

Ruukki
Building your tomorrow.

# Sandwich panel SPA

## Installation instructions

## Content

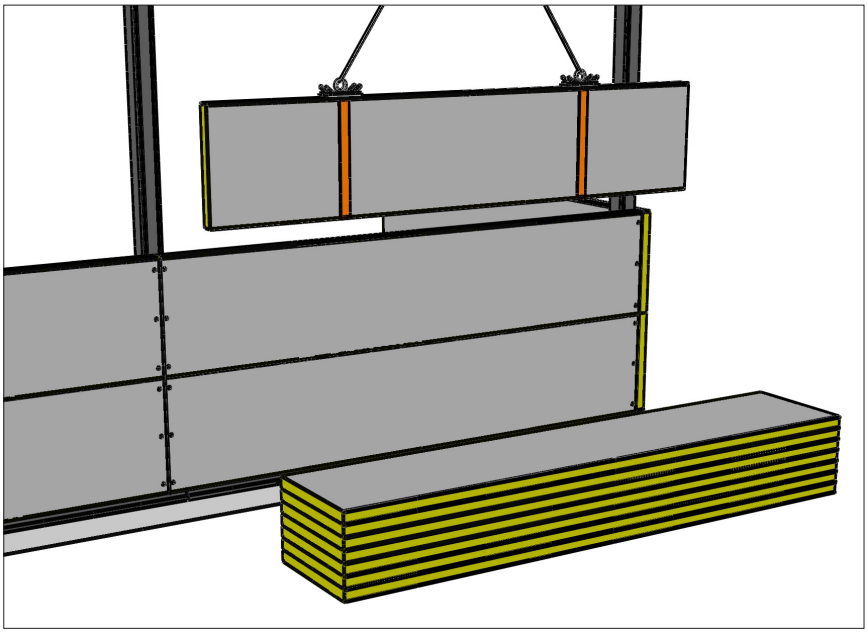

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Presented operation methods are examples and they are meant for guidance. They do not directly fit for use in all construction sites. In conflict situations act according to the instructions of the structural designer or contact our technical support (contact information on the last page of this brochure).

- **Installation directions and fastening of the panels**

  The panels can be installed horizontally, vertically or diagonally. The text printed onto tongue joints of the panels indicates the installation direction of the facing in question.

  The panels can be fastened with screws or fastening plates. The most common way of fastening a panel is to screw it through the panel directly to the building frame.



**Weights of the panels (kg/m²)**

| | Thickness (mm) | | | | | | |
|---|---|---|---|---|---|---|---|
| **Panel** | **100** | **125** | **150** | **200** | **200+** | **230** | **300** |
| SPA E LIFE | – | – | 18.5 | 21.2 | – | 23.2 | – |
| SPA E & I | 18.4 | 21.0 | 23.4 | 27.5 | – | 30.6 | – |
| SPA F | – | – | 27.2 | 32.5 | – | 36.4 | – |
| SPA S | 21.8 | 25.3 | 28.7 | 34.5 | – | 38.7 | – |
| SPA EE | – | – | – | – | 24.9 | 27.1 | 32.4 |

- **Additional information of the panels**

  For more information of the panels see our website.

- **Preparing the installation**

### Reception of goods

Always check that the delivery is in accordance with the order and that all items specified in the dispatch note are included. Faulty or incorrect deliveries and any transport damages must be stated on the waybill and the retailer must be notified immediately. The note on the waybill is endorsed by the signature of the driver and the person receiving the goods. Ruukki Construction Oy is not liable for any costs resulting from the replacement of products that have been installed in non-compliance with the installation instructions.

### Unloading

Deliveries are unloaded using a crane, and the disposable lifting belts are attached to the package at the factory by moving the panels straight upwards and to the desired level. The panels may also be unloaded using a forklift, but particular caution must be exercised. The packages are lifted one by one, grasping them at the middle, inside the cross-supports. Inappropriate lifting of the package may damage the panel at the bottom of the package. No steel cables or chains may be used for lifting the packages. The belts used for lifting must be of sufficient length and width. Belts that are too short may damage the tongues and grooves of the upper panel during lifting.

### Storing the panel package on site

The panel packages must be placed on an inclined base so that rain water can flow out or evaporate. The panel packages may not be stored on top of each other. When stored outdoors, the panel packages must be protected from rain, sun and dirt with a tarpaulin or similar cover. When stored for a longer period, the packages must be stored indoors and their protective film must be removed. An opened panel package must be appropriately protected at the end of the workday. If the panel packages are stored in exceptionally humid conditions (e.g. tropical climate), ventilation holes should be cut on the sides of the packages, and sufficient air circulation should be ensured. This allows evaporation of humidity that may condense inside the packages.

### Handling and machining the panels

The panels must be handled properly to prevent any damages and be protected against moisture or impact damage. Cutting or any other machining operation must be carried out using appropriate tools to ensure safety and to achieve a fault-free result. The panel surfaces must be protected against machining waste. Hot-cutting (e.g. using a grinding machine) is strictly forbidden, as it would damage the coated surface of the panel. Any stains are removed by washing with plain water or a mild detergent solution. If the surface of the panel has been visually impaired, it can be repaired by touch-up painting, or the whole panel can be replaced. The panel must always be replaced if there is a hole in the sheet metal face or the integrity and strength of the structure has been compromised. The protective film of the panel must be removed as soon as possible after installation. Removing the protective film will become more difficult if it is left in place for an extended period.

If the package contains panels of several lengths, possible cutting swarf from shorter panels above need to be removed from panel surfaces before lifting or moving them. This ensures that panels are not accidentally scratched during the handling of them.

### Lifting the panels

For lifting and handling single panels, a panel lifting tool hired out by Ruukki must be used. N.B: The blue lifting tool is intended for horizontally installed panels and the red lifting tool for vertically and diagonally installed and cut panels. In some market areas, Ruukki hires out vacuum lifting tools. Read the instructions for use and safety instructions supplied with the lifting tool thoroughly prior to using the tool. **NOTICE: Protective film on upper (external) facing of Sandwich panel SPA must be removed before lifting the panel. Vacuum lifting tool is not allowed to use when profiling is Grid 15.**

**Maximum panel lengths permitted by lifting tools**

**Installation of horizontal panels**

| Panel | Lifting tool and safety strap / Max. length of the panel | |
|---|---|---|
| SPA100 | 1 pcs / 6.6 m | 2 pcs / 13.1 m |
| SPA125 | 1 pcs / 5.6 m | 2 pcs / 11.1 m |
| SPA150 | 1 pcs / 4.9 m | 2 pcs / 9.8 m |
| SPA200 | 1 pcs / 4.2 m | 2 pcs / 8.5 m |
| SPA200+ | 1 pcs / 6.1 m | 2 pcs / 12.2 m |
| SPA230 | 1 pcs / 3.7 m | 2 pcs / 7.4 m |
| SPA300 | 1 pcs / 4.8 m | 2 pcs / 9.5m |

**Installation of horizontal panels**

| Panel | Lifting tool and safety strap / Max. length of the panel | |
|---|---|---|
| SPA100 | 1 pcs / 6.0 m | - |
| SPA125 | 1 pcs / 6.0 m | - |
| SPA150 | 1 pcs / 5.3 m | 2 pcs / 6.0 m |
| SPA200 | 1 pcs / 4.6 m | 2 pcs / 6.0 m |
| SPA200+ | 1 pcs / 6.0 m | 2 pcs / 6.0 m |
| SPA230 | 1 pcs / 4.0 m | 2 pcs / 6.0 m |
| SPA300 | 1 pcs / 4.8 m | 2 pcs / 6.0 m |

Installation and details of the Ruukki Airtightness system differ to some extent from these instructions. Installation of The Ruukki Airtightness system is permitted only to a qualified installation company that has been certified by Ruukki.

- **Work safety**

Always wear work gloves and protective clothing when handling the panels. Be careful with sharp edges and corners. When the panels are being moved, do not go under them. Make sure that the slings are strong and firmly attached. Avoid handling the panels in heavy wind. The lifting slings included in the panel package are disposable. Always follow the occupational safety provisions in force and find out whether the installation site is subject to any particular requirements regarding occupational safety before beginning the installation work. We recommend the use of goggles and respirator when cutting panels. We recommend using an additional handle on the drill (when drilling and mounting screws) for a better grip.

## Waste recycling

Package waste can be recycled as follows:

- Plastic wrapping can be collected to be used as recycled plastic, or to energy recovery in waste incineration.
- Cardboards can be recycled to paper or cardboard production.
- Individual panel protective film, plastic straps, EPS blocks, wooden pallets and lifting belts can be collected for example to energy recovery in waste incineration.

More detailed recycling instructions are available from local environmental or waste authority.

Panel waste can be separated to steel plates and insulation material to ease the recycling process. Steel plates can be recycled as raw material to steel. Mineral wool can be used for example for blowing wool production.

- **External wall – horizontal installation (1/4)**

The installation must be carried out according to the structural plans. Begin the installation at the bottom and proceed upward with the tongue of the panel facing up.

Always remember work safety and wear protective gear during the installation!

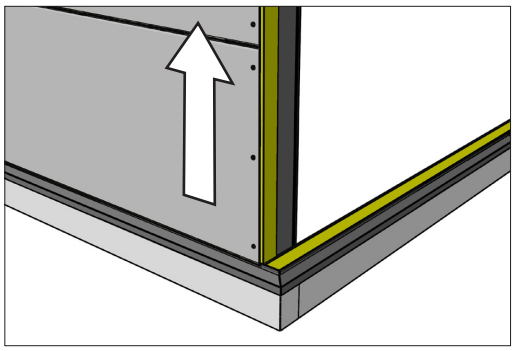
If you do not complete the installation, make sure that any exposed wool surfaces are appropriately protected against the weather. The factory applied Ruukki® Rain Protect film on the upper joint of the panels ensures that the exposed top surface of the panel is automatically protected against rain. Cut edges of the elements (e.g. window openings) should be sealed carefully. The easiest way to do this is by ordering Ruukki® Rain Protect protective film. The rear surface of the protective film is coated with glue to ensure good fixation to the panel surface.

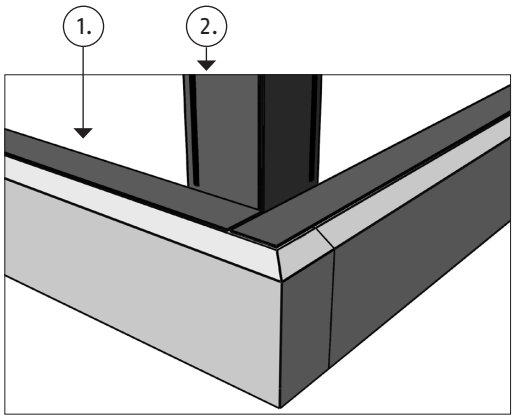
Check the straightness of the installation surfaces. Install the plinth sealing and the sealing strip (4x10 mm) between the columns and the panels. The sealing strip is installed on the face of the columns inside of the line of fasteners as per the detail drawings and plans. This way, the holes for the fasteners can be made vapour-tight without any extra work.

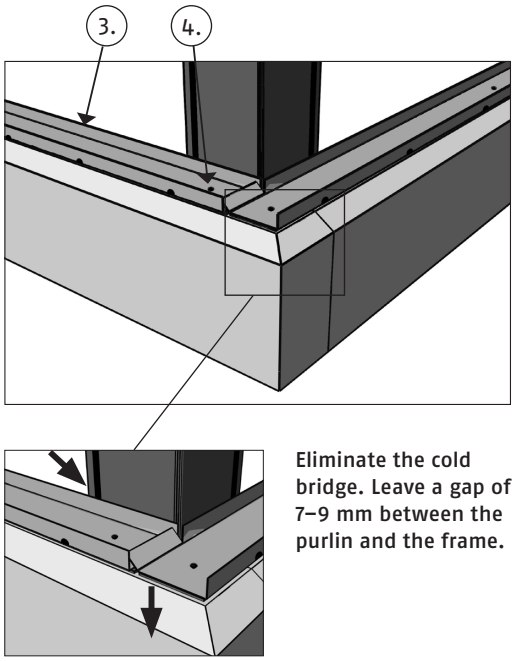
1. Plinth sealing
2. Sealing strip

Install the U-Plinth purlin on the plinth. Remove the protective film from the outer surface of the U-plinth purlin before installation. **NOTE! Do not remove the film covering the thermo perforation on the inner surface of the U-plinth purlin. Install the purlin so that the weep holes are on the outer side of the structure!** Make sure that the U-Plinth purlin is straight and straighten it if required. Leave a gap of approximately 7–9 mm between the U-plinth purlin and the frame. The panel's inner side's groove must fit into this space. Fasten the purlin on the plinth.

3. U-Plinth purlin
4. Fastener (fastening with a spacing of 600 mm)






**Eliminate the cold bridge. Leave a gap of 7–9 mm between the purlin and the frame.**

- **External wall – horizontal installation (2/4)**
  Install the insulating wool inside the U-plinth purlin. Place the plinth flashing in the U-plinth purlin as shown in the detail drawing. Fasten if required. The order in which the flashings are installed depends on the flashing type. Overlap and apply sealant mastic into the plinth flashing lengths on a length of approximately 100 mm. Make a vertical joint in the plinth flashing in the outer and inner corners. See cutting and bending instructions for the vertical joint after this part.

