

Roofs

Installation instructions

Models Classic™ C and D

A complete roof includes a lot more than just the roofing sheets. A combination of lead-ins, water removal systems, ladders, roof bridges and snow stops is also needed to make the roof safe and functional. All the components of roof packages manufactured by Ruukki are tested high-quality products that are compatible with one another. Steel roofs have an impressive and elegant appearance. They are watertight, light and durable, which ensures easy installation and use.

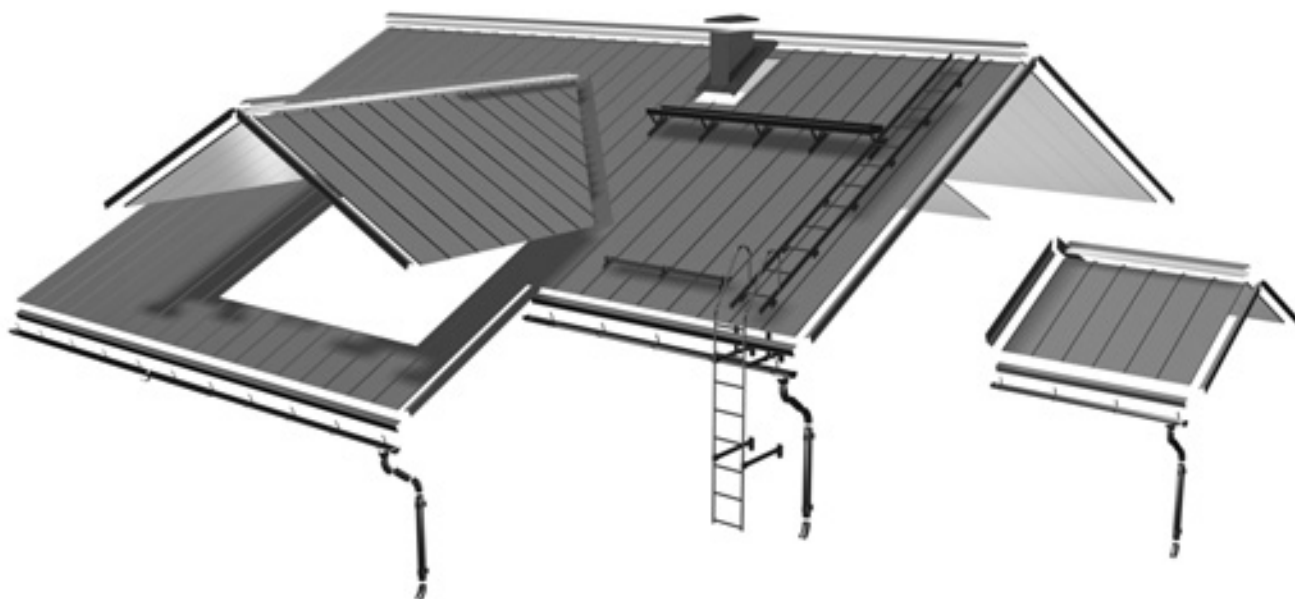
Product applications

- detached houses
- terraced houses
- residential multi-storey buildings
- recreational dwelling
- schools, day care centres and other public buildings

Ruukki is a metal expert you can rely on all the way, whenever you need metal based materials, components, systems or total solutions. We constantly develop our product range and operating models to match your needs.

Instructions for the installation of Classic models C and D.

A complete roof includes a lot more than just the roofing sheets. A combination of lead-ins, water removal systems, ladders, roof bridges and snow stops is also needed to make the roof safe and functional. All the components of roof packages manufactured by Ruukki are tested high-quality products that are compatible with one another. Ruukki is the only roofing manufacturer in Finland to have a quality certificate issued by the Technical Research Centre of Finland (VTT) covering all parts of its roof packages.



The methods presented in the installation instructions are examples and can not be implemented as such for all roofs. When unsure about how to proceed, follow the structural designer's instructions or contact our technical support department.

