

## WINDOW and DOORS INSTALLATION INSTRUCTIONS

### PREPARATION OF HOLES

The basis for the correct installation of windows is precisely measured openings, according to which the windows are made. Depending on the dimensions of the opening fillings and the wall construction, the following joint widths must be taken into account when determining the size of the windows to ensure correct sealing of the joint and taking into account possible expansion and contraction of the profiles.

Material	Profile length			
	≥ 1,5 m	≥ 2,5 m	≥ 3,5 m	≥ 4,5 m
	Joint width (mm)			
White PVC windows	10	15	20	25
Colored PVC windows	15	20	25	30

Table 2. Minimum joint widths between the sides of the window frame and the opening

The table applies to new and restored openings. Care should be taken that the outer beam does not cover more than 40 mm of the window frame.

The described joint widths are easy to ensure for new buildings, but when replacing windows, it is necessary to use additional profiles or adjust the openings to achieve the correct joint width. Additional profiles are usually used in cases where the joint widths need to be adjusted either from the sides or at the top of the window. Before using additional profiles, the situation should definitely be discussed with either the installation manager or a sales consultant. Correction of openings is usually performed using combinations of impregnated beams. According to the opening, beams of suitable cross-section are selected and formed into a wooden frame in the existing opening, the deviation of the side lengths of which may not exceed  $\pm 5$  mm. The wooden frame is leveled with wedges and fixed with either nails or screws. The fastening step is selected according to the step of the window fastening clamps (see Figure 2). However, the part between the wall and the frame is insulated with stone wool, glass wool or polyurethane foam along the entire joint. When using foam, make sure that the dimensions of the joint to be insulated do not exceed the maximum widths permitted by the manufacturer and that the expansion of the foam does not deform the sides of the frame.

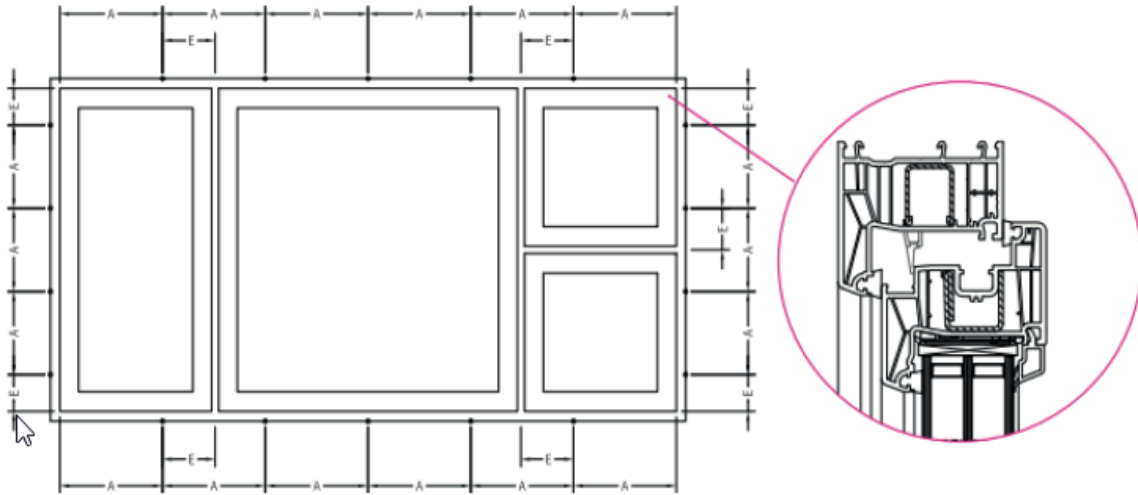
### WINDOW FRAME PREPARATION

After making sure that the opening is correct and suitable for the manufactured window, the completeness of the window and the correct fastening of the opening mechanisms are checked. The opening frames shall be removed. If the window has an outer cover covering the frame, the outer protective films of the frames shall be removed (unless a separate agreement has been concluded with the customer for the storage of the protective film or additional protection of the frames). The mounting brackets are then installed (if no mounting is used through the frame). The correct installation location and tightness of the fastening clamps ensure uniform expansion and contraction of the frame and the final stiffness in the opening, therefore the installer is obliged to follow the instructions below when installing the clamps.