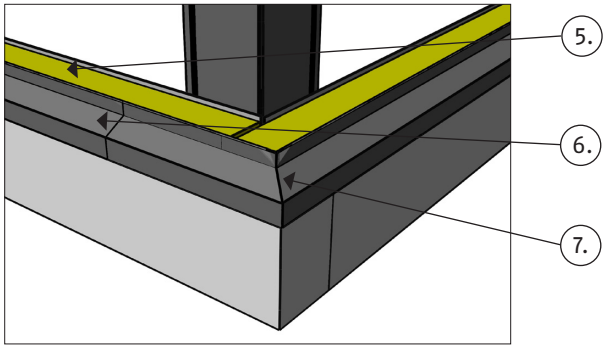
  5. Insulating wool
  6. Plinth flashing overlap (100 mm) (+mastic sealant)
  7. Vertical joint in inner and outer corner

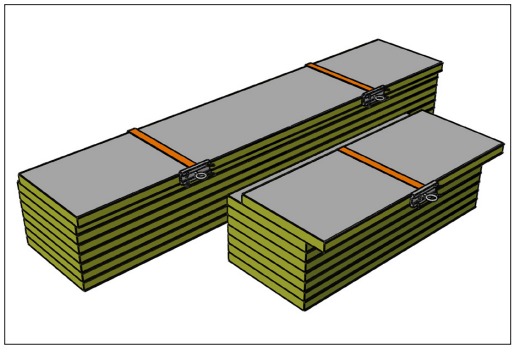
  Fasten the panel lifting tool or tools on the top-most panel in the package. Follow the instructions for use and the safety instructions provided with the lifting tool. Use a safety strap around the panel to be lifted and, if required, use the boom during the lifting operation.

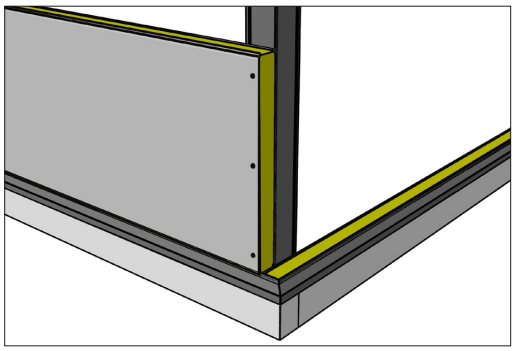
  Raise the panel into an upright position and take care not to scratch the surface of the lower panel in the package. Remove any protective films from the panel, either from the edge portions or entirely.

  Remove the safety strap prior to positioning the panel. Install the panel on the U-Plinth purlin and fasten it to the frame columns as shown in the detail drawing. Make sure that the distance of the fasteners from the edge is maintained. The fasteners must be placed at a minimum distance of 30 mm from the panel end. Do not over-tighten the fasteners, as this would cause dents in the panel surface under the fastener. It would also impair the load-bearing capacity of the fastening. Over-tightening can be avoided by using a depth limiter or a torque screwdriver.

- **External wall – horizontal installation (3/4)**
  During installation, make sure that the groove joint seal installed at the factory is in its place. Then, apply mastic sealant to the outer groove joint at both ends of the panel covering the width of the vertical flashing and the inner groove joint at the column seal. This ensures the tightness of the structure.



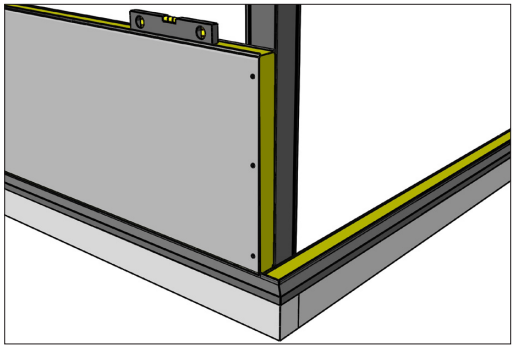





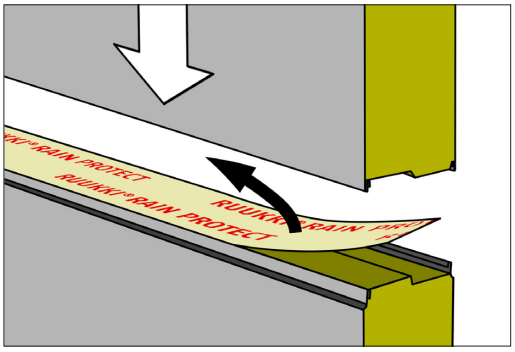
**Minimum fastening distance from the edge is 30 mm.The fastening surface of the panels against the beam, i.e. the width of the panel support surface, must be at least 50 mm. Note this at the L and T steels of the eaves, too.**

After the installation of the first panel, check that the panel is level. Install the other panels following the installation order from the bottom upwards, one span at a time.

Check the run and straightness of the wall to be installed after each installation of two new panel layers.

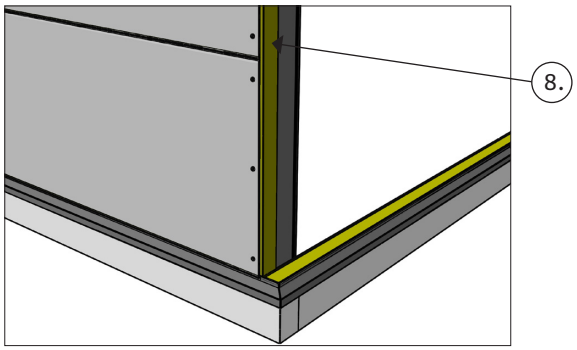


**Only remove the Ruukki® Rain Protect film from the upper joint of the panel just before mounting the subsequent panel onto the joint.** The protective film on the top row of panels installed on the eave can be left in its place for final structure. Ruukki Rain Protect film protects the panel insulation layer against water during installation.



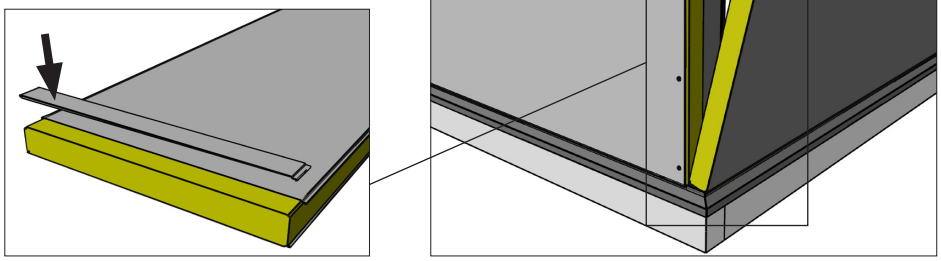

Once you have completed one span, install insulating wool at the panel ends before installing the panels in the next span. This makes it easy to seal the wool at the joints with the panels of the next span or, in a corner, with the adjoining panel. Apply insulating wool into all corners and vertical joints between the panels.

8. Insulating wool




Cut off sheet metal from other of the panels to be installed in the corner so that the cut-off portion corresponds to the thickness of the adjoining panel. This prevents cold-bridging in the corner structure.

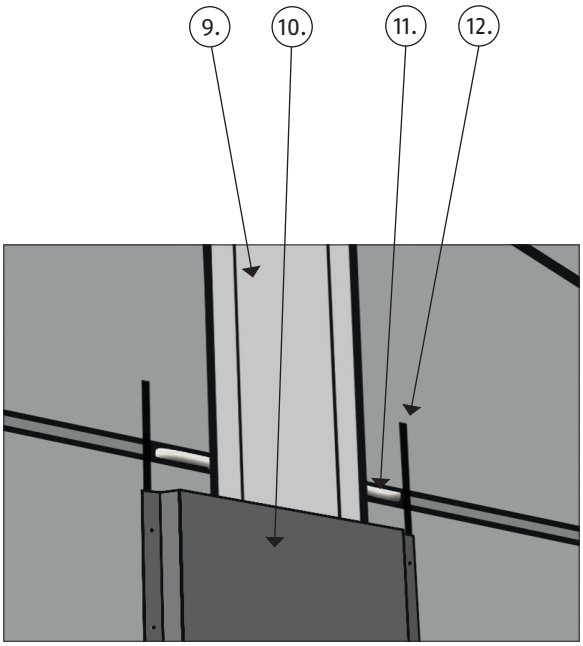
**Cut the cold bridge off.**



- **External wall – horizontal installation (4/4)**
  Protect the vertical seams of the pillars against the weather immediately with Ruukki sealing tape. Fold the top edge of the sealing tape at the eave on top of the panel seam in order to prevent rainwater from entering the vertical seam between the panels. Make sure that the groove at the horizontal seam of the element (behind the vertical flashing) is filled with mastic sealant in order to achieve weather proof connection to the vertical sealing tape. Wider tape is available for outer corners. Ensure that the sheet metal face of the panel is dry and clean before applying the tape, and apply the tape by pressing it carefully throughout. If necessary, use a roller or a trowel to press the tape in order to ensure that the tape is applied adequately. Apply sealing strips to the vertical flashing before installing the flashings. **NOTE! In more challenging climates (e.g. coastal areas), heavy-duty, EPDM-based sealing tape should be used.** The flashings are installed with 300 mm spacing, unless otherwise indicated in the schematics. When using a fastening plate, remember to lock the fastening plate into the sheet metal face of the panel and always fasten the panels above openings with through-fasteners.

9. Sealing tape
10. Vertical flashing
11. Mastic sealant
12. Sealing tape

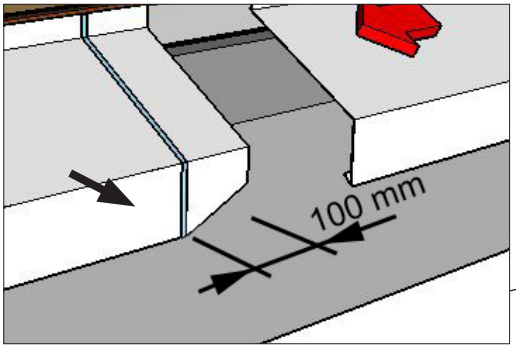
If the fire resistance requirement exceeds EI60, the panel fastenings have to be fire protected according to the chart on page 29.

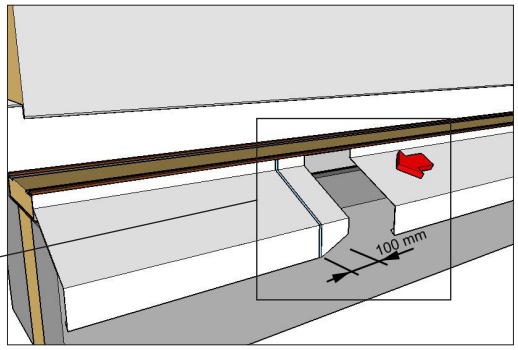


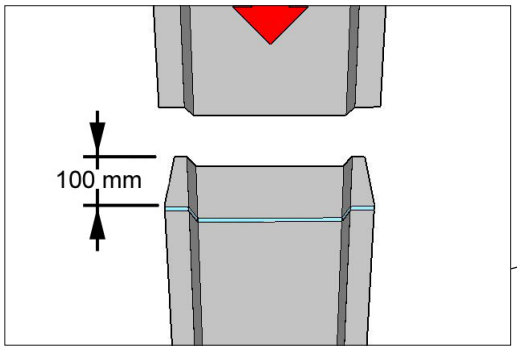

## Finishing the installation

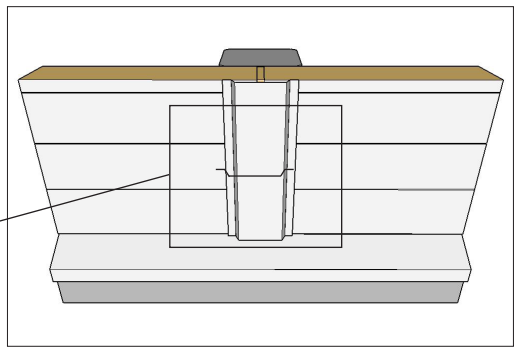
Remove the protective films right after the installation or at the latest once the wall is completed. The protective films protect the surface of the panels against scratching and contamination during construction. The protective films will be more difficult to remove if they are left on the panel for a long time.

- **Flashing details**
  Below you can find instructions and tips to ensure good flashing details. Fasten flashings with a maximum spacing of 300 mm. Cut off an overlapping piece from the lower flashing. Apply sealant mastic on the lower flashing and overlap the flashing a minimum of 100 mm.

