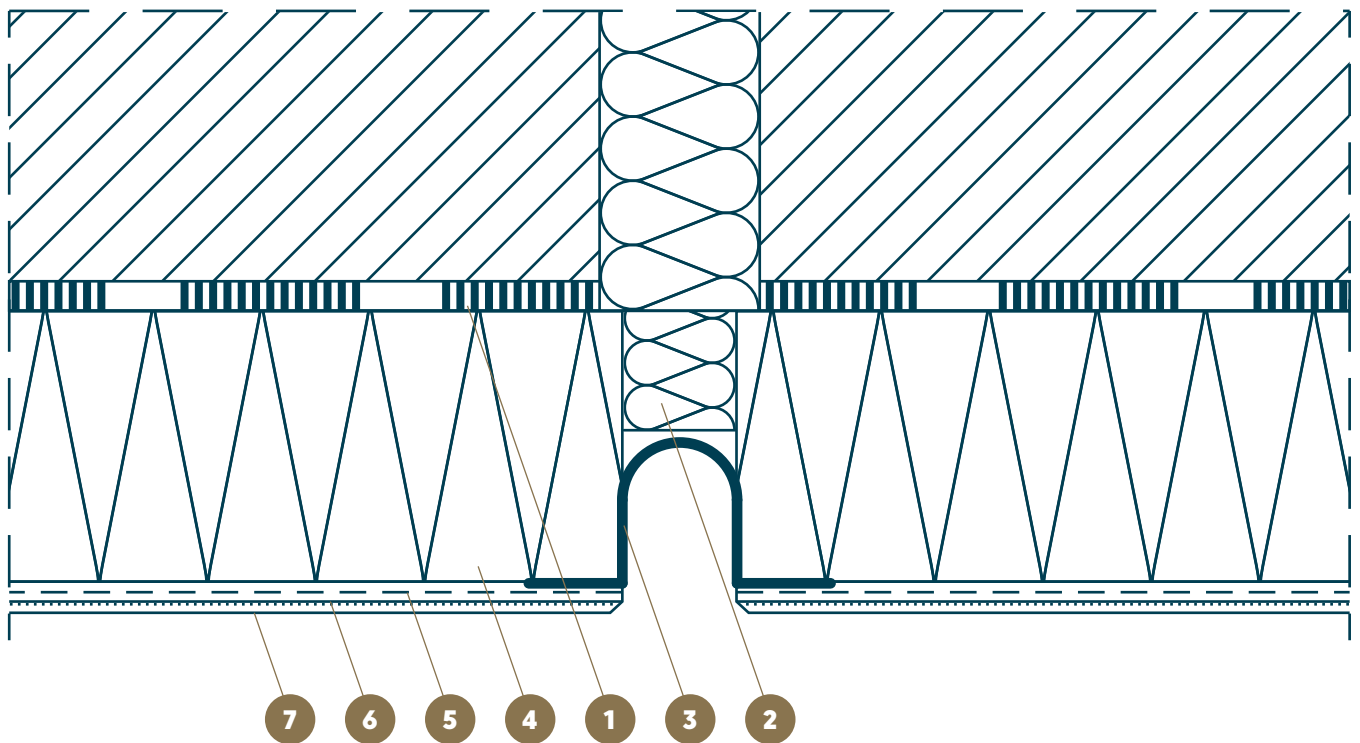
INSULATION OF CONCAVE CORNERS SECTIONS

1. Adhesive mortar
2. Thermal insulation
3. Reinforcing layer with a 160 g/m² KLEIB mesh.
4. Priming under plaster
5. Rendering
6. Protective corner sections with fibreglass mesh.
7. Mechanical fastener



INSULATION OF SIMPLE EXPANSION JOINTS USING EXPANSION JOINT PROFILE

1. Adhesive mortar.
2. Insert made of thermal insulation material.
3. Expansion profile.
4. Thermal insulation.
5. Reinforcing layer with a 160 g/m² KLEIB mesh.
6. Primer under plaster.
7. Rendering.