Mounting brackets are also installed on the windows at the lower edge of the frame (there is a definite requirement for posts) and with a step not exceeding 700 mm (same, density as elsewhere on the perimeter).

A - mounting distance 700 mm

E - distance from the inner corner of the profile 150 mm



- - Attachment point
- A - Attachment distance approx 700mm
- E - Distance from inner corner of the profile approx 150mm

*Drawing No. 2 Attachment distances for PVC windows*

\* - maximum permissible distance from clamp to clamp

Figure 2. Location of mounting brackets and installation density on the frame (dimensions in mm)

In strip windows, special connection profiles are used to connect the individual window elements. In this case, the window frames are fastened to each other or to the connection profile with screws, the locations of the fastening screws being identical to the locations of the fastening clamps of the frame.

## WEDGE AND FIXING OF WINDOWS

After the opening and the frame have been prepared, support blocks are installed in the opening, which are subjected to an initial approximate leveling. The window frame is then placed in place and wedging and final leveling are performed. When wedging, there must be taken into account the possible expansion of the plastic profiles, which must be possible without additional stresses.

Changes in profile lengths due to temperature:

- White PVC profiles up to 1.6 mm / m
- Colored PVC profiles up to 2.4 mm / m

In order to ensure the correct distribution of the weight of the window itself and the of the acting forces, the following drawing should be followed when installing load-bearing blocks and additional wedges.

If the frame tilts to the left, if necessary, pairs of additional wedges 1-1 are installed, if the frame tilts to the right, pairs of additional wedges 2-2 are installed.

NB! Removal of load-bearing blocks is prohibited during the entire service life of the windows. Auxiliary wedges can be used to level the window, which must be removed after leveling and fixing the window.