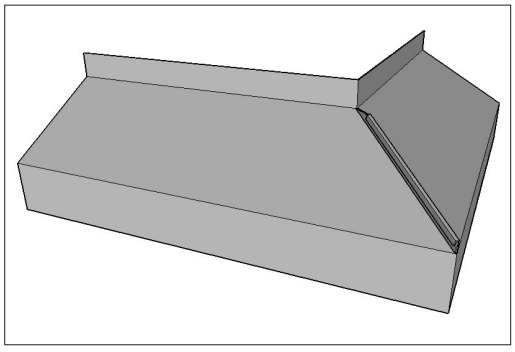


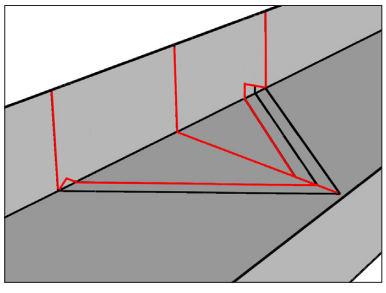



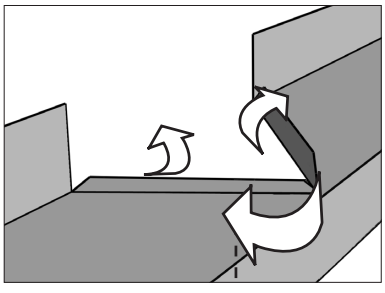



Mark cutting and folding lines on the plinth flashing for vertical joint. Cut along the red lines and fold up along the black lines. Bend the flashing to a 90° angle. Create a tight vertical joint by folding the longer side to overlap with the shorter side. Below is a series of pictures presenting the cutting and folding process.

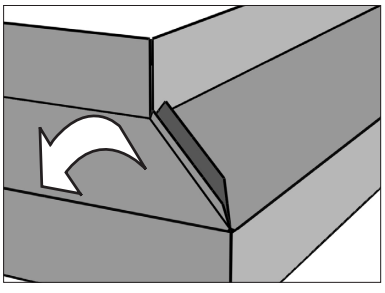




Cut along the red lines and fold along the black lines.



Fold the sides upwards and bend the flashing to a 90° angle.



Create tight vertical joint by folding the longer side over the shorter one.

- **External wall – vertical installation (1/4)**
  The installation must be carried out according to the structural plans. Begin the installation so that the tongue of the panel is facing in the direction of installation.

  Always remember work safety and wear protective gear during installation!

  If you do not complete the installation, the exposed wool surfaces of the panels, both those that have already been installed and those still remaining in the package, must be appropriately protected against the weather, for example by plastic covering, which you may order from Ruukki.

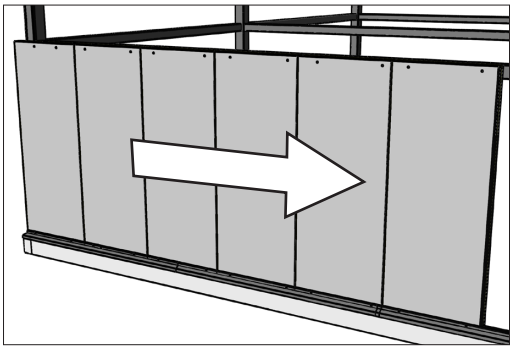
  Check the straightness of the installation surfaces. Install the plinth sealing and the sealing strip between the frame and the panels. The sealing strip is installed on the face of the columns and the plinth purlin inside of the line of fasteners as per the detail drawings and plans. This way, the holes for the fasteners can be made vapour-tight without any extra work.

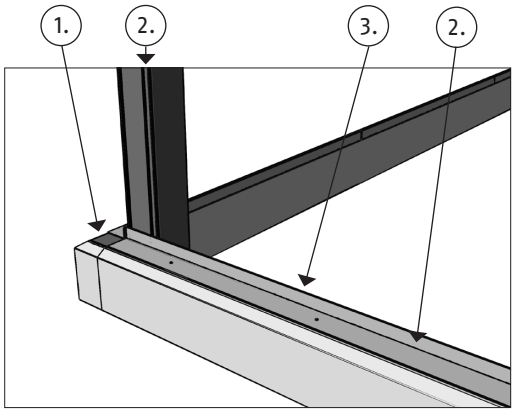
  Fasten the plinth purlin on the plinth.

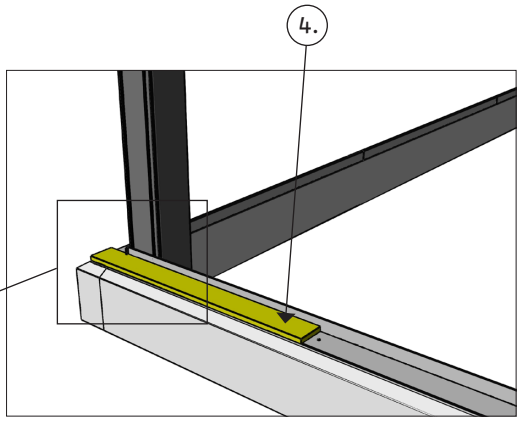
  1. Plinth sealing
  2. Sealing strip
  3. Plinth purlin (fastening with a spacing of 600 mm)

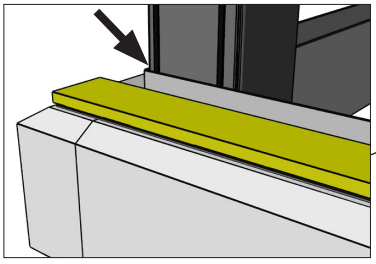
  Insulating wool must be installed in the plinth purlin to ensure the tightness and thermal insulation of the external wall.

  4. Insulating wool





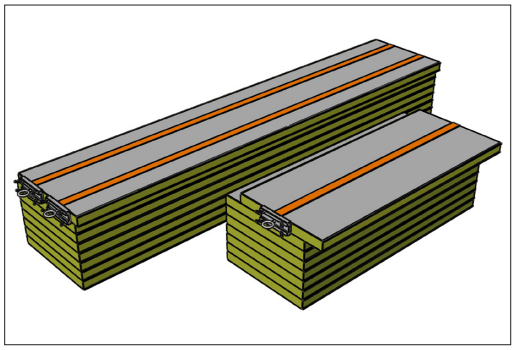



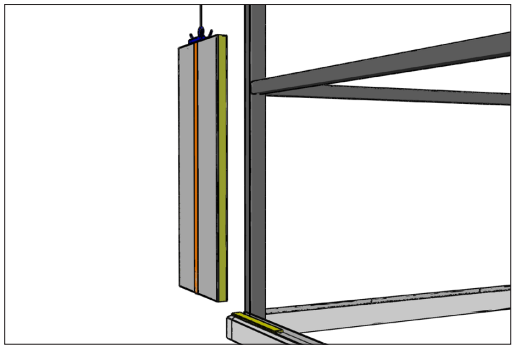



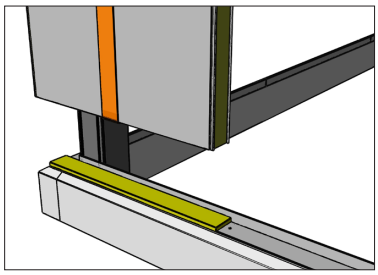
**A gap of 0–1 mm between the purlin and the frame**

- **External wall – vertical installation (2/4)**
  Check that both panel grooves are provided with joint seals. Fasten the panel lifting tool or tools on the top-most panel in the package. Follow the instructions for use and the safety instructions provided with the lifting tool. Use a safety strap around the panel to be lifted and, if required, use the boom during the lifting operation. Raise the panel into an upright position and take care not to scratch the surface of the lower panel in the package. Remove any protective films from the panel, either from the edge portions or entirely.

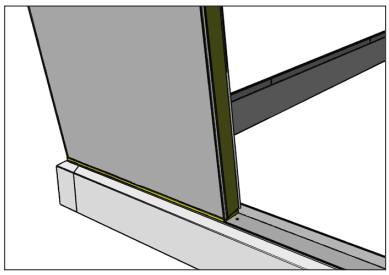
  Begin the installation of the first panel with the tongue facing in the direction of installation. Lift the panel in place with the lifting tool. Always read the instructions for use and the safety instructions of the panel lifting tool thoroughly before starting installation.



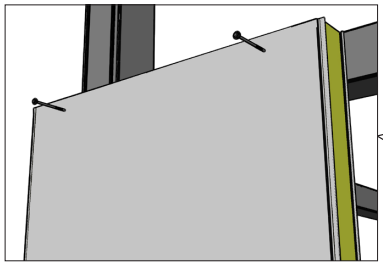




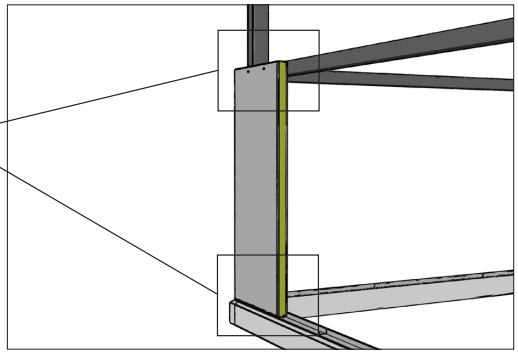
Remove the safety strap prior to positioning the lower end of the panel.



Fasten panel from the lower and upper end to the frame structures. Use a depth limiter in the screwdriver to prevent over-tightening and damaging the panel surface.



Fastening the end of the panel



- **External wall – vertical installation (3/4)**
  Check that the installed panel is vertical. The panel straightness must be at least ±2 mm. Check the run and straightness of the wall to be installed at different levels after each installation of two new panels. Well-aligned panels ensure that the joints are securely locked and that the wall is vapour-tight.

  When installing long and multiple span panels ensure that the panel joints fit tightly together (temperature differences may bend the panel to curve).

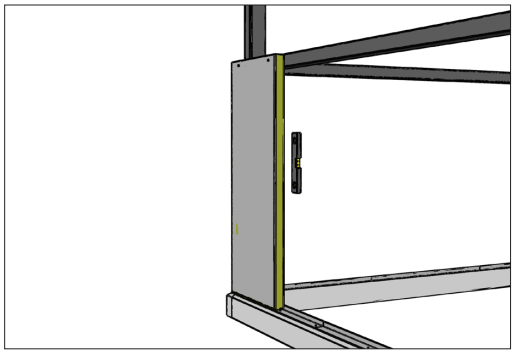
  Install an insulating wool in the plinth purlin for the next panel. Raise the next panel into an upright position on the insulating wool. Remove the safety sling prior to positioning the lower end of the panel.

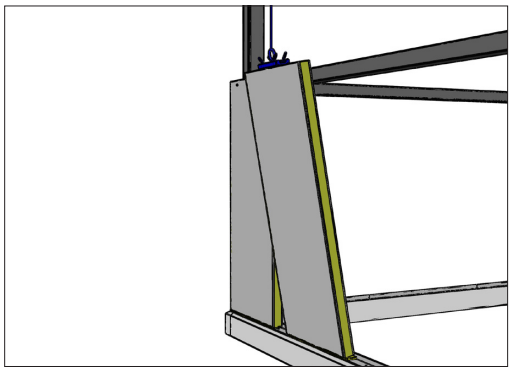
  Apply mastic sealant into the outer joint between the panels to be installed. All the outer joints must be sealed on the entire surface of the wall in vertical and diagonal installation. Also apply mastic sealant to both ends of the inner joint (approx. 60 mm) so that the sealant reaches the column seal. This ensures that the structure is properly sealed.

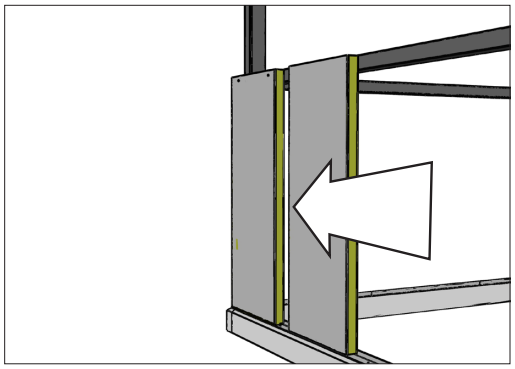
  Push the panel to be installed firmly against the preceding panel prior to fastening, to ensure the tightness of the structure. Use manual suction cups or a wide clamp belt.

  When using a clamp, make sure not to damage the joints of the panel. Fasten the panel on the upper and lower support structures. Continue the installation as described above, one wall at a time.

  Make sure that the inner and outer joint seals installed in the panel groove joints at the factory remain in place during installation. Check the structural plans for any special tightness requirements.







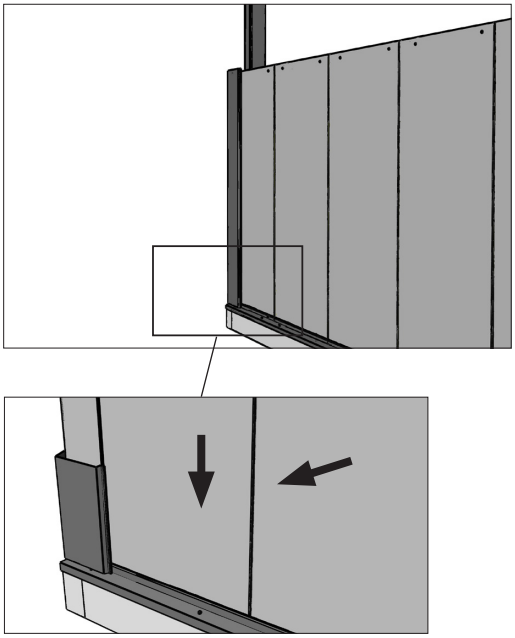
- **External wall – vertical installation (4/4)**
  Apply insulation, sealant and flashings on the finished wall structure. Install a plinth flashing at the bottom edge of the panel and seal the upper edge of the flashing with mastic sealant. Make sure to apply mastic sealant on the vertical joints between the panels, too. Fire protect the panel fasteners in the compartmenting walls.