● **Table Of Contents**

Reception of goods	4
Unloading and handling the delivery	4
Dimensioning	4
Work safety	4
Ordering the roof	5
Measuring the roof and verifying the measurements	5
Roofing underlay	5
Battening	6
Fasteners	6
Installation direction	6
Installing the roof	7
Fixing the Classic model	9
Building roof valleys	10
Overlapping extensions	14
Building roof valleys that end within the roof pane	16
Gable and ridge	19
Lead-ins	21
Fire hatches	23
Detailed drawings	25
Technical information	27
Roof maintenance	28
Contact information	28

- **Reception of goods**

Ensure that the goods delivery is as ordered and features all the goods listed on the dispatch note. Any deficiencies or errors in the delivery and any transportation damages must be written down on the consignment note and reported immediately to Ruukki or the retailer. Any objections regarding the delivery must be made within 8 days of the delivery. The company accepts no liability for any costs arising from the replacement of products installed in some other way than as described in these instructions.

- **Unloading and handling the delivery**

The roofing sheets are unloaded from the truck to even ground. Place approx. 200 mm high supports underneath the sheet stack at one-metre distances. In normal conditions, roofing sheet stacks can be stored either packaged or unwrapped for about a month. For longer storage, the stacks must be protected and placed on a sloping surface to allow any water between them to evaporate or drain off. The roofing sheets can also be lifted onto the roof in stacks. If the sheet stacks are lifted onto the roof with lifting equipment, do not remove the sheets from their transport packages before lifting. When handling individual sheets, remember that long sheets must not be lifted by their ends nor allowed to rub against each other. The best way is to hang them from the edge seam. Individual sheets are lifted onto the roof along supports that run from the eaves to the ground. The sheets are lifted onto the roof to install along supports, and the lifting can be helped from the ground by pushing the sheets from their sides. Do not go under the sheets during lifting.

- **Dimensioning**

Roofing sheets are delivered cut-to-size. But in roof valleys, hipped roofs and lead-ins, roofing sheets have to be cut on-site. Roofing sheets can be cut with a hand-held circular saw suitable for cutting steel sheets, with shears, a nibbling machine, jigsaw or any other device that does not produce heat when used.

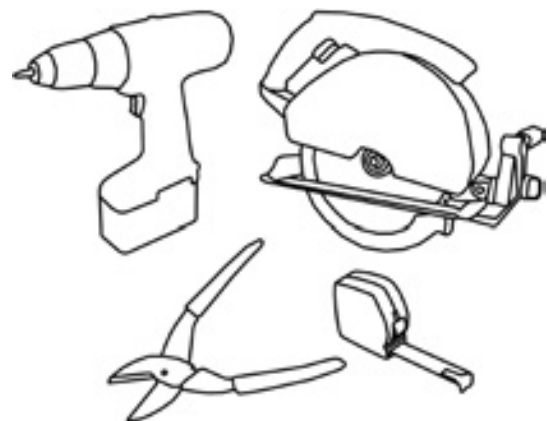
The use of an angle grinder with a cut-off disc is strictly forbidden. Using an angle grinder with a cut-off disc to cut the sheets will automatically void the sheets' surface guarantee.