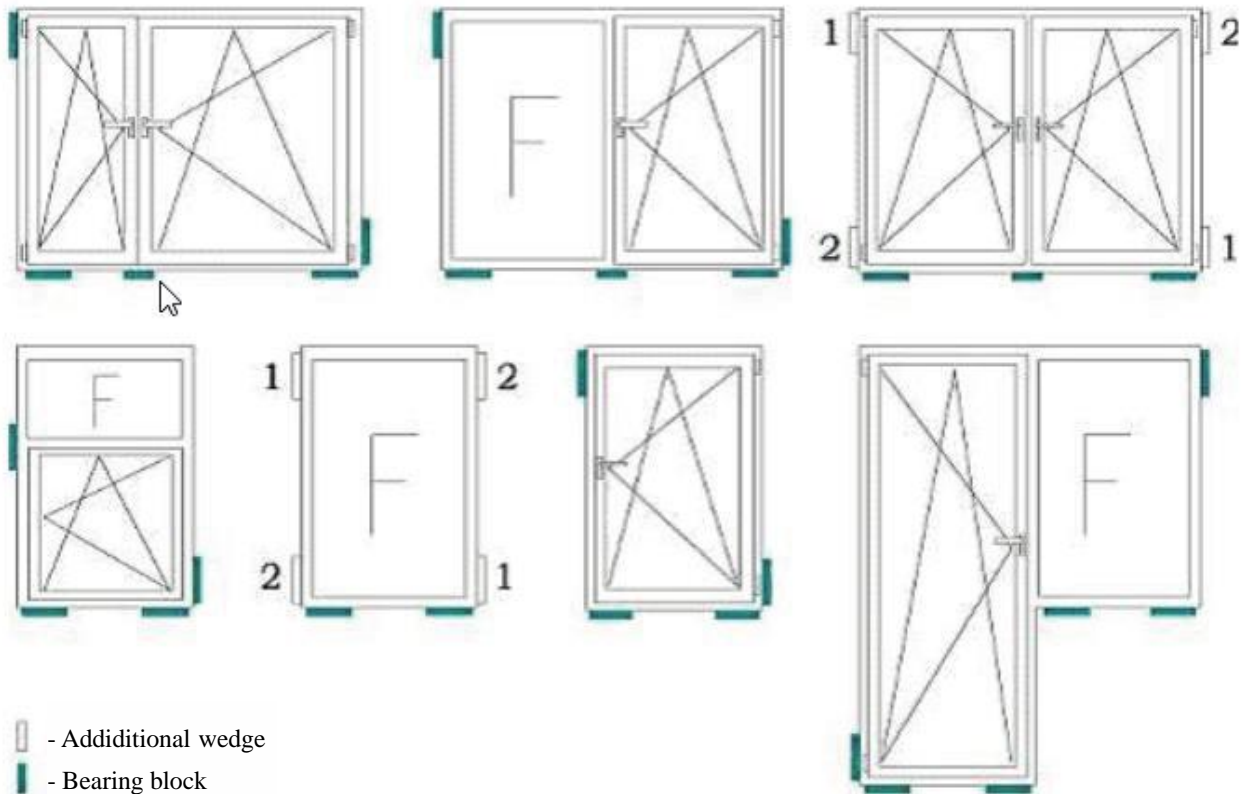
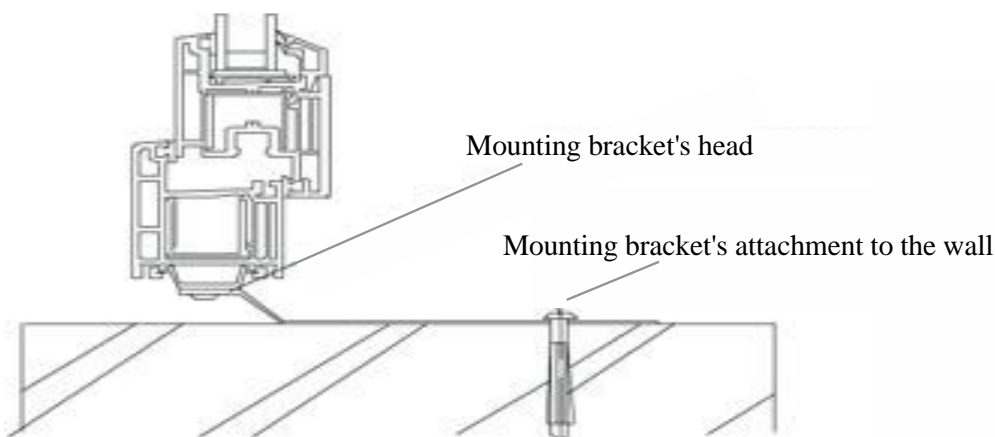


Figure 4. Window wedging

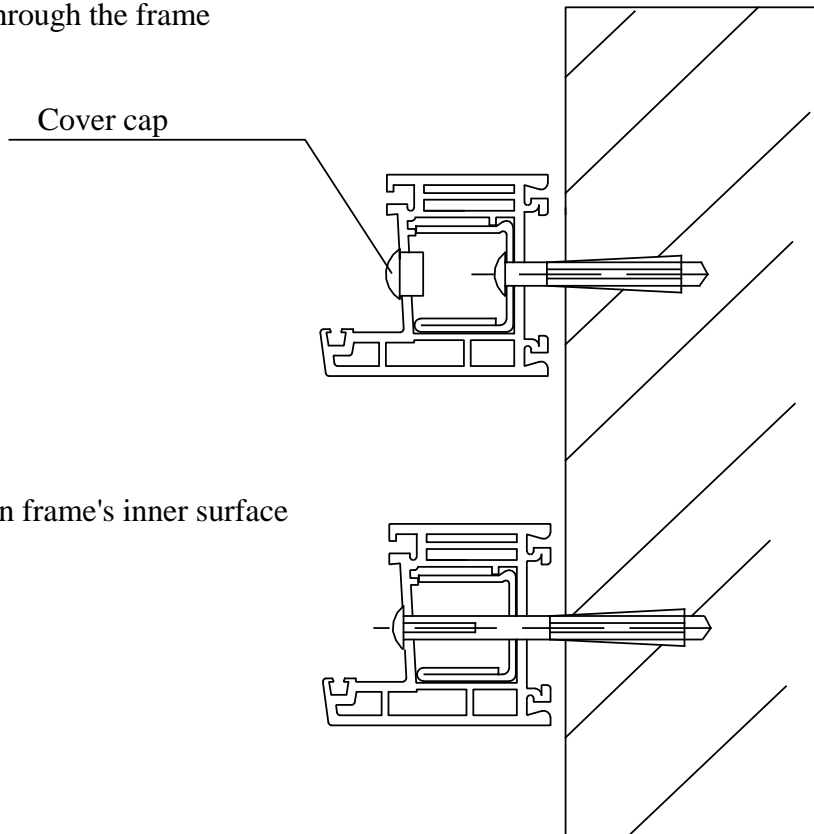
After wedging the window and checking the level, the window must be fixed immediately. If mounting brackets are used, the mounting is done with nail dowels or screws, depending on the wall construction. When using nail dowels, make sure that the dowel is fastened to at least the depth specified in the manufacturer's installation instructions and that the fastening depth of the screw is at least 40 mm.

