Building Research
Design Guides
1 – 2003

Installing windows in framework walls

523.701E

0 General

01 Contents

This Design Guide describes the installation of windows in framework walls made of timber or thin Guide-metal sections. The Design Guides shows where the windows should be positioned in the wall and how the windows should be installed and fastened. Furthermore, it describes in detail how the joint between the frame and the wall is made both airtight and watertight, as well as the execution of interior and exterior casings.

02 References

The Planning and Building Act (PBA)
Technical Regulations (TEK) Pursuant to the PBA with guidelines
Standards:
NS 3420-RS Specification texts for buildings, constructions and installations
Building Research Design Guides:
520.406 Using elastic sealant to seal joints
520.415 Weather-protective flashings
523.255 Timber framework walls. Thermal insulation and sealing
523.702 Installation of windows into brick and concrete walls
533.109 Sound insulating properties of windows
573.102 Sealing materials for joints. Groups and terminology
573.104 Sealants. Properties, choice of materials
573.105 Weather strips. Properties, choice of materials
573.107 Single-component polyurethane foam. Properties, areas of use
573.121 Materials for air and vapour tightening
Group 533 concerning windows
Building administration:
723.638 Replacing windows

1 Requirements and recommendations

11 Technical regulations

TEK sets out a number of requirements relating to the properties of windows. Depending on where they are to be used, there are regulations relating to stability, fire safety, health and the environment, safety of use, sound insulation and thermal insulation. TEK also requires those properties to be adequately documented; see Section 14. Windows and other parts of the building must be fastened securely, to ensure that they cannot fall out and cause personal injuries.

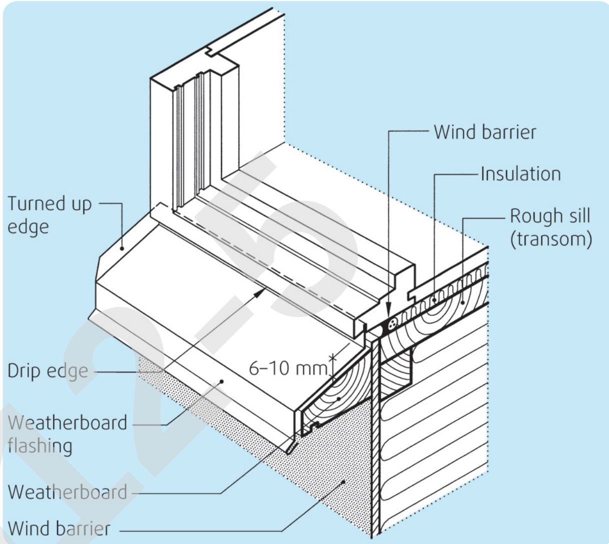


Fig. 65
Window with weatherboard flashing entering a groove in the bottom of the window sill
The air seal between the wall framework and the window frame has been effected using a sealing compound.

12 Functional requirements

Windows must be securely fastened, not just to avoid the window falling out or blowing in, but also to ensure that the window functions as intended during many years of opening and closing.

The external casing and sealing must prevent rain and wind from penetrating through the wall via the joint between window and wall. It must also be possible for the window and joint to dry out, so that materials that become damp can quickly dry out again. The joint must be sufficiently airtight on both the cold and warm sides to prevent through-going air leaks and convection within the joint insulation.

13 Other requirements

It is particularly important that windows classified in a specific fire and sound insulation class should be installed in accordance with the manufacturer's instructions. The installation instructions should always be available at the construction site. Installation of windows is described in NS 3420-R5.

14 Documentation of product properties

TEK stipulates that product properties affecting the fundamental requirements relating to structures should be documented before the product is marketed and used. This documentation is generally produced in accordance with Norwegian Standards or equivalent technical specifications. Relevant documentation may include type approval from the Norwegian Door and Window Control, Technical Approval or Product Certification from SINTEF Certification, including any product-specific installation instructions.

2 Positioning

21 Positioning options

Positioning of the window (far out or deep in respectively) relative to the wall surface affects a number of issues and should be considered carefully. You must bear in mind aspects relating to moisture, thermal insulation and architectural design. See Sections 24 and 25.

22 Recommended positioning

In order to avoid thermal bridges, and thereby eliminate unnecessary heat loss, the window should be positioned roughly in line with the layer of thermal insulation. As a general rule, the window should be placed so that the turned-up edge of the weatherboard flashing is just outside the wind barrier. This minimises heat loss, makes it easier to seal against rain and minimises the risk of damage due to moisture.

