FAÇADE INSULATION USING THERMAL INSULATION CLINKER CLADDING PANELS KODERUS

INSTALLATION WORKS TECHNOLOGY

STAGES AND SEQUENCE OF INSULATION WORKS

Stages and sequence of insulation works using thermal insulation clinker panels KODERUS

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1. Transport, storage and warehousing

1.1. Preparation for transport of goods

1.1.1. KODERUS panels are covered with a special protective film before transport to protect the material from adverse weather conditions and other factors. The packaging of the goods must not be damaged during loading, transport or unloading.

1.2. Loading goods onto a vehicle

1.2.1. Only load the goods onto the vehicle with a manipulator or hoist.
1.2.2. Each row of panels or each row of pallets of panels must be securely fastened with tensioning straps to ensure that they are secure, up to a maximum load of 50 kg.

1.3. Transport

1.3.1. It is prohibited to place additional loads on pallets of goods during transport to prevent them from being subjected to additional horizontal and vertical forces. Stacking pallets on top of each other is strictly prohibited.

1.4. Unloading of goods

1.4.1. During unloading, the pallets of panels must be unloaded from the vehicles by means of a manipulator or a hoist.
1.4.2. When unloading, it is necessary to ensure that the goods are placed evenly on level ground, avoiding any impact.

1.5. Warehousing and on-site storage of goods

1.5.1. KODERUS goods shall be stored on-site on a level (horizontal) surface. The pallets with panels shall be covered to protect them from direct sunlight, rain and dust.
1.5.2. KODERUS pallets of goods must be stored in such a way that they do not come into contact with the ground.
1.5.3. The number of panels on a pallet must not exceed 10 and the height must not exceed 2.5 m.
1.5.4. Damage to the special protective film during storage may allow moisture to penetrate between the panels. In this case, stains may appear on the surface of the panels.

2. Preliminary construction works before installation of the clinker panels

2.1. Temperature during and after works

2.1.1. The installation of insulation and cladding panels can be carried out throughout the year at all ambient temperatures, but it is necessary to select the correct installation materials for the installation weather conditions. The choice of materials shall be made by the client. The manufacturer of the panels (in this case, “Koderus”, UAB is not responsible).
2.1.2. The adhesion works of thermal insulation panels can only commence once the horizontal planes of the building have been covered (roof covering, flat roof parapets, pitched roof edges and rainwater drainage elements), the building openings have been filled (doors, windows, shop windows), the plinth and the basement slab have been waterproofed.
2.1.3. In new or renovated buildings, interior plastering and floor-concreting must be completed and the masonry, plaster and concrete in the walls must be dry to prevent excessive moisture build-up. Foundations and other parts adjacent to the ground must be covered with horizontal waterproofing to prevent the ingress of moisture.
2.1.4. Before commencing wall insulation works, the contractor shall provide the client with the agreed sequence of works, the solutions for the individual units, and the agreed locations for the storage of materials on-site.
2.1.5. Other additional parts of the insulation system must be stored in a dry environment and protected from mechanical damage.
2.1.6. The contractor shall be responsible for the timely ordering, on-site unloading and storage of materials. Goods shall be ordered at least 20 working days in advance.
2.1.7. The adhesion works of thermal insulation cladding panels is prohibited when:

a) wind or wind gust speeds reach 18 m/s or more;
b) frost or icing has formed on the surface of masonry or panels;
c) all mandatory safety measures are not in place (proper scaffolding, safety harnesses, helmets, etc.);
d) it rains and the work areas are not protected against rainfall;
e) the requirements of Clauses 2.1.2 and 2.1.3 are not met.

2.2. Temperature during and after works

2.2.1. Dirt, mortar residues and other materials that may impair the adhesion of the panels to the walls must be removed from the façade.
2.2.2. Highly absorbent (pervious concrete), crumbling or dusty surfaces must be thoroughly cleaned and primed with a deep penetrating primer.
2.2.3. It is necessary to remove any protruding parts (mortar, loose concrete) from silicate blocks, brickwork and concrete. To strengthen the surface of the masonry of the silicate blocks and to reduce the absorption, it is necessary to prime with an impregnating primer. Silicate brickwork and concrete do not need to be primed. After priming, the insulation panels may be adhered no earlier than 4 hours after.
2.2.4. Any works that result in an increase in the moisture content of the substrate must be carried out at least 72 hours prior to the start of the thermal insulation adhesion.
2.2.5. In the case of thermal insulation of a building under construction, where the insulation is an integral part of the façade design, the installation of the roof and all masonry and concrete works which cause the building to become damp must be completed at least 14 days before the start of the adhesion of the thermal insulation.
2.2.6. Electrical, alarm and CCTV installations must be completed before the start of the insulation works, and the ends of the installation cables must be left longer where necessary (assess the thickness of the KODERUS insulation material).
2.2.7. All planned inserts to which handrails, doorstops, light fixtures, etc. will be attached must be fitted prior to the adhesion works of the thermal insulation material.
2.2.8. Gutters and other rainwater drainage systems shall be installed after thermal insulation works.
2.2.9. Before the insulation panels are adhered, the vertical and horizontal geometry of the building must be checked, and changes in the irregularities of the individual plane of the façade must be marked on the drawing. If the plane unevenness exceeds the tolerances, the contractor shall invite the representatives of the client and the material suppliers, and shall present the method of levelling the plane (different thicknesses of insulation material, higher adhesive content). Permissible tolerances are 30 mm.
2.2.10. When checking the verticality of the façade, a string with a plumb bob should be lowered at the corners of the individual façade planes and attached to the temporary supports by pulling them back 2-3 mm more than the required insulation thickness to prevent the string from touching the surface of the insulation panels, and to level the panels with the help of a plastic pad of a certain thickness. These strings shall remain in place for the duration of the façade insulation works.
2.2.11. When starting the works, it is necessary to take into account the design layout of the façade panels and, if required, to determine the verticality of the windows between the floors by means of a string or a laser, as the vertical seams will have to match the window frame.

