Attachment no. 1
Company guidelines for the installation of CDM window joinery

Wooden windows manufactured by CDM have a number of advantages that render their use easy and enjoyable. They are equipped with high-class multi-point locking fittings, thermal insulation glazing units and acrylic varnish coating with increased resistance to adverse weather conditions. The installation of the joinery should be performed by specialized installation teams with appropriate experience and expertise. The basic steps of woodwork installation, ensuring the smooth and correct performance of woodwork installation works, are presented below:

· inspection and preparation of the opening in the wall,
· setting of the window in the opening,
· mounting of the frame in the wall,
· execution of insulation around the frame,
· adjustment of fittings

1. Inspection and preparation of the opening in the wall
Each installed window should be inserted into a finished opening in the wall. It is unacceptable to enclose the frame of the window with a wall during the process of its erection and to use the frame as a form work element for the execution of the wall lintel above the window. As a result of such installation the window is fitted too tightly, without any clearances, without proper insulation. What is even worse, stresses from the wall structure are transferred through the window resulting in its improper functioning. Therefore, the opening in the wall should be 3-4 cm wider than the width of the window frame (1-2 cm on each side), and 5-8 cm taller (1-2 cm from the top and 3-6 cm from the bottom). The angles of the opening should have 90 degrees, and the diagonals should not differ by more than 1 cm, which can be checked using a tape or a string. If the opening in the wall is larger than recommended, this results in increased and unnecessary consumption of insulating material, and if the angles are not right angles, it may cause the "skewing" of the frame. All interior surfaces of the wall opening should be smooth, free of deficiencies and the internal insulation layer should protrude beyond the surface of the wall in the frame. The bottom surface of the opening should be uniform, even, and executed using a layer of bonded material allowing for the stable placement of the window.

2. Setting of the window in the opening

In order to facilitate the manipulation of the window during installation, the window sashes should be removed and only the frame should be used. In relation to the depth of fitting of the window and the window threshold in the wall opening, it is important that the dew point isotherm (10°C) for the wall passes through this window. Only then can we avoid the phenomenon of water vapor condensation on the inside of the window. In a layered wall

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insulated with mineral wool or polystyrene, this isotherm is usually limited with a layer of insulating material, therefore the window should be mounted at that height (or actually depth of the opening). After setting the frame on the threshold you should determine the horizontal and vertical directions (level and plumb) of the sides of the frame with the use of a spirit level and block the frame in the correct position using spacer and support wedges (Figure 3). In plastered frames it is advisable to interrupt the continuity between the internal and external plasters, preferably with an insulation layer.

3. Mounting of the frame in the wall

The CDM company recommends fixing windows using a system of anchors for the installation of wooden window (Fig. 1). Mounting anchors for PVC windows should not be used under any circumstances. The anchors have to be attached to the frame before the frame is set in the wall opening, at a distance of 15 cm from each corner, the distance between subsequent anchors should be no greater than 700mm (Fig. 2). The anchors should be mounted in the frame with 3.5 x40 mm wood screws. After the initial setting of the frame and its wedging the anchors are mounted to the wall using wall plugs. Please remember to attach each anchor to the wall using two wall plugs, except in cases where the anchor is mounted to a reinforced concrete wall. In such case the use of one wall plug is acceptable.

4. Execution of the window insulation

Wooden windows are characterized by the thermal insulation of Rs = 0.9-1.6 and high wind and water tightness. In order to maintain these parameters for the entire opening we have to seal the gap between the frame and the wall in such a way that it becomes resistant to water and cold penetration. Polyurethane mounting foams are currently most commonly used for this purpose. After they are applied to a gap they start swelling, thus sealing the gap completely. There is a danger in this case, that if the foam is not applied skillfully to the gap, excess foam which cannot find a way out of the gap may push the frame away from the wall, resulting in the creation of a bulge. In order to prevent this, primarily low-pressure polyurethane foams should be used. In addition, when sealing balcony doors a tensioner should be installed halfway up the door's height. It should be secured so as not to damage the window frame. We should always keep in mind, however, that mounting foam is only an insulating material and it is unacceptable to use it as the sole material fixing the window to the wall.
The insulating layer around the frame should be uniform, without interruptions, and of equal thickness. On the outer side, a waterproofing layer should also be executed along the gap. The layer should be executed especially carefully along the bottom frame, corners and the area of contact with the flashing. This insulation layer should be executed using materials such as durable elastic putties e.g. silicone. After the polyurethane foam has hardened the spacer wedges should be removed and the support wedges should be left. Then we should once more check whether the frames are plumb, level and square, and use polyurethane foam to fill the holes created after the removal of the wedges.

