

# RAKE TERM

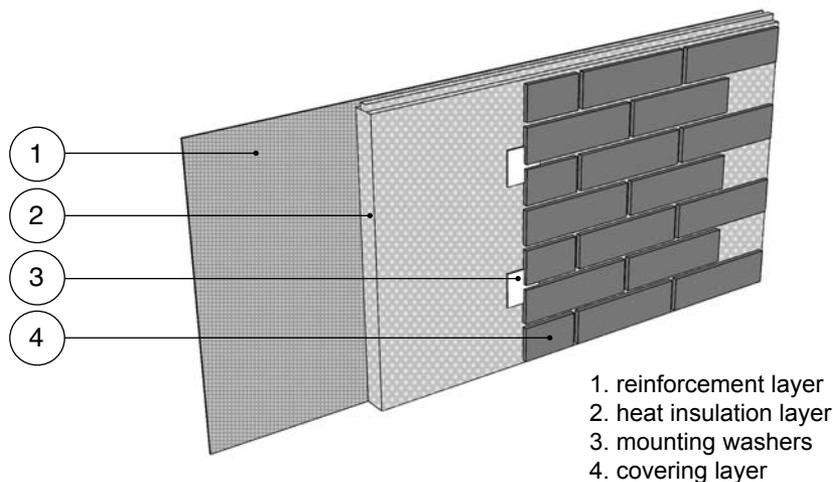
## MOUNTING AND MAINTENANCE MANUAL



This manual contains instructions for mounting your façade panels on an up to eight storey building. Please read these instructions carefully before starting installing the panels. To perform the work you will need at least one assistant, preferably a professional carpenter or bricklayer.

**The RAKETERM Panel is a reinforced composite board consisting of two parts:**

- covering layer
- heat insulation layer



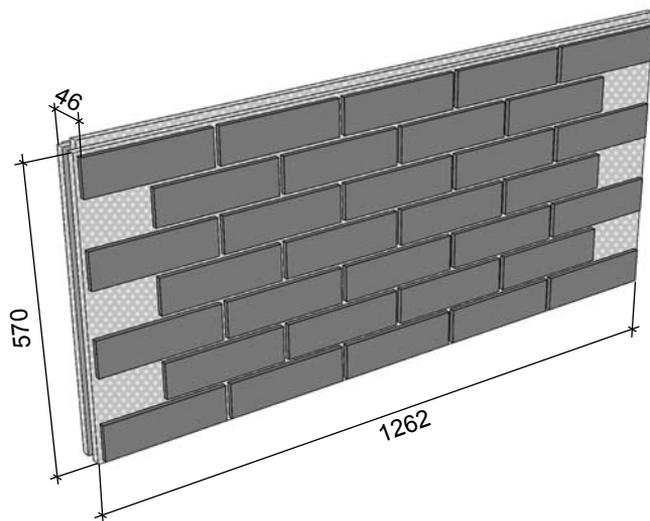
The covering layer consists of separate stone slabs or ceramic tiles. Their joints are filled with a mortar of cement, sand and polymer binder. The covering layer gives the plate its fire and weather resistant properties and mechanical strength. The rear side of the covering layer has metal mounting washers to facilitate installation.

The insulation layer is made of polyurethane foam and reinforced with glass fibre mesh on its rear. Pre-foamed polystyrene beads as filler of the heat insulation layer ensures lightweight and high insulating properties of the panel.

Panels are attached to each other with tongue-and-groove joints, which makes the cover protected against humidity and wind.

The RAKETERM standard panels are covered with clinker tiles of the so-called normal format 240×71×10 mm.

Standard panels are 1262 mm long, 570 mm high and 46 mm thick.



Since you cannot press panels fully tight against each other, you should assume additional 1 to 2 mm to the panel length. For calculations, take that a panel module has the length and height of respectively 1264 mm (with the resulting frame step as half of the length, or 632 mm) and 570 mm. For a tile module, take the length and height respectively of 252,8 mm and 81,6 mm.

You can mount façade panels on a frame made of metal or wood. To prevent a wooden base frame from twisting, cross-section of timber boards must not exceed 50×50 mm, and boards must be pre-treated with a timber preservation agent.

To mount panels on a metal frame, use special hidden fastenings. Depending on conditions, choose galvanised fastenings or of stainless steel. To mount on a wooden frame, you can use flathead screws at least 12 mm in diameter or woodscrews with washer head at least 70 mm long, and drive them at the angle of 45° from the edge of the joint tongue through the frame section (similar to mounting floor boards with ploughed-and-tongued joints).

It is easy to fasten sections of the frame to the wall using appropriate angle straps. The mounting step of straps must not exceed 750 mm.