3. Repairing defects

Before adhering the KODERUS insulation panels, it is necessary to make sure that the façade clinker panel is free from mechanical cracks and other damage.

3.1. Replacement of the panel in case of mechanical damage

3.1.1. The panels must be protected against mechanical damage.
3.1.2. In case of mechanical damage, the panel or clinker segment can be replaced with a repair panel or only the damaged clinker tile can be replaced. In order to replace a tile, the damaged clinker tile must first be carefully removed. A new tile should be adhered in its place using mineral polystyrene adhesive.

4. Adhesion works

4.1. Thermal insulation clinker cladding panel adhesion

4.1.1. Building insulation is provided by an external wall insulation system, using:

Surfaces to be thermally insulated	*Thermal insulation material*	*Thickness of thermal insulation material (cm)*

Silicate blocks Silicate bricks Gas silicate blocks Ceramic blocks Monolithic, concrete walls	Polystyrene foam (EPS 80 or EPS 100)	5–30 cm

4.1.2. Thermal insulation clinker cladding panels are adhered to the wall of the building with a mineral adhesive designed for polystyrene adhesion. The adhesive shall be supplied dry to the site. The manufacturer's adhesive preparation recommendation (water content, adhesive mixing time, adhesive curing time, re-mixing, ambient temperature) shall be taken into account when mixing the adhesive on-site. After re-mixing, the adhesive is ready for use. At lower temperatures, special cold period adhesives shall be used.
4.1.3. The adhesive is applied around the perimeter of the panel, with an approximately ~5 cm wide adhesive strip at the edges of the panel, and three to six palm-sized adhesive dots in the centre of the panel (Figure 1). When cutting the panels, the method of adhesion changes accordingly, with the adhesive strip being applied further away from the edge of the panel to prevent it from entering the panel joint. The adhesive shall be spread to cover at least 60% of the surface of the panel when pressed against it. The quantity of adhesive to be applied shall be chosen to ensure good adhesion of the panel to the wall. The thickness of the adhesive layer shall be chosen to smooth out the unevenness of the surface as much as possible, but shall not exceed 25 mm. If the substrate unevenness does not exceed 5 mm, the adhesive can be applied to the polystyrene using a “comb”.

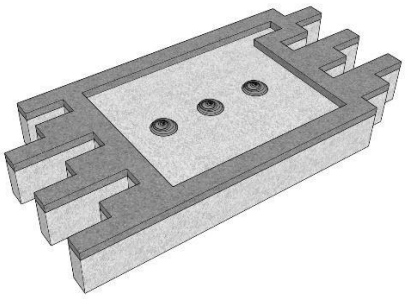
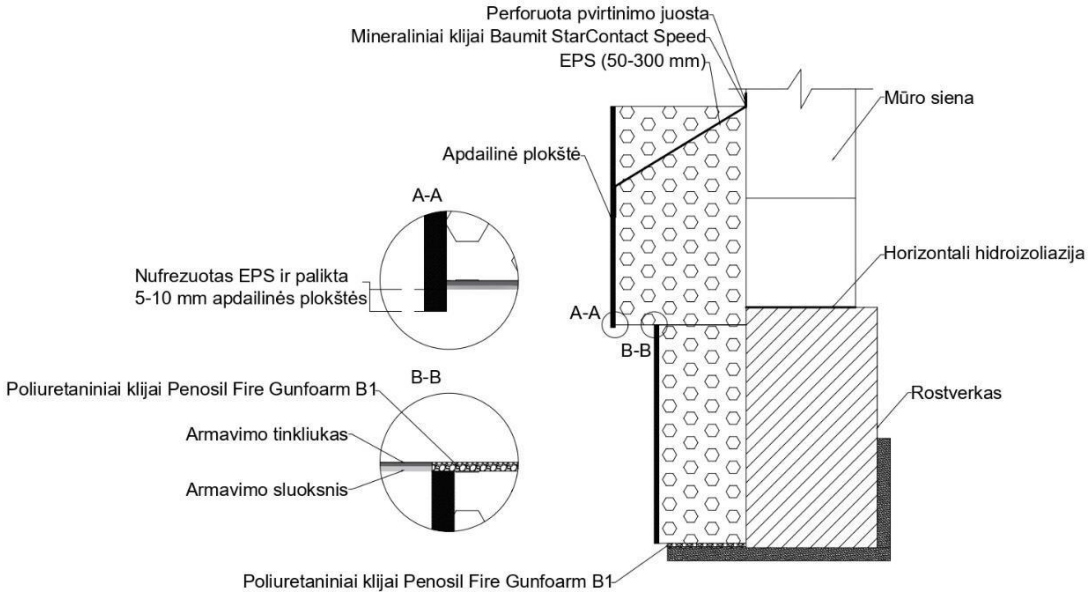