  Also install the flashings covering the panel's upper edge and the frame structure and apply sealant (fastening with a spacing of 300 mm).

  If the fire resistance requirement exceeds EI60, the panel fastenings have to be fire protected according to the chart on page 29.

### Finishing the installation

Remove the protective films right after the installation or at the latest once the wall is completed. The protective films protect the surface of the panels against scratching and contamination during construction. The protective films will be more difficult to remove if they are left on the panel for a long time.



Apply sealant to the upper edge of the bottom flashing and to the vertical joints.

- **Partition wall – horizontal installation (1/3)**
  The installation must be carried out according to the structural plans. Begin the installation at the bottom and proceed upward with the tongue of the lower panel facing up. Proceed one span at a time. Pay attention to the sealing of the partition wall joints to ensure fire safety.

  Always remember work safety and wear protective gear during installation!

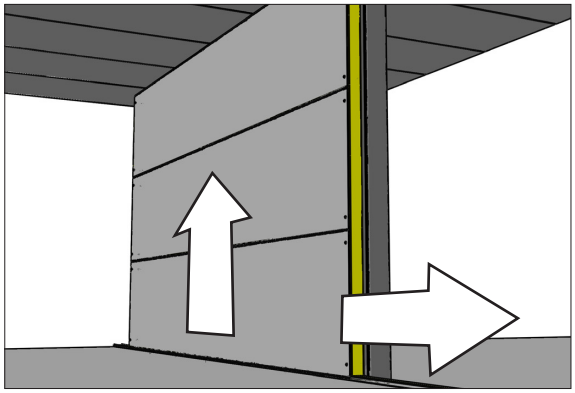
  If you do not complete the installation, the exposed wool surfaces of the panels, both those that have already been installed and those still remaining in the package, must be appropriately protected against the weather, for example by plastic covering, which you may order from Ruukki.

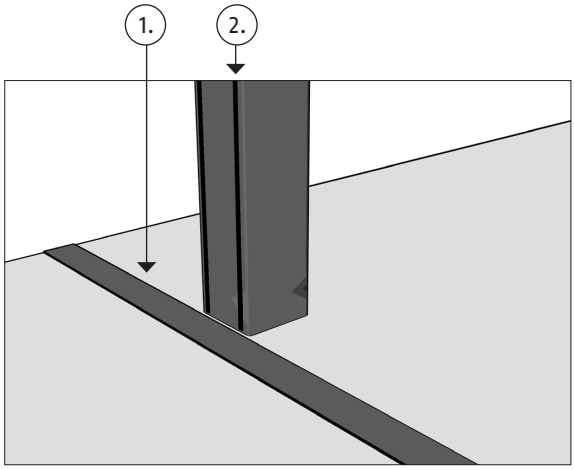
  Check the straightness of the installation surfaces. Install the plinth sealing on the plinth or on the floor. Install the sealing strip (4x10 mm) between the columns and the panels (if applicable). The sealing strip is installed on the surface of the columns inside of the line of fasteners of the panel as per the detail drawings and plans. This way, the holes for the fasteners can be made vapour-tight without any extra work.

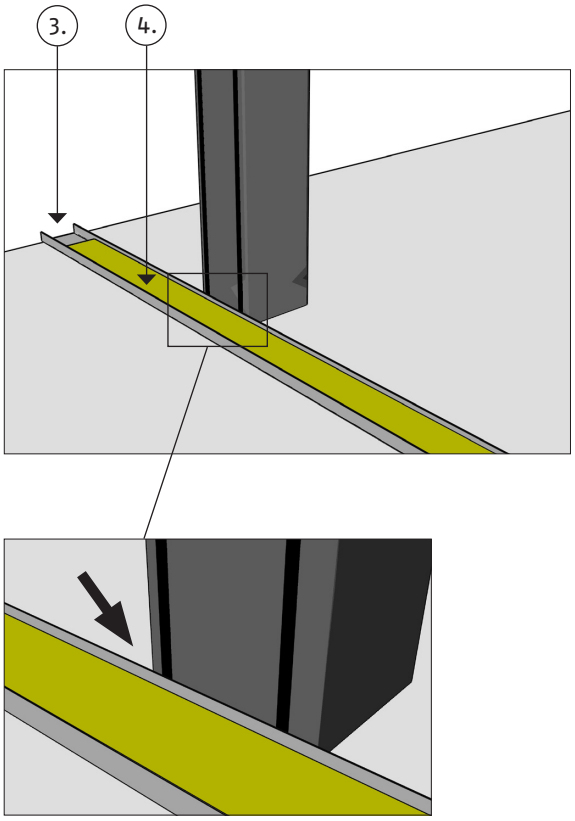
  1. Plinth sealing
  2. Sealing strip

  Install the U-Plinth purlin on the sealing as shown in the detail drawing. Make sure that the U-Plinth purlin is straight. Leave a gap of approximately 7–9 mm between the U-Plinth purlin and the frame. The panel's inner side's groove must fit into this space. Fasten the purlin on the partition base or on the floor and install insulating wool inside it, if required.

  3. U-Plinth purlin
  4. Insulating wool





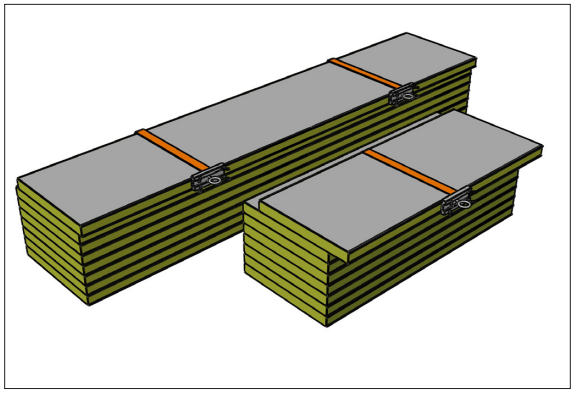

A gap of 7–9 mm

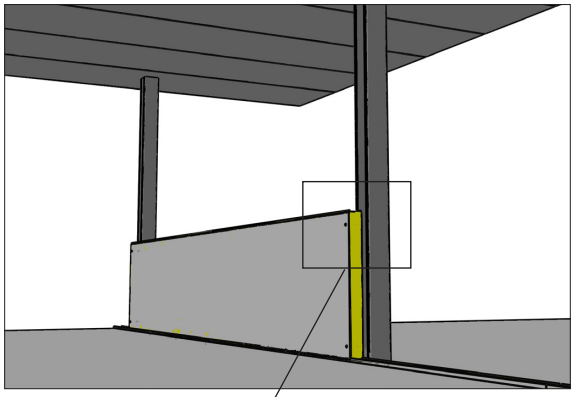
- **Partition wall – horizontal installation (2/3)**
  Fasten the panel lifting tool or tools on the top-most panel in the package. Follow the instructions for use and the safety instructions provided with the lifting tool. When lifting, for example, the top element against a roof/floor slab, the use of a vacuum lifting tool and manual suction cups is recommended. Be careful of the sharp edges of the element.

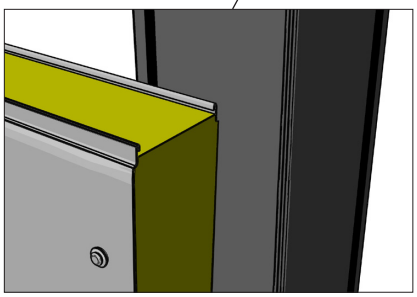
  Raise the panel into an upright position and take care not to scratch the surface of the lower panel in the package. Remove any protective films from the panel, either from the edge portions or entirely.

  Apply mastic sealant into the panel joint at the distance of 60 mm on the column and flashing seals in the walls where vapour-tightness is required.

  Install the bottom wall panel on the U-Plinth purlin and fasten it to the frame as shown in the detail drawing. Make sure that the distance of the fasteners from the edge is maintained. The fasteners must be placed at a minimum distance of 30 mm from the panel end. Do not over-tighten the fasteners, as this would cause dents in the panel surface under the fastener. It would also impair the load-bearing capacity of the fastening. Over-tightening can be avoided by using a depth limiter or a torque screwdriver.



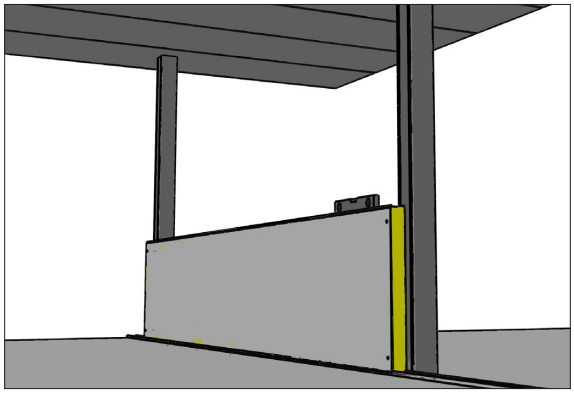




**Minimum fastening distance from the edge is 30 mm.The fastening surface of the panels against the beam, i.e. the width of the panel support surface, must be at least 50 mm.**

Make sure during installation that the joint seals installed in the grooves at the factory are in place.

After the installation of the first panel, check that the panel is level. Install the other panels in the order of installation from the bottom upwards, one span at a time.



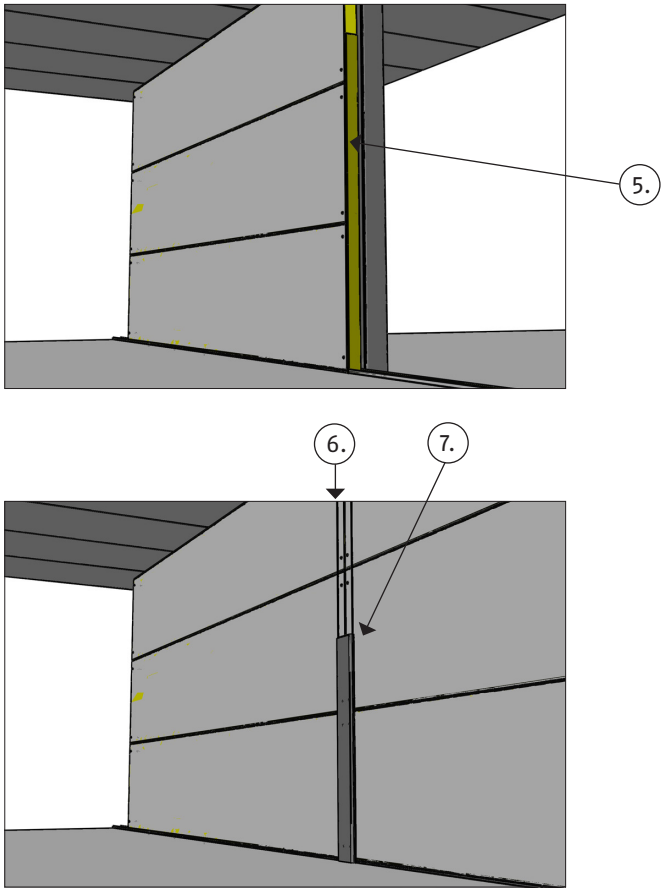
- **Partition wall – horizontal installation (3/3)**
  Once you have completed one span, install an insulating wool at the panel ends before installing the panels in the next span. This way, the wool can be sealed easily with the panels of the next span. Insulate all corners and vertical joints between the panels.

  5. Insulating wool

  Install the sealing strips for flashings. Install the flashings on the vertical joints of the panels. Install the seals and fire insulation (if necessary) on the joint between the panel wall and the ceiling. Install all protective flashings and seals of the panels according to the structural plans.

  If the fire resistance requirement exceeds EI60, the panel fastenings have to be fire protected according to the chart on page 29.

  6. Sealing strip
  7. Vertical joint flashing (fastening with a spacing of 300 mm)




- **Finishing the installation**
  Remove the protective films right after installation or at the latest once the wall is completed. The protective films protect the surface of the panels against scratching and contamination during construction. The protective films will be more difficult to remove if they are left on the panel for a long time.

- **Partition wall – vertical installation (1/4)**
  Installation must be carried out according to the structural plans. Begin the installation so that the tongue of the panel faces the direction of installation. Pay attention to the sealing of the partition wall to ensure fire safety.

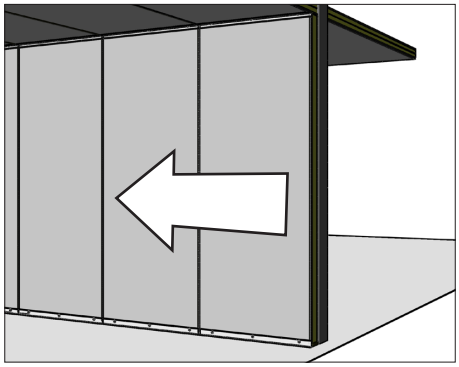
  Always remember work safety and wear protective gear during installation!