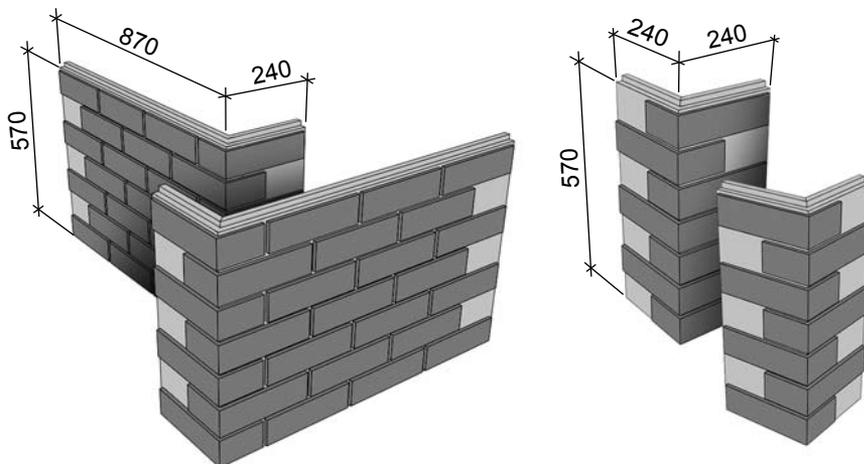
Taking subsequent operations into account, it may be desirable to build the skeleton construction with the frame step appropriate for installation of panels.

Before you start mounting heat insulation materials, make sure that concrete works and internal plastering have been completed and humidity has dried out of the construction, and check the heat and moisture performance of the selected wall structure.

#### Tools and materials for mounting work:

- hammer drill
- disc cutter for clinker tiles
- knife
- fat board
- spatula
- metal hammer
- polyurethane foam
- neutral silicon or assembly adhesive, with applicator gun
- electric screwdriver
- marking cord
- spirit level
- jointing tools (long and short)
- trowel
- reference strip
- fastenings, screws, dowels, washers

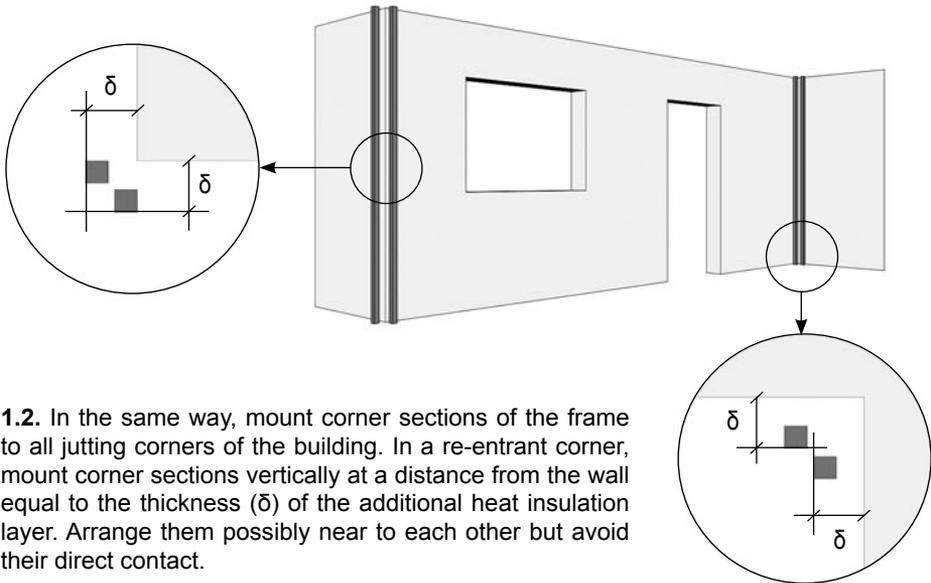
And, of course, you need the façade panels. These come with tiles to be glued and with additional joint mortar. Use large angle pieces (240/870×570 mm) for cladding corners of the building, and small angle pieces (240/240×570 mm) for cladding edges and lintels of openings. Angle pieces are of right-hand and left-hand type. They must be mounted upon each other by turns and fastened to frame sections as described in this manual.



# 1. Making the frame

1.1. Start mounting the frame from jutting corners of the building.

Begin with mounting corner sections of a wooden or metal frame vertically to the corners of the building, fixing them with angle straps at a distance from the existing wall equal to the intended thickness ( $\delta$ ) of the additional heat insulation layer and possibly far from the top of the existing corner of the building.



