INSTALLATION MANUAL OF WINDOWS AND DOORS

22.05.2024

CONTENTS:

GENERAL RULES 1

DELIVERY AND STORAGE 2

POSITIONING THE PRODUCT INTOTHE OPENING 3

INTERCONNECTING THE PRODUCTS 4

INSTALLATION TO A LOG WALL 5

SEALING INSTALLATION GAP 6

WATER DRIP ASSEMBLY 7

INSTALLATION SCHEMES 8

MOISTURE CONTROL 9

REFERENCES:

[1] Good engineering practice: RT 41- 10947-et Wooden and aluminium windows and their installation.

[2] E.Just. Wooden structures (2012; Tallinn University of Technology, EEP0011; EEK0050)

1. GENERAL RULES:

Viking Window AS manufactures bespoke wood and aluminium-cald wood windows and doors (contemporary windows and doors).

1. Before starting the installation, get to know acceptable construction practices and the Viking Window installation guidelines;
2. The summary of good engineering practice for installing wood windows and doors can be found in the guidelines **RT 41-10947-et Wood and wood-aluminium windows and their installation** of Estonian Building Centre (NB! These guidelines use the so-called Finnish type of windows as examples; therefore, it does not apply to the products of Viking Window AS in all aspects);
3. If necessary, ask for a consultation about installation solutions **before** ordering the products and starting the works from a sales representative of Viking Window;
4. Products must be kept and stored in way that avoids their mechanical damage (e.g. exposure to sharp objects, abrasive materials, etc.);
5. While delivered, the products are fixed on the pallet and with each other using timber, veneer, cardboard, plastic film which may be fixed on the back side of frames using screws, nails, staples etc. Remove fixings with caution.
6. Windows and entrance doors should to be installed in the final stages of construction, in order to minimize construction humidity and other construction related stress which may affect products.
7. Wooden windows and doors may not be in direct contact with the ground; window sills and door thresholds must be sufficiently hydro isolated and sufficient water drainage must be provided.
8. Wooden windows and doors are designed to be used in situations, in which interior conditions are normal - the relative humidity of the living areas in normal conditions is Rh = 40...60% (during heating period Rh = 25...45%); see more about moisture management in ch. 9
9. The door and window must be supported from below, so the product does not “hang”;
10. The product must be installed vertically and it must be levelled; timber parts of sashes and frames must be straight;
11. The installation gap between the frame and the wall must be 10-20 mm;
12. The products are generally aligned according to the wall layer insulation; reasonable distance from the wall’s exterior plane is between 50-250 mm;
13. Products must be fixed with the wall in a way that prevents their shape changing during use - fittings designed for installing windows and doors (e.g. installation sleeves, frame screws, special load bearing brackets etc.) must be used;
14. Insulation material (including insulation foam) used between the frame and the wall is not considered as a fastener in terms of its strength [1];
15. The number of attachment points depends on the product dimensions; if the mounting holes have not been drilled by the factory, follow the general rule: the distance of the attachment point 200 mm from the product edge and not more than 900 mm between two attachment points;
16. Other parts of the structure should not put pressure on the product;
17. Adjusting the product to ensure perfect functionality is one part of the installation works; the operating and maintenance manual of Viking Window AS gives useful guidelines;
18. After finishing construction and/or installation works the work place as well as products should be cleaned; dirt damages the finishing and fittings of the products;
19. The gap between the frame and the wall filled with insulation material should not be “accessible” to moisture for too long; there are different cover materials and systems for the gaps, the main rule is that interior moisture and water from outside should not get between the wall and the frame; assembly foam should be protected from the sun (UV radiation damages the foam);
20. When bonding the product with the wall it is necessary to ensure that water does not get inside the wall or on the product into areas that must be protected from water (e.g. in the case of wood aluminium products between the aluminium profiles and the wooden part; see figure 3-9).

2. DELIVERY AND STORAGE:

Check the quality of the delivered products and the delivery’s compliance with the order. If you notice any errors, notify Viking Window AS immediately. Transport damages must be marked down on the delivery note upon delivery of the goods. If possible, you should take pictures of the broken package and forward them to Viking Window AS.

NB! Submitting and handling claims has been described in the standard terms and conditions attached to the contract with Viking Window AS (you can also find them at www.viking.ee).

Make sure that products are not damaged while unloading and storing. The products must be on level ground and protected from dirt and moisture. It is recommended to store the products indoors in a room with a normal humidity level. Products cannot be stored against each other because excess pressure may harm the surface of wooden parts. Products kept outdoors must be protected from weather conditions (direct sunlight, rain, etc.).

NB! Package covered with plastic may prevent the product from getting dirty but could create a greenhouse climate; as a result resin substances activate in the wood. Long-term contact with plastic material creates a specific glow on the finished wooden surface which is irreversible damage and can be further increased by the sun.

3. POSITIONING THE PRODUCT INTO THE OPENING:

The specific attachment methods depend on the product type and they may differ a bit depending somewhat on the wall's construction. General principles have been given on schemes 1-15 of **figure 1** (water drip installation, recovering the cheeks, installing border sliver works must be agreed on separately).

The installation schemes of the main products of Viking Window are on figures 4-9 on pages 4-8. If necessary, consult a sales representative of Viking Window.

The number of attachment points depends on the product dimensions; if the mounting holes have not been drilled by the factory [3], follow the general rule: the distance of the attachment point 200 mm from the product edge and not more than 900 mm between two attachment points. If the product is wider than 1000 mm, the frame must be attached both at the top and the bottom. If there is a mullion or transom in place of the attachment point, an attachment bracket shall be used to attach a frame in this point.

Drill the holes for attachment screws (or installation sleeves) into the frame of an **opening product**; fit attachment brackets onto the frame of a **non-opening product** (see figure 4 page 4).

Before installing the product, place supporting blocks onto the wall opening's lower surface max 50 mm inside from the product edges and level them. Product with vertical impost(s) must also have supporting blocks beneath the impost(s).

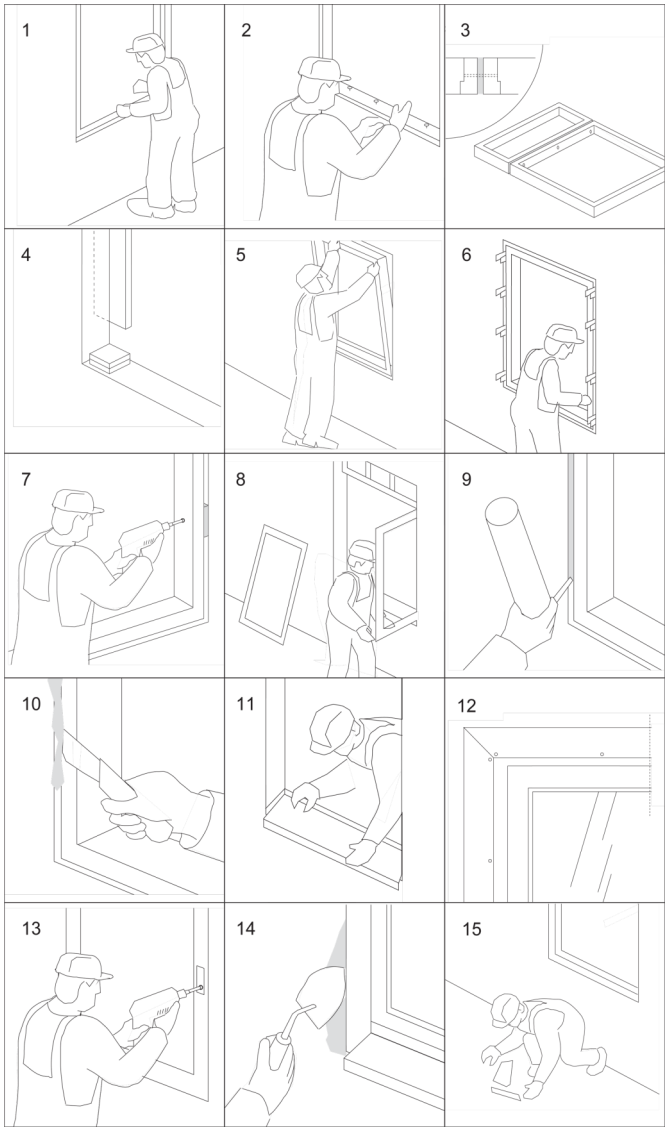
Figure 2 illustrates the positioning of supporting blocks and alignment wedges. It is essential that the alignment wedges are not further than 200 mm from the corner and the distance between the supporting blocks as well as alignment wedges is not greater than 900 mm.