When leveling large windows, it is advisable to pre-fasten the frame before leveling, using the adjustment hole of the mounting bracket. After leveling, the clamp is then finally fixed with an additional screw or dowel.



Fastening with a screw or nail dowel through the frame is also used, as a rule in cases where it is not possible to cover the fastening brackets during the later finishing of the blocks. The fastening step for this type of fastening is identical to the clamp fastening step. In this case, when drilling additional fastening openings, care must be taken not to damage the seals or the outer surfaces of the frame profile, but the fastening type or screw head must not endanger the glazing in the case of non-opening windows.

Fastening through the frame



Fastening on frame's inner surface

*Figure 5. Fastening through the window frame*

After the window has been wedged and fastened, there must be performed a check leveling and a rigidity check of the fastening. At the end of the fastening work, the window frame must be stationary in the opening, any gaps must be removed before sealing the joints, as self-expanding seals, sealants, adhesives and insulation foam are not considered as fastening materials.

After checking the rigidity of the attachment, the frame previously removed shall be refitted. Special spacers are installed on the PVC window between the frame and the frame to prevent the frame from deforming due to the expansion foam expansion. The gap between the wall structure and the window frame is then filled with assembly foam, according to the foam instructions. After the installation foam has finally hardened, the spacers between the frame and the frame must be removed and the window frame shall be adjusted in accordance with the window use and maintenance instructions.

## SEALING

The correct sealing of joints depends on the wind and rain resistance around the window, as well as the general technical "health" and longevity. Compaction must always be based on the fact that the bound moisture in the warm air inside does not enter the joints where, due to the lower temperature, there is a favorable environment for condensation. If the external joint is sufficiently ventilated, the

condensate will dry out in a while, but additional cold bridges will remain in the joint throughout the drying period and the humid environment will damage the structure. If the inner joint is closed correctly and the function area is insulated, the internal moisture will not affect the joints and moisture can only enter from the outer joint. Due to the relative uniformity of the outdoor temperature and the external joint temperature (achieved only if the insulation in the functional plane does not allow a warm external joint), condensation water is less likely to form in the joint. Thus, it is important that no external water enters the joint, but at the same time the joint breathes sufficiently to dry out any moisture that may enter the structure. The easiest way to achieve such a "breathable" joint is with self-expanding joint seals that repel water but allow air to pass through. If joint dressings are used, it is recommended to leave the joint partially open in places where rainwater is the least likely to get into the joint. This ensures that the joint breathes outwards. When sealing a joint, always follow the basic principle "Tighter inside than outside". Thus, even humidity must not get inside the joint, proper insulation must be provided in the function area and the outer joint must breathe but water must not be allowed in.