Figure 1. Applying adhesive to the thermal insulation panel

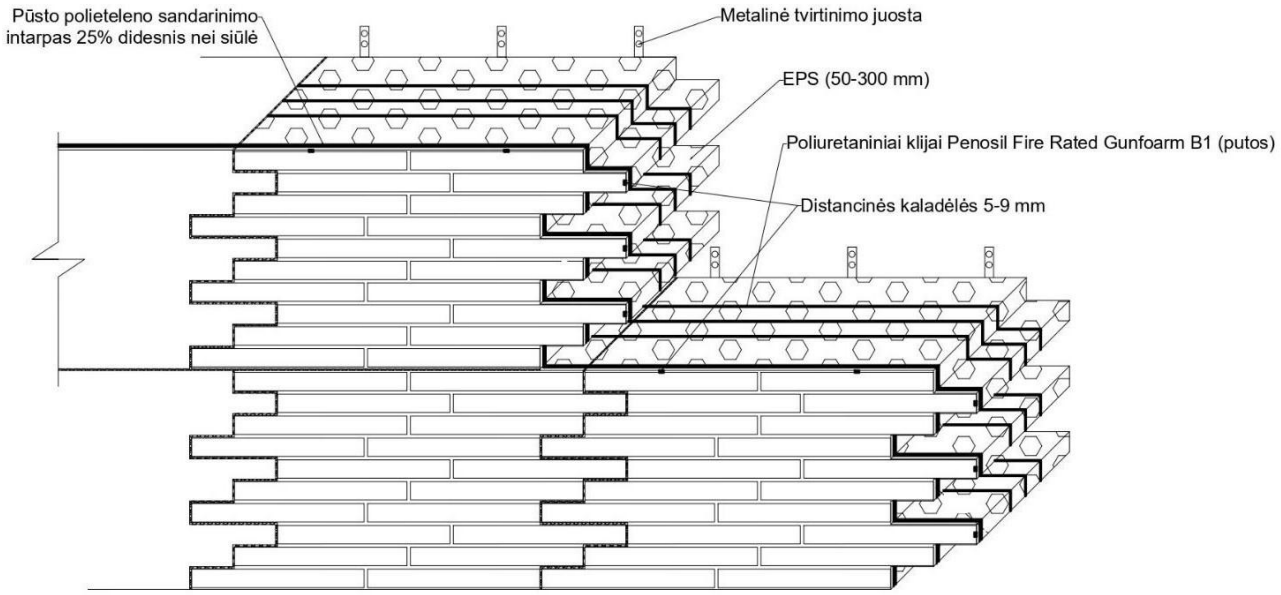
4.1.4. Unless the wall or scaffolding is covered with a safety net, adhesion or sealing (grouting) works must not be carried out in direct sunlight, at ambient temperatures above +25°C, or in strong winds. In the event of rain, the walls of the building must be protected from water by the installation of a temporary canopy.
4.1.5. Adhesive shall be applied to the thermal insulation panels from the bottom up. The panel shall first be placed in position and measured without adhesive. The foam can be sanded if necessary. Note the ends of the galvanised perforated tape protruding from the panel, which must be facing upwards. When the first row is adhered, the panel is placed against the wall after the adhesive has been applied, with the underside of the panel resting on a nailed support point or plinth profile. After the plinth has been made and the second row has been placed, a 50 mm EPS layer must be milled to prevent rainwater from running onto the reinforced layer. See (Figure 2. Section A-A).



/Text in figure: Perforuota tvirtinimo juosta – Perforated fastening strip;
Mineraliniai klijai Baumit StarContact Speed – Baumit StarContact Speed mineral adhesive;
Apdailinė plokštė 9–20 mm – Cladding panel 9–20 mm;
Nufrezuotas EPS ir palikta 50 mm apdailinės plokštės – Cut EPS and 50 mm of the cladding panel retained;
Poliuretaniniai klijai Penosil Fire Gunfoam B1 – Penosil Fire Gunfoam B1 polyurethane adhesive;
Armavimo tinkliukas – Reinforcing mesh;
Armavimo sluoksnis – Reinforcement layer;
Mūro siena – Masonry wall;
Horizontali hidroizoliacija – Horizontal waterproofing;
Rostverkas – Grillage/

Figure 2. Plinth assembly

4.1.6. A horizontal string or laser leveller beam is routed between the vertical strings lowered at the corners of the building wall to align the entire row. Before the second clinker panel is adhered, the edges of the joints between the panels shall be fully coated with polyurethane adhesive to prevent cracks that may cause heat loss, while at the same time interlocking the panels together. Leave the same spacing between the panels as between the clinker tiles in order to maintain the integrity of the seams. After the first row has been adhered, the ends of the galvanised perforated fixing tape shall be mechanically fastened with fixing elements according to the type of masonry. For the second row, everything is identical, but when attaching the panel to the already adhered panel, the two sides of the panel must be coated with 3 to 4 rows of polyurethane foam. The mineral adhesive-coated panel shall be placed immediately in the appropriate location and adhered to the previously adhered panel. Smooth the panel with light strokes or presses over the entire area of the panel (Figure 3). Use a plastering ruler or a spirit level for levelling. The mineral adhesive must not get into the joints of the panels.