4. INTERCONNECTING THE PRODUCTS:

When using the so-called frame-to-frame connections in which the products are placed next to each other or on top of one another, you should consult the manufacturer **before placing the final order and starting the installation works** in order to find the best solutions in terms of thermal insulation and technical strength.

Final approval in regards of compliance with building regulations, specific project requirements, load bearing properties, strength and thermal properties, safety etc. remains in each and every case to the **building engineers**. These aspects need to be cleared **before** placing the final order. Viking Window AS takes no liability in such installation solutions!

The windows and front doors of Viking Window AS are not load bearing elements of buildings and the company presumes that the products are installed/assembled in a way that prevents the application of vertically directed loads to the products.



1. *Checking the hole (overview of frame attachment points)*
2. *Adjusting the height position of cavity filler*
3. *If possible, removing opening parts from the frame (and connecting the frames, if necessary; see guidelines for frame-to-frame connection ch. 4 and ch. 6)*
4. *Installing support blocks*
5. *Positioning the frame into the opening*
6. *Using wedges to fix the frame square in the wall*
7. *Attaching the frame onto the wall with screws (or other special fittings for frames, see ch. 3 and figures 4-7)*
8. *Installing the frames and checking the movements*
9. *Sealing the gap between the frame and the wall*
10. *Finishing the gap between the frame and the wall (including cutting off excess joint filling foam, gluing installation tapes and/or seals, if necessary, etc.)*
11. *Fixing metal sills or water drips (if this is ordered and the works have been agreed on)*
12. *Installing cover beads (if this is ordered and the works have been agreed on)*
13. *Installing fittings and ordered extras (e.g. handles, flyscreens, blinds)*
14. *Repearing reveals (if this is ordered and the works have been agreed on)*
15. *Clean up after finishing the job*

Figure 1. *The stages of window installation (Source: RT 41-10947-et)*

INSTALLING THE PRODUCT TO A LOG WALL:

On the sides of door and window openings of a log building, there is a gap in the hollow cut into the logs with posts compensate for the sinkage of the log wall, to which by window or door are always attached. Above the cavity filler, there should at least be the size of log sinkage. New log wall may sink up to 50 mm per one metre. For sealing, use material that allows for compression (e.g. wool).

[3] The dimensions and locations of installation gaps drilled by the factory may not correspond one to one to the general rulesbased on the parameters and programmes of woodworking machinery.

6. SEALING INSTALLATION GAP:

Window or door must be attached to the surrounding wall in an air and moisture-tight manner. For this purpose, dry, clean sealing material (e.g. insulation foam, wool, etc.) is used. Sealing material must be protected from moisture and other weather effects. For this, window tapes, self-expanding filler seals, elastic filler sealant intended for external and internal conditions (e.g. weatherproof MS Polymer) or other suitable material are used.

The so-called frame-to-frame connections (products that are next to/above each other) must be handled similarly to frame-to-wall connections: e.g. it is the responsibility of the installer to ensure its weather resistance and insulation. Solutions for such connections (including schemes, if required) should be co-ordinated with the manufacturer for each order separately before confirming the final order.

Before sealing, redundant alignment wedges should be removed. Supporting blocks must not be removed from underneath the frame. If the attachment tool (e.g. installation case or load bearing brackets) functions as a so-called two-in-one solution and also as a stronghold, the side alignment wedges can also be removed. Supporting blocks and alignment wedges that **remain** inside the insulation are not considered a cold bridge if the thermal conductivity of their material is the same or less than that of the frame material.

In the case that Viking Window AS performs the installation, then, when agreed with the customer, Viking Window AS may leave protecting the sealing material from humidity and other weather effects to the customer and/or third persons.

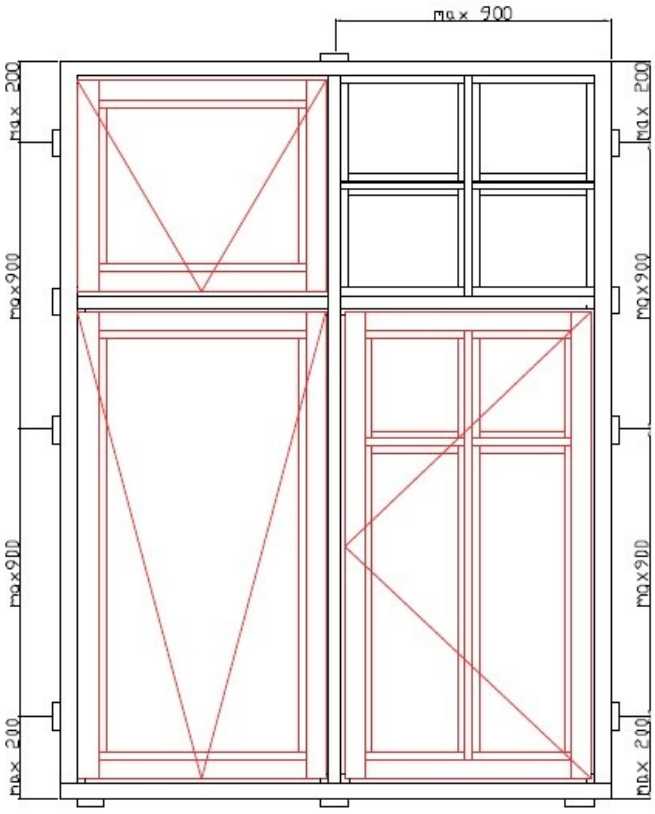


Figure 2. *General scheme for supporting blocks, alignment wedges, and attachment points.*

REMINDER:

- Insulation foam must be chosen according to application temperature and purpose. Normal installation foam does not foam adequately in the cold, a product that functions in the cold must be chosen for this purpose [1].
- When using the insulation foam, there must be enough foam: too much can bend the frame, too little leaves the installation gap "narrow".
- When using the insulation foam, it is recommended to first moisten the joint surfaces.
- Insulation foam can be sprayed both from the room and the outdoor side.
- Thermal insulation must be as homogeneous as possible within the depth of the entire frame: in case of deep frames follow the principle that 2/3 of from this depth must be insulated; there must be at least 100 mm of insulation; in the case of narrower frames, insulation must be provided for the entire depth [1].
- Insulation foam can be "grown" - sprayed layer by layer; if necessary, foam can also be added to foam that is up to 48 hours old.
- Excess insulation foam is cut off.
- Sealed gaps must be filled with cavity filling material from both sides within a few days. Moisture and UV radiation damage sealing materials and thus also the density of the gap.
- While checking installed products inspection must consider natural cold bridges as glazing and openable part's perimeters, support blocks, locking points etc. which may be revealed as cooler areas in thermal imaging.
- **Fire-guard windows must be installed according to the fire-guard window guidelines; insulation should be stone wool (see pages 9-10).**

7. WATER DRIP ASSEMBLY :

Assembling metal sill (water drip), it must be assured that the edge of the water drip is assembled into the special groove under or in front of the sill (bottom frame profile). Metal sill is fixed to the water drip groove with screws (on windows that open outwards; see figure 3) or into a special groove in the front of the frame (windows that open inwards). Additional figures 4-7 on pages 4-6; if necessary, consult a sales representative.

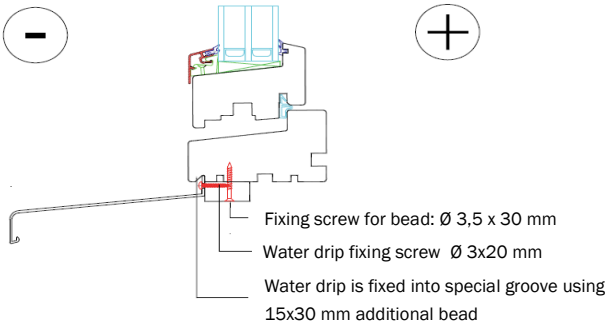


Figure 3. *Fixing metal sill (water drip) with a 15x30 mm bead (based on the example of outward opening window)*

8. INSTALLATION SCHEMES:

- When installing windows and doors, it is possible to use different fittings that are specific for this work (sleeves, load bearing brackets, frame screws, etc.). The choice of particular fittings always depends on the wall construction and must already be considered before ordering the product and before starting the works.
- The schemes in these guidelines are meant to illustrate the principle of the installation of windows and doors. The walls on these schemes are not drawings in terms of technical engineering.
- There are not schemes for all product types in these guidelines – in the case of special products and solutions please consult a sales representative of Viking Window AS before the final order.
- When installing windows and doors, you must adhere to the following general principles:
  - *Frames must be fixed to the wall strongly, so that they cannot bend or twist under the pressure of the opening sash. For this, the use of installation screws, sleeves, or load bearing brackets that run through the frame should be used (see figures 4-9 on pages 4-8).*
  - *While using installation sleeves, installer must turn the sleeve out of the frame until it connects firmly with the wall.*
  - *While fixing door frame to the wall, sufficient support behind hinges and strong fix with the wall is of critical importance for proper functionality. It is recommended to use additional frame to wall screw connection through the frame hinges.*
  - *To increase the security add support blocks between the frame and wall aligned with the hinges and espagnolette/lock bolts of doors and side hung windows.*
  - *Non-opening products (and the non-opening parts of products with multiple holes) are attached to the wall similarly to an opening product (part of an opening product), if possible; if this is not possible, use special installation brackets that are attached to the outer part of the frame as an alternative (see figure 4 on page 4);*
  - *NB! Installation brackets on figures 4-9 are not load bearing brackets, and they are not recommended as sole fixing means for openable products;*
  - *The windows and front doors of Viking Window AS have been designed and produced in a way that they should be installed straight and aligned*
  - *Adjusting the product after installation is an inseparable part of installation and the responsibility of the installer.*
  - *The insulation between the frame and the wall must be protected from exterior weather effects and interior humidity.*
  - *The installer and/or builder must ensure that water does not get between aluminium profiles and wood from the sides or from above. This can cause irreversible damage to the product's construction, the repair of which (if at all possible) does not fall under the warranty.*
  - *The tightness and weather resistance of a frame-to-frame connection must be ensured by the person who performs the installation works.*

VIKING21 WINDOW:

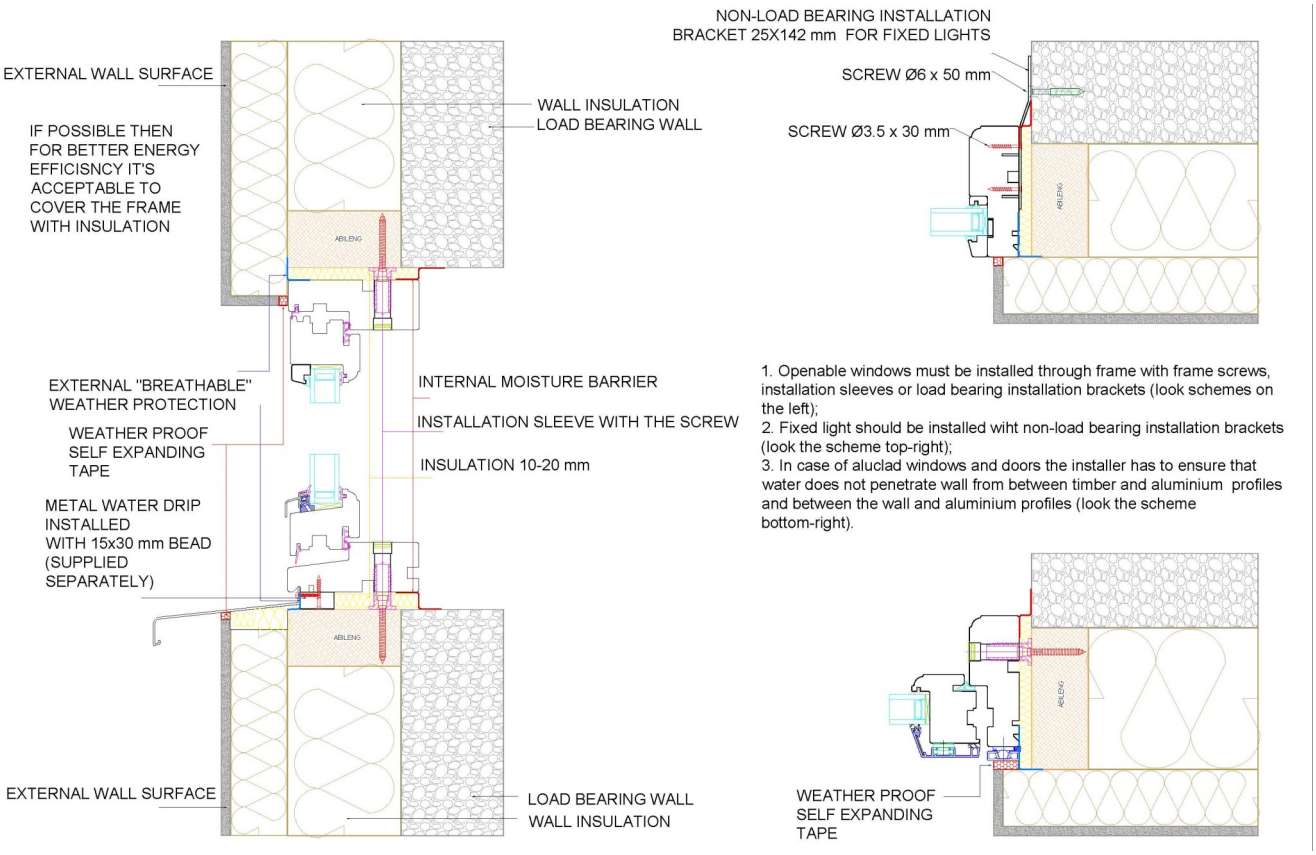


Figure 4. *The installation schemes of Viking21 outward opening window*

SW17 WINDOW:

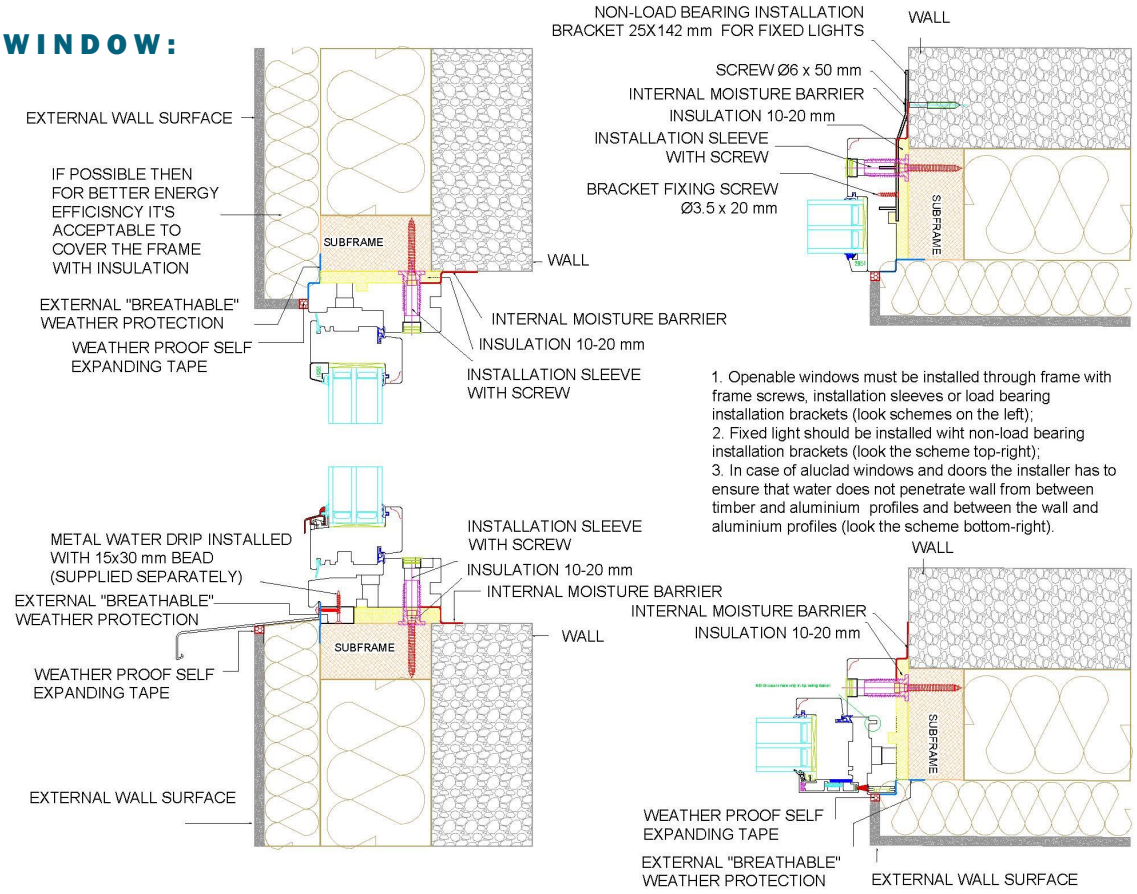


Figure 5. *The installation schemes of SW17 outwards opening window*

DK22 WINDOW:

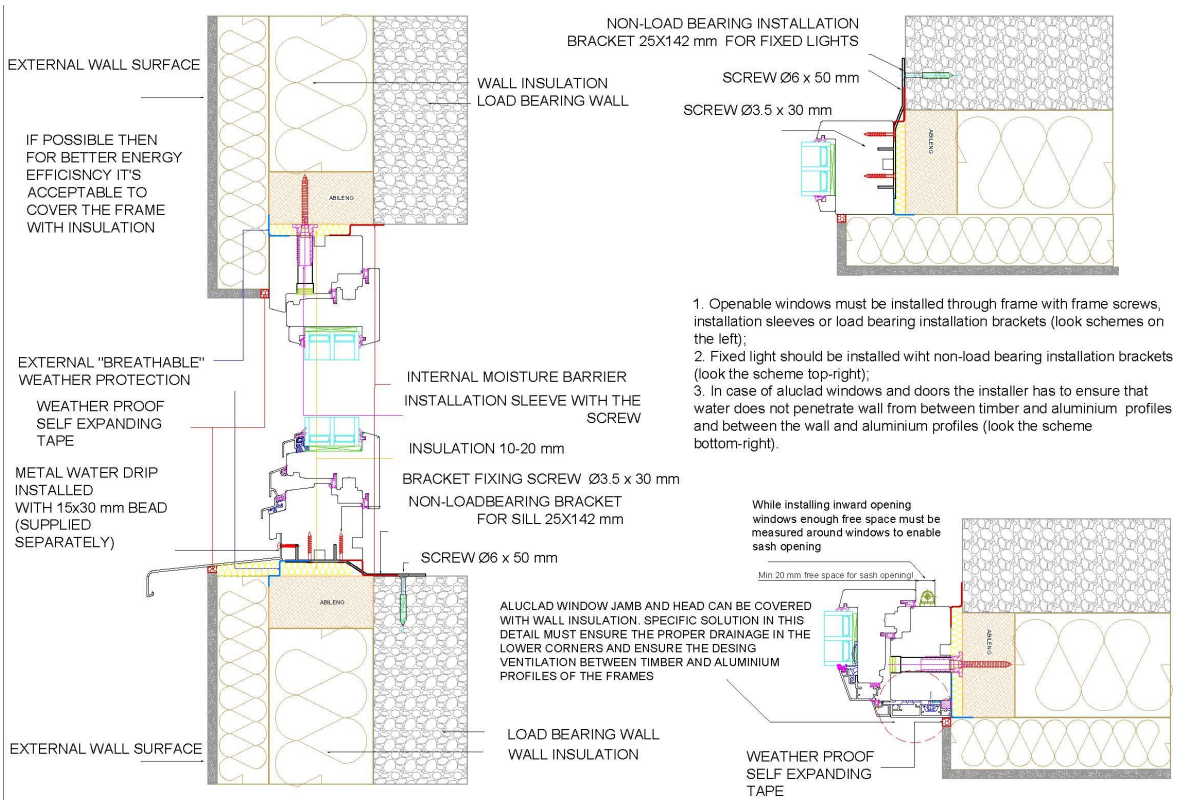


Figure 6. *The installation schemes of inward opening DK22 windows, balcony doors, and sliding doors*

NB! DK88 and DK22 Fireguard Windows are installed according this scheme with following exceptions: insulation must be rockwool; installation sleeves or load-bearing brackets must be made of steele (resistant of high temperatures); all the support blocks and/or installation wedges must be made of hardly ignitable materials (e.g. oak; materials with special fire resistant treatment ect.)