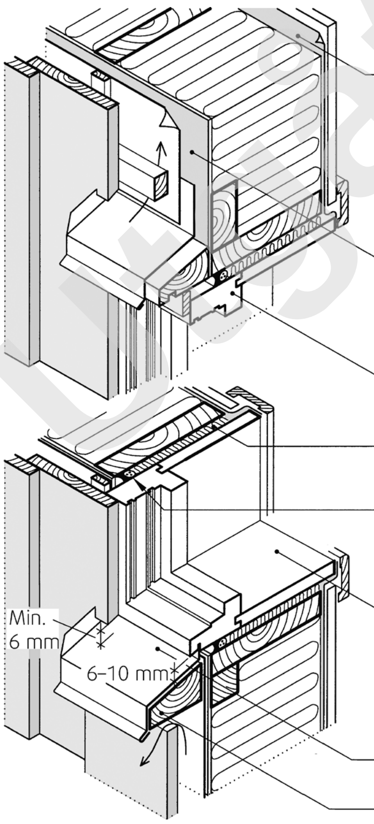


Fig. 22 a
Window installed in a wall with vertical timber cladding on battens
The window can be positioned further out in the wall so that the outer boards of the wall form the uprights of the exterior casing.

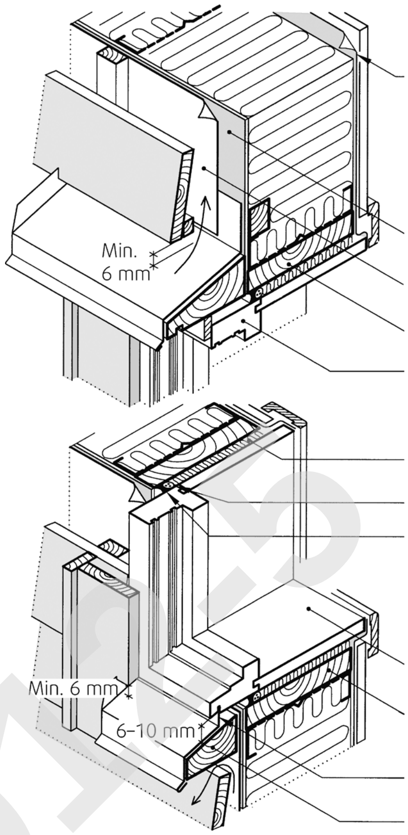


Fig. 22 b
Window installed in a wall with horizontal cladding on battens fixed to a wall framework made of thin steel profiles with a plain sill.
Similar detailing can be used for vertical cladding if you want a special/separate casing for the window. If the window is positioned in the outer part of the wall, it must be fastened securely using specially designed metal anchors.

A good seal against rain is particularly important in places exposed to large amounts of driving rain. See Figures 22 a and b.

23 Cold inland regions

In cold inland regions with little driving rain, the window can be positioned towards the warm side of the wall in order to reduce the risk of condensation on the inside. If the window is positioned so far in that the turned-up edge of the weatherboard flashing enters the insulation layer, it is very important to ensure that the flashing and the seal around the window are completely raintight in order to prevent leaks and damage to the wall due to moisture. See Figures 23 a and b.

24 Positioning in the outer part of the wall

Positioning the window in the outer part of the wall will:

- facilitate sealing against rain and minimise the risk of moisture in the wall below the window, as driving rain penetrating past the exterior casing can easily drain down on the front of the wind barrier/insulation
- maximise the solar heat gain as the window recess doesn't shade the window to any large extent
- maximise drainage and ventilation behind the exterior casing and increases the rate at which the window dries out after driving rain
- increase wear and maintenance requirements

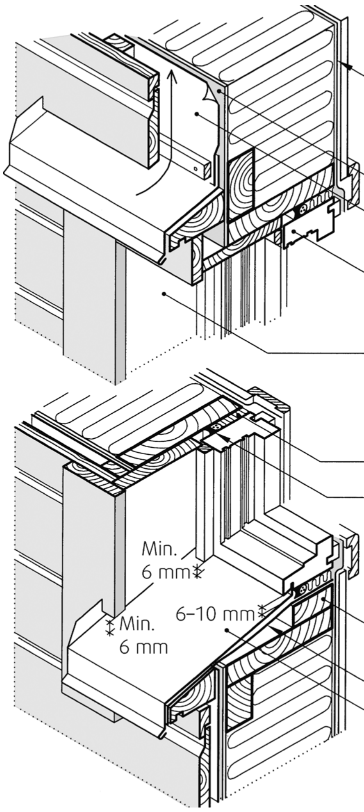


Fig. 23 a
Window positioned towards the warm side of the wall
If the turned-up edge of the flashing is inside the wind barrier in the wall, there are very strict requirements relating to the flashing and sealing details. Leaks around the window will cause the walls to become damp. This design is not recommended where there is a lot of driving rain.

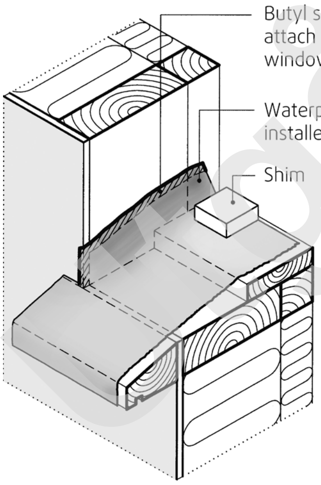


Fig. 23 b
Extra sealing under weatherboard flashing

25 Positioning further in towards the warm side of the wall

Positioning towards the warm side of the wall will:

– reduce the risk of condensation on the inside of the window to a certain extent, as the internal surfaces of the window will stay warmer. Without deep window niches, the window will more easily be warmed by heat sources below the window and from the general warm air circulating in the room. It will also reduce the risk of cold draughts from the window.
– reduce the risk of condensation on the outside of the window, as the external surface of the window will stay warmer. This is due to the window recess providing partial protection from the effects of a clear (cloudless) sky
– increase the lifetime and reduce the need for maintenance, particularly of wooden windows. This is because the window will be exposed to less rain, and also because the frame and the sash will be warmer, reducing their average moisture content.
– reduce solar heating. This is an advantage for buildings that produce excessive heat and need cooling.