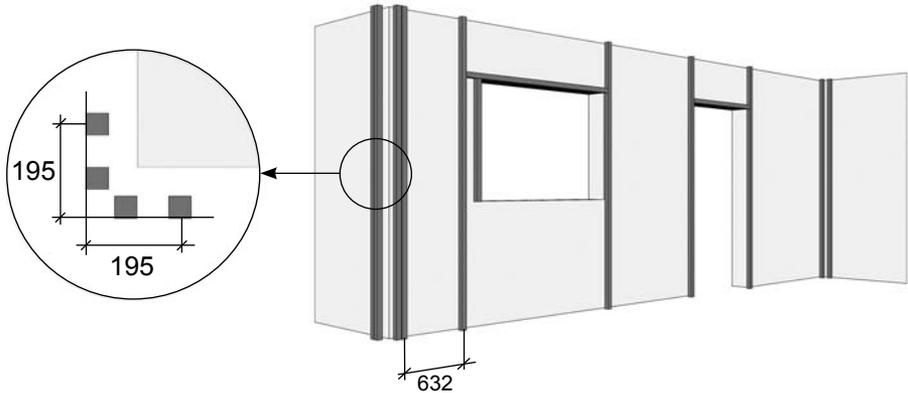
1.2. In the same way, mount corner sections of the frame to all jutting corners of the building. In a re-entrant corner, mount corner sections vertically at a distance from the wall equal to the thickness ( $\delta$ ) of the additional heat insulation layer. Arrange them possibly near to each other but avoid their direct contact.

**NB!** Before finally fastening frame sections in a re-entrant corner, mount the heat insulation into the corner. It would be difficult to do this later.

1.3. To ensure proper vertical mounting and levelling of the next frame sections, pull marking cords between the corner sections at the bottom and the top of the frame sections.

1.4. Make sure to leave enough space between the marking cord and the existing wall along the whole length of the wall, to allow mounting the frame and the additional heat insulation layer. When necessary, relocate corner sections of the frame farther from the wall.

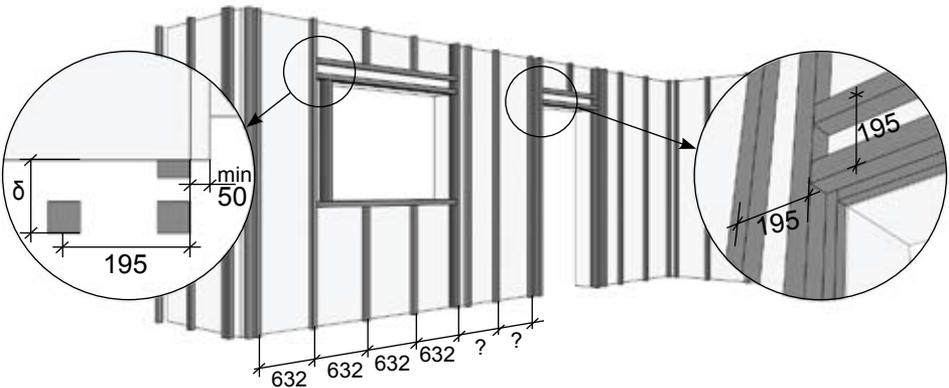
**1.5.** Mount the next frame sections vertically against the marking cord so that the axis of a frame section is at the distance of 195 mm from the point of intersection of the two lines (imaginary extensions of marking cords) drawn between corner frame sections of two walls making up a corner of the building. Mount the third frame section of the wall, leaving the distance of 632 mm from its axis to the axis of the previous section.



**1.6.** To mount angle pieces to the edges and lintel of an opening, fasten a vertical frame section to scuncheons against the supporting wall at the distance of approx. 50 mm from the opening face of the wall opening. Then mount a horizontal frame section over the opening in the similar way.

**NB!** Remember that panels covering the edges and lintels of openings are 46 mm thick, so you must leave at least the space of 50 mm for their installation.

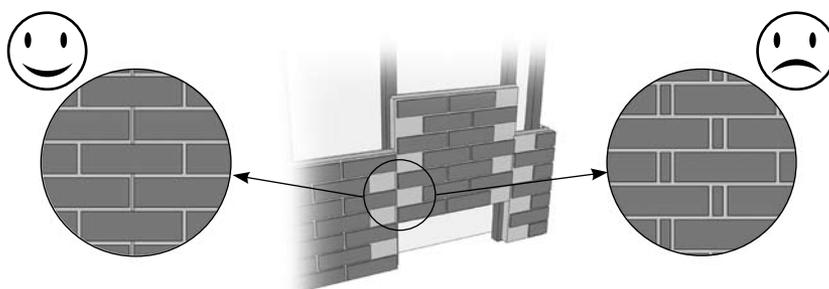
**1.7.** Mount vertical frame sections to the sides of the opening and the horizontal section over the opening. Align them along the plane of marking cords at the distance of the thickness of heat insulation layer ( $\delta$ ) from the wall.



**1.8.** Now mount a vertical frame section. Place it along the plane of the marking cord so that the axis of the profile is at the distance of 195 mm from the opening faces of the already mounted flanking profiles. Then mount a horizontal frame section over the opening in the similar way. Repeat these operations at all openings.