FRONT DOORS:

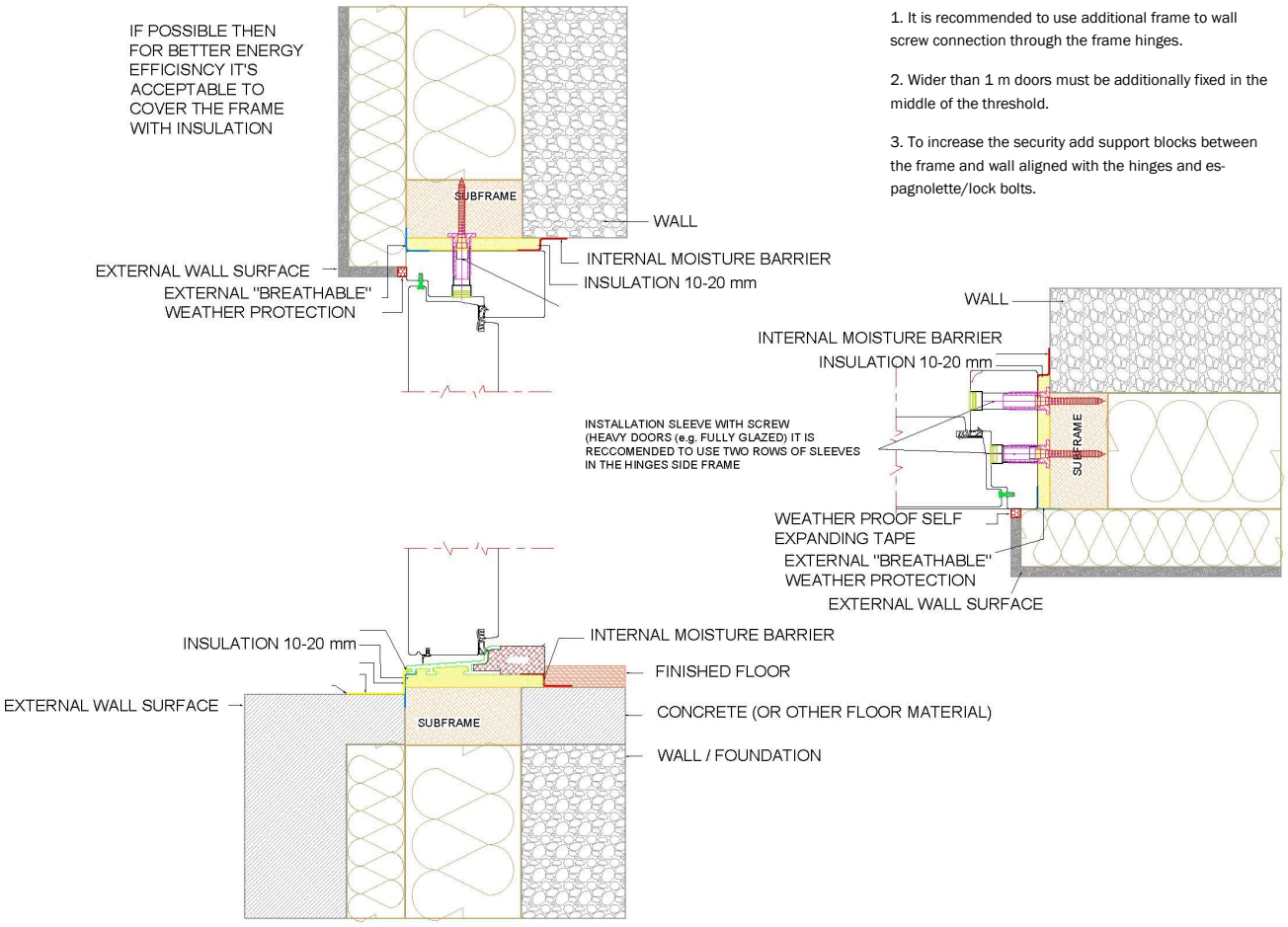
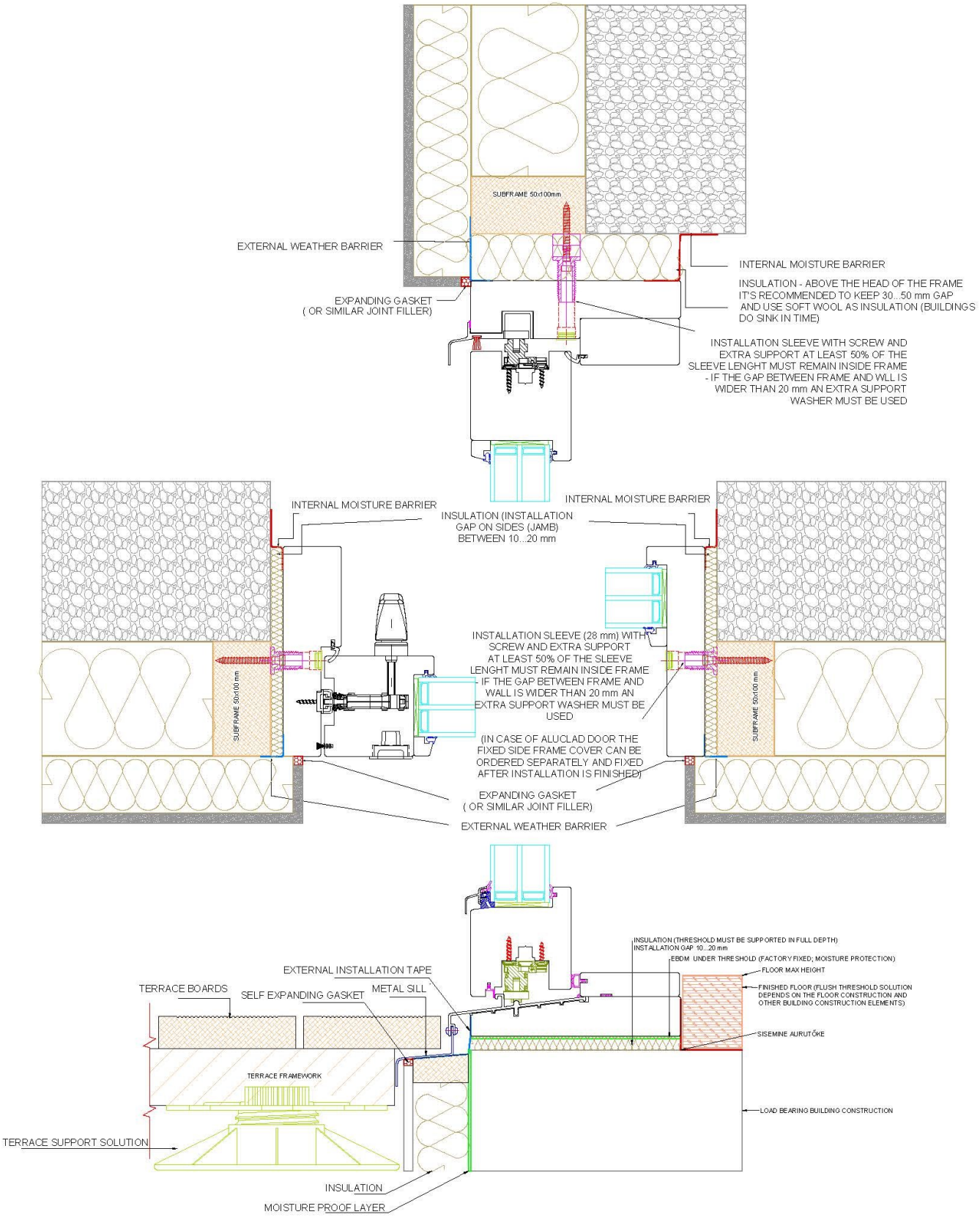


Figure 7. *The installation schemes of external door set (by way of example of SW17 panel door)*

INSTALLING SLIDING DOORS:

The general principles of window installation apply. Distinctive features and product-specific additional subjects are described below.