3 Installation

31 When to install

The windows must not be installed before the frame wall has been made sufficiently rigid. Sheathing (boards that provide wind bracing) should therefore be installed before fitting the windows. If the walls are permanently braced using diagonal bands , the windows can be installed before the wind barrier. The roof must be installed before the windows, in order to ensure that the windows are sufficiently protected against precipitation at all times. The windows should be installed before the external cladding. This makes it easier to achieve a good seal of the joint between the frame and the wall against air and wind.

32 Shims

321 *General*. Load-bearing shims are intended to transfer the weight of the window to the wall beneath, and must therefore be positioned directly under the load-bearing elements of the frame. It is essential that the rough sill (transom) at the bottom of the window opening is fastened securely, and must be as level as possible.

322 *Operable windows*. Before positioning the window in the opening, place two shims towards the corner of the opening, directly beneath the side jambs, see Figures 322 a and b. The thickness of the shims must be exactly right, so that the sill is completely level and at the same height as all other windows. For operable windows with a mullion, an extra shim must be placed under the mullion if one of the sashes is hinged to the mullion. An extra shim is also needed for windows with mechanisms that transfer some of the sash's weight to the mullion. It is important that the shims under the mullion are no higher than the shims under the side jambs. If the shims are too high, the sill will be pushed upwards, resulting in too little clearance between sash and frame. All of the shims must be short enough to avoid interfering with the air seal around the window.

323 *For fixed frame windows*, a shim must be placed directly under each of the two glazing supporting blocks upon which each pane rests in the sash. A space of approx. 100 mm is usually left between the edge of the pane and the edge of the glazing supporting block. There must

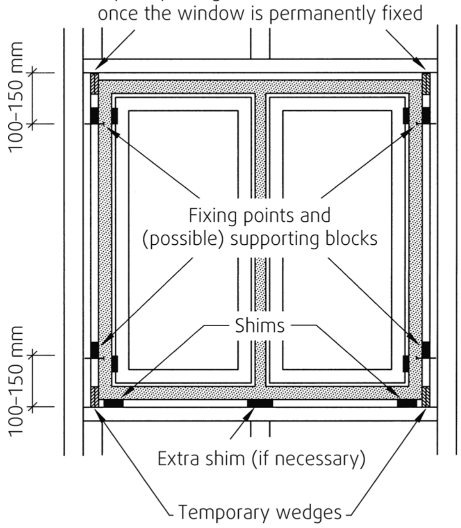


Fig. 322 a
Operable window with mullion
Positioning of load-bearing shims, temporary wedges, fixing points and possible additional supporting blocks

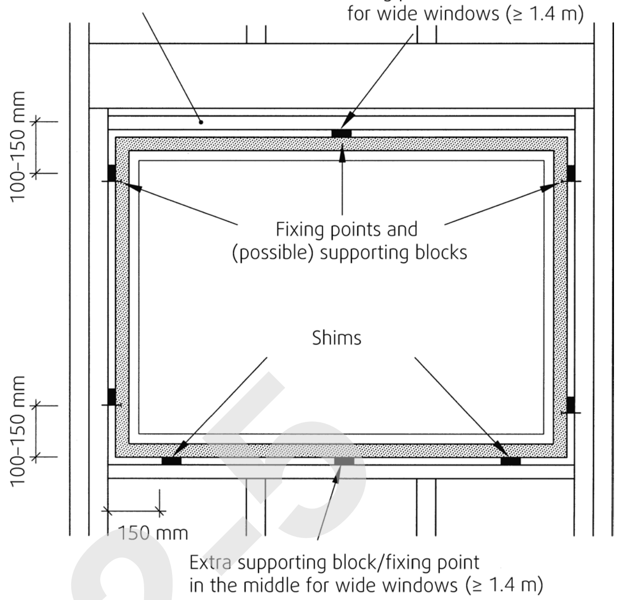


Fig. 323
Positioning of shims below the window, fixing points and possible supporting blocks on either side of large fixed-frame windows