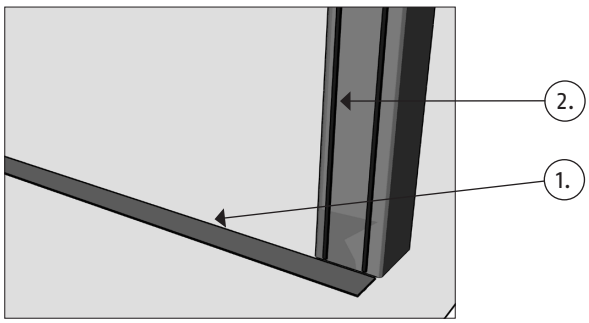
  If you do not complete the installation, the exposed wool surfaces of the panels, both those that have already been installed and those still remaining in the package, must be appropriately protected against the weather, for example by plastic covering, which you may order from Ruukki.

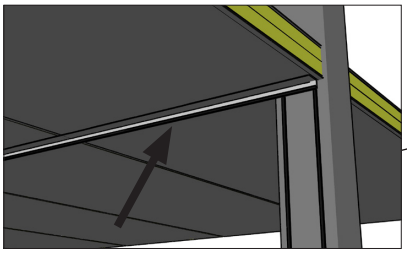
  Check the straightness of the installation surfaces. Install the plinth sealing on the floor or on the plinth. Install the sealing strip between the columns and the panels (if applicable).

  1. Plinth sealing
  2. Sealing strip

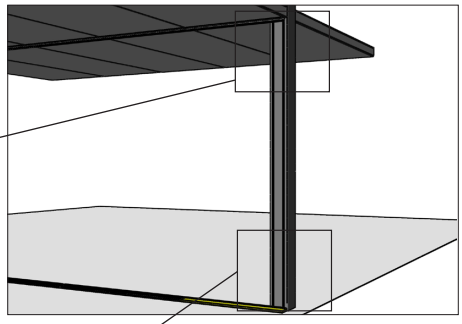
  Measure and mark the locations for the lower and upper support purlins. The upper support purlin is L-shaped and the lower support purlin is L- or U-shaped. Fasten the support purlins. Install the sealing strips into the support purlins.

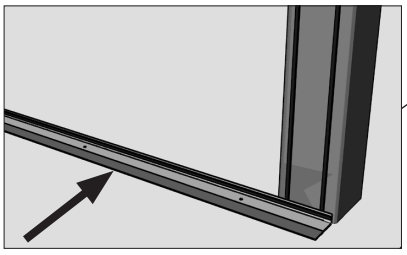




Fasteners and sealing strip in the inner flange of the upper support purlin





Fasteners and sealing strip in the inner flange of the lower support purlin

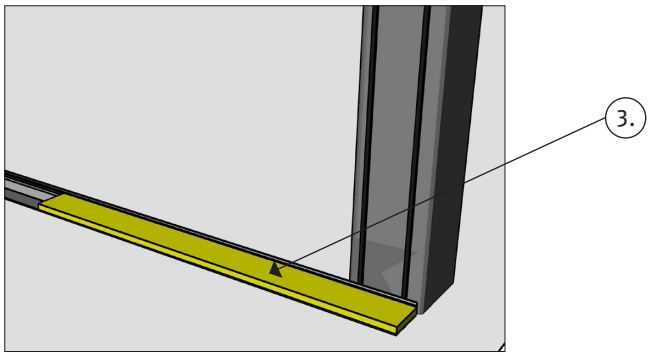
- **Partition wall – vertical installation (2/4)**
  Install an insulating wool in the lower support purlin to ensure the tightness and thermal insulation of the wall. Cut the insulating wool to the panel width.

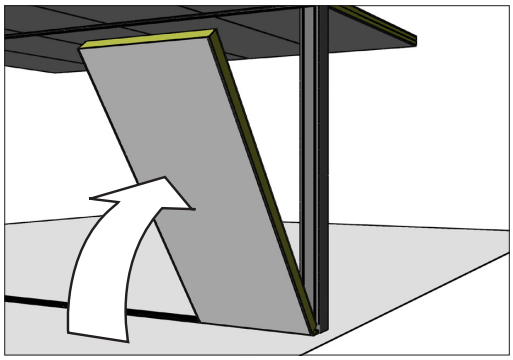
  3. Insulating wool

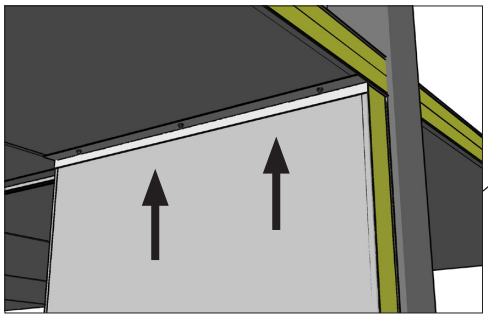
  Begin the installation of the first panel with the tongue facing in the installation direction. Lift the panel in place with the lifting tool. Always read the instructions for use and the safety instructions of the panel lifting tool before starting installation.

  Apply mastic sealant into the panel joint at the distance of 60 mm on the frame and flashing seals in the walls where vapour-tightness is required.

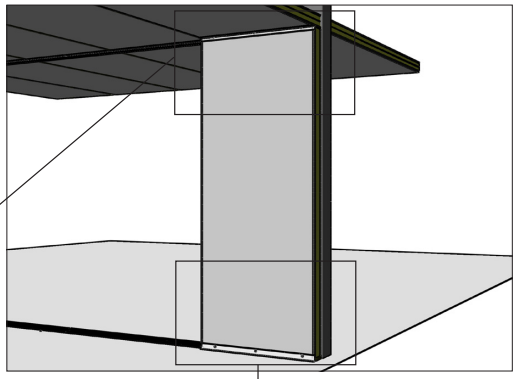
  Fasten the panel by installing support purlins between panel and ceiling and between wall and floor. Usually, no fasteners are installed on the panel itself between the ceiling and wall connection to allow the ceiling to settle. Alternatively a fastening that allows settling (oval perforated fastening corner flashings) can be used. The panel straightness must be at least ±2 mm.

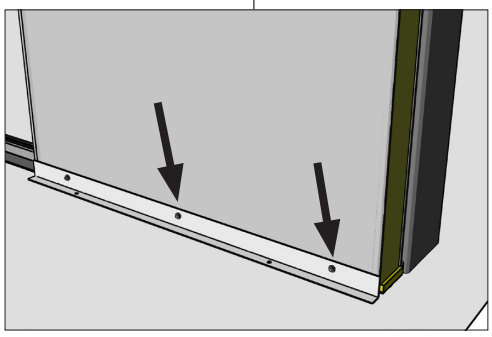




Fastening the panel by installing the upper support purlin on the ceiling. Check the allowance for settling of the ceiling and take it into account during fastening.



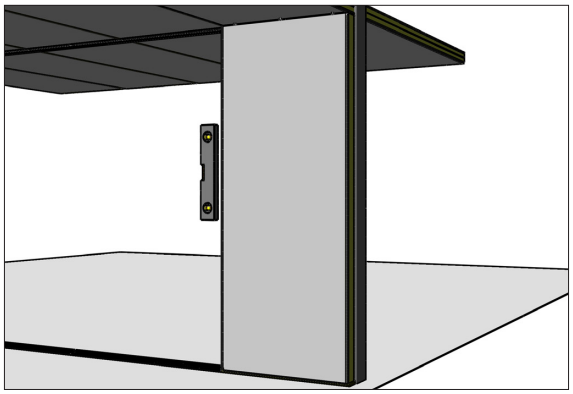


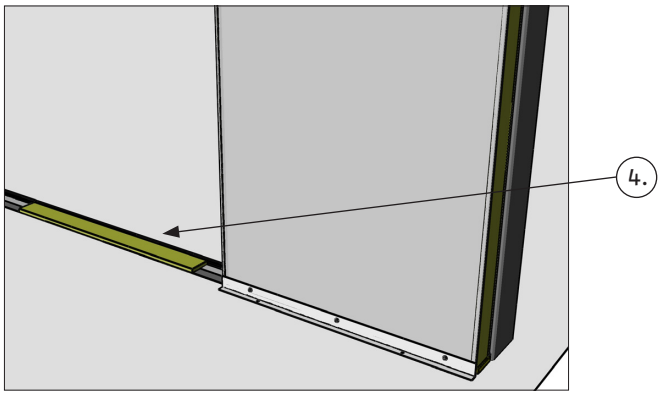
Fastening the panel by installing the lower support purlin on the floor and to the panel.

- **Partition wall – vertical installation (3/4)**
  Check the run and straightness of the wall to be installed at different levels always after having installed a few panels. The panel straightness must be at least ±2 mm. Good alignment of the panels ensures that the joints are securely locked and that the wall is vapour-tight.

  Install an insulating wool in the lower support flashing for the next panel. Check thermal insulation at the lower end of the panel.

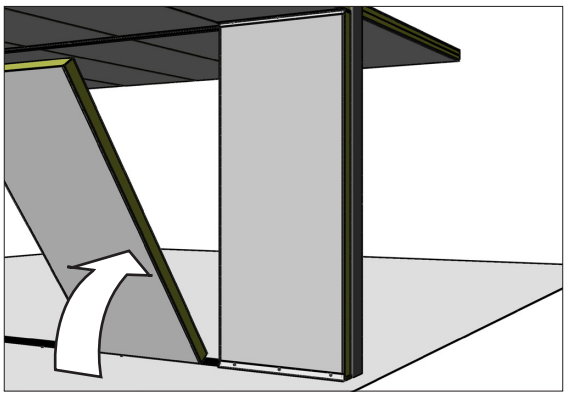
  4. Insulating wool

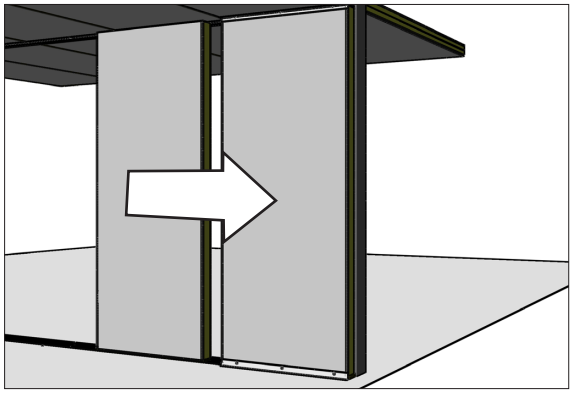





Raise the next panel into an upright position on the insulating wool. Push the panel to be installed firmly against the preceding panel prior to fastening to ensure the tightness of the structure. Use a suction-cup lifting tool or a wide clamp sling. When using a clamp, make sure not to damage the tongue and groove of the panel.

Make sure that the inner and outer joint seals installed in the panel joints at the factory remain in place during installation. Check the structural plans for any special tightness requirements and take appropriate measures.

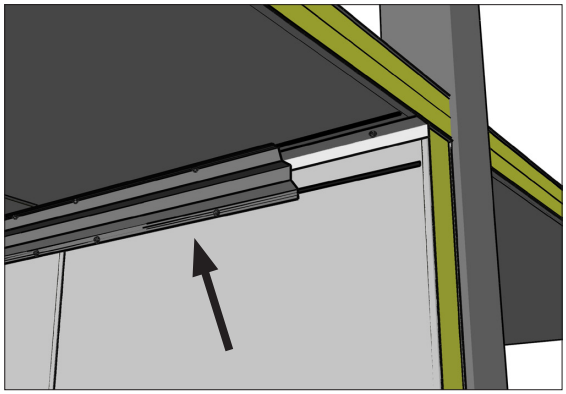




- **Partition wall – vertical installation (4/4)**
  Apply insulation, sealant and flashings on the finished wall structure. Install the seals and fire insulation (if necessary) on the joint between the panel wall and the ceiling. Install all protective flashings and seals of the panels according to the structural plans.

  Fire protect the panel fasteners in the compartmenting walls. If the fire resistance requirement exceeds EI60, the panel fastenings have to be fire protected according to the chart on page 29.

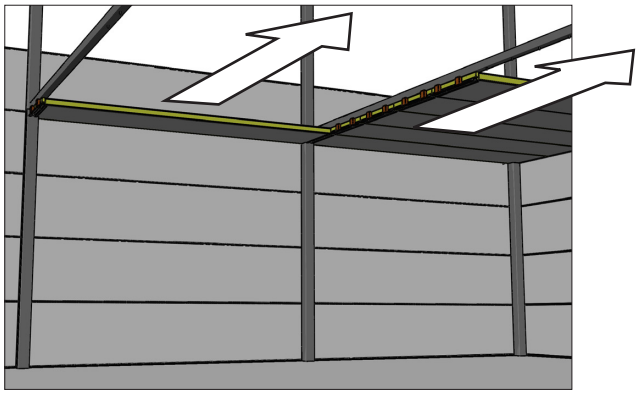
  **Finishing the installation**
  Remove the protective films right after the installation or at the latest once the wall is completed. The protective films protect the surface of the panels against scratching and contamination during construction. The protective films will be more difficult to remove if they are left on the panel for a long time.