1. Keep sufficient gap between the head of the sliding door frame and wall (lintel or any other kind of construction element) to enable sinking of the construction without effecting door frame and/or so it would be possible to correct the frame later during use. If the construction above the frame leans on top of the frame, it might damage the functionality of the product and product itself. With no other guidelines follow the 30...50 mm installation gap rule given on the schematics of drawings 8 and 9. For insulation it is recommended to use soft non-combustible wool.
2. Threshold of the sliding door must be supported in full depth. On the drawings 8 and 9 there are no support blocks shown because they must remain inside insulation material used to fill the gap between the threshold and supporting building construction.
3. It is recommended to fix threshold to supporting building construction with additional screws or special wall anchor.
4. In case of need for flush threshold it is critical to ensure sufficient water drainage on the external side of threshold. Water must not flood the threshold.
5. If lower parts of the door frame are located close to the ground it must be ensured that the timber parts of the door are protected against moist from the ground, surrounding building construction etc.
6. In case of outward opening Innova sliding door ensure that the external flush surfaces leave room to remove the door leaf in case of maintenance needs. Same apply for inward opening GU sliding door leaf and the internal flush floor.
7. Any kind of architectural solutions used in building (e.g. support posts, beams, terrace boards, barriers etc.) may not interfere with removing the sliding leaf from the frame in case of maintenance needs.
8. In case of more specific guidelines needed, consult with the manufacturer's representative before finalizing your order.



INNOVA SLIDING DOOR THRESHOLD NEEDS TO BE SUPPORTED UNDERNEATH TO AVOID BENDING

NB! ATTENTION TO THRESHOLD DEPTH AND THE FACT THAT SLIDING DOOR LEAF MOVES ON THE EXTERNAL SIDE - SUPPORT MUST BE PROVIDED BOTH INNER AND EXTERNAL SIDE OF THRESHOLD.

(IF ANY KIND OF SUBFRAME IS USED IT MUST BE FIXED WITH THE LOAD BEARING BUILDING STURCTURE IN A MATTER WHICH AVOIDS BENDING)

Figure 8. *The installation schemes of Innova sliding door*

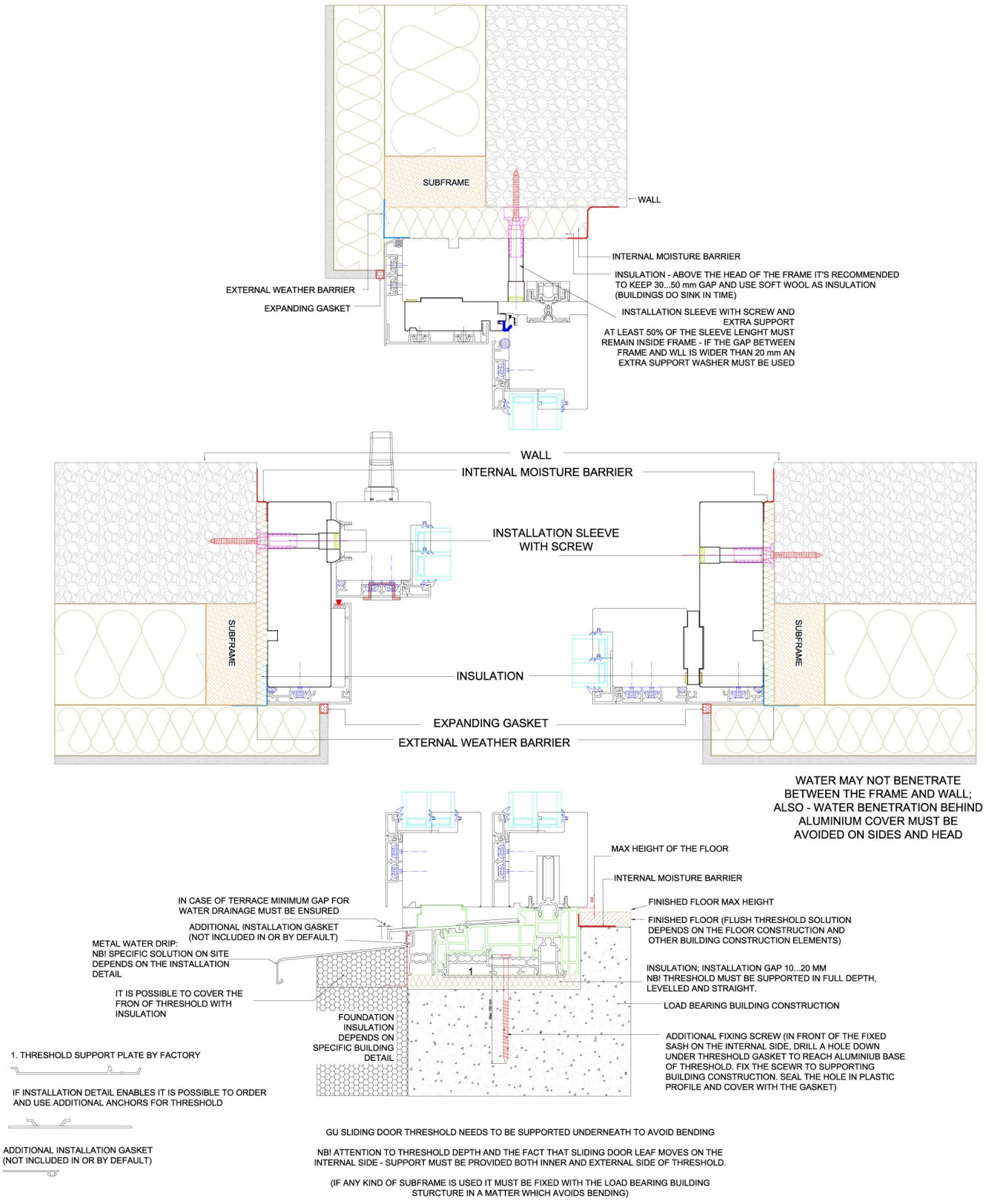


Figure 9. *The installation schemes of GU sliding door*

INSTALLATION OF A FIREGUARD WINDOW

The general principles of window installation apply. Distinctive features and product-specific additional subjects are described below.

NB! Fire-guard glass is on the room side of the product. Fireguard glass may be sensitive to temperature: range of use –10°C...+45° C (pay attention on the markings on the glass).

Products must be fixed as described below:

1. Materials used for installation must be non-combustible or of limited combustibility.

2. Clean the window opening from debris and dust and check the compatibility of the existing opening. The biggest wall opening dimensions are: frame width +30 mm and height +30 mm. In the case of larger slots, please adjust the opening to meet the required dimensions.