**1.9.** Start mounting ordinary frame sections of the wall. Begin from the left corner of the wall (and, at a later stage, mount façade panels in the same manner). Mount vertical frame sections along the plane of marking cords with the step of 632 mm (measured between axes), cutting the sections above openings.

**1.10.** Check the remaining space between the last section of the course and the previously mounted third section from the right-side corner of the wall. If this space is less than 240 mm and/or if you would have to mount fractions of tiles smaller than a quarter-tile instead of solid façade panels, you should cut not only the last panel but the two last panels and accordingly shift the last frame section of the wall to the left in order to make the work look correct.



**1.11.** The supporting frame for façade panels is ready when you have mounted ordinary frame sections in the same manner on all walls. If additional heat insulation must be installed, do this prior to mounting façade panels.

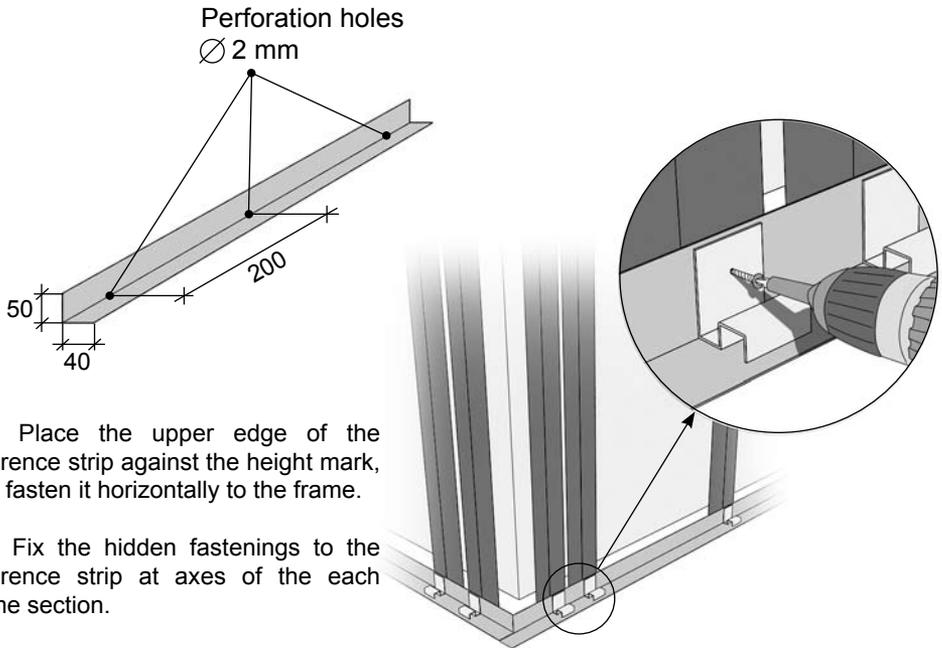
**NB!** Carefully fill or hermetically seal the joints between heat insulation boards, and fill any gaps between the heat insulation and frame sections.

## 2. Height marking in the corners of the building

2.1. Mark the location of the bottom edge of the first panel course by drawing a line on a corner section of the frame. Draw another line 50 mm above the first one. This will give you a height mark of the upper edge of the backside of the reference strip. Mark this height horizontally on all frame sections using either a levelling instrument or the marking cord and a spirit level.

**NB!** If possible, choose the part of the wall to be covered to have the height equal to an integer multiple of the panels height. This will reduce the material loss and the amount of waste.

2.2. The reference strip must be made of galvanized steel at least 1 mm thick. It will be good to perforate the rib of the reference strip by drilling holes 2 mm in diameter at intervals of about twenty centimetres.



2.3. Place the upper edge of the reference strip against the height mark, and fasten it horizontally to the frame.

2.4. Fix the hidden fastenings to the reference strip at axes of the each frame section.

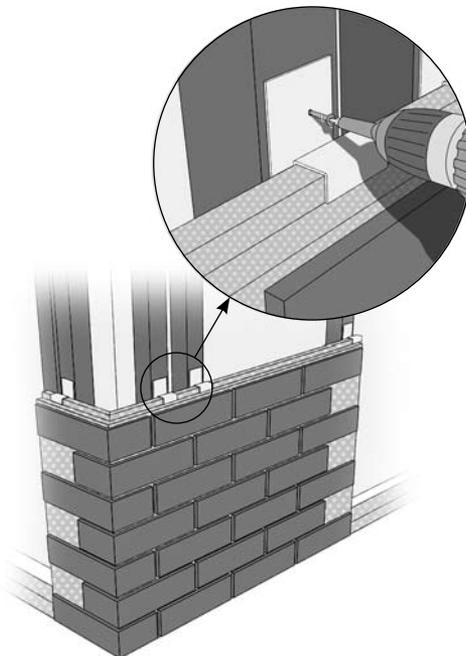
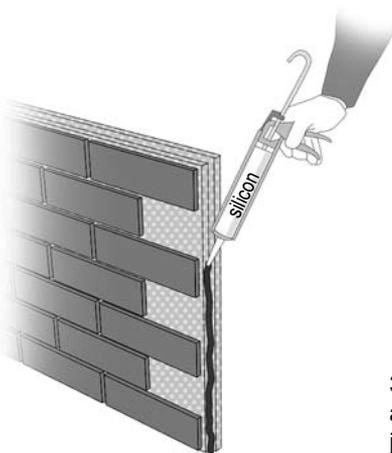
## 3. Mounting the façade panels