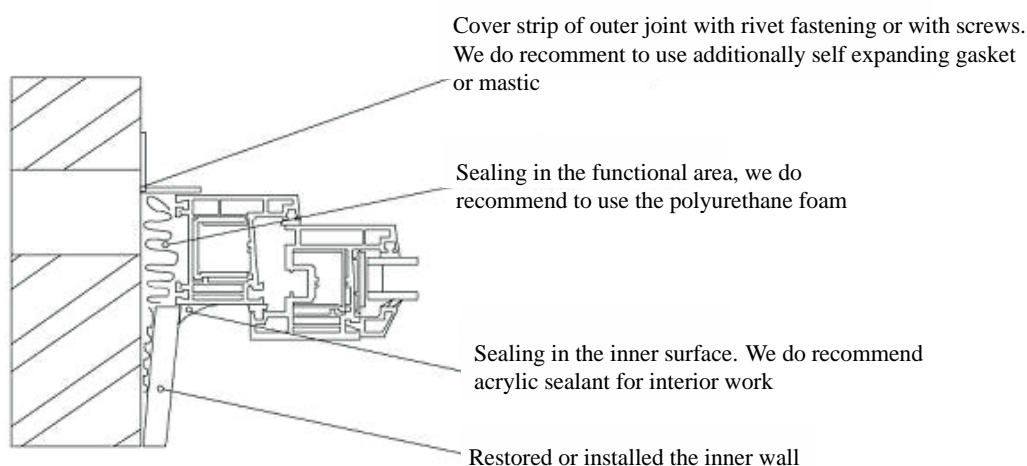
Here are solutions to some common situations:

### Exterior wall construction

Exterior window openings are most common in both renovated and new buildings. When installing in this type of opening, the joints are easy to seal because rain and wind only have a direct effect on the joint in the joint between the window and the outer beam running on the outer perimeter of the window, which usually varies between 5 mm and 10 mm. It is also simplified to seal this type of joint with polyurethane foam in the functional area, since it is ensured that the foam remains in the joint and thus there is no possibility that the foam falling out of the joint could damage the facade coating. Plastering external joints does not guarantee rain and wind resistance of the joint, as the window surfaces do not adhere to the plaster (and PVC window profiles move with temperature fluctuations) - so plastering also requires sealing external joints with mastic or self-expanding seal. Figure 6. Joint sealing for external wall construction

### Exterior wall construction

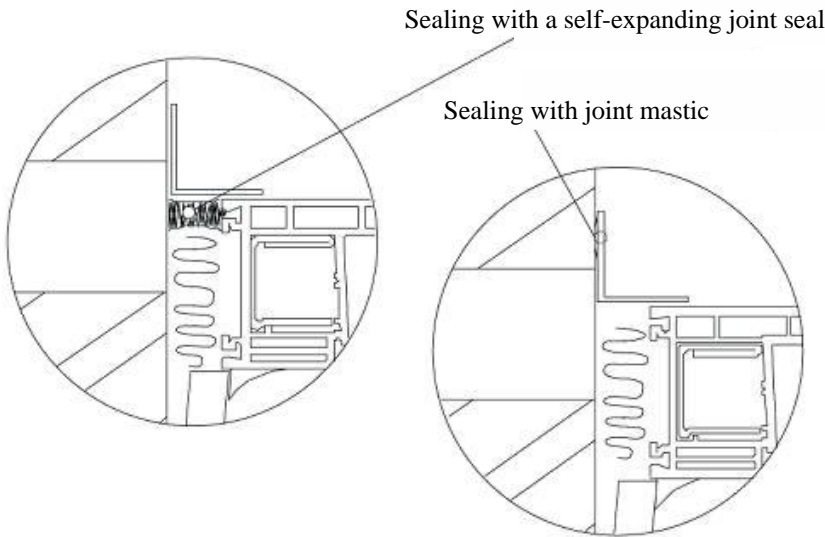
Structures without an external shell are found in much older types of panel and block houses, where the joints were covered with wooden slats on the outside. When sealing these joints, care must be taken to ensure that the external strips to be installed protect the joint not only from UV radiation but also from rainwater, therefore additional sealing of the joint is recommended.