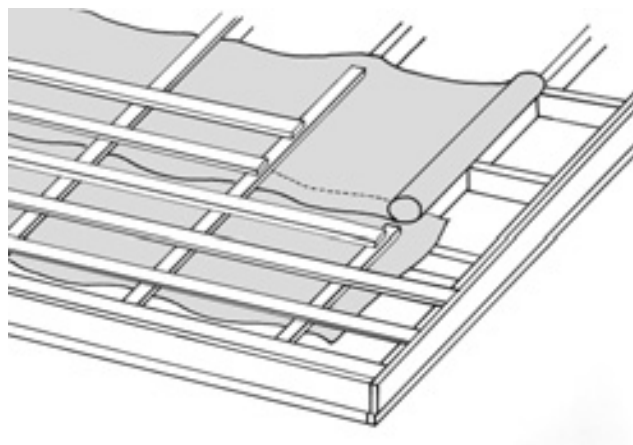
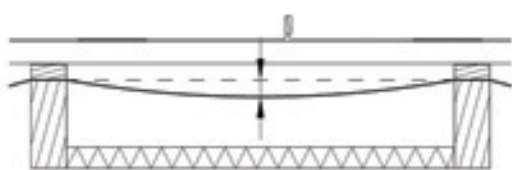
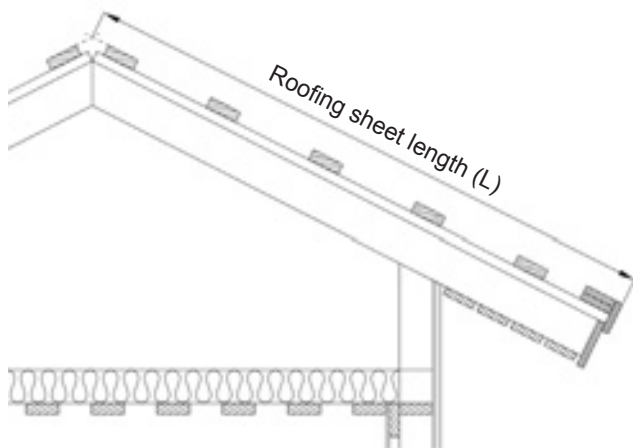
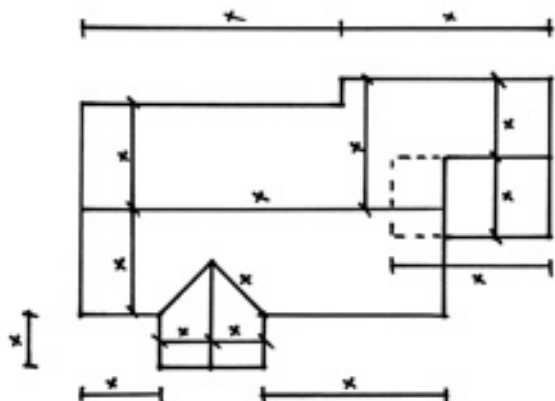
In addition to hand-held circular saw with suitable blade and shears or a nibbling machine you need at least one screw gun and measuring tape.

Protect the roofing sheet before commencing working, because the sharp chips may damage the surface. Any debris from drilling or cutting carried out during the installation must be thoroughly brushed off. It is recommended that any scratches on the coating and any visible cut surfaces are painted with suitable touch-up paint.

- **Work safety**

Always use work gloves and protective clothing when working on the sheets. Be careful of the sharp edges and corners. Do not go under the sheets when they are moved. Ensure that the hoisting lines are in working order and suitable for the sheets' weight and that they are appropriately attached. Avoid handling the sheets during high winds. When on the roof, always move with great caution. Use a safety rope and soft-soled footwear. All effective safety regulations must be complied with while working.





● Ordering the roof

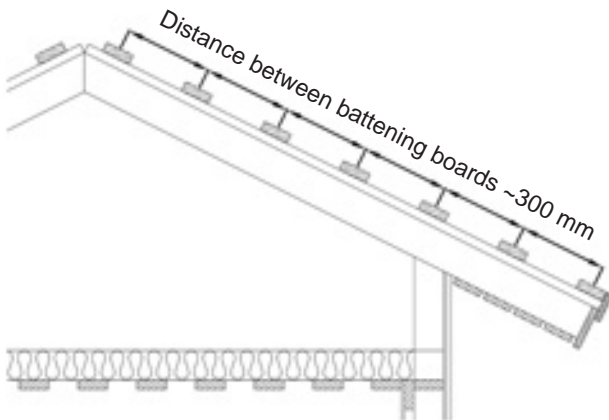
Ruukki delivers the roofing on the basis of measurements provided by the customer. These measurements can easily be found on structural drawings. You can also draw a simplified model drawing and include the most important measurements. A rule of thumb is that the length (L) of a roofing sheet is measured from the outer surface of the farthest facing board at the eaves to the middle of the ridge. In order to get the right measurements for the order, it is useful to check the measurements of all roof panes in different places.