Begin mounting façade panels from the left corner of the wall, and move by one course at a time.

# NB!

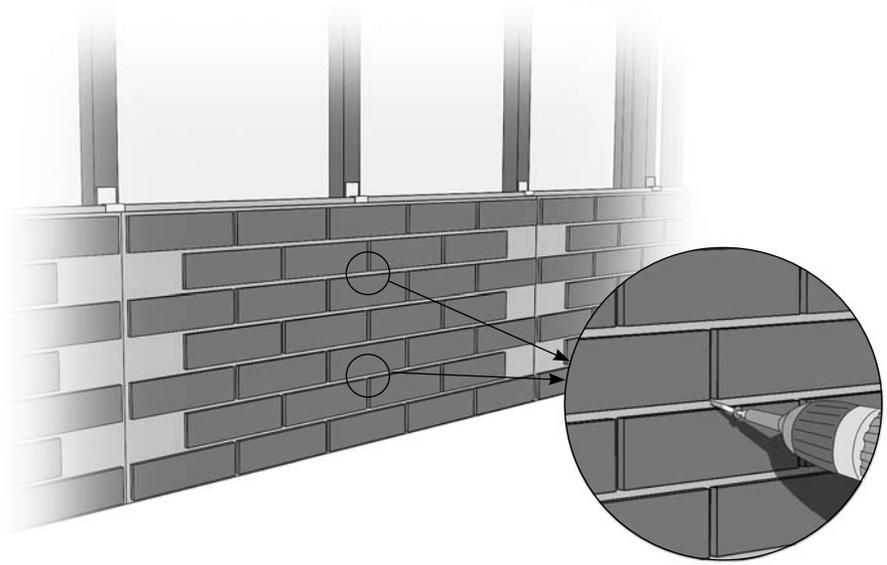
**Correct mounting of the first course is at least as important as mounting the first corner, so you must be very careful. The first course must be laid precisely horizontally and in line on the reference strip.**

**3.1.** Place a large angle piece (either left-hand or right-hand) above the reference strip. Press the piece down strongly until the groove at its bottom, in the heat insulation layer, is fully placed on the hidden fastenings below it. Make sure that both arms of the angle piece have their panel ends extending exactly to the axis of frame sections. If they are not exactly on the axis, then the frame sections were mounted incorrectly due to a mistake in calculations, measuring or else and you must fix the error.. Then check the vertical alignment of the angle piece at its both sides. Finally, fix the angle piece to the frame with hidden fastenings on the upper part of the tongue.



**3.2.** Seal the vertical joints of panels by laying a thin silicon bar along the external edge of the joint tongue on the vertical side of the previous panel.

**3.3.** Press the next panel strongly in its place and slide the joint tongue of the previous panel into the groove of the panel you are mounting. The panel should stand possibly tight against the previous one, and the groove at the bottom of the heat insulation layer must be fully placed on the hidden fastenings.

