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Installation manual for (NORDIC-DESIGN) PVC-windows opening to the outside

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These installation instructions cover the design and execution of construction joints, with the objective of ensuring a long useful life for the installed windows.

Window quality depends on the joints, which is why the correct configuration of construction joint junctures is very important. All forces of construction physics having an effect on the window must be taken into account (Drawing 1).

1. Fixing elements

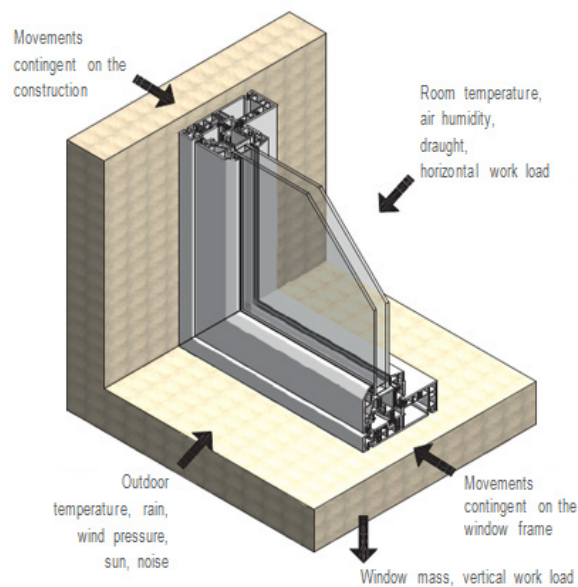
1.1 Load amounts

In order to ensure the long useful life of windows, doors and facades, all forces systematically acting on the windows must be directed to the building. The following forces apply:

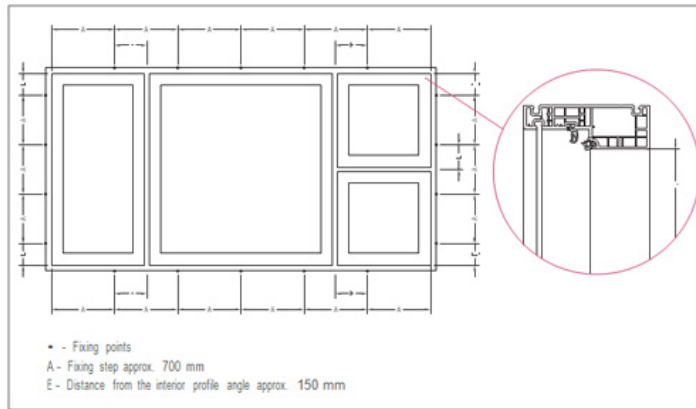
- wind load,
- own load,
- horizontal workloads. Based on DIN 1055.

In addition to the named loads, the following also apply to the forces:

- frame profile flexural rigidity,
- location and number of fixing points,
- difference between internal and external temperature,
- heat expansion of used materials, and
- flexibility of fixing devices (spring rigidity).



Drawing 1. Influences to the installation joint juncture



Drawing 2. Plastic window fixing steps

1.2 Load diversion

Wind loads and horizontal work loads

The selection of suitable fixing devices is mainly dependent on the occurring loads, actual construction situation and wall connection system.

The used fixing devices mainly divert wind load and horizontal work load. PUR-foam, sprayed jointing materials or other insulation and jointing materials are no longer considered to be fixing devices.

Fixing should be mechanical!

The location of fixing devices on plastic windows must correspond to Drawing 2.

Own loads

These are loads contingent on the mass of the window or door element.

In order to direct the load to the wall, frames must be pillared and fixed with commercially available fixing devices (see Drawing 3).

The latter is not sufficient for directing the load resulting from the mass!

The following must be taken into consideration:

- Blocks must be made of suitable material.
- Block location may not influence the expansion of the element in an unacceptable manner.
- Blocks must be kept in the construction joint junctures for the permanent load drain off.
- Steel corners or consoles with relevant stability must be used for elements in front of brickwork.
- It is always presumed that the frame profile has sufficient flexural rigidity.
- Blocks may not hinder further works, e.g. sealing the joint juncture.

1.3 Fixing devices

The choice of correct fixing devices depends considerably on the construction situation. The brickwork and fixing devices must be compatible.

At that, the following data submitted by the manufacturer must be taken into consideration (Drawing 4):

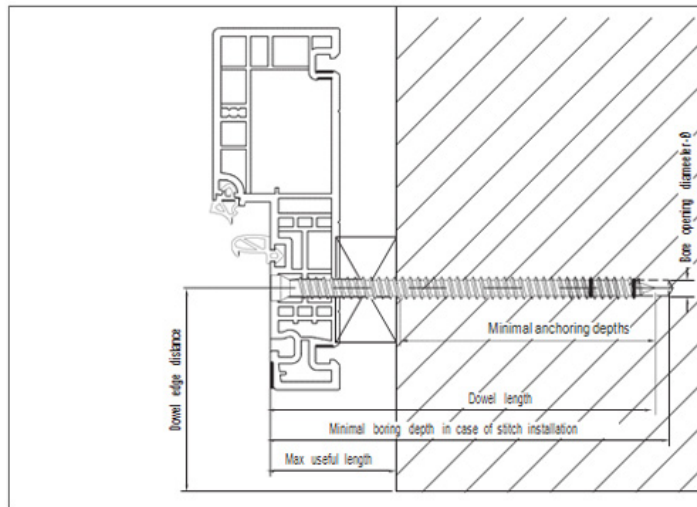
- given main loads,
- maximum distance between frame and brickwork: maximum usage length d_a ,
- minimal mooring depth h_v ,
- dowel edge distance,
- diameter d and depth t_d of drilled opening.

Follow data provided by the relevant manufacturer!

For fixing the window frame horizontally, fixing devices that would not inevitably open the armature chamber on the ground of the half closure should be chosen.