*Figure 7. Joint sealing for external wall construction*

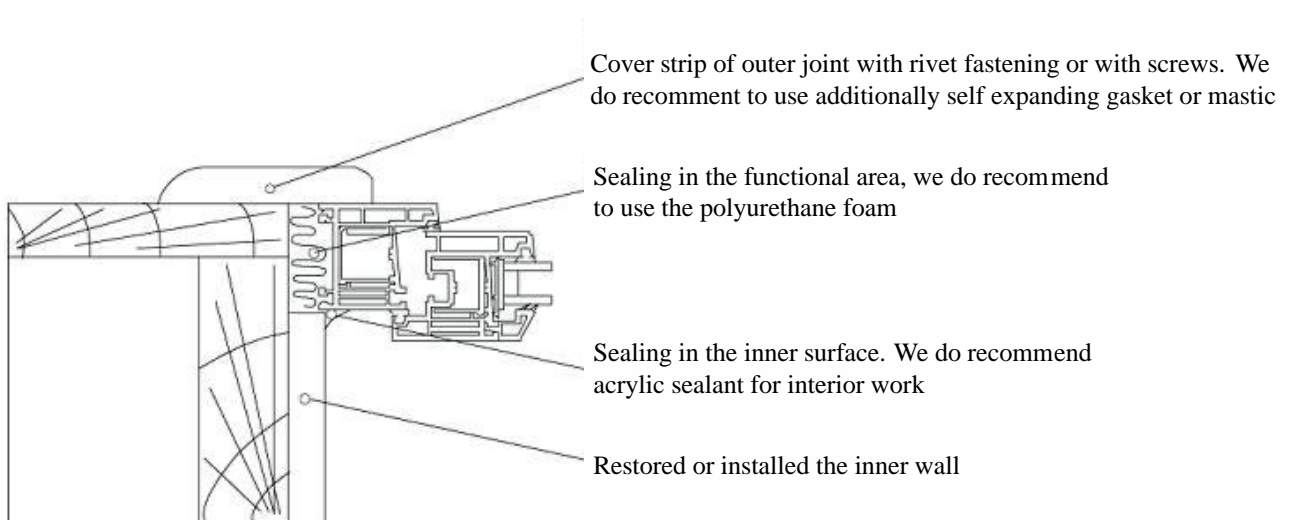
There are two basic solutions for additional compaction:

- a) sealing the outer joint with a self-expanding joint seal (see Figure 8)
- b) sealing the cover strips and the part and the part between the frames with joint mastic (see Figure 8)



*Figure 8. Possible additional sealing methods for the external joint*

Care should be taken when sealing the function area with polyurethane foam, as the foam escaping under pressure from the gun (cylinder) may fall out of the joint and damage the façade cover. In the case of older types of wooden buildings, the most common is the construction of a windowless window opening, which is essentially identical to the construction of a stone house of the same type.



*Figure 9. Possible joint compaction for wooden structures*

When additional sealing of the outer joint with a self-expanding joint sealant, the thickness of the seal should be approximately half the width of the joint. If additional sealings are made with joint mastic, unsealed parts a few centimeters wide must be left on the upper edge of the outer surface (where the risk of water entering the joint is minimal).

NB! When sealing joints with polyurethane foam in the functional area, care must be taken to ensure that the sealing does not break along the entire perimeter of the window, including in the vicinity of mounting brackets, support blocks and additional wedges.

## INSTALLATION OF WATER BLOCKS AND WINDOW SILLS

To prevent the outer base from falling apart and the walls and insulation from getting wet, water stains are installed with the windows. The width of the water stain should be chosen so that the nose of the water stain extends at least 3 cm beyond the façade (this way the water is directed further away from the façade surface when draining) but preferably not more than 6 cm (there is a risk of wind breaking the stain). The length of the water stain's sheet should be chosen so that even after the ends of the sheet have been rolled up, it is possible to overlap the side pieces on the sheet to prevent water from getting between the sheet and the edges of the sheet. If it is not possible to cover the outer slab with the sheet metal, the contact surface between the water sheet and the slab must be sealed with joint compound. The fixing of water stains is performed with sheet metal screws in the window profile. Additional fastenings to the side or base are made separately if necessary, depending on each specific situation. When installing the sheet, make sure that the slope of the water sheet is at least 5 ° outwards.