- **Installation of the ceiling (1/5)**
  Install the panels as shown in the installation chart, starting from the first span of the end wall, proceed one span at a time. Check that the joint seal installed at the factory is in place. If required, apply mastic sealant into the panel joints, e.g. at the distance of 60 mm on the connections (see the installation chart and detail drawings).

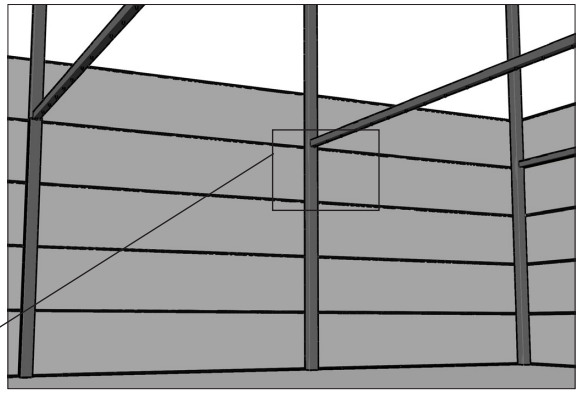
  Always remember work safety and wear protective gear during installation!

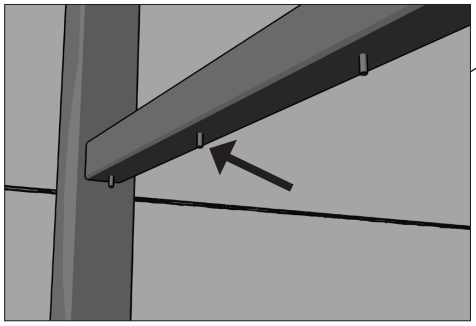
  If you do not complete the installation, the exposed wool surfaces of the panels, both those that have already been installed and those still remaining in the package, must be appropriately protected against the weather, for example by plastic covering, which you may order from Ruukki.



  Check the straightness of the installation surfaces. Fasten the threaded sleeves onto the bottom boom of the roof truss (fastening with a spacing of 600 mm) for the installation of the panels. Threaded sleeves can be fastened also at the workshop (recommendation). The panels can also be installed with through-fasteners.

  Check the run and straightness of the ceiling after each installation of two new panel layers.



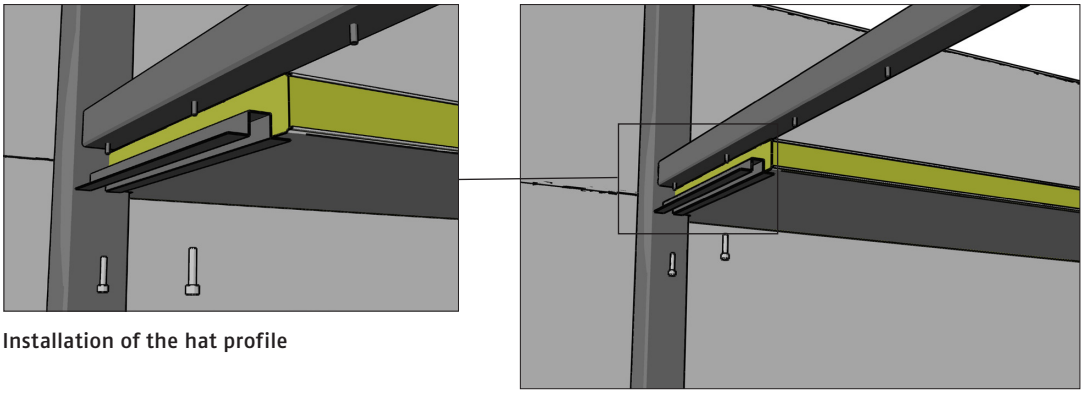


Installation of the threaded sleeves on the bottom boom, fastening with a spacing of 600 mm

- **Installation of the ceiling (2/5)**
  Make needed cutouts, for example to colums, to the first panel. Install the panel. Leave approximately a 20 mm gap between the panel and side wall. Gap is later on sealed by  means of polyurethane foam or insulating wool (ensure immovability of wool).

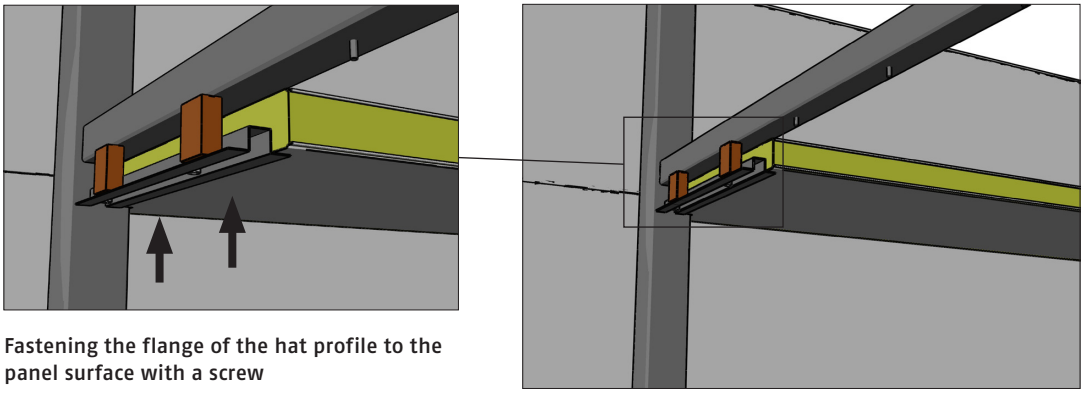
  For lifting the panels, a vacuum lifting tool is the most convenient solution. Remove the protective film of the panel before the lifting operation. Remember work safety and read the instructions for using the lifting tool before starting the installation.

  Install the panels using a fastening beam/rail with a hat profile and a length of less than 1200 mm. Use the threaded sleeves installed on the bottom boom for the fastening. Pre-tighten the fasteners of the hat profile.



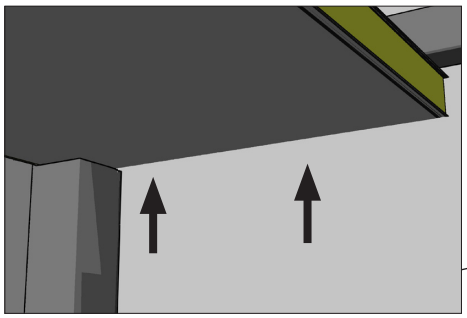
Installation of the hat profile

Support the hat profile with installation pads, which are of the same thickness as the panel and tighten the fasteners. Fasten one of the hat profile flanges to the panel surface with a screw. This makes it easier to remove the installation pads when installing the panels of the next span.

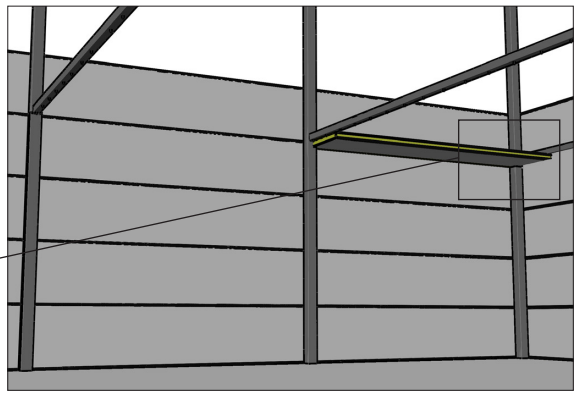


Fastening the flange of the hat profile to the panel surface with a screw

- **Installation of the ceiling (3/5)**
  Fasten one panel end by means of screws through the panel or as a threaded sleeve fastening to the frame.

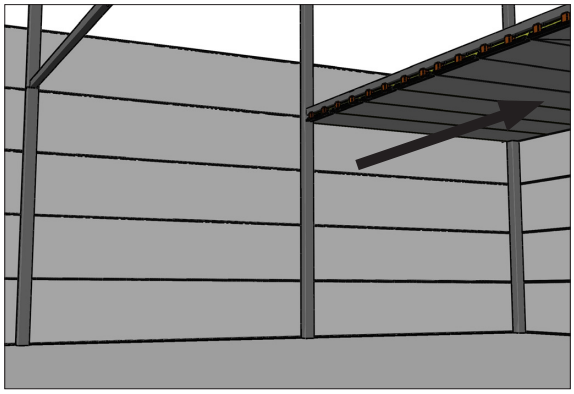


Fastening of the panel end to the frame



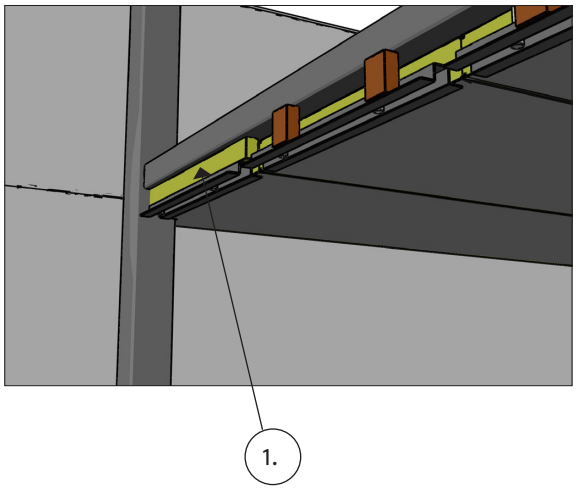
Continue the installation as described above one panel at a time until the span is completed. Join the panels tightly against each other. Use manual suction cups or a wide clamp belt for clamping and check the run at intervals of a few panels. When installing the last panel, note the allowance for installation.

When required under the fire safety regulations, the upper surfaces of the panels are joined using a metal sheet or by fastening the tongues and grooves with screws according to the structural plans.

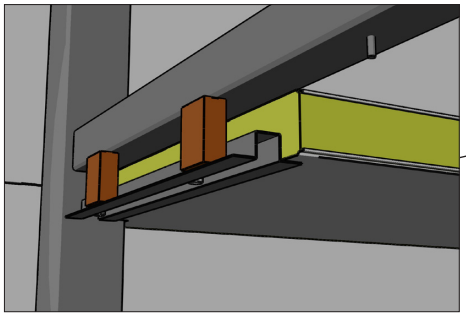


Before starting the installation at the next span, remove the installation pads from one panel at a time and install the insulating wool into the end joints of the panels.

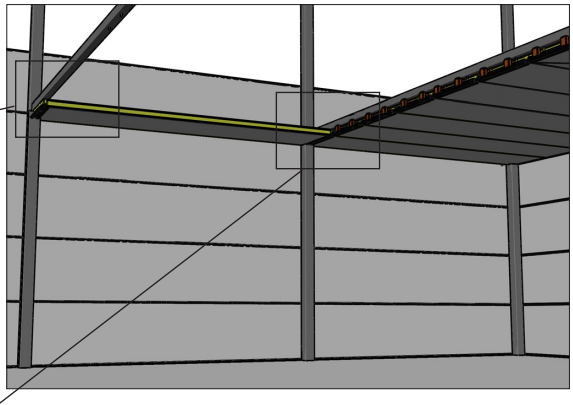
1. Insulating wool

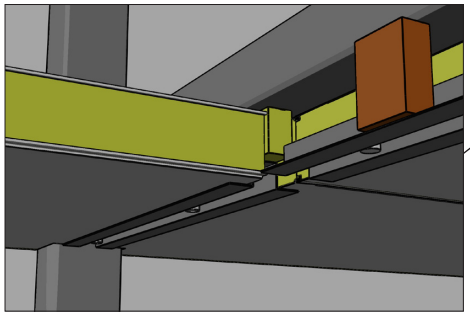


- **Installation of the ceiling (4/5)**
  Lift the first panel of the span in place by supporting the rear end on the hat profile of the preceding span. The front end of the panel is installed on the bottom boom with the hat profile and the installation pads.



Fastening the front end of the panel

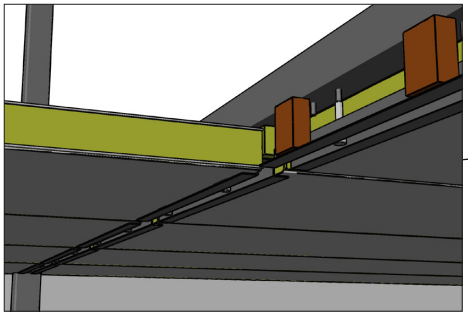




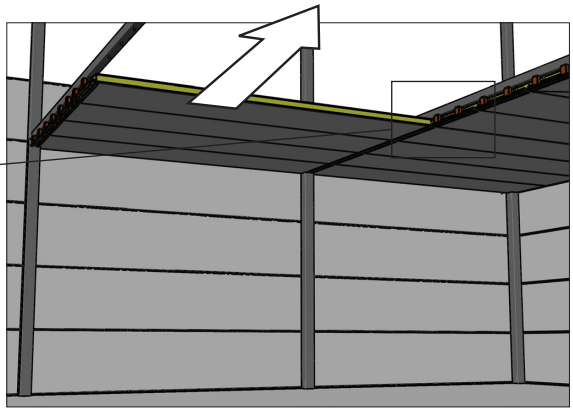
Fastening the rear end of the panel

Complete the installation of the ceiling as described above, one span at a time.