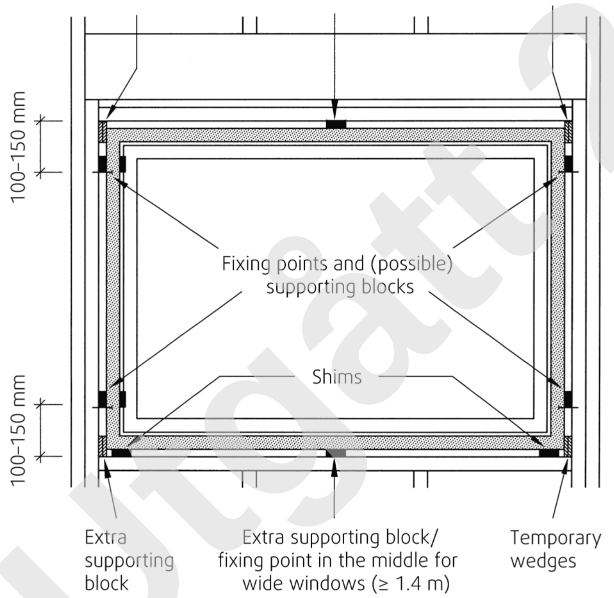


Fig. 322 b
Operable window with wide, side-hinged sash
Positioning of load-bearing shims, temporary wedges and fixing points and possible additional supporting blocks

therefore be a gap of approx. 150 mm between the edge of the opening in the wall and the edge of the shim, see Fig. 323.

33 Adjustment and wedging

When the window has been correctly positioned in the opening, fasten the frame temporarily by inserting wedges into the vertical joints between the extension of the frame head and the wall. Next insert temporary wedges between the extension of the sill and the wall. When installing high windows and windows with a transom, it may also be necessary to insert temporary wedges, for instance next to the transom. With the window still closed, adjust the wedges until the window is straight and vertical. Then open the window sashes to check that the clearance between the sash and the window is correct. No part of the sash should touch the frame when opening or closing the window. Also check that the sash fits snugly against the bead stop and weather strips around the whole window. For windows with wide, side-hinged sashes, it is important that there is adequate clearance between the sash and sill on the closing side, so that there is room for adjustment if the sash drops over time, e.g. due to the hinges becoming worn. You must not place any shims or permanent wedges in the horizontal joint between the frame head and the wall. See Section 343. That could result in the frame head being pushed downwards. When you have finished fastening the window, remove the temporary wedges (but not the additional supporting blocks), see Section 34.

34 General installation advice

341 *Strength*. It is important to fasten the windows securely to the wall, both to prevent them from blowing in and to prevent them from falling out when they are opened. Double, and particularly triple, glazed units are heavy, and impose a substantial load on hinges and fixing points when fully opened. The forces exerted on the fixing points increase with the size of the window, as do the requirements relating to their specification. If the window is not properly supported, or if the frame is not fastened securely to the wall, the window may move out of position, resulting in leaks and problems with opening and closing of the sashes.

342 *Post-installation adjustments*. If the window's supporting blocks or fastenings fail, or if the opening in the wall is distorted, it may be necessary to make adjustments to the window.

Using screws with sleeves during installation makes it easier to perform any such subsequent adjustments. Provided the window is properly supported and the walls are stable, with good wind bracing, alternative fastening methods which limit the ability to make post-installation adjustments may be used. See Sections 353–356.

343 *Positioning of fixing points*. Normal sized windows only need fastening through the side jambs, approx. 100–150 mm from the top and bottom. Side-hinged windows should be fastened close to the hinges, so that the forces that are transferred from the sash via the hinges are transferred directly into the wall. Windows that are more than approx. 1.4 m wide must for safety reasons also be fastened through the frame head and sill. In such cases the frame head is fastened to a window transom which is independent of the lintel. See Fig. 323. Windows that are higher than approx. 1.4 m should have at least three fixing points on each side. Any fixing points in the sill of metal or plastic windows must never be located in such a way that they perforate channels that are designed to drain away water. The fixing points should always be on the inside of the weather strip between the sash and the frame, or on the inside of the pane of fixed frame windows. If fixing points are positioned so that they make holes in the flange of windows that open outwards, it could easily cause water to leak into the wall. When the window has been properly fastened, the holes in the frame should be covered with a plastic plug or bung that is glued in place.

344 *Supporting blocks*. If the window is to be fastened with nails or standard, thin wood screws, the frame needs to be made more rigid with supporting blocks at the fixing points on either side of the window. Supporting blocks or double wedges should be placed in the gap between the frame and the wall at the fixing points. They also prevent the frame from being pressed outwards during nailing or screwing. This is particularly important when installing wooden-frame windows, in order to prevent damage to the corner joints.

Provided you use the sleeves correctly, or use thick, rigid screws (thicker than approx. 7 mm) supporting blocks are unnecessary at the fixing points; cf. Sections 351 and 353.

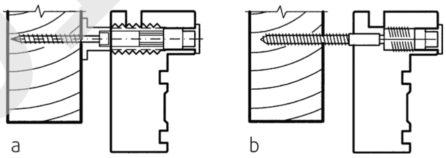
Windows with wide, side-hinged frames should have extra lateral support at the bottom on the hinge side and at the top on the closing side, in order to prevent the frame distorting and the sash sagging. Such windows should therefore have extra supporting blocks at the extension of the frame head and window sill. All of the supporting blocks must be short enough to avoid obstructing the sealing of the window.