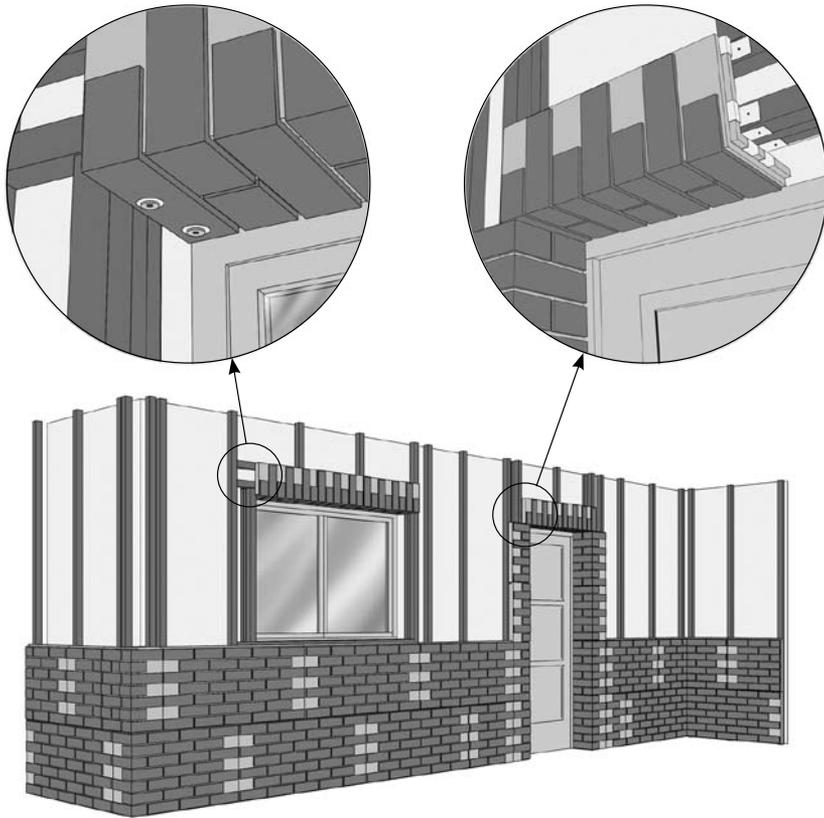


**3.4.** Check the horizontal alignment and height of the panel, and fasten it by driving a screw through the panel at one fixture point in its centre. Before this, make an approximately 5 mm deep recession in the joint filler for the screw head.

**3.5.** Check that the panel is precisely levelled up. Then fasten the upper hidden fastenings and mount the second screw in the centre of the panel.

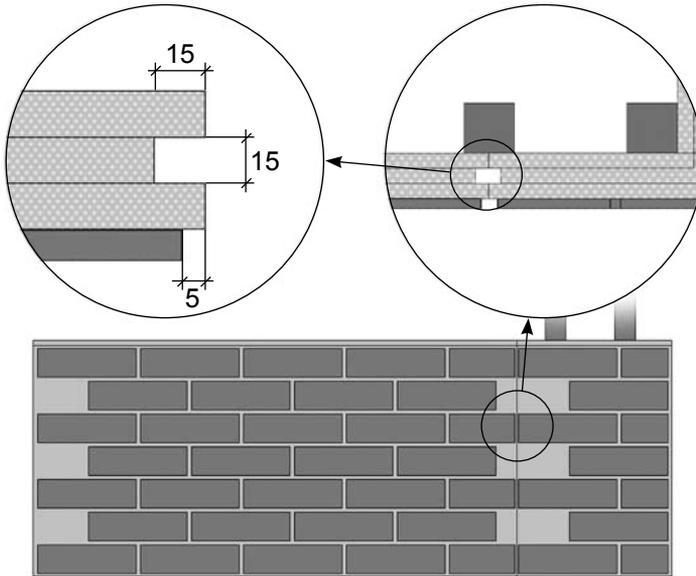
**3.6.** Mount the next panels in the same manner, checking the horizontal and vertical position of each panel.

**3.7.** When you have reached the distance of three frame sections to the edge of an opening, shape the space around the opening. Begin with mounting transoms and covering them with small angle pieces to make up a lintel. If necessary, saw the jamb side of the angle piece to make it more narrow, or add a strip of a standard panel. For good appearance, seek to lay the lintel covering of whole clinker tiles, and crosscut the edge angle pieces from the joint. Fasten the jamb side of the lintel ends with screws and at least Ø15 mm galvanized washers. Make sure that the distance of screws from the edge of the angle piece does not exceed 20 mm. In this case, the subsequently mounted vertical angle piece will cover the screw. Fix the ends of the angle piece on the lintel with hidden fastenings on the tongue. Fasten each small angle piece at six points at least.



**3.8.** Now mount small corner pieces vertically on both sides of the opening to cover the edges of openings. When necessary, saw the edge of the opening to make its sides more narrow, and cut the angle pieces shorter. Make sure that the lines of horizontal joints on the angle pieces coincides with the joint lines of the mounted standard panels. When covering the edges of an opening, fasten each small angle piece at six points at least.

**3.9.** If you have to cut a standard panel that comes into contact with angle pieces (see 1.10 as well), first draw a cutting line on the panel and then crosscut the panel by sawing it from the clinker surface. To ensure the correct width of the new vertical joint, always saw the covering layer 5 mm shorter than the heat insulation layer. When the panel has been cut, there must be a void in the vertical side between the heat insulation layer and the angle piece (if there is no void, you have to cut it, for example with a knife, making a cross-section of 15×15 mm). Immediately before fastening the plate, fill the void with urethane foam. Mount the cut piece of the panel and fix it with hidden fastenings at four corners at least.