The CDM company recommends covering the window frame with adhesive paper tape in order to avoid the contamination of the window with polyurethane foam. Please note that this should be a special adhesive tape for acrylic surfaces, which must be removed immediately after the window is sealed with polyurethane foam.

In order to improve the thermal insulation parameters, we recommend the use of an additional sealing layer in the form of a vapor barrier tape from the inside and a vapor permeable tape from the outside.

5. Adjustment of fittings

CDM windows are equipped with multi-point locking fittings, which lock the window sashes in several places around the entire perimeter and allow for the use of one handle to control door opening and tilting functions. The multi-point locking fittings is a high-precision mechanism. However, the fittings have a tolerance of a few millimeters allowing for their adjustment in several directions. In the fittings used by the CDM company this adjustment is performed using a hex key in accordance with the window adjustment instructions. Each user can perform window adjustment on his own based of the instruction manual. After inserting the sashes in the mounted frame, the installer should also inspect the proper operation of the windows, lubricate the fittings components in the places indicated in the instruction manual and make adjustment where necessary. Window sashes should open and tilt easily, without any friction and resistance, and the contact pressure of the sash against the frame should be even around the entire perimeter.

6. Finishing works

The task of the authorized installation team is not only to mount and adjust the window but also to sash the premises clean and tidy. The installer should be able the plaster in areas where the it has been damaged, e.g. plaster carved out for the mounting anchors. During installation we should keep in mind that the final element of the new window is the sill installed underneath it and sloping in the direction opposite to the window. In regards to the outer side, we must remember about the flashing which should be properly installed under the window gutter drip and which protects the wall against water dripping. An additional aesthetic element are the masking strips applied around the window and used outdoors and indoors.

Required materials and tools

1. One component polyurethane low-pressure foam
2. Paper self-adhesive tape for acrylic surfaces.
3. Spirit level.
4. Hammer drill.
5. Mounting anchors - appropriate for the given wall

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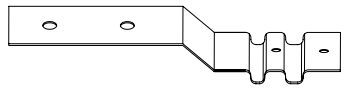
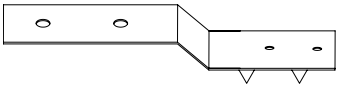
6. Wedges.
7. Tools for window or door adjustment.
8. Wood screws and wall plugs.
9. Optional vapor barrier tape and vapor-permeable tape.

Figure no. 1 mounting anchors for the installation of wooden windows



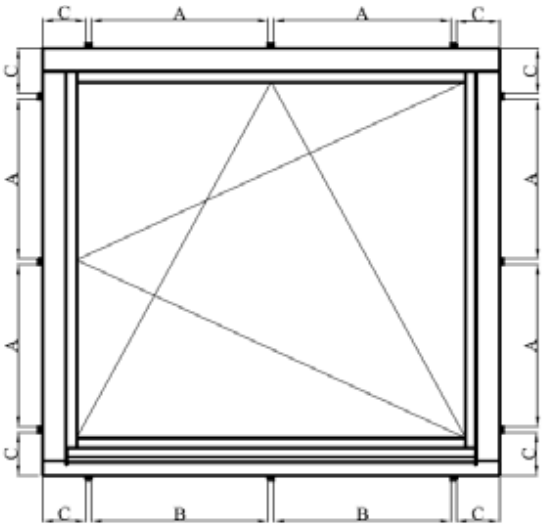
profiled anchors (side and top)