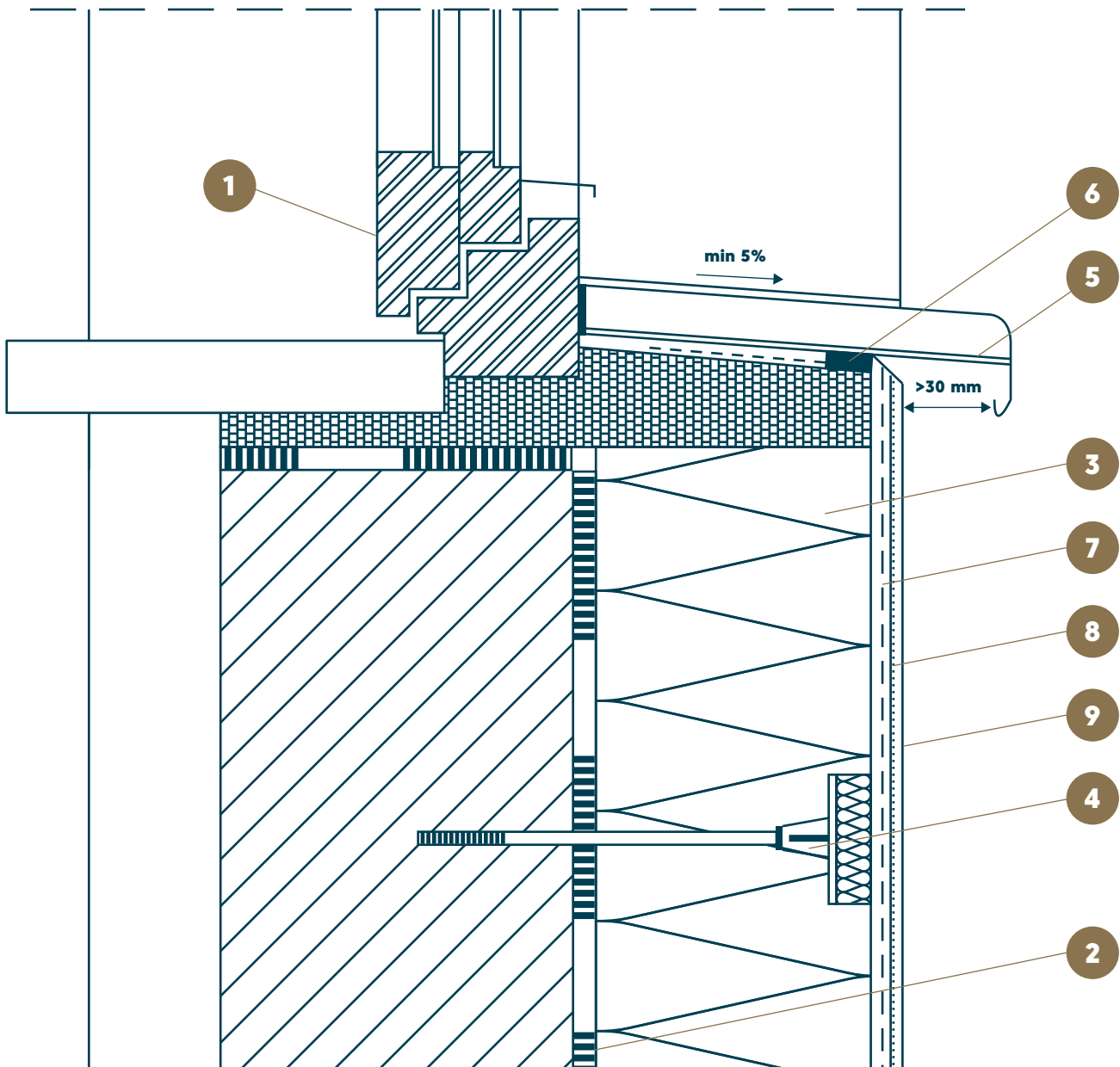


The maximum width of the expansion joint can be 50 mm

INSULATION BENEATH WINDOWS

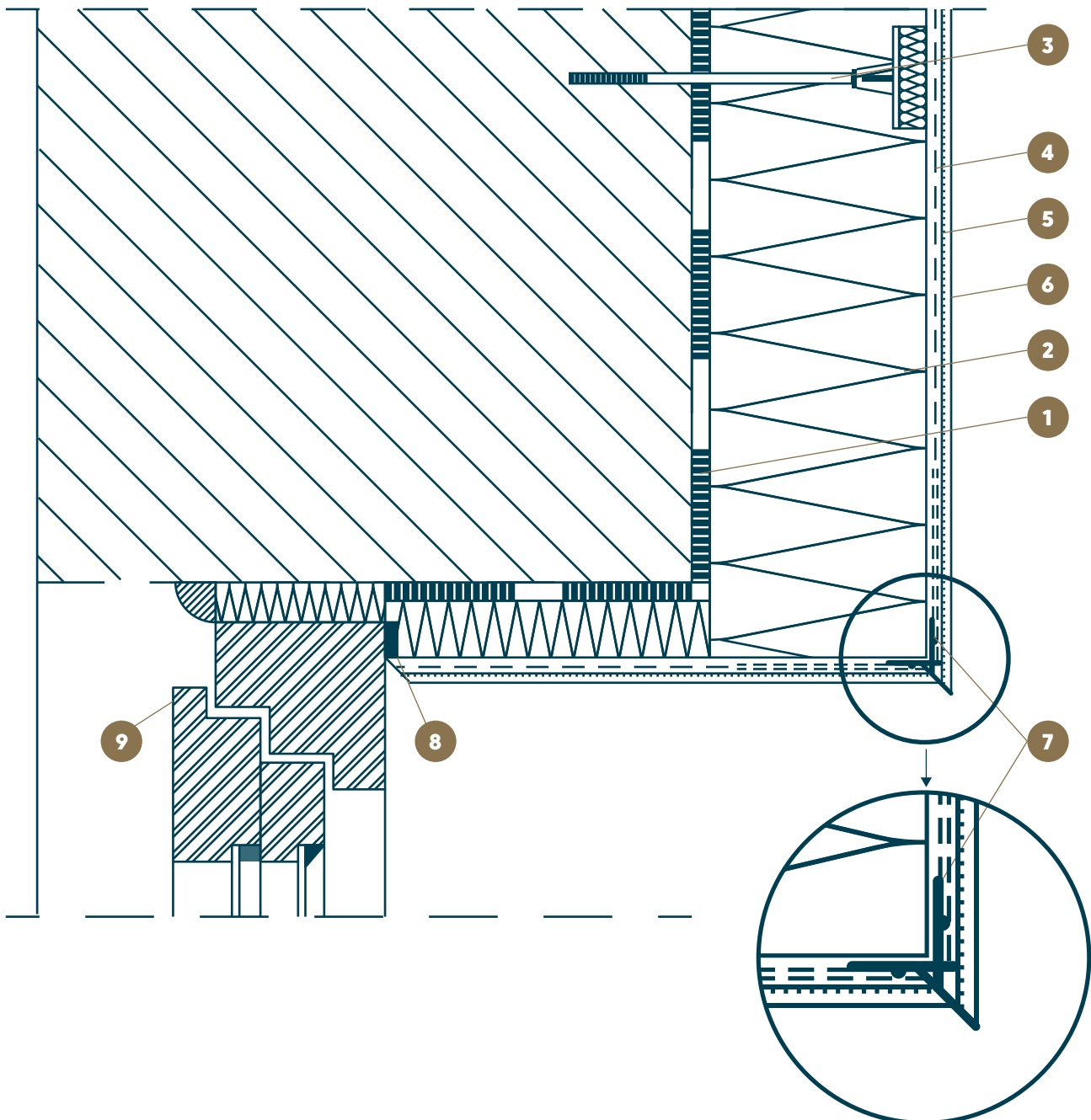
WINDOW INSTALLED FLUSH WITH THE WALL

1. Window frame/window.
2. Adhesive mortar.
3. Heat insulation.
4. Mechanical fastener.
5. Window sill
6. Expansion sealing tape
7. Reinforcing layer with a 160 g/m² KLEIB mesh
8. Primer under plaster
9. Rendering