3. Before installing the window, put non-flammable supporting blocks onto the opening's lower surface and align them. After lifting the product onto the supporting blocks, also support it from side corners with oak wedges.

4. Check the frame's horizontality and verticality with a level and ensure that the window is in the center of the opening. The building constructions above the window may not apply vertical loads on the window frames.

5. SW14 Fireguard windows (both openable and fixed lights) must be fixed with wall using both stainless steel sleeves and installation brackets (see figure 9 and 10 page 7). DK22 Fireguard window must be installed according the remarks of the figure 9 and the general guide lines of inward opening window installation (see figure 6 page 5)

The stainless steel sleeves are factory mounted into the frames of SW14 and DK22 Fireguard windows. While installing the window the sleeve must be turned out of the frame until it connects with the wall (providing the needed support) and then fixed with the screw. Choose the screws according the wall material.

Attach fastening installation brackets to the window frame's outer part, 200 mm from the frame corner, whereas the distance between two fastening anchors should not be over 900 mm. Window which is wider than 1000 mm must be attached in the centre of both the lower and upper frame.

Attach installation brackets to the wall with applicable screws (e.g. Ø 6 x 50 mm) or wedge anchors ((Ø 8 x 40 mm); the choice of the screw also depends on the wall material (wooden carcass, concrete, lightweight concrete, etc.).

6. Use rock wool as the sealing material in the gap between the wall and the frame (e.g. ISOVER KH, PAROC eXtra or similar); fire resistance classification A1-A2 - non burning materials.

NB! Before using rock wool, consult the manufacturer.

7. The insulated installation gap must be finished from both sides (e.g. with gypsum board, plaster, slivers, etc.); also see figure 9.

8. With DK22 and SW14 Fireguard windows it is possible to build non load bearing module walls (i.e. the fixed light may be fixed together and openable windows fixed with fixed lights). See figures 11 and 12.

NB! Dimensions must be specified with the manufacturer before placing the order.

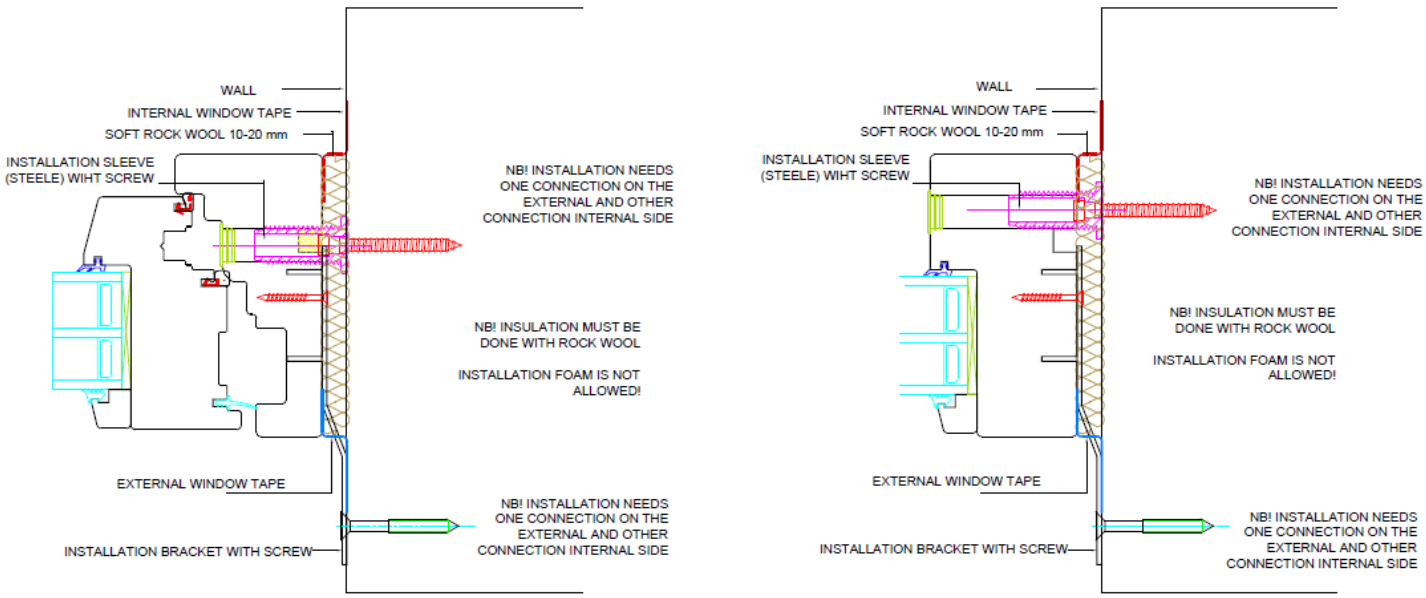


Figure 10. *Installation of SW14 Fireguard windows (NB! On this illustration due to confidentiality of window construction, the SW14 window with regular glass is used. The external dimensions of the frame and sash profiles match with the SW14 Fireguard windows.)*

NB! DK22 Fireguard Window is installed according DK22 scheme (see figure 6 page 5) with following exceptions: insulation must be rockwool; installation sleeves or load-bearing brackets must be made of steel (resistant of high temperatures); all the support blocks and/or installation wedges must be made of hardly ignitable materials (e.g. oak; materials with special fire resistant treatment ect.)

9 In the case of attaching a frame-to-frame connection, figures 12—14 should be followed.

- Before placing the order, consult with the manufacturer.
- The frames must be fixed strong with screws (see figure 13 and 14)
- Between the frames use fixing bead profile 924 and the heat expanding gasket.
- Both external and internal joints of the frames must be sealed weather tight using fireproof silicone.

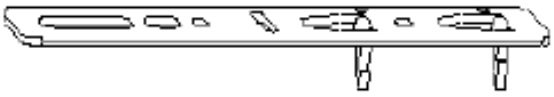


Figure 11. *Non load bearing installation bracket for fixed lights (non-openable products)*

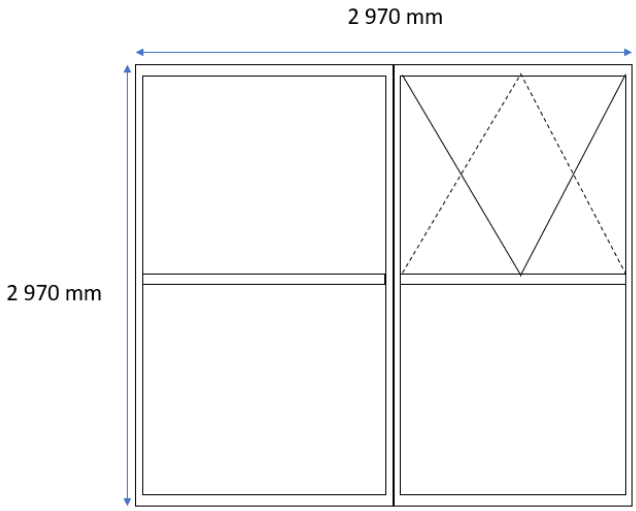


Figure 12. *With SW14 Fireguard window it is possible to build non load bearing module walls. NB! Dimensions must be specified with the manufacturer before placing the order.*