If this is not possible, the armature chamber must be permanently sealed.

The choice of fixing device depends on brickwork construction. In case of cell brick brickwork, the brickwork in the dowel area must be filled (e.g. with finishing injection mortar Fischer FIS VS 150 C)



Drawing 4. Important fixing dimensions

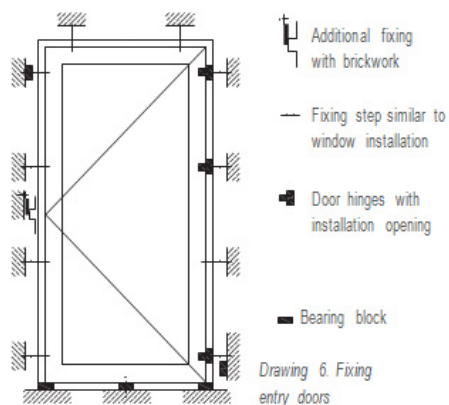
1.4 General guidelines for window fixing

- Drill correctly, and do not use percussive tools (except in the case of concrete).
- In the case of brickwork, drill as much as possible in the mortar joint junction.
- Take into account wall constructions in case of dowel bearing capacity and length.
- Use bolts, anchors, clamps, montage systems, etc., suited for the used dowel system.
- Blow the bore holes clean.
- The dowel manufacturer's indicated, material-dependent axle and edge distances must be taken into consideration.
- Fix the bolts to the frame in a uniform and pressure-free manner. (Use a screwdriver with a torque besieger.)
- Bearing block and fixing element should be matching.
- The use of nails is prohibited, including special nails.

1.5 Special connections

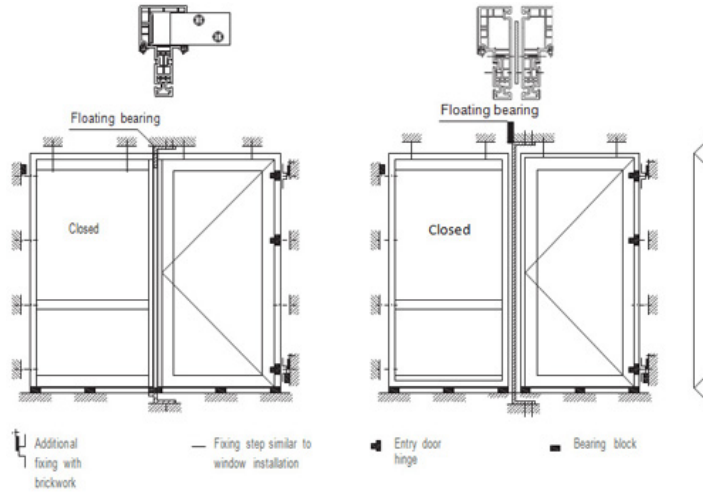
Entrances

Entry doors are more influenced by dynamic (e.g. slamming doors) than static load. Also, compared to windows, entry doors have fewer closing points, which is why additional fixing must be used in addition to the already mentioned regular fixing points (see Drawing 6).



Drawing 6. Fixing entry doors

In case of entry doors connected as multi-element posts or single elements, the strengthening profiles must be fixed separately (Drawing 7).



Drawing 7. Fixing multi-element entry doors

Connections, expansion gap

For safe management of applied loads in case of element connections or element expansion gap, the armatures used for making the constructions static must be fixed in the construction. At that, the armatures may never be stiffly fixed, but it must be possible to balance construction related movement with either a stable or floating bearing according to Drawing 8 or 9.

| Window width | Length change at Δt [mm] $\pm 30^\circ\text{C}$ $a_{\text{exp}} = 0.42 \cdot 10^{-4} / \text{K}$ |
|--------------|---|
| 1500 | ± 1.9 |
| 2500 | ± 3.2 |
| 3500 | ± 4.4 |
| 4000 | ± 5.0 |

Table 1. Length change caused by white PVC window thermal load

In case of large element widths or heights, leaving an expansion gap must compensate for both the horizontal and the vertical expansion of profiles. Expansion of white profiles has been shown in Table 1. Simply put, in designing the gap size for white windows, ± 1.25 mm must be calculated for each metre or profile. In case of other colour windows, the value is double that.

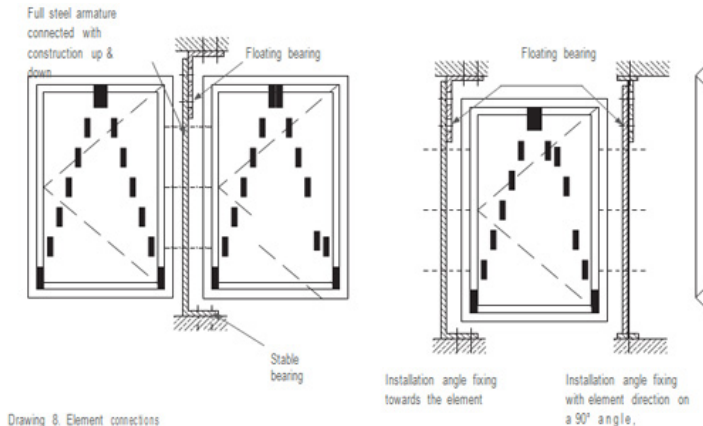
Maximum profile length for elements

- Profile colour, white: 4.0 m
- Profile colour, not white: 3.0 m

Starting for these profile lengths, the window frame connections must be executed as expansion gaps. Jamb, support profiles etc. may not bridge these expansion caps. Also, profile movement may not be obstructed in any way.

Maximum profile length in case of single closed glasses

- Profile colour, white: 3.0 m
- Profile colour, not white: 2.5 m



Drawing 8. Element connections

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