/Text in figure: Pūsto polietileno sandarinimo intarpas 25 % didesnis nei siūlė – Expanded polyethylene sealing insert 25% larger than the seam;
Metalinė tvirtinimo juosta – Metal fastening strip;
Poliuretaniniai klijai Penosil Fire Rated Gunfoam B1 (putos) – Penosil Fire Rated Gunfoam B1 polyurethane adhesive (foam);
Distancinės kaladėlės 5–9 mm – Spacers 5-9 mm/

Figure 3. In-plane adhesion.

4.1.7. When cutting thermal insulation panels, it is important to consider in advance how they will be adhered. It is recommended to cut the finished part of the clinker panel using a power tool with a diamond-tipped blade without serrations.
4.1.8. It is recommended to use a fine-toothed handsaw or a special knife for cutting the insulation material, and a support ruler to ensure accurate cuts. When cutting panels, it is recommended to use an industrial vacuum cleaner to suck up dust to prevent the dust from accumulating on the concrete surface. Once the cutting of the material has been completed, dust and dirt must be cleaned off before adhesion works.
4.1.9. After the completion of the daily installation works, the upper rows of panels must be covered with a film to prevent water from penetrating between the masonry wall and the façade panels.

5. Panel joints

5.1. Panel joints at outer corners

5.1.1. When adhering the thermal insulation panels at the outer corner, the joint edges of the clinker panel are cut to form a flat edge (Figure 4).

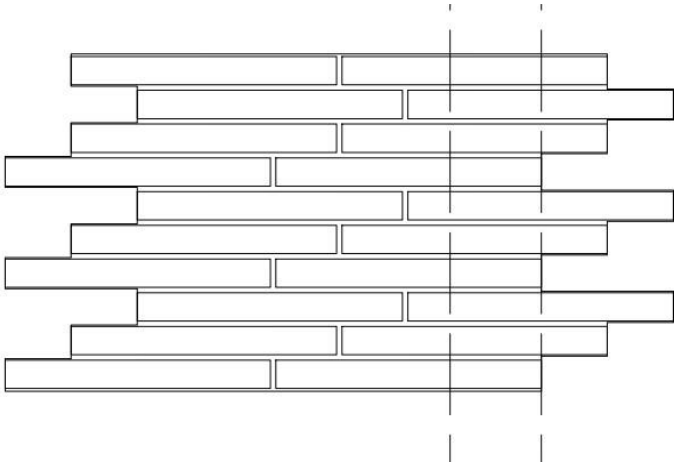
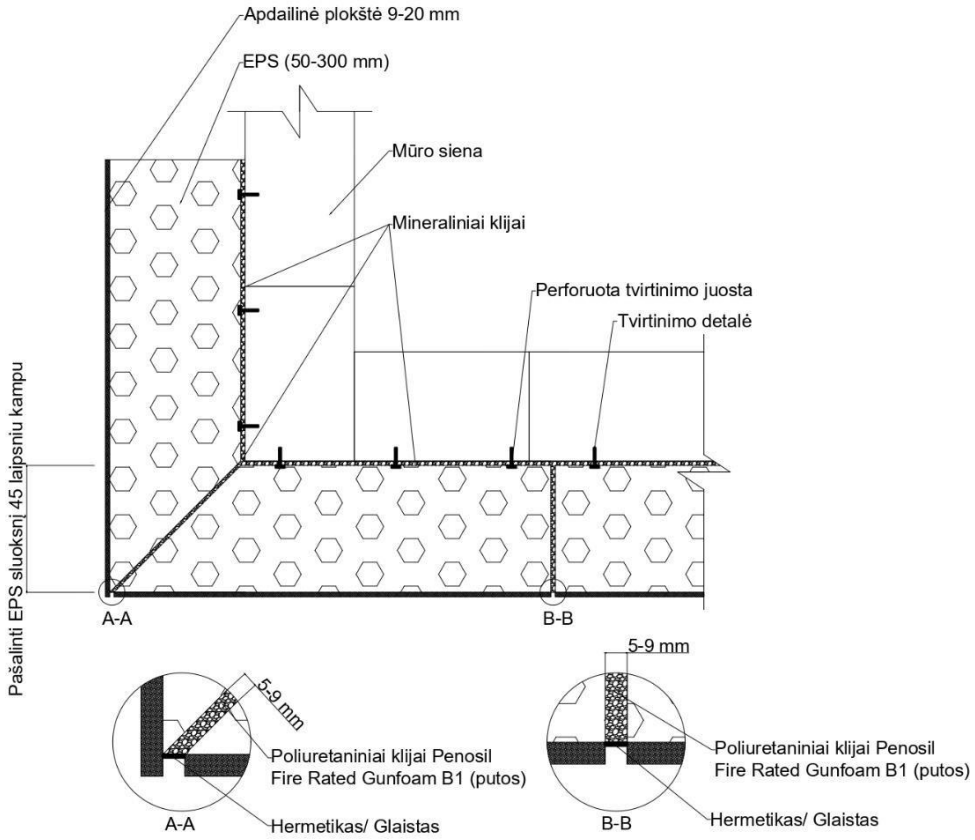