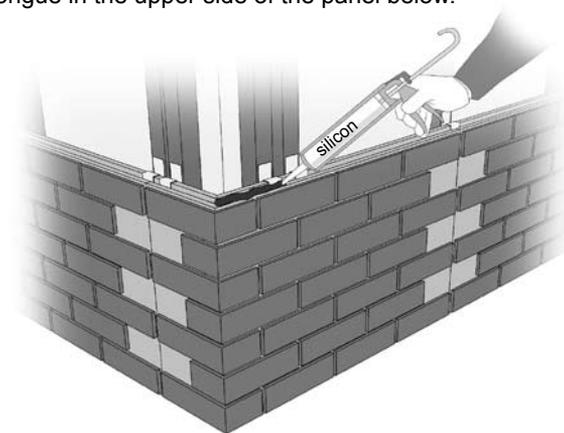
**3.10.** Repeat the above operations when necessary when you mount the panels before angle pieces.

**NB!**

**Mounting the reference strip, angle pieces, lintels and the first panel course are the most important stages of installation. Special care at this stage spares you from problems at the following stages. If you perform installation for the first time, we recommend you to begin working from the less visible part of the building.**

## 4. Mounting the next courses

**4.1.** Seal the horizontal joints of panels by laying a thin silicon bar along the external edge of the joint tongue in the upper side of the panel below.



**4.2.** Begin with mounting a large angle piece of the first corner (this time, of the opposite-hand type as compared with the course below). Then mount standard panels and claddings of edges, lintels and other corners. To prevent conjunction of the four corners of heat insulation boards, standard panels are mounted in the interlacing way, each course shifted against the previous course by half of panel's length.

**NB!**

**Mount window ledge strips before mounting edge parts of the window opening.**

**Constantly observe the levelling of panel courses. The RAKETERM panels are rigid and you cannot bend, fold or twist them.**

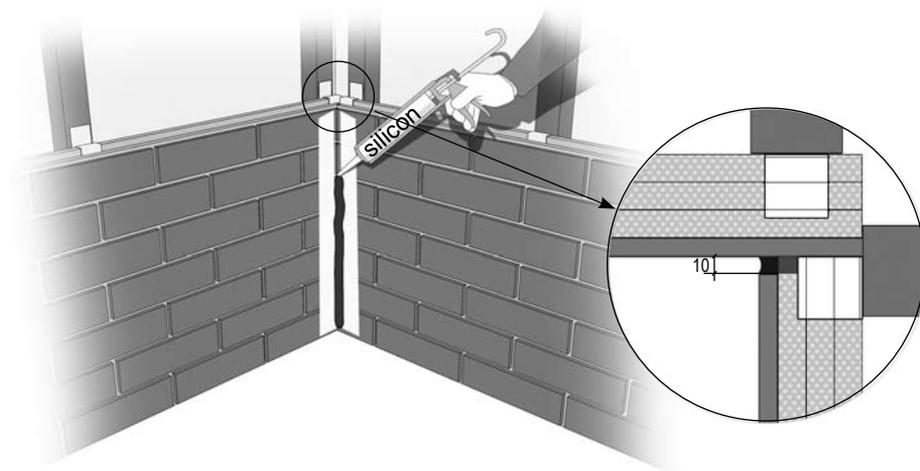
To finish edges and lintels of doors and windows you may apply other technologies as well, like plastering or covering with steel profiles, boards of timber or other materials, etc.

## 5. Making re-entrant corners

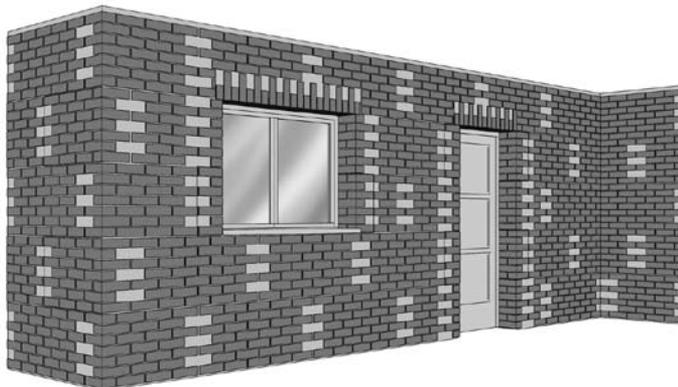
**5.1.** To make a re-entrant corner, cut one panel to the required dimensions, mount it in its place and fasten.

**5.2.** Cut the adjacent panel at right angle to give it the required dimensions, and leave a 10 mm void between the two panels. Then fasten the panel.

**5.3.** When corner panels have been fastened along the entire height of the corner, fill the void with mineral wool. Then press the joint string on the void and seal it with joint mastic or silicon.



You have now finished mounting façade panels. What remains is to glue covering tiles to their sockets and to fill joints in the space around tiles and between panels.



## 6. Gluing clinker tiles

To maintain the pebbledash pattern, tiles must overlap the panel junctions in every other course. Since it is impossible to mount tiles during manufacture, you must do this during installation.