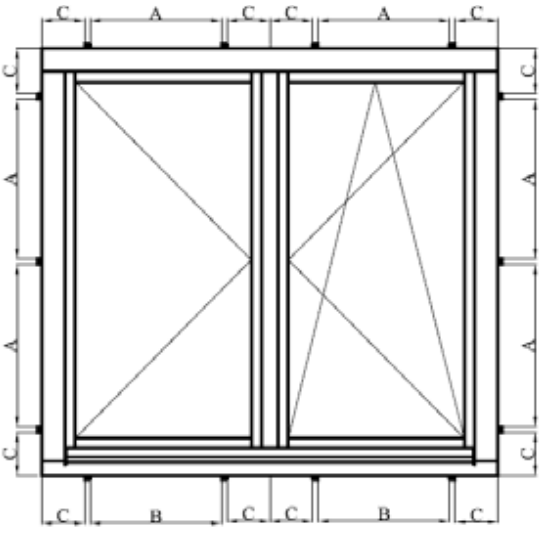
driven anchors (bottom)

Figure no. 2 - the principle of anchor spacing

single casement window and fixed window



double casement window and all windows with mullions



dimension A
– max. 700 mm

dimension B
– opened and fixed window max 700 mm
– sliding and folding window max. 500 mm

dimension C
– max. 150 mm

Figure no. 3 - Spacing of the support and spacer wedges

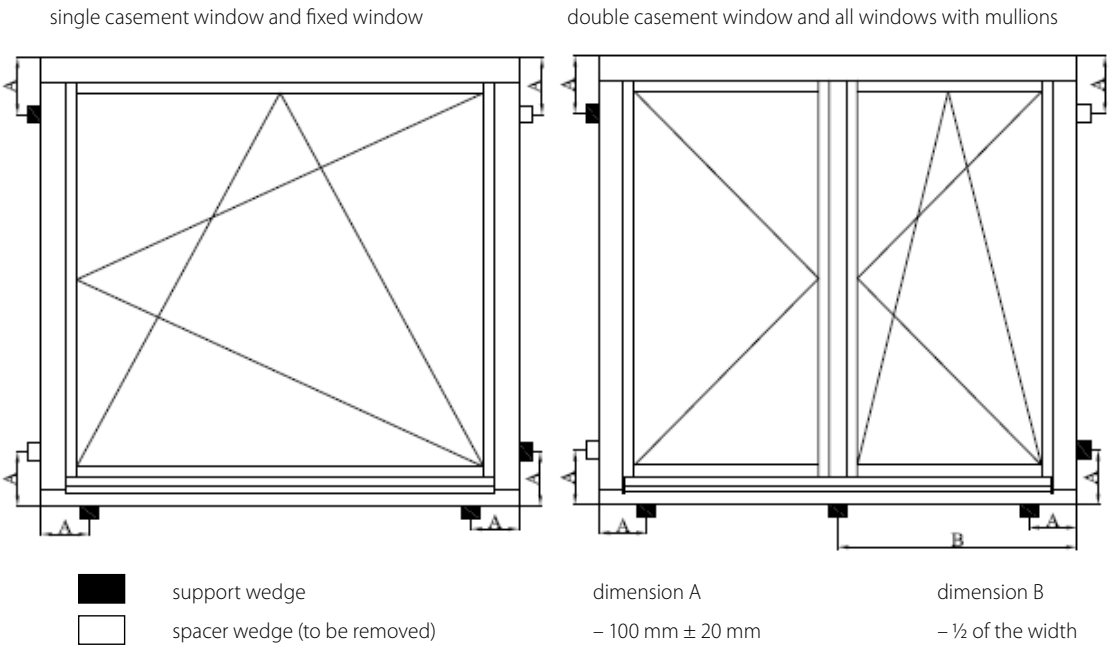


Figure 4 – Diagram of the window frame embedding

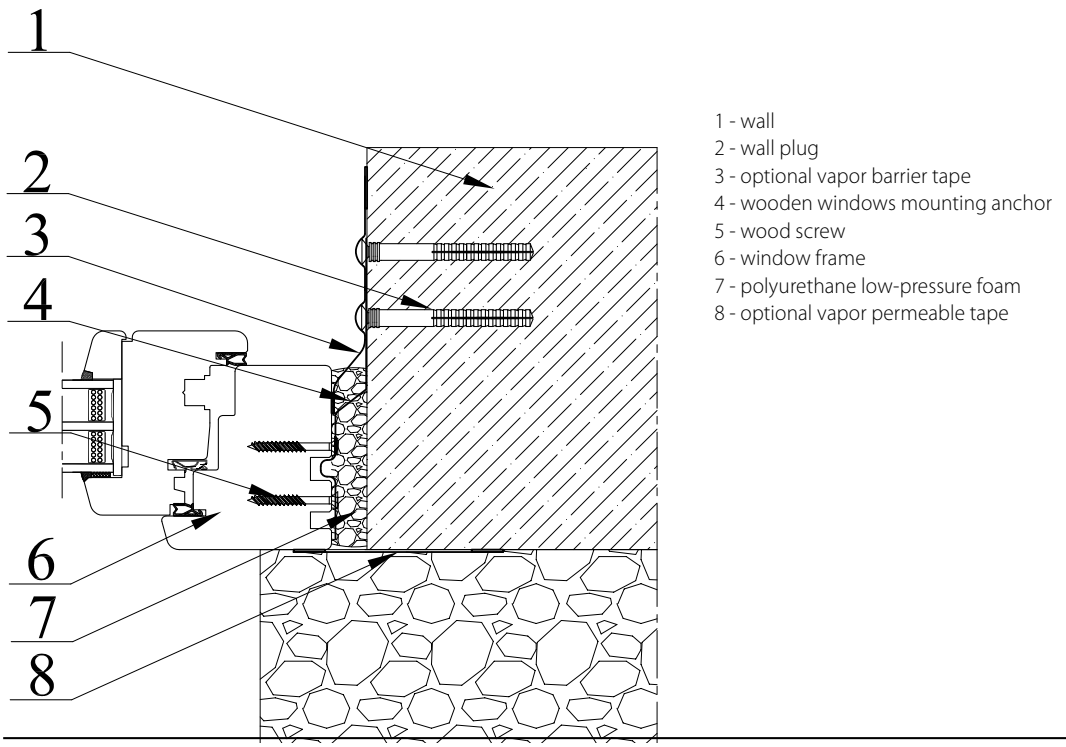