35 Installing wooden windows

351 *Fixing and adjustment sleeves*. There are several types of fixing and adjustment sleeves that can be installed in pre-drilled holes in the side jambs. For frames without pre-drilled holes, there are special drill sets designed for the various systems. If using sleeves, you will not need supporting blocks between the side jambs and the wall for normal sized windows.

One type of sleeve can be screwed out towards the uprights and be fastened with its own screw when the window is in the right position, see Fig. 351 a. Sleeves with a wide base provide the most rigid fixing, but require the surface of the upright to be parallel to the frame, to prevent the frame from being twisted when the sleeve is screwed into place.

When adjusting the window after installation, loosen the screw at the bottom of the sleeve before screwing the sleeve round so that the frame is moved sideways. Another system involves a thick screw with an externally threaded sleeve that is kept in place by the head of the screw, but in such a way that the sleeve can be turned independently of the screw. See Fig. 351 b. The screw and sleeve are screwed into pre-drilled holes in the frame using a special key. The whole of the sleeve is set into the frame and it does not touch the upright. As the screw is relatively thick, approx. 7 mm, this provides a sufficiently rigid fixing for normal sized windows without the need for supporting blocks on either side of the frame.



Figs 351 a and b
Example of fixing and adjustment sleeves used to fasten wooden windows
a. Fixing and adjustment sleeve that is screwed to the stud
b. Screw with a sleeve that is held in the frame by the head of the screw, but in such a way that the sleeve can turn independently of the screw

352 *Special screws*. Special screws are available that make it possible to adjust the window after installation. One type involves a deeply grooved sleeve that is held in place below the head of the screw, but in such a way that the screw can be turned independently of the sleeve. As the screw is screwed into the wall, the grooved sleeve is pulled into the pre-drilled hole in the frame. The large diameter and deep grooves ensures that this becomes securely fastened to the frame. The position of the frame can be adjusted sideways slightly as the frame will be held by the grooves in the sleeve and be drawn along when the screw is unscrewed again. Other screws have grooves instead of threads nearest their head, but being thinner, they do not fasten the window as strongly to the frame. If the screw is thinner than approx. 7 mm, you must use supporting blocks or double wedges that are exactly the same thickness as the width of the space at each fixing point.

353 *Coarse fully-threaded screws*. Wooden windows can be fastened to woodwork using coarse, fully-threaded screws (thicker than approx. 7 mm). See Fig. 353. Such screws require you to pre-drill into the uprights, but the coarse screw will hold the window in place without the

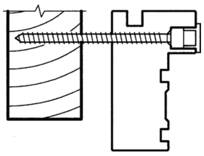


Fig. 353
Thick, threaded special screw used for fastening wooden windows Temporary wedges are removed after the window has been screwed in place. Supporting blocks are not required on either side of the frame.

need for supporting blocks at the fixing points. If you want to make any post-installation adjustments you will need to unscrew the screw, adjust the position of the window and screw it back in again, pre-drilling again if necessary.

354 *Normal thin wood screws* can provide a good and stable fastening provided that you insert supporting blocks or double wedges between the side jambs and wall at all of the fixing points. If you subsequently want to adjust the window, you will need to adjust the supporting blocks as well.

355 *Nailing* is one of the traditional ways of fastening wooden windows, but it is hard to make any subsequent adjustments without sawing through the nails. We do not, therefore, recommend using nails. If you nevertheless choose to use nails, you must use accurately made supporting blocks, or double wedges, made of wood or plastic. They can be inserted in the space between the frame and the wall, above the nail to ensure that they don't fall down if they become loose. The nails should be countersunk into the side jambs using a punch.

356 *Alternative fastening methods that do not allow post-installation adjustments*. If the walls have very good wind bracing, so that they have minimal movement due to wind, the window can be fastened using battens, strips of fibreboard or angle sections; see Fig. 356. Wooden windows with special grooves around the frame can be fastened using pre-cut strips of fibreboard. These strips can be hammered into the grooves before the window is lifted into position from the outside and into the opening in the wall. The window is fastened by means of fibreboard strips nailed against the wind barrier and the framework. Provided that these strips are dry at the time of installation, and you use sufficient number of nails, they can also act as an adequate external wind barrier. In order to ensure that it has a stable base, the window must be placed on shims in the same way as for traditional window installation. This method should only be used as the sole means of fastening for small windows that are less than 1 m wide or high, and in accordance with the manufacturer's instructions. Larger windows should also be fastened through the side jambs in the normal way. Instead of strips of fibreboard, you can nail or preferably screw battens or angle sections made of thin Guides of steel to the frame, so that they form an equivalent flange around the window frame. The size of the battens/ angle sections must match the battening for the external cladding. If properly nailed/ screwed in place, battens and angle sections provide a better fastening than strips of fibreboard. In both cases any post-installation adjustments will be very time-consuming.