If the fire resistance requirement exceeds EI60, the panel fastenings have to be protected according to the chart on page 29.

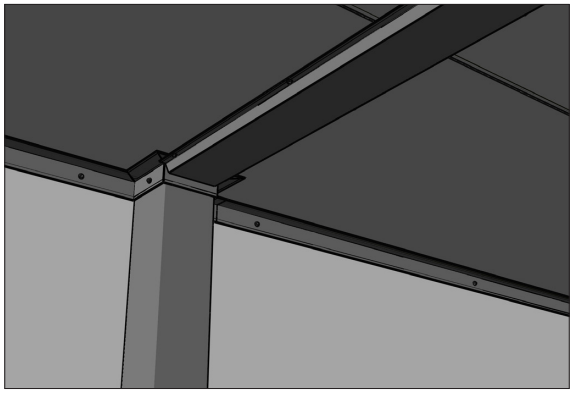


Complete the installation of the ceiling, one span at a time.



- **Installation of the ceiling (5/5)**
  Seal the joints between external wall and ceiling. Glue and fasten by steel strips the vapour barrier that allows for thermal expansion and shrinkage in the joint between wall and ceiling. Cover the lead-throughs of the columns with adhesive tape to make them tight.

  Install the cover flashings between the ceiling and wall (fastening with a spacing of 300 mm). The flashings must consist of two parts (two separate flashing) to allow thermal expansion movements. Use sealing strip (4x10 mm) or mastic sealant in the joint flashings of the ceiling panels.



### Finishing the installation

Remove the protective films right after the installation or at the latest once the wall is completed. The protective films protect the surface of the panels against scratching and contamination during construction. The protective films will be more difficult to remove if they are left on the panel for a long time.

- **Walking on the panels**
  When the Sandwich panel SPA is used, for example, as a compartmenting ceiling, as a load-bearing element or as part of another load-bearing structure, extreme care must be taken not to walk on the panels or to store goods on them unless the panels have been appropriately protected. Walking on unprotected panel surfaces is forbidden, as it always impairs the structural properties.

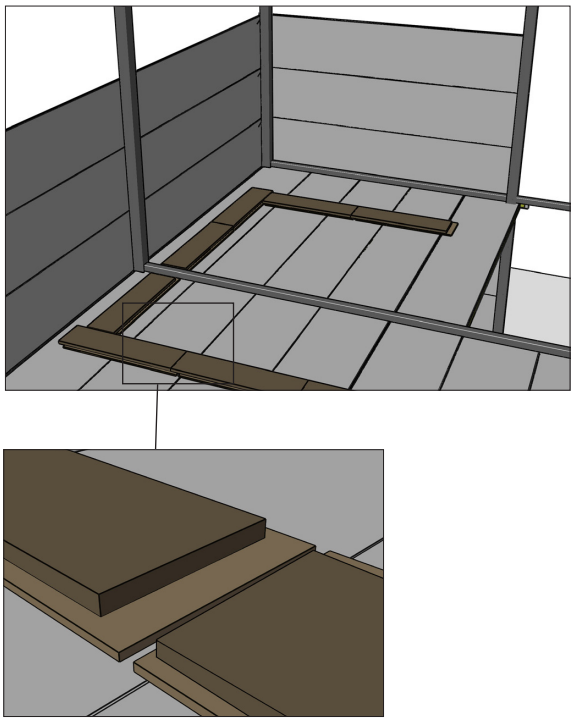
  The following procedure, for instance, may be applied to protect the panels during installation:

  Flexible fibreboards with a minimum width of 600 mm are placed in the area where movement is required (max. 100 kg = one person). On top of the fibreboard, a rigid plywood board is placed, which is at least 10 mm thick and substantially narrower and shorter than the fibreboard. Walking is allowed on the plywood board.

  Protect the ceiling with two overlapping wooden boards during installation.

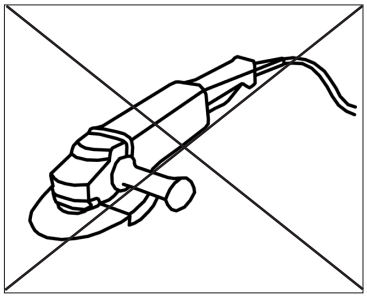
  If regular or continuous walking above the panel structures is required, use appropriately designed platforms, which are supported on the frame and which do not load the panel structures.

  The site's structural designer must take into consideration any suspension or other similar loads when dimensioning.



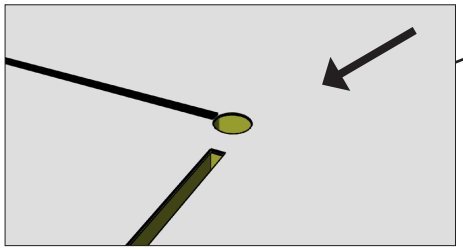
- **Cutting the panels**
  It is recommended, that any large holes in the panels are cut only after the panel has been fastened to the frame. Smaller cuts may be carried out before installation. Appropriate tools and protective equipment must be used for cutting.

  Panels may be cut on site using various panel cutters. A circular saw which has a cemented-carbide-tipped blade with a negative angle, can also be used for cutting. Hot cutting and the use of a grinding machine for panel cutting are strictly forbidden, as the hot blade and the sparks would damage the panel surface.

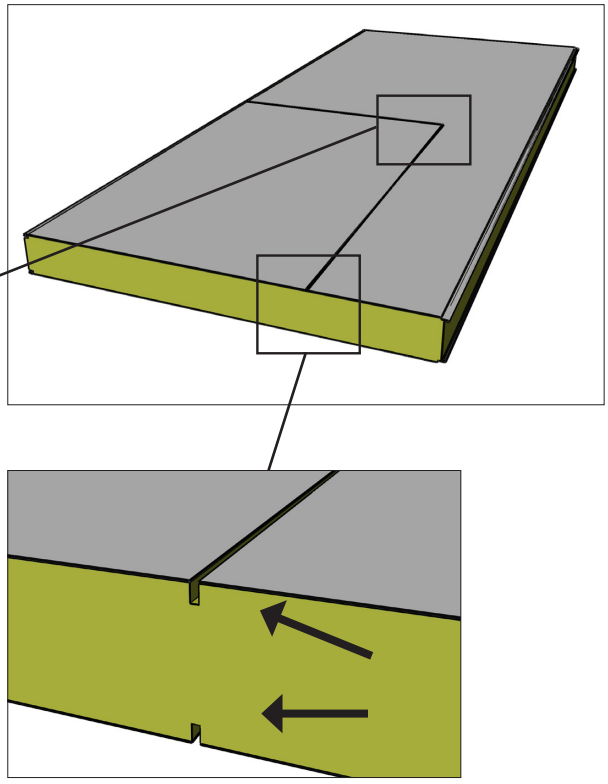


  Cutting is carried out by marking the cutting point on the sheet metal faces on both sides of the panel. The metal faces are cut along the marked lines. The insulation between the sheet metal faces is cut by using for example a wool cutter.

  Ruukki's mineral wool sandwich panels can be recycled and it is recommended that panel off-cut pieces, damaged panels or end-of-life panels are sent to a reclamation facility where steel can be separated from the insulation core. The individual parts can then be recycled and used to create new products. Please note the work safety issues on page 4.



By drilling hole in the corners, the cut will be sharper and cleaner.

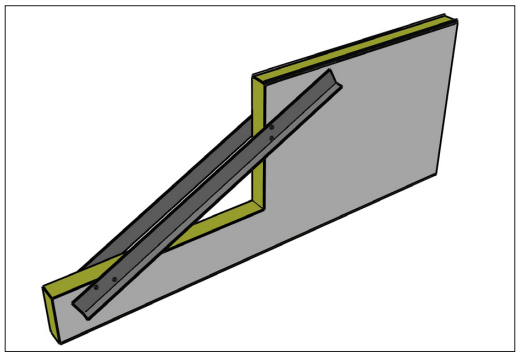


Cut the metal faces on both sides before cutting the insulation.

  Large openings or slots, which have been cut in the panel before lifting or transporting the panel, must be strengthened to prevent the panel from being damaged.

  Large openings (over 1200 mm x 1200 mm) and all openings made in a fire-compartmenting wall must be dimensioned separately.

  **Note! All the exposed surfaces should be protected with Ruukki Rain Protect film, which is available from Ruukki.**



- **Sealing**

  Any gaps and holes on the external surface of the wall during the installation must be sealed as the installation work progresses. The joints of the wall structures must be insulated, sealed and provided with flashings immediately after the installation of the panels. If it is not possible to install the flashings right after the thermal insulation of the joints, the exposed wool must be protected against moisture for example with a cover plastic or adhesive tape. The exposed wool surfaces of the wall structures or single panels must be protected from getting wet at all stages of installation to maintain the tightness of the wall structure.

  At the points where the panel's inner surface is in contact with the building frame, a suitable column gasket is needed. Moreover, mastic sealant is needed on the internal joint (at the column gasket interface) to ensure air tightness.

  The panel joints remaining under the flashings and the contact faces between the flashings must be sealed with a mastic sealant to ensure that the external surface of the wall will be airtight. When installing the flashings, a sealing strip must be used under the fastening surfaces.

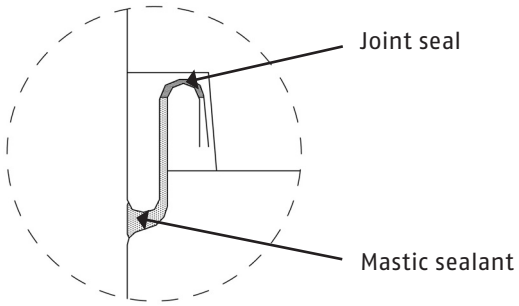
  All inner joints must be sealed to provide a vapour and airtight seal: e.g. by applying mastic sealant into the inner joint on the connections in contact with plinths, eaves, and columns, and the edges of the openings. The partition wall structures are sealed as required in each case. If the building or structure is subject to particularly high requirements in terms of vapour and air tightness, the sealing and the choice of materials must be made in accordance with these specific requirements, e.g. hygienic facilities, cold-rooms, laundries and pressurised rooms.

  The connections on the external surface must also be sealed to ensure rainwater-tightness; window, door and equipment openings, for example, must be sealed during construction (at the distance equivalent to cover flashing width).

  As standard, a joint seal has been installed in the female joints of the panels during manufacturing, on both the inner and outer sides.

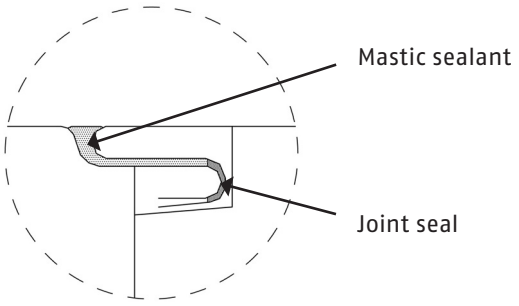
**Sealing the joints of the panel, horizontal installation**

Mastic sealant must always be applied during installation to outer female groove in length equivalent to vertical joint flashing width and inner female groove in length of sealing




**Sealing the joints of the panel, vertical and diagonal installation**

Mastic sealant must always be applied during installation to outer female groove on the entire distance and inner female groove in length of sealing



- **Fasteners**

The use of high-quality fasteners ensures the longevity of the fastening and the corrosion-resistance of the screws. The fasteners must be chosen according to the requirements of the service conditions. Over-tightening must be avoided to ensure that the fastening maintains its strength and that the panel is not damaged under the fastener. The fastener may not be punched through the panel surface during installation. For exterior wall structures, we recommend the use of fasteners provided with seals.

Fasteners are always definitively dimensioned case by case by the designer according to the instructions for use and research results of the fastener manufacturer. The designer must define, case by case, the fastener type, designation, number by installation site, distance from the edge and fastening detail drawing among other things.

A panel must be fastened using at least two fasteners at the panel end and three in the corner areas. A higher number of fasteners are often required due to high loads. The panels are fastened on the frame material using appropriate fasteners, such as a drill screw or a pull nut. The width of the support surface must be at least 50 mm, which must be noted when specifying the fasteners and dimensions of the panel. The fasteners must be installed at a minimum distance of 30 mm from the panel end edges and at a minimum distance of 150 mm from the horizontal joints of the panel. The drill chips produced during fastening must be removed without scratching the surfaces.

A panel can be fastened on a more than 14 mm thick steel support by means of normal panel fasteners when pre-drilling is performed (the drilling capacity area of the screw must be reached first). Another option is to use self-threading screws, in which case pre-drilled holes through the frame structure are required. A third option is a threaded sleeve fastening. The internally threaded sleeves are recommended to be welded to the steel frame at the workshop. The panels are fastened by using fastening plates. The fastening plate must always be locked into the metal sheet face of the panel. When using the threaded sleeves, the impact of the panel's own weight must be taken into account. In low-rise buildings (<6 m) no through-fasteners are usually needed, but in higher buildings the panels must be locked in this direction too (every fifth panel). The panels located above openings must also be fastened through the panel on the building frame.