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Figure no. 5a - Diagram of threshold setting for doors opened to the outside

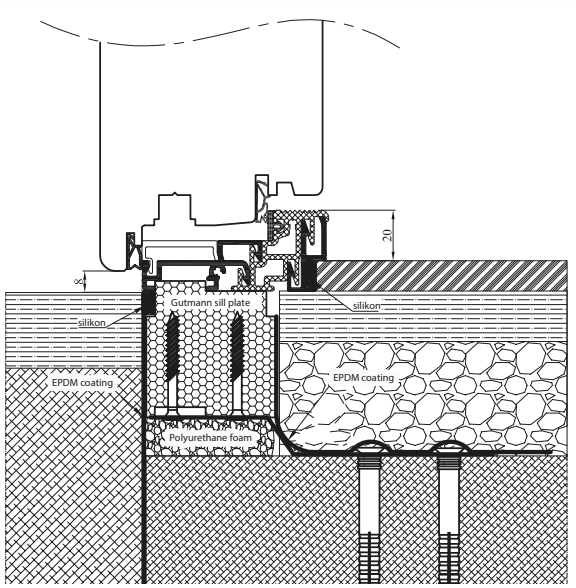
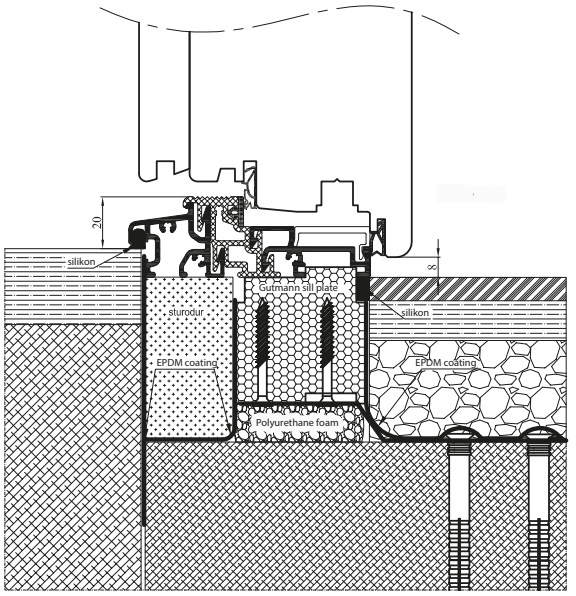


Figure no. 5b - Diagram of threshold setting for doors opened to the inside



Spacing of the mounting anchors and wedges in accordance with Figures 2 and 3. Gutmann thresholds are available in heights of 30 mm and 50 mm. The thresholds can be joined freely in order to obtain the desired height.