● Measuring the roof and checking the measurements

Roofing sheets are installed at right angle (90 degrees) to the eaves. Before the installation, check how level the roof is, its cross-measure, and the straightness of the ridge and eaves. In problem situations, contact our technical support department.

● Roofing underlay

Begin the installation of roofing underlay horizontally from the eaves on top of the roof trusses. The roofing underlay should extend at least 200 mm beyond the wall at the eaves and the verge. First staple the roofing underlay onto the roof trusses. The final fixing is accomplished by nailing wooden strips (needed to ensure ventilation) on top of the roofing underlay in the direction of the roof trusses. Leave the roofing underlay hanging loose between the roof trusses (at the lowest point ~40 mm in the middle of the trusses). At the ridge, the roofing underlay is installed according to the installation instructions specified in the detailed drawings (p.25). In problem situations contact the structural designer regarding the specific ridge solution. The roofing underlay layers are supposed to overlap by about 150 mm at the horizontal joint. If the roofing underlay must be extended lengthways, this must be done at the roof trusses with a minimum of 100 mm overlap.



● Battening

Begin to install the battening at the eaves. Fix the first batten onto the facing board. It is recommended that the following battens are installed at 200-300 mm intervals. The top batten must be installed so that the self-drilling screws fixing the Classic ridge saeling strip flashing are not driven into the top batten (see p. 25).

The size of the battening boards depends on the distance between roof trusses and the distance between battening boards. See table 1.

● The size of the battening boards

Table 1

	Distance between roof trusses (mm)		
	600	900	1200
Distance between battening boards - 200 mm	22X100	22X100	32X100
Distance between battening boards - 300 mm	22X100	25X100	32X100



Classic screw for
wood batten
4,2 x 25 SS

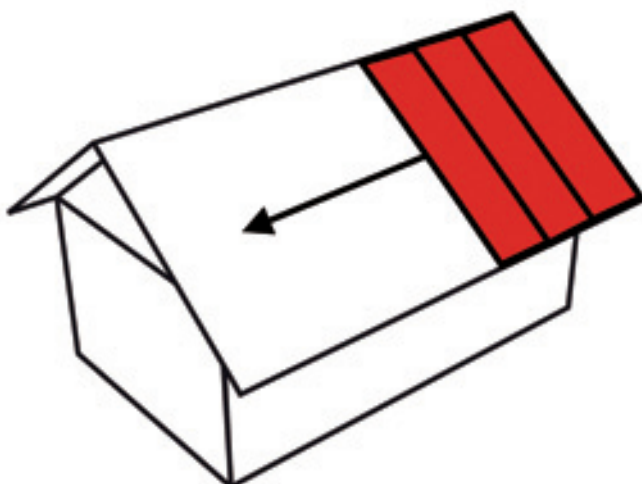


Classic screw for
steel batten
4,2 x 19 SS



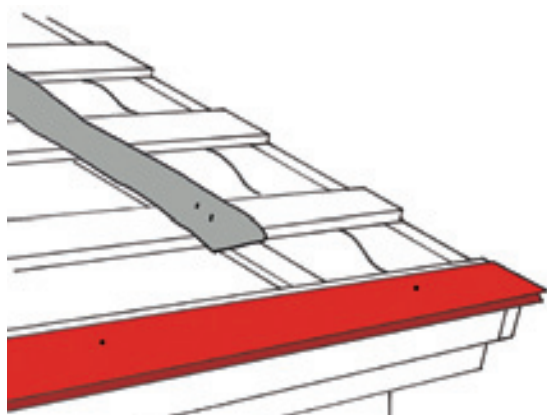
Self-drilling screw
4,8 x 20

● Fasteners



● Installation direction

ALWAYS begin the installation of Classic model D roofing sheets from the right. Depending on the roof's details, the first sheet of the roof pane may in some cases be very small. In such cases, ensure that the first sheet is installed accurately.