Figure 4. Aligning the ends of the clinker panels

The polystyrene foam is then cut at an angle of 45 degrees and joined to the other plane through the thickness of the insulation material. The process shall be repeated on the other face of the wall. When the two panels are joined together, an equal angle is achieved. The space between the polystyrene foam panels is filled with polyurethane foam (Figure 5).

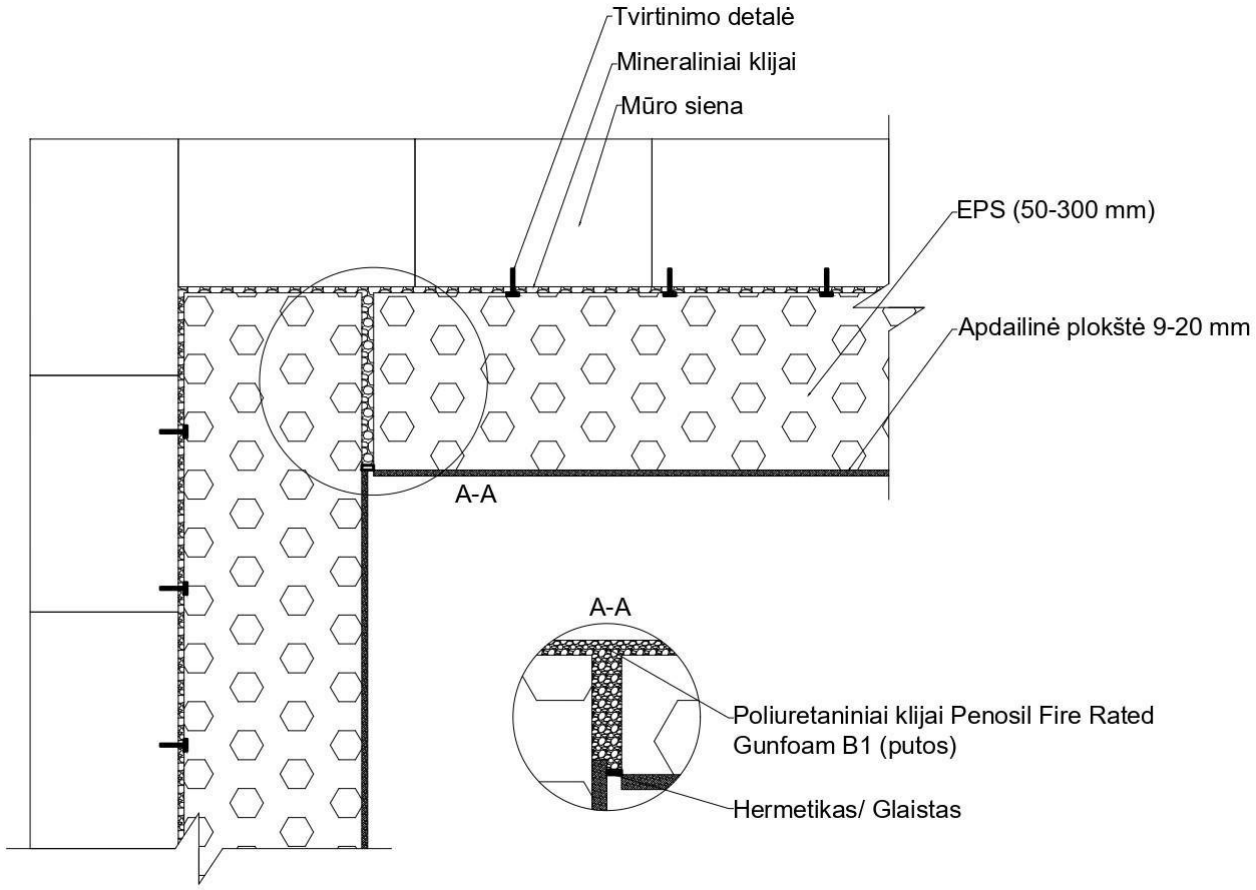


/Text in figure: Pašalinti EPS sluoksnį 45 laipsniu kampu – Remove the EPS layer at an angle of 45 degrees;
Apdailinė plokštė 9–20 mm – Cladding panel 9–20 mm;
Mūro siena – Masonry wall;
Mineraliniai klijai – Mineral adhesive;
Perforuota tvirtinimo juosta – Perforated fastening strip;
Tvirtinimo detalė – Fastener;
Poliuretaniniai klijai Penosil Fire Rated Gunfoam B1 (putos) – Penosil Fire Rated Gunfoam B1 polyurethane adhesive (foam);
Hermetikas / Glaistas – Sealant/Putty/