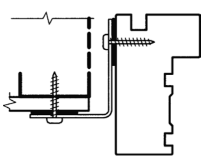


Fig. 356
Fastening a window using an angle section

36 Installing metal and plastic windows

Metal or plastic windows can be fastened to the wall using screws or sleeves that go directly through pre-drilled holes in the side jambs. The holes must always be elongated in order to allow the sections to move slightly in response to temperature changes. The windows can also be fastened using brackets or anchors that are threaded into grooves in the sections; see Fig. 36. This means that you can avoid drilling holes into the frame sections, and temperature changes can be absorbed without the window being pushed out of position in the wall.

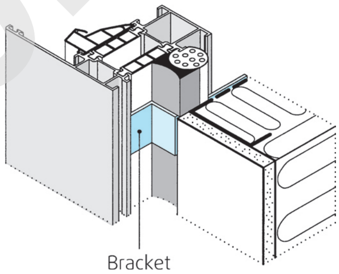


Fig. 36
Example of metal and plastic windows fastened with brackets

4 Principles for external sealing

Failure to properly seal the gap between the window frame and the wall can often cause air and rainwater to leak in, thus causing damage to the window itself and the wall around it. The wall below the window is particularly vulnerable. Good and reliable rain tightness is most easily achieved by using the principle of two-stage sealing with separate rain and air tightening. The outside of the gap is covered by a rain shield that stops the rain, usually the casing or a flashing. Casings and flashing are described in greater detail in Section 6. Between this rain shield and the external air seal (wind barrier), there must be a ventilated space at least 10 mm deep. The external air seal covering the gap between side jamb and wall must be designed in such a way that any water that does manage to penetrate through to the air tightening runs down to the weatherboard flashing, and is diverted away from the wall.

5 External air sealing

51 Sealing materials

External air sealing is accomplished using elastic sealant, foam sealant or strips of a wind-barrier material clamped tightly against the frame and wall. See Sections 52–56.

52 Elastic sealant

Elastic sealant applied against a backing strip is considered the most suitable sealant for the gap around metal and plastic windows, and also produces good results with wooden windows, see vignette on Page 1 (Fig. 65).

The strip of sealant must be continuous and should be of even depth around the whole window. Ideally the cross-section of the seal should have a width to depth ratio of approx. 2:1. When using elastic sealant, the gap between the frame and the wall must be even and not too wide – preferably no wider than 15 mm. The elastic sealant can be injected against a round backing strip that has previously been pushed into the right position in the joint. The backing strips should be made of a plastic material with closed pores to which the sealant cannot adhere. The backing strip must be 20–25% thicker than the width of the joint, so that it creates sufficient resistance when it is pushed into the joint. The sealant must bond well to the materials used for the opening and window frame. Any cleaning and priming of the sides of the joint must be done prior to sealing and in accordance with the manufacturer's instructions.

The sealant must be able to absorb the movements that can occur and should withstand being stretched or compressed up to at least 20 % of the width of the joint. It must also have a long lifespan and withstand temperature variations without cracking or loosening. See also Design Guide 520.406 on how to execute a seal and 573.104 on types of sealants and their properties.

53 Strips of wind-barrier material

An external air seal can be formed around wooden windows by cutting strips of wind barrier material from a roll. In order to create a satisfactory air and wind barrier, the strips of windproof material must be pressed firmly against both wall and window frame. The wind barrier material should be pressed against the side jambs using thin nailing strips nailed firmly into place. The wind barrier material can be pressed against the wall using the battens for the cladding or separate nailing strips. See Fig. 53. Creating a seal out of wind-barrier material is relatively time-consuming and requires the window to be positioned far enough out in the wall. This method is particularly suitable if the space between the window frame and the wall is very wide, or very variable in width. Corners are weak points that are hard to seal adequately in exposed places. You can manage to achieve a good seal even in the corners by using prefabricated neoprene seals.

Design Guide 573.121 sets out the requirements for materials used for wind and air tightening.

54 Polyurethane foam

Single-component polyurethane foam sealant is an al-

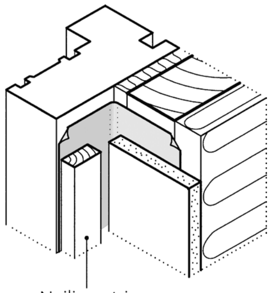


Fig. 53
Making the gap between window frame and wall wind tight
Strips of wind barrier material and nailing strip

ternative choice for sealing around wooden windows. Although the foam has a certain amount of strength, the window must nevertheless be fastened mechanically to the wall. Foam sealant is particularly suitable if the surface of the window opening is uneven and if the width of the space between the wall and the frame varies. The foam hardens by absorbing moisture from the air or surrounding materials after it has been injected into the joint. In order to speed up the hardening process, you can moisten the materials around the joint before injecting, but the materials must not be wet. The speed at which it hardens is also highly dependent on the temperature, which should be over 5 °C. You must follow the manufacturer's instructions.

Until the foam has completely hardened, it may be necessary to brace the frame to prevent it from being pressed inwards against the sash. Bracing is especially necessary at low temperatures and if there is a deep layer of foam sealant. Foam sealant cannot be used as the only seal between the wall and windows made of aluminium or plastic, as the foam may crack due to temperature movements in the window. Foam sealant has the disadvantage of making it impossible to adjust the window frame after the foam has hardened. If you use polyurethane foam to seal the gap, you must follow the manufacturer's instructions and the safety regulations of the Norwegian Labour Inspection Authority (*Arbeidstilsynet*).