**6.1.** If the panels have been crosscut and the socket of the tile to be glued stands against a fragmented tile on the panel, you should remove the fragmented tile. To do this, saw open the mortar joint around the tile, carefully break the tile with a metal hammer into small pieces, and remove the pieces from the panel with a knife.

**6.2.** To fasten clinker tiles to their respective sockets, use either silicon or assembly adhesive. The glue must be intended for temperature range of  $-50$  to  $+100$  °C.

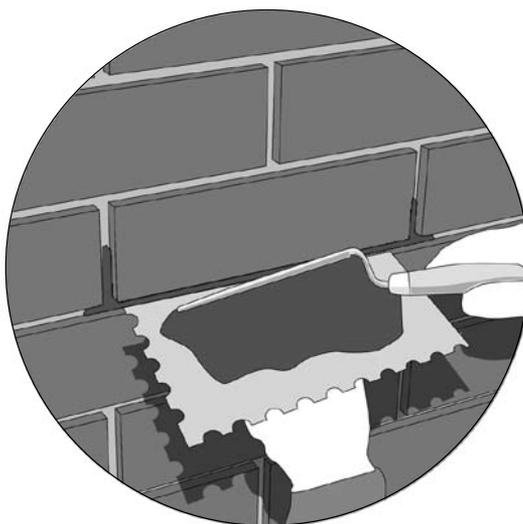


**6.3.** Check that surfaces of the tiles to be pasted are aligned exactly to the surface plane of pebble-dash panels and are at the same height.

**NB!** Do not use nails, screws, etc. to support clinker tiles during glue hardening. If any aids used as supports pierce into the heat insulation layer, this may impair insulation properties and water-tightness of the façade.

## 7. Finishing

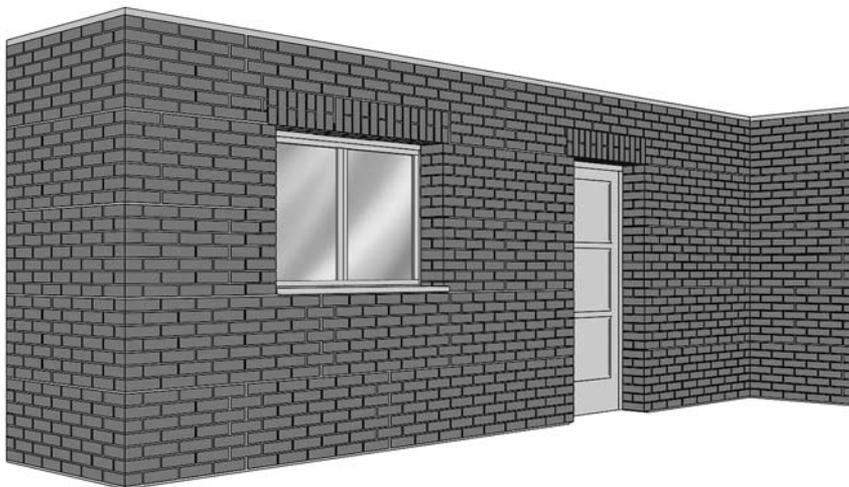
The last stage of mounting façade panels is finishing the joints. Do this when clinker tiles have been mounted and the glue has set. During jointing, air temperature must not be lower than +10 °C and relative humidity must not exceed 70%.



To fill spaces around the pasted clinker tiles and to finish panel joints and screw-holes, use only the special compound made of dry mortar that comes with the product. Add water to the mortar and mix it. Press the compound into joints and smooth it with the jointing tool, to achieve a clean joint line and invisible junction.

**NB!** Prepare the joint compound as dry pack. When you are smoothing joints with the jointing tool, do not allow a water membrane to emerge on the surface; otherwise the colour tone of the joint may change noticeably. When necessary, let the compound harden after filling the joints and before smoothing them with the jointing tool. Avoid staining the clinker tiles while jointing; otherwise you will have to clean them later.

If the tone of refilled joints differs from that of factory-made joints, you may trim the colour by treating joints with tinted laitance. Seal all junctions and spaces between panels, the reference strip, window and door casings, penetrations etc. with weatherproof mastic. When joints have completely dried (in the summer it takes approximately four weeks), you may wash the finished surface and treat it with clinker oil or an impregnating solution if desired.



## **MAINTENANCE MANUAL**

RAKETERM façade panels need no special maintenance. If desired, you may wash manually or with a power-washer. Since clinker tiles are acid- and alkali-resistant, you may use appropriate solvents or acid baths to remove graffiti from the façade surface. After treating the façade with chemicals, neutralise the surface and wash it with ample water. Check that the chemical has not damaged junctions filled with silicon or mastic; reseal them with appropriate materials if necessary.

Every five years check the façade joints, replace any damaged compound layers and open and refill any possible crevices.

To refresh the façade surfaces, treat them with clinker oil or impregnating solvents.