Figure 5. Outer corner jointing

5.2. Panel joints at inner corners of the building

5.2.1. When joining the insulation panels at the inner corner of the building, the clinker joint edges must be cut and the clinker tiles removed from the polystyrene foam. The number of tiles to be removed depends on the thickness of the ESP to be joined. The clinker panels of the next plane are cut off at the edge of the joint to obtain a joint as shown in Figure 6. The panels are adhered together with polyurethane adhesive. The joint seam shall be sealed with silicone or mineral putty.



/Text in figure: Tvirtinimo detalė – Fastener;
Mineraliniai klijai – Mineral adhesive;
Mūro siena – Masonry wall;
Apdailinė plokštė 9–20 mm – Cladding panel 9–20 mm;
Poliuretaniniai klijai Penosil Fire Rated Gunfoam B1 (putos) – Penosil Fire Rated Gunfoam B1 polyurethane adhesive (foam);
Hermetikas / Glaistas – Sealant/Putty/

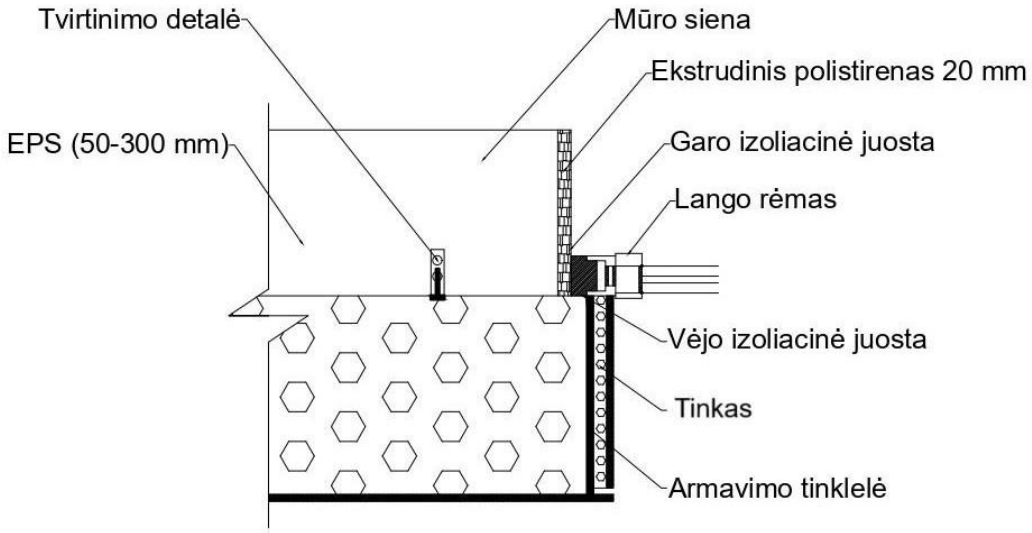
Figure 6. Inner corner jointing

6. Window and door framing

6.1. Window, door and other corner framing works (Figure 7)

6.1.1. The upper frame must be installed with a >5% slope towards the façade to prevent rainwater from running onto the window.

6.1.2. The thermal insulation system (together with a layer of reinforcement and/or finishing tiles) is applied to the window and door frames 25 mm.



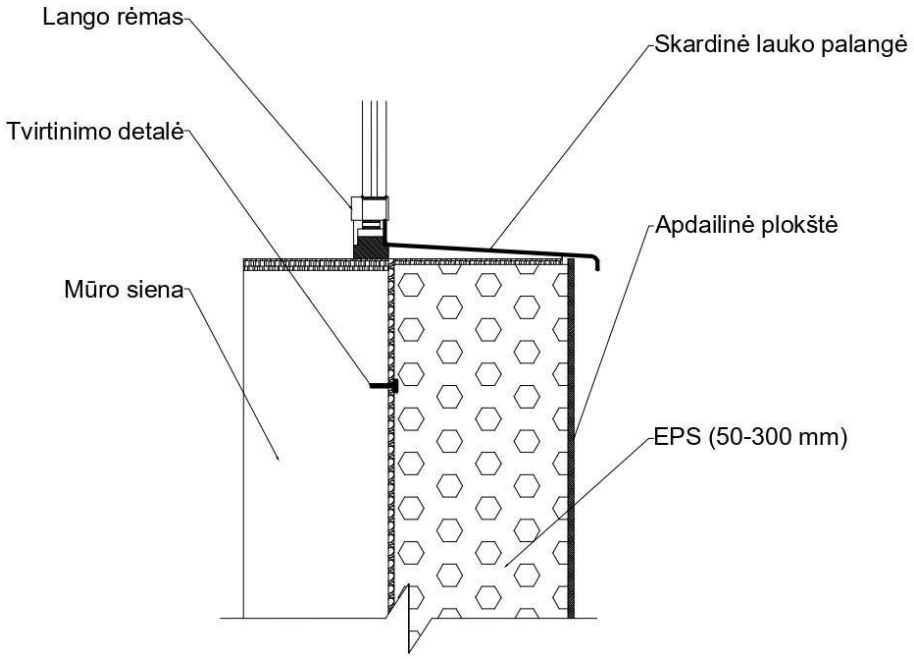
/Text in figure: Tvirtinimo detalė – Fastener;
Mūro siena – Masonry wall;
Ekstrudinis polistirenas 20 mm – Extruded polystyrene 20 mm;
Garo izoliacinė juosta – Steam insulation strip;
Lango rėmas – Window frame;
Vėjo izoliacinė juosta – Wind insulation strip;
Tinkas – Plaster;
Armavimo tinklelė – Reinforcing mesh*/*