Design Guide 573.107 describes how to seal joints using polyurethane foam.

55 Weather strips

Weather strips can only be used for relatively narrow and even joints. This method has proved particularly suitable for use in conjunction with prefabricated building elements. Some manufacturers of prefabricated houses use neoprene seals that are fitted in grooves along the outside of the frames and that are pressed against the wind barrier in the wall. The position of the window is fixed, but the window is easy to adjust after installation.

It is important to achieve a tight seal in the corners. See Design Guide 573.105.

56 Other types of seals

Special plastic «socks,» filled with mineral wool, are available that can be pressed into the space between the frame and the wall. This requires both sides of the joint to be smooth and the work must be executed very carefully in order to achieve a good seal.

6 External flashing and casing

61 General

In order to achieve a two-stage seal, external flashing and casing must be fitted in such a way that together they create a rain barrier that prevents rainwater reaching the air seal; see Section 4. The flashing and casing should also protect the sealing compound against deterioration due to sunlight. The joints above and below the window are particularly vulnerable on account of the water that runs down from the wall/ window pane above them. Weatherboards and flashings should have a gradient of at least 1:5.

62 Materials

Flashing can be made of copper, zinc, aluminium or coated steel Guides. When choosing flashing, you must also bear in mind other metals used in the facade, so as to avoid potential corrosion. Copper flashing may produce green stripes on the wall where water runs down from the flashing.

63 Turned-up edges and joints in flashing

Weatherboard flashings must have a turned-up edge towards the wall/ window frame and at both ends in order to prevent rain from running into the wall; see Figs 63 a, b and c. This is particularly important in areas exposed to a lot of driving rain. See Figs 22 a and b. Joints in long lengths of continuous drip cap flashing, for example where there are a number of adjacent windows, must be flanged so that temperature changes can be absorbed without damage to the flashing or leaks occurring; see Fig. 63 d. Using a sealing compound to seal an overlap joint will produce an inadequate long-term seal. Soldered butt joints or overlap joints with the pieces fastened together using roofing nails or screws have little capacity to absorb temperature movements without the flashing becoming damaged or breaking its seal.

Weatherboard flashings must not be jointed lengthwise.

64 Weatherboard (drip-cap) flashing above the window

Water running down the back of the external cladding and along the wind barrier must be directed out by a weatherboard (drip-cap) flashing above the window. The turned-up edge of the flashing must therefore be behind the wall's wind barrier. Alternatively you can install an extra wind barrier on the wall above the window and down the front of the turned-up edge of the flashing. Flashings and weatherboards (drip-caps) are unnecessary if the window is just below the eaves.

65 Weatherboard flashing below the window

A weatherboard and flashing are always necessary beneath the window, so that the water is directed out from the window and beyond the wall below it. The flashing must never be flush with the bottom of the frame, but there must be a gap of 6–10 mm in order to prevent drops of water forming on both surfaces of the joint and staying there for a long time without running off; see Fig. 65 (see vignette on page 1). It is particularly important that there is enough clearance for wooden windows, as the frequent suction of moisture through the ends of boards can easily lead to paint flaking off and damage caused by moisture. A narrow gap can also lead to capillary suction of water in through the wall below the window. If the clearance is too big (10 mm or more), there is a risk that rain will be blown over the turned-up edge of the flashing.

The lengthwise turned-up edge of the flashing should be inserted into the groove on the bottom of the sill. The top edge of the flashing and the joint between the frame and the flashing will then be protected against splashing rain. If the window is positioned far into the wall, the turned-up edge of the flashing must be particularly high, and it is also essential that the corners of the turned-up edges at the ends are completely watertight, see Fig. 23 a. Using sealing compound in the corner after the flashing has been mounted will not produce an adequate long-term seal. In order to increase protection against water penetrating under flashing that goes inside the wall's wind barrier, you should also install a watertight membrane, see Fig. 23 b.