7. Installation of the Hs sliding window

In the HS lift and slide windows, the entire weight of the sashes is transferred to the threshold. Due to the large weight of the sashes (up to 400kg), the proper setting of the threshold is a prerequisite for the proper functioning of the window throughout the period of use.

The installation should begin with:

a. Fixing the connector plates on the entire perimeter of the window.
The spacing of the connectors should be executed in accordance with Figure No. 6 It is important for the connector plates to be made of galvanized sheet steel with a minimum thickness of 2 mm and dimensions of 40x250mm.

b. Leveling and anchoring of the threshold, accounting for the established depth of the threshold setting in the flooring.
The threshold should be supported through a self-leveling screed on the entire width of the window in accordance with Figure No. 7, or with spot supports through elements made of hard, non-absorbent materials such as impregnated waterproof plywood. The elements for the spot support should have a minimum dimension of 150x100mm and an appropriate thickness, and their spacing should be executed in accordance with Figure no. 8.
Before anchoring the threshold it is necessary to check its straightness using a long spirit level, which should also be used to check the leveling of the threshold. The threshold cannot be warped or oriented non-horizontally.

c. Setting of the window squareness.
Check the squareness of the entire structure using 2 spacer blocks placed diagonally on the doors. It is also necessary to check the vertical setting of the window in the direction perpendicular to the glass plane.

d. Mounting of the window in the wall.
The window should be mounted in accordance with the rules described in point 3.

e. Execution of the window insulation
The window insulation should be executed in accordance with the rules described in point 4.

An example of installation of a window with the sill supported on a self leveling compound is presented in Figure no. 9, while Figure no. 10 shows and example of installation with the sill based on spot supports.

We recommend using thermal sill plate systems, available in heights of 100, 150 mm. The sill plates can be joined or trimmed to achieve the desired height. Thermal sill plates can be replaced with a sill plate made of impregnated wood.

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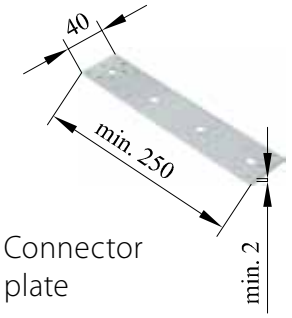
Figure no. 6
Spacing of connector plates



Connector plate

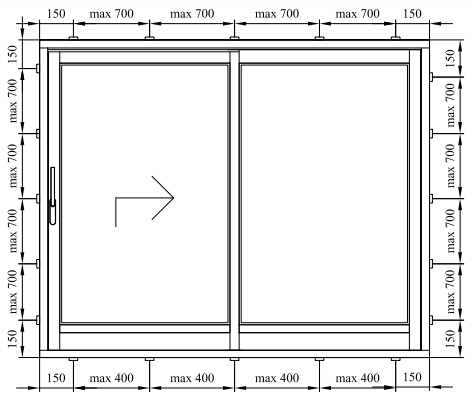


Figure no. 7
Sill embedded on
a self leveling compound

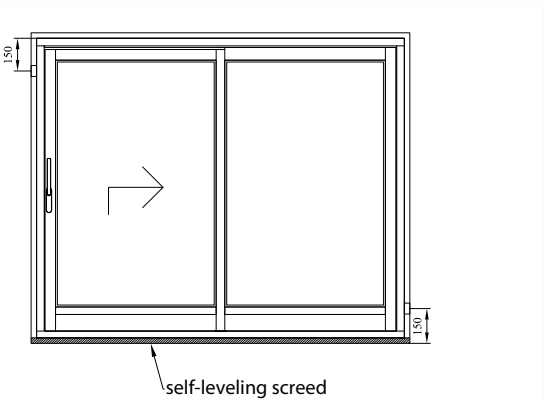


Figure no. 8
Sill embedded
on spot supports.
descriptions of the figures:

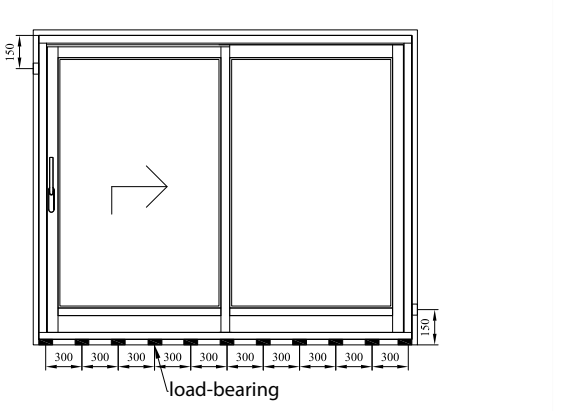


Figure 9 - Example of installation of the HS windows with the sill embedded on a self leveling compound

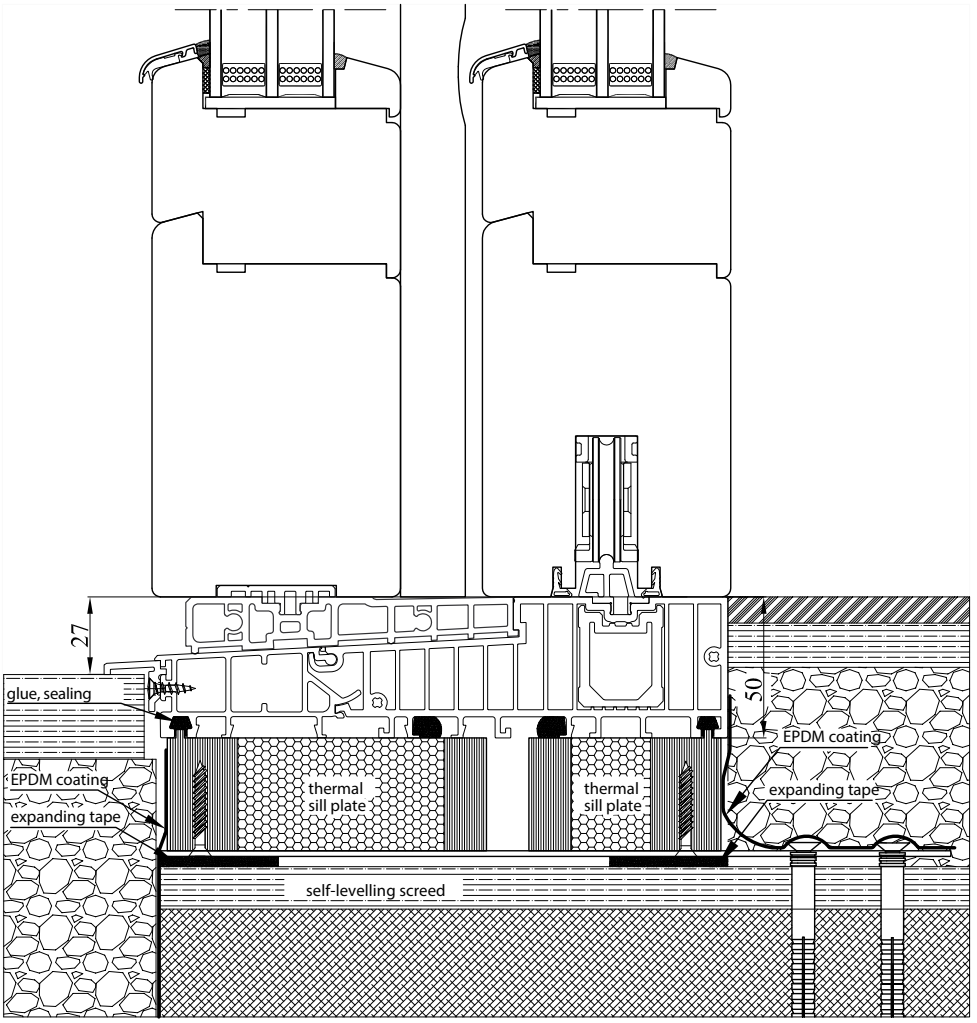


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Figure 10 - Example of installation of the HS windows with the sill based on spot supports