Figure 7. Joining the façade to the window frame through the horizontal section.

7. Window sill and transom installation works

7.1. Window sill installation (Figures 8 and 9)

7.1.1. The window sill shall have a minimum clearance of 45 mm from the window sill profile.
7.1.2. The slope shall be formed towards the outside.
7.1.3. Once completing framing works, all remaining gaps between the window frame and the insulation material, as well as the gaps where the insulation panels join, should be filled with polyurethane foam with special precision. **The polyurethane-filled gaps should be reinforced with a reinforcing compound and a glass mesh.**
7.1.4. Once the reinforcement layer has dried, the clinker tiles are adhered together using a highly elastic adhesive.
7.1.5. The tin window sill shall be installed as standard, protruding 30-40 mm from the plane of the façade and recessed 20-30 mm into the sides of the façade.



/Text in figure: Lango rėmas – Window frame;
Tvirtinimo detalė – Fastener;
Mūro siena – Masonry wall;
Skardinė lauko palangė – Tin outdoor window sill;
Apdailinė plokštė – Cladding panel/

Figure 8. Façade joining with window frame and sill. Vertical section.

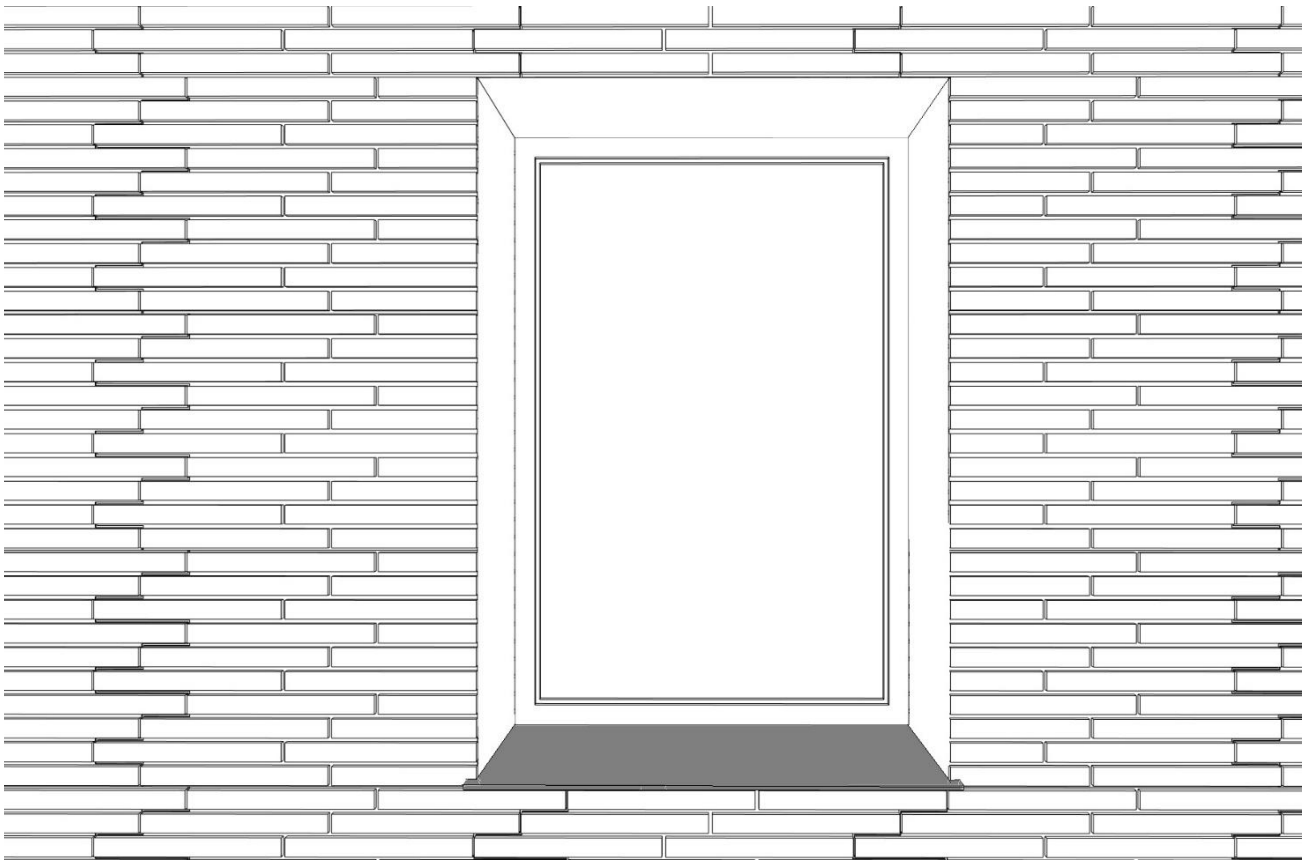
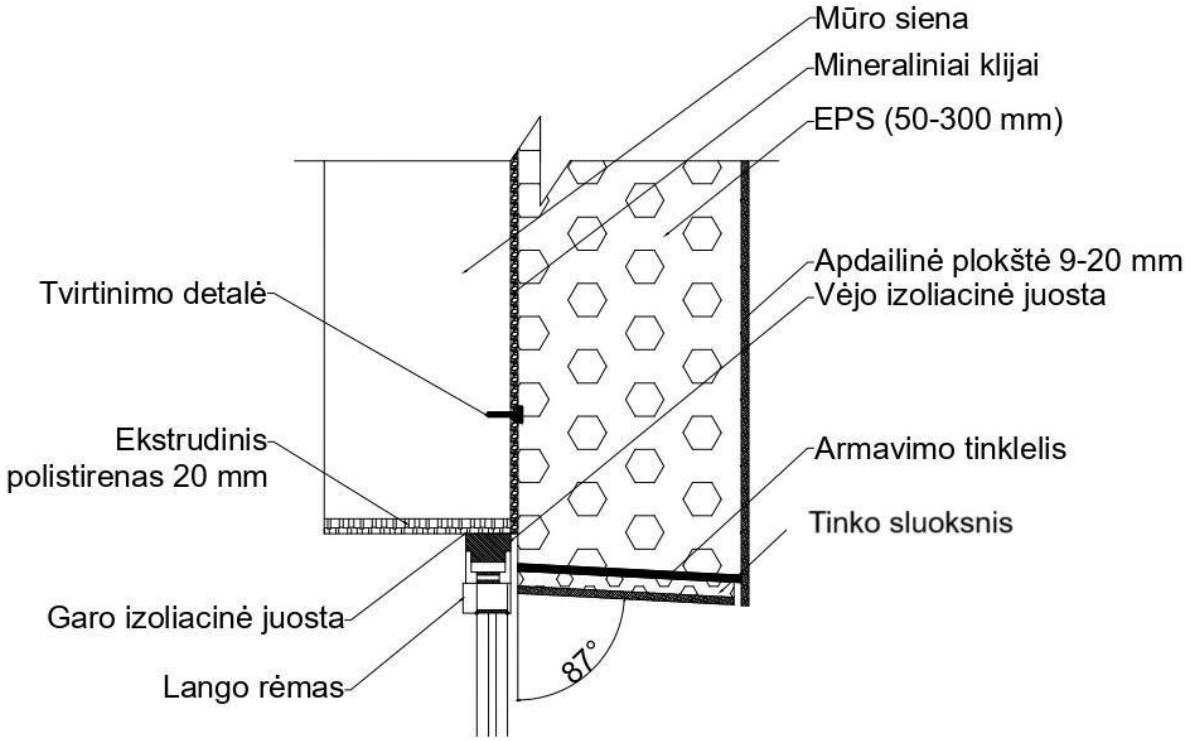


Figure 9. Installation diagram of a window sill on a façade. Front view

7.2. Installation of the transom

7.2.1. For the installation of the transom, follow the workflow (recommendation) for the forming of the frame as set out in Clause 6.