INSULATION OF LINTEL WINDOW INSTALLED IN THE CENTRE OF THE WALL

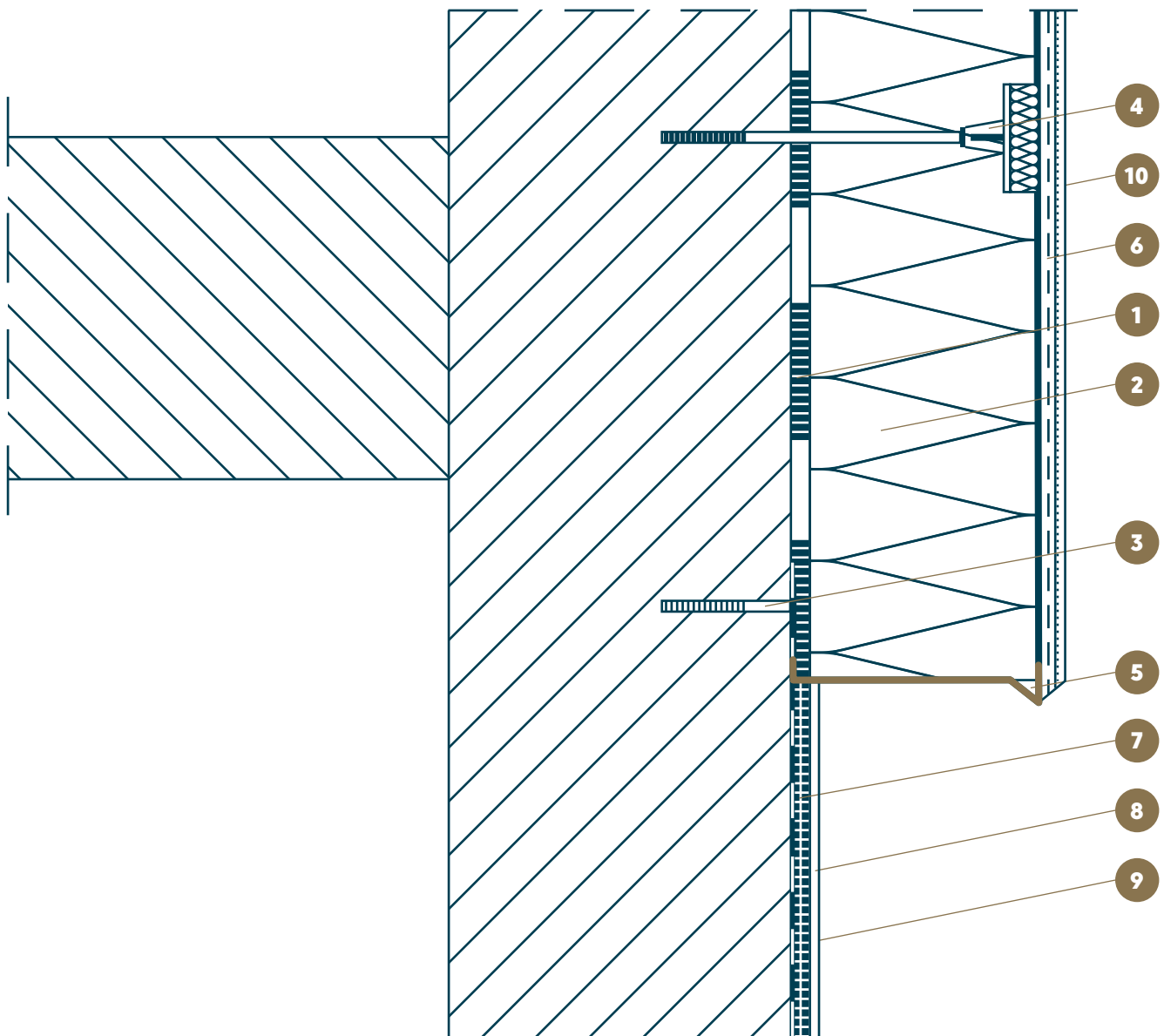
1. Adhesive mortar.
2. Thermal insulation.
3. Mechanical fastener.
4. Reinforcing layer.
5. Priming under plaster.
6. Rendering.
7. Expansion sealing tape.
8. Dripline profile with 160 g/m² KLEIB fibreglass mesh.
9. Window frame/window.



INSULATION OF BASE COURSE

LOWER EDGE OF THE INSULATION

1. Adhesive mortar.
2. Heat insulation.
3. Expansion bolt with a screw fixing the starter strip.
4. Mechanical fastener.
5. Starting strip.
6. Reinforcing layer with a 160 g/m² KLEIB mesh.
7. Hydro insulation (HYDRO EXTRA).
8. C3 Primer.
9. Mosaic plaster.
10. Rendering.



The above information constitutes general guidelines for the use of the construction product, namely the KLEIB system. These cannot replace professional preparation by a contractor and do not exempt him from applying the rules of construction arts and the principles of health and safety.

We recommend Instructions No. 418/2007 issued by the Building Research Institute (Instytut Techniki Budowlanej) in Warsaw entitled Technical conditions for the performance and acceptance of construction works, Part C: Security and insulation; issue 8: Jointless thermal insulation system for external building walls and Instructions No. 447/2009 entitled Complex External Thermal Insulation Composite System ETICS. Design and implementation principles.