- **Suspensions and loading (walls)**

Please refer to separate instructions Sandwich panel SPA cladding www.ruukki.com

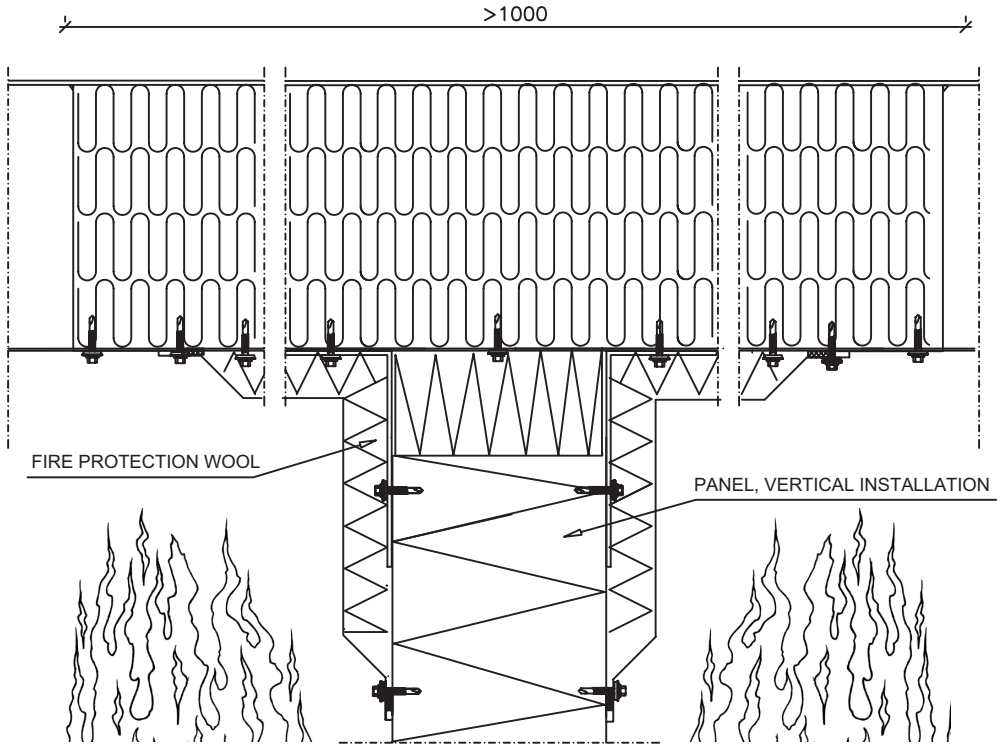
**Maximum span lengths of panel bolt fastenings by panel types**

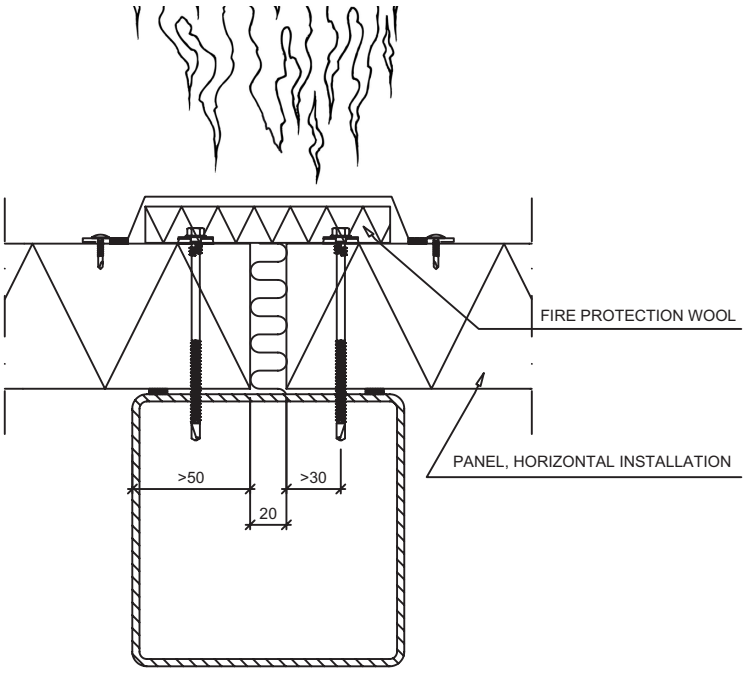
| SPA E LIFE, SPA E, SPA EE and SPA I type panels | | | | | SPA S ja SPA F type panels | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Maximum span legth (m) | | | | | Maximum span legth (m) | | | | |
| Panel / Bolt (mm) | M12 | M16 | M20 | M24 | Panel / Bolt (mm) | M12 | M16 | M20 | M24 |
| SPA100E, SPA100I | 12.0 | 12.0 | 12.0 | 12.0 | SPA100S | 12.0 | 12.0 | 12.0 | 12.0 |
| SPA125E, SPA125I | 6.0 | 12.0 | 12.0 | 12.0 | SPA125S | 5.0 | 12.0 | 12.0 | 12.0 |
| SPA150E, SPA150I, SPA150 ELife | | 12.0 | 12.0 | 12.0 | SPA150S, SPA150F | | 10.0 | 12.0 | 12.0 |
| SPA200E, SPA200I, SPA200 ELife, SPA200+ EE | | 6.0 | 10.0 | 12.0 | SPA200S, SPA200F | | 4.7 | 8.5 | 12.0 |
| SPA230E, SPA230I, SPA230 ELife, SPA230 EE | | | 6.0 | 12.0 | SPA230S, SPA230F | | | 4.5 | 11.0 |

Dimensionings are based on a joint made according to Ruukki's basic details with bolt division k/k 600 mm

**Panel fastening in fire-partitioning constructions must be fire-protected according to the table below.**

| | Mineral wool board EAFW206001200, thickness (mm) | | | | |
|---|---|---|---|---|---|
| Structure | EI60 | EI90 | EI120 | EI180 | EI240 |
| Wall | not needed | 20 | 20 | 30 | 50 |
| Ceiling | 20 | 20 | 30 | not available | not available |



- **Washing and painting the facings**

### Washing facade

When washing facades, the products used and their sensitivity to mechanical impact must be taken into account. Because of this, when using a suspended cradle make sure that the work platforms do not touch the façade causing indentations or paint damage that may be detrimental later. The detergents must not be abrasive to avoid damage to the surfaces.

Ruukki's facade products can be washed with water, and persistent dirt with mild detergents used in households. More difficult dirt may require rubbing with a sponge and the use of detergents designed for factory painted products. If detergents are used, the surfaces must be rinsed well afterwards with clean water. Rinsing of façades must always be carried out from the top downwards Using a pressure washer is not recommended, because water may get into the facade structure. However, if a pressure washer is used, a low pressure (<50 bar) must be applied and direct spraying to the seams of elements and flashings must be avoided.

### Maintenance painting and overpainting

For maintenance painting, follow the separate instructions, which are available for example at Ruukki's website www.ruukki.com. To change the colour of the coating, overpainting may be used. In this case, follow the same instructions as in maintenance painting.

### Touch-up painting

Any damage to the coating should be fixed as soon as possible, because at that stage the damage is usually small and easily fixed. The paints that should be used are listed in the maintenance instructions that come with Ruukki's painted sheets. Before you begin touch-up painting, clean the area with white spirit, allow it to dry and then paint over the scratches with a small brush. If the scratch only extends to the primer, one coat of paint is sufficient, but if the scratch reaches down to the zinc layer, allow the paint to dry and then apply a second coat.

### Repainting

The aesthetic service life of Sandwich panel SPA can be extended with repainting. The reason for repainting is usually damage to the paint coating or a significant change in colour or gloss. It is difficult to specify exactly when repainting should be carried out, because the paint surface is affected by many factors, such as location, inclination, method of construction and installation, and paint colour and type. The recommended time for the first repainting depends on the paint coating. Before repainting, the adhesion of the old paint to the base must be tested. If the adhesion is insufficient, all the old paint must be removed. A paint surface that is in good condition is cleaned and all old surface material that comes off is removed and any corrosion is sanded off. Areas cleared of corrosion or with the paint removed are primed with anti-corrosive paint. The actual painting is done with paints or combinations of paints specified in the Ruukki maintenance manual for colour-coated steel sheets. A surface that is painted early enough is like new and can be painted over again in 20 years.

### Fixing small dents

Sand the damaged area and clean it carefully. Then, the dent should be filled with a filler (e.g. Plastic padding) and sanded until even after drying. The area should be painted twice according to Ruukki's specific instructions (Maintenance instructions, colour coated steels).

### Removal of graffiti from a Pural BT Satin coating

These instructions apply also to factory-painted coatings, but are not ideal because the coating colour or gloss may change. Apply the graffiti cleaner either with a cloth or a sprayer on dry graffiti and allow to act for 0.5 to 5 minutes. The graffiti cleaner must not affect the coating too much; test this by wiping the area gently. Wipe off the cleaner and graffiti with a dry cloth. Rinse the surface thoroughly with water and clean with a damp cloth, and finally dry to remove any paint remnants. When using detergents and paints, follow the manufacturer's instructions. Note that the temperature must be above freezing point and that the temperature affects the application time – the cleaner is more effective in warmer conditions. Tools: cleaner (W-GRA), protective gloves, cloths (sprayer) and water in a suitable container.

- **Maintenance and inspection of the panels**
  The general condition and functioning of the panels and other structural parts must be monitored yearly. Regular inspections extend the service life of the panels. During the yearly inspections, attention must be paid to places where dirt and moisture accumulate.

  When a need arises to replace panels or other structural parts, corresponding products must be used to replace them. A record must be kept of the maintenance work performed on the structures. Things to be recorded include the exact object of maintenance work, measures performed, the date, the person who performed the work and the supplies and materials used.

  Fastenings of structural parts must be inspected in connection with the maintenance. The condition of the fastenings is best inspected by unscrewing some of them in different parts of the building. Special attention should be paid on the appearance of fasteners and the condition of the seal under the screw head to prevent water from entering the joints. Damaged or worn fasteners must be replaced.

  The building's seals must be inspected to ensure that the designed level of air and vapour tightness is maintained. Damaged or worn seals must always be replaced with new seals, using, for example, applicable mastic. Old seals are removed when necessary and appropriate. The condition of the seal must also be monitored and replaced whenever necessary, for example, if the insulation material has become wet.

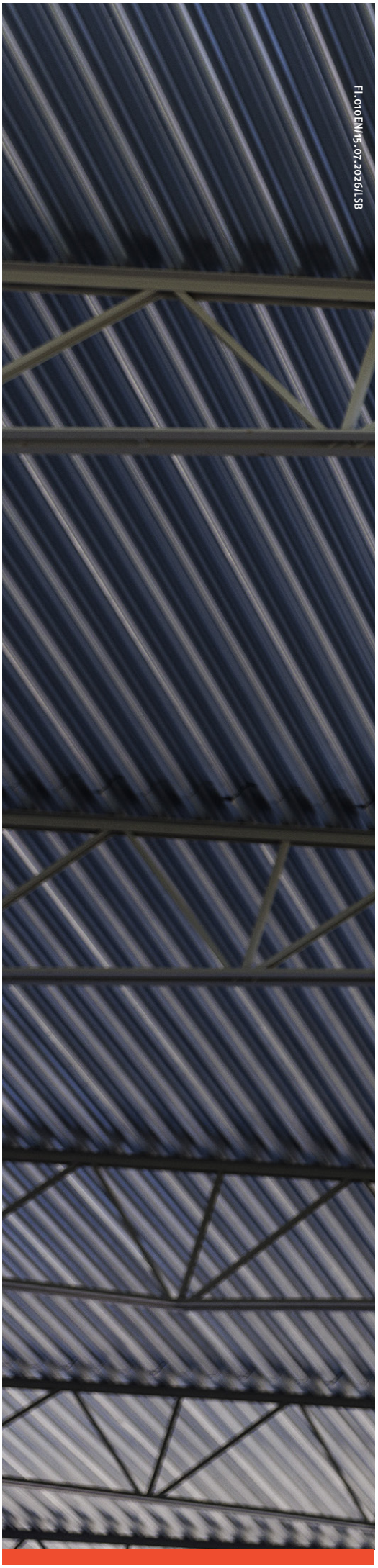
  It is also recommended to wash the façade surface during the yearly maintenance. For more detailed instructions, see the section above or separate washing and maintenance instructions.

- **Partial replacement of the panels**
  Panels and other materials can be replaced partially when necessary. For more information, contact our technical support.

**Annual inspection actions**

| Target | | Action |
|---|---|---|
| **Fastenings** | Panel fasteners | Inspect some of the fasteners for tightness and corrosion. Replacement as required. |
| | Flashing fasteners | Inspect some of the fasteners for tightness and corrosion. Replacement as required. |
| **Paint coatings** | Cleanliness | Washing and painting of surfaces. |
| | Colour changes | Repainting – contact an expert first. |
| | Scratches | Touch-up – contact an expert first. |
| **Joints** | | Inspection of the panel joints and flashings for tightness and corrosion. |

**We make steel-based products for walls and roofs, for both commercial buildings and private homes. We're a supplier of high-quality products, systems and solutions, developed sustainably and to live up to the highest demands on durability in harsh conditions.**




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