7.2.2. The transom window is reinforced as in the case of the window frames. After the reinforcement layer has dried, the clinker tiles are adhered together using a highly elastic adhesive.



/Text in figure: Tvirtinimo detalė – Fastener;
Ekstrudinis polistirenas 20 mm – Extruded polystyrene 20 mm;
Garo izoliacinė juosta – Steam insulation strip;
Lango rėmas – Window frame;
Mūro siena – Masonry wall;
Mineraliniai klijai – Mineral adhesive;
Apdailinė plokštė 9–20 mm – Cladding panel 9–20 mm;
Vėjo izoliacinė juosta – Wind insulation strip;
Armavimo tinklelis – Reinforcing mesh;
Tinko sluoksnis – Plaster layer/

Figure 10. Connecting the façade to the window frame at the top through the vertical section.

8. Seam sealing with putty

8.1.1. The seams can be sealed with mineral putty, either dry or wet, in accordance with the recommendations of the putty manufacturer.
8.1.2. The recommended surface temperature for puttying seams is +5 to +30 °C.
8.1.3. Coverage from direct sunlight for 48 hours is required.
8.1.4. Before sealing the seams with putty, the seams must be thoroughly cleaned of dust and other dirt that could reduce/impair adhesion.

9. Acceptance of works

9.1. Acceptance of façade installation works

9.1.1. The visual assessment of the façade of the building shall be carried out at a distance of 30 m from the façade wall of the building on the shaded side of the façade.