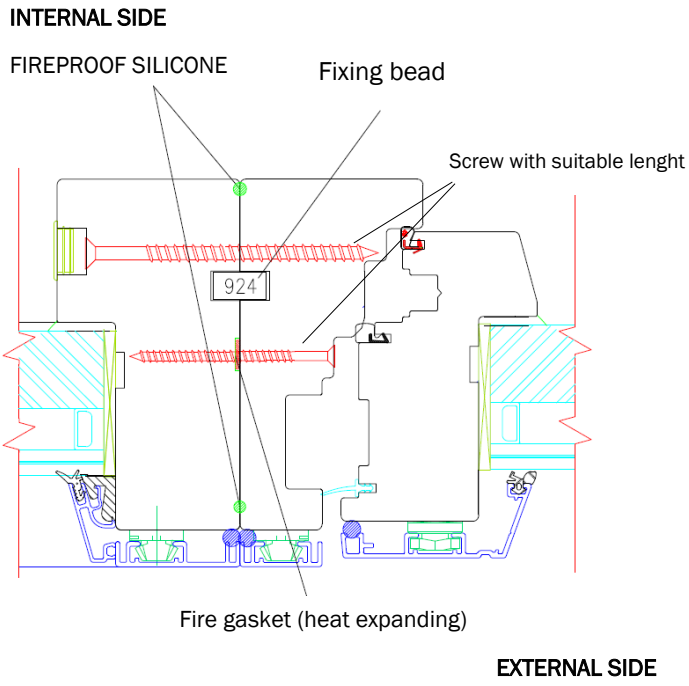
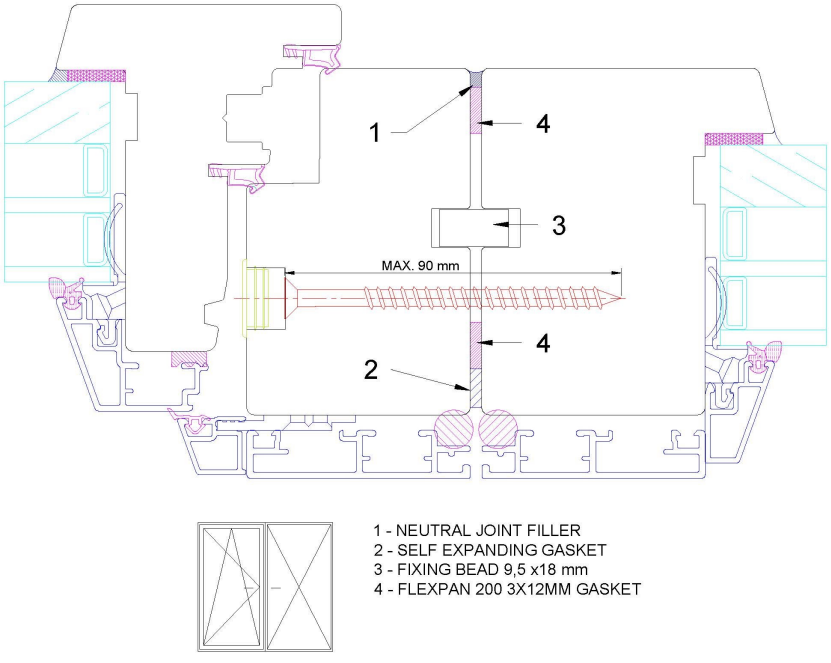


Figure 13. *Fixing two SW14 Fireguard window frames (based on SW14 Aluclad Window)*



Joonis 14. *Connecting frames of DK22 fireguard windows.*

9. HUMIDITY CONTROL:

Viking Window AS manufactures wooden windows and entrance doors finished with so-called breathable water-based wood paint designed for industrial use (including lacquers and varnishes). This means that through the finishing layer humidity inside wood is adjusted in line with the environmental conditions.

Excess humidity indoors during construction period has an adverse effect on wooden windows and doors. Wood humidity depends directly on the ambient humidity. When it stays in a given environment for a long time, wood takes on the equilibrium humidity in line with that environment [2]. If the ambient humidity changes, humidity in the wood changes, too, until a new equilibrium humidity is formed. As humidity in the wood changes, changes occur in the volume of the wooden profiles (cross-sectional expansion or shrinking).

The production of windows and entrance doors utilizes wood intended for use in circumstances where indoors the conditions are dry. Windows and entrance doors should to be installed in the final stages of construction, in order to minimize construction humidity and other construction related stress which may affect products.

The wooden sections of windows and entrance doors do not resist excessive humidity stress during construction, which is produced, for instance, when floors are poured, masonry is laid, walls are plastered or when other wet construction materials are used. Construction humidity causes the wooden sections of the window to expand: affected by humidity, members expand crosswise, with irregularities produced at joints, and a glued joint may crack. When drying and recovering humidity levels fit for use later, cracks may appear at the joints of the window, the pressure of gaskets and the functionality of products are impaired, and distortions may appear [1].

DURING CONSTRUCTION:

Viking Window AS recommends that alongside the **replacement of windows or doors,** the ventilation and heating design of living premises are considered (and designed) as well.

Accumulation of excess humidity in a dwelling may cause mold to grow, which in turn may cause respiratory illness and damage to components of the building.

When new buildings are constructed, Viking Window AS recommends introducing a controlled ventilation design with exhaust, supply and heat recovery, with which a good quality of indoor air and heating energy savings can be achieved.

To prevent humidity damage to windows, the following guidelines need to be adhered to on the construction site:

• The place for storing windows and entrance doors needs to be sufficiently ventilated during storage.

• It needs to be considered that the protective film on the packaging does not protect against humidity, only against major soiling and dust during transport, storage and installation.

• Once windows and entrance doors have been installed, the indoor air in a building needs to be sufficiently dry. If necessary, the air needs to be dried either by heating or ventilation, or using a condensation air drier.

• In winter, it is important to make sure that no water is condensed on the inside of doors or windows – constant exposure to water subjects wood to the same kind of damage as above. Moreover, a situation may also arise where the frames of the windows and doors freeze to the frame, which may result in even further damage.

• The condition of windows and entrance doors needs to be checked regularly to detect and prevent humidity damage as early as possible.

• If windows and entrance doors are covered with film to prevent soiling, it must be confirmed that no excess humidity accumulates between the film and the product. Space in the room needs to be dried and the films need to be removed temporarily if humidity accumulates there.

• The humidity of the wall's wooden parts to which the product is attached must be checked prior to installing windows and doors. If this exceeds 20%, wall structure must be dried prior to the beginning of installation works.

• Upon the replacement of old windows and front doors, it must be checked that the part of the wall to which the window or door is attached is strong. Rotten or crumbled material parts should be replaced before installing the product [1].

DURING THE USE OF LIVING PREMISES:

It is important to remember that contemporary windows and doors are airtight. Thus, the replacement of old windows and entrance doors may result in reduced ventilation. Faulty ventilation may cause humidity levels indoors to rise.

Norms of ventilation can be found from local building regulations.

In naturally ventilated buildings, the following measures need to be implemented to ensure the quality of air indoors:

- Open windows regularly to ventilate the rooms ;
- In the case that the window includes ventilation valves, leave them open;
- Opening windows by Viking Window AS may be closed in the ventilation position (so-called micro ventilation). See more in User and Maintenance Manual (www.viking.ee/maintenance.pdf)

Viking Window AS

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