The installation of the window sill is performed from the inside against the installation profile.

The window sills are installed with an inclination of about 2 ° towards the room in order to drain any accidental water from the window sill. The window sill is wedged evenly from the rear edge against the lower frame of the window and the front edge is supported with support blocks. In the case of long boards, they must be fixed against the top panel during assembly, as the window sill may deform as the polyurethane foam expands. After supporting the window sill, it is insulated with polyurethane foam from below. The fixing of the window sill is ensured by covering the edges of the window sill with wedges, polyurethane foam and interior finishing. Additional support for window sills shall be performed, if necessary, in accordance with the installation instructions provided by the window sill manufacturer.

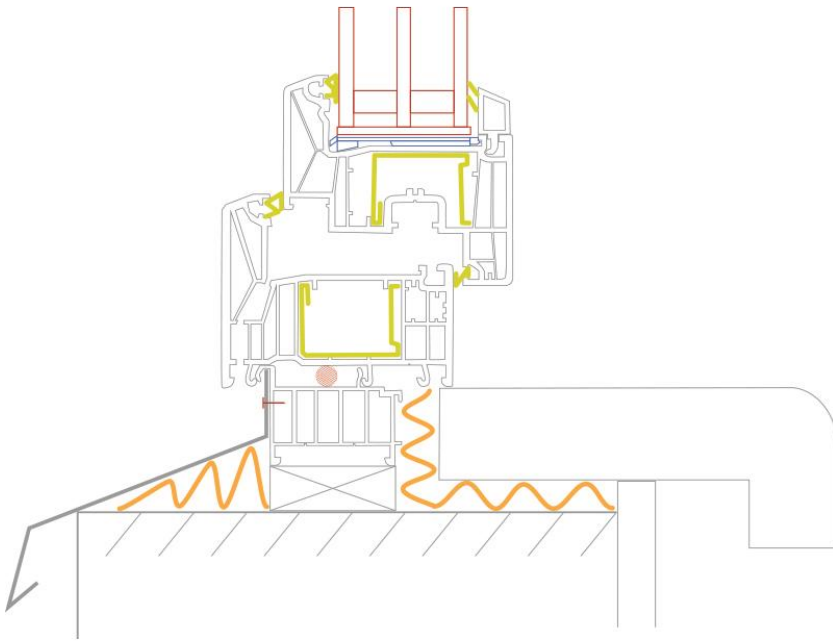


Figure 10. Installation of window sill and water sheet

NB! When installing water stains and window sills, make sure that the previously performed seals are not broken.

**Synego external (VU) and terrace door (TU) installation instructions.**

1. In accordance with REHAU's instructions and technical requirements, all Synego VUs and TUs must be mounted on the masonry (wall) with fasteners through the frame! All mounting points have holes pre-drilled in the frame by the manufacturer (4 holes on each side and 2 holes upwards (4 holes on the blinded door). As an exception if the mounting through the frame is impossible due to the wall construction or other similar reasons, there is allowed mounting also with metal anchors (similar way to the mounting of windows).

2. The installer is obliged to install wedges between the masonry and the frame at the fastening points in such a way that the fastening means (screw or dowel) passes through the wedge or is directly below the wedge (side frames) or immediately next to it (upper frame). It is required that the wedge to be installed must extend SURELY under the room edge of the frame (must be at least flush with the edge of the frame) or throughout the thickness of the frame.





**NB! View from the room! The support wedge MUST be flush with the edge of the frame on the room side!**



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3. The threshold pack (both high and low) must also be fixed with a screw in the middle, on a blind door with 2 screws. The holes are not pre-drilled, as this depends on the substrate material and the location is chosen on the site.