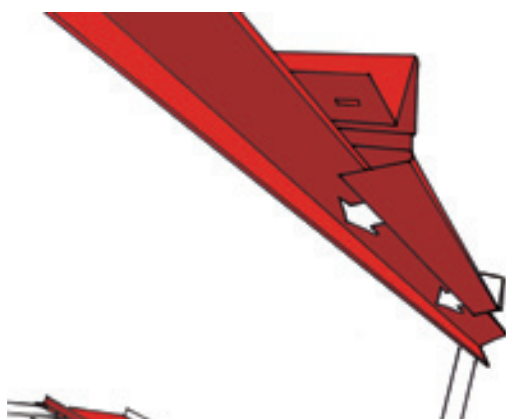


● Installing the roof

Before installing the first roofing sheet, install Classic eaves flashing. The Classic eaves flashing is installed aligned straight and first fixed with galvanised nails or Classic screws to the first battening board. You can ensure the correct alignment of the eaves flashing by, for example, marking a straight line along the eaves using an alignment wire. The eaves flashing is installed end-to-end instead of overlapping.



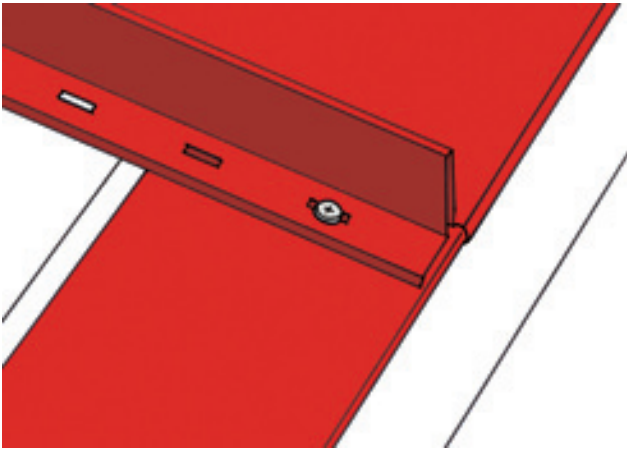
Install a sound insulation band under each sheet at the middle of the sheet. The sound insulation band must begin from the second lowest batten and end at the second highest batten. The purpose of the sound insulation band is to reduce the noise caused by such things as wind and rain.



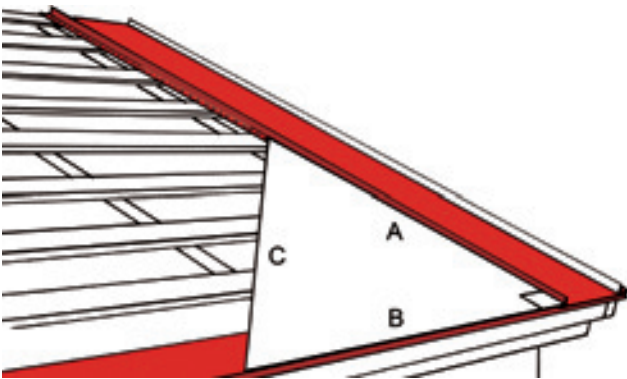
Roofing sheets are always installed along the direction of the eaves. Install the first sheet to the right edge of the roofing pane so that the bend at the bottom end of the sheet goes underneath the lip of the eaves flashing. Pull the roofing sheet towards the ridge until the lip of the eaves flashing is at the bottom of the sheet's bend.



First fix the roofing sheet with just one Classic screw at the sheet's bottom corner.

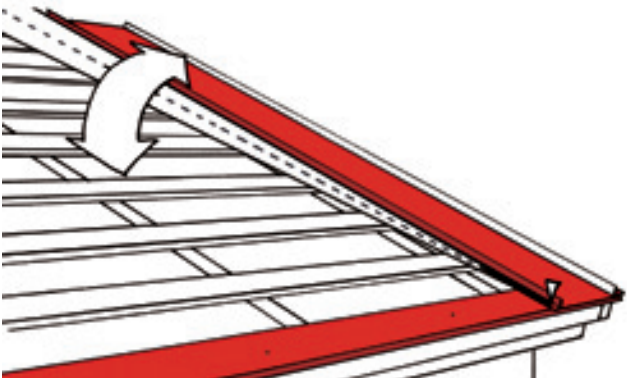


Fix the roof at approximately the middle of the hole. Screws running through the eaves flashing fix the flashing in place. Pay attention to the fixing tightness and screwing direction. Screws fixed too tight will hinder the sheets' thermal expansion. Failure to drive the screws in straight will prevent the roofing sheet laid on top of the fixing strip to go all the way to the bottom of the seam.



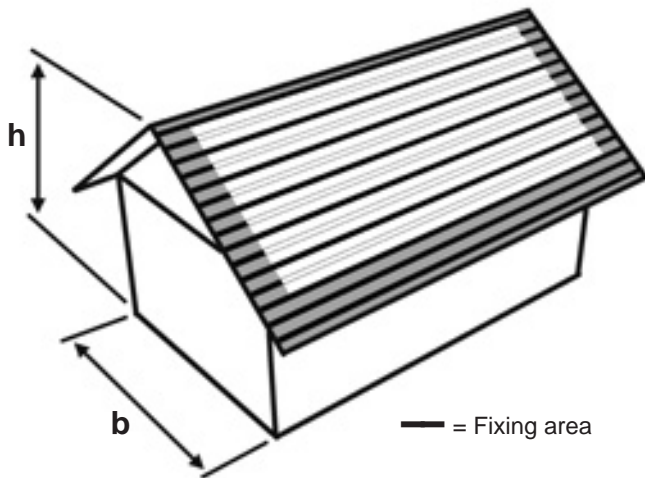
Exercise extreme caution when installing the first roofing sheet. Getting the first roofing sheet at a right angle to the eaves flashing makes the installation of the rest of the sheets easy. The right angle (90 degrees) can be determined with a right-angled-triangle, the sides of which have the following lengths:
 A = 3 metres
 B = 4 metres
 C = 5 metres.

Mark the measurement A on the roofing sheet and the measurement B on the eaves flashing.



Adjust the length of the C side by turning the roofing sheet around the fixing point. When the measurement C is exactly 5 metres, the roofing sheet is at a right angle to the eaves flashing. Fix the sheet at the fixing strip to each battening board.

The other edge of the sheet will only be fitted when the verge trim is fitted. Until that time ensure that the sheet remains in place.



● Fixing the Classic model

The first and last two full-sized roofing sheets in each roof pane are fitted to each battening board at the sheets' fixing strip.

All sheets in between are fitted to both the top battening board and the three lowest battening boards, as well as to every other board in their middle.

The above-mentioned fixing principles apply to buildings that are located on level ground with a shortest horizontal measure (b) of no more than 12 metres and height (h) of no more than 15 metres. In other applications, such as buildings located on an outer archipelago, contact the structural designer regarding the distance between fixings.



Remove the protective tape from the seam of the installed sheet. Install the second roofing sheet so that the sheet's bend appears to be going underneath the lip of the eaves flashing and the sheet's lengthways seam appears to be going on top of the previous sheet's lengthways seam. When the sheet is in the right place, pull it towards the ridge.

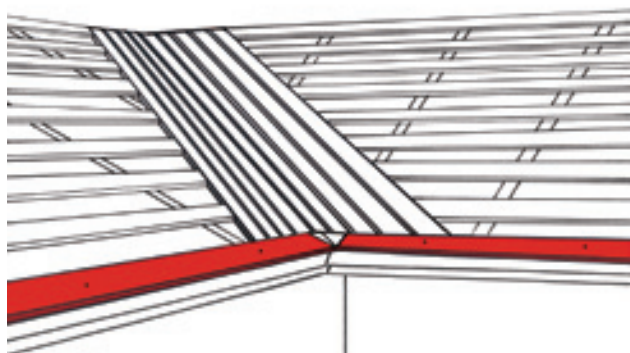


Press the roofing sheet's seam in place, proceeding from the eaves to the ridge. After pressing the seam in place, remove the protective tape from the seam.



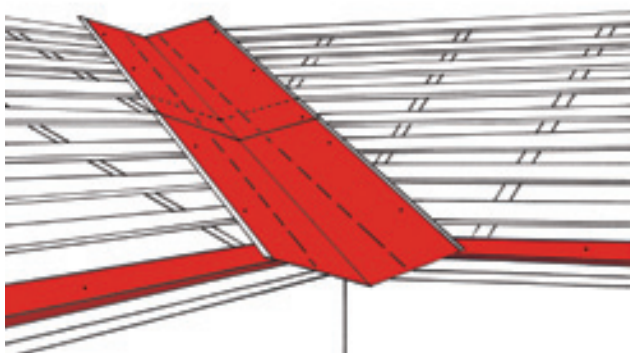
After locking the seam, move the roofing sheets carefully so that their bottom ends are in line, for example using a bumping mallet.

Proceed to place the sheets in their places in the manner described above.



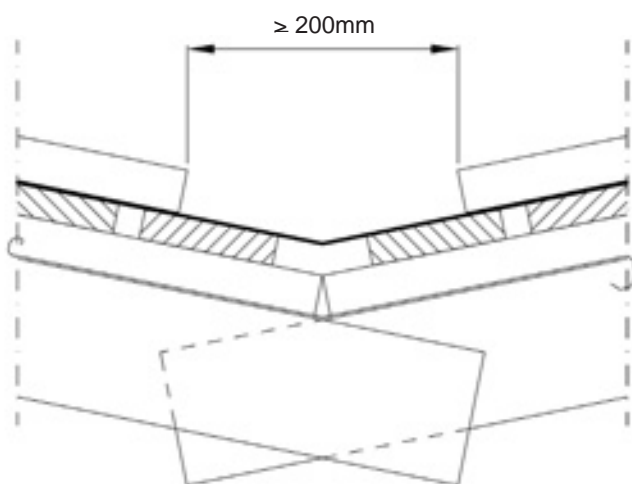
● Building roof valleys

Build the bottom of the roof valley at the same level as the roof pane battening. Leave ventilation gaps of approx. 20 mm between roof valley boards. Cut the eaves flashing to shape and install it in the corner of the roof valley.

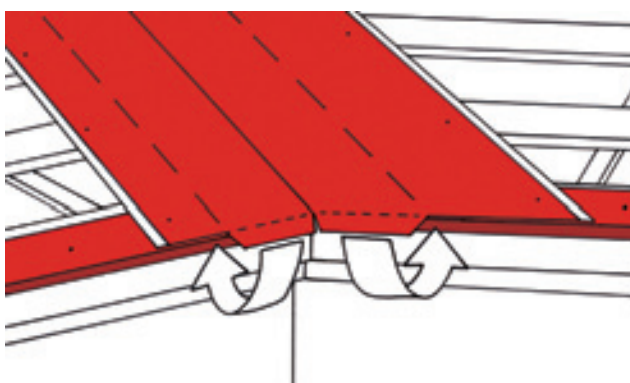


Fit the angled roof valley sheet in place. First fix the sheet with galvanised nails or Classic screws. The angled roof valley sheet should have an overlap of at least 200 mm. The use of sealing compound to seal the overlap is recommended.

Draw lines on the angled roof valley sheet to indicate the alignment of the sheets to be installed in the roof valley.



The minimum distance between these indication lines (indicating the position of the roofing sheets) must be at least 200 mm. The angled roof valley sheet must extend at least 250 mm under the roofing sheet.



Cut and shape the bottom end of the roof valley sheet according to the alignment of the eaves. However, the ends of the roof valley sheet must reach the indication lines and extend some 30 mm beyond the eaves. Bend these ends under the eaves flashing.



Install the roofing sheets up to the