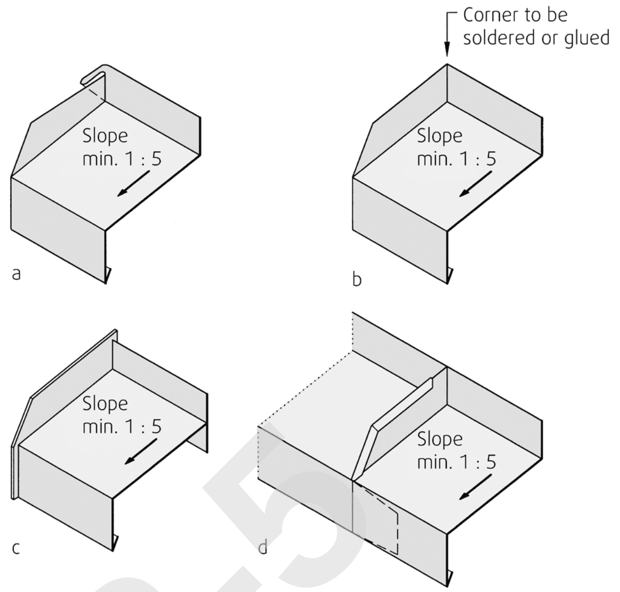


Fig. 63 a–d
Weatherboard flashing
a. Folding the corners is a simple way of ensuring a perfect seal in the corners. Can be used for steel, zinc and copper flashing
b. Soldered/glued/welded corners. Can be used for zinc, aluminium, copper and hot galvanised steel flashing
c. An end piece made of plastic, etc. is suitable for extruded aluminium profiles.
We do not recommend using this system if the turned-up edge is inside the wind barrier, as it is uncertain how long these end pieces will remain sealed.
d. Example of joints on long flashing. The joints must be located between two windows.

66 Casing

It is recommended that you use unplaned boards for wooden casings, to provide a good adhesive surface for wood stain and pain. The vertical casing must always be finished at a good distance, min. 6 mm, from the weatherboard flashing in order to prevent suction of moisture through the ends of the boards, see Figs 22 a and b. Adequate clearance will also allow you to seal the ends of the boards with wood stain or paint, and make it easier for the casing to dry out properly. You must ensure that the wall cladding is ventilated above and below the window. Wooden casing should not be used to press down the wind barrier. Due to large movements caused by moisture, it will not necessarily fasten it securely. Casing boards are normally fastened to both the window and the wall.

7 Insulation and internal sealing and casing

71 Insulation

The gap between the frame and the window opening should be insulated to its full depth, for instance using strips of mineral wool or similar, which can be pushed loosely into the space from the inside. The insulation must not be pushed in so hard that the external seal is damaged or the frame or the trim is pushed inwards. The insulation only provides a very poor wind barrier, and cannot be used in place of other separate external and internal air seals. This is true both of mineral wool and other fibrous materials that can be used to provide thermal insulation in the space between the window frame and the wall.

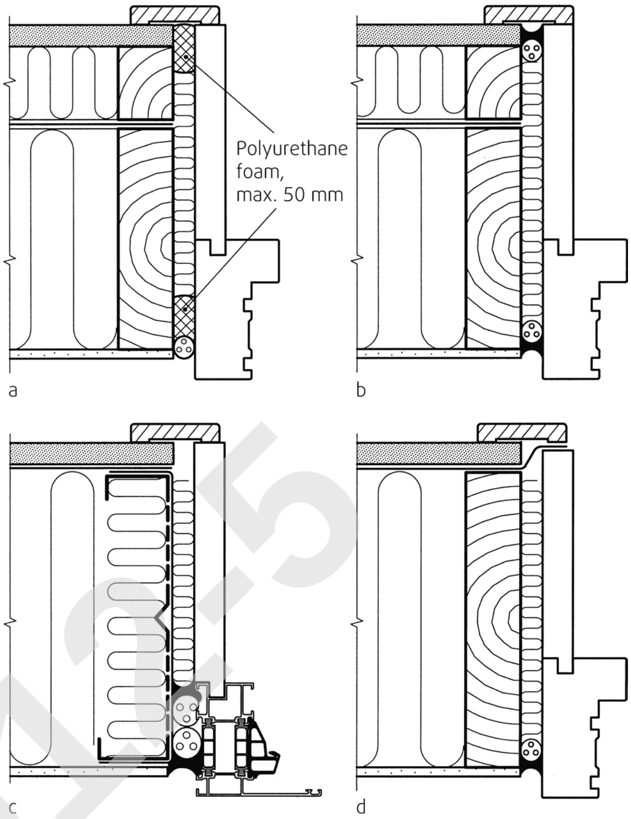
72 Internal sealing

The internal seal is important, and must be executed with care. Its purpose is to provide an air seal and prevent external draughts entering the room. It is also intended to prevent moist air from the inside penetrating through to the external seal, where it would cool down and release moisture in the form of condensation.

The internal seal should either be produced by pressing the moisture barrier against the trim using the interior mouldings, nailed every 200 mm, by using elastic sealant or by using polyurethane foam, see Figs 72 a-d. Elastic sealants are particularly suitable for wet rooms such as bathrooms and utility rooms. It is not necessary to protect the elastic sealant on the inside, but mouldings are often used for aesthetic reasons, and they will also help to prevent mechanical damage to the sealant.

73 Interior casing

Trim and mouldings must be chosen to fit the thickness of the wall, the width of the frame, the thickness of the frame and the thickness of the internal cladding. If the windows open inwards, the trim must be fitted in such a way on the frame that there is enough space to lift out the sash. The mouldings should be nailed to the trim, not to the wall, in order to prevent cracks at the joints. For the trim to act as a windowsill, it may be necessary to support it from below.



Figs 72 a-d
Internal air seal around a window
a. Polyurethane foam
b. Elastic sealant against backing strip
c. Elastic sealant against backing strip by frame
d. Moisture barrier pressed against trim

8 References

81 Authors

This guide has been revised by Sivert Uvsløkk and Tore Kvande

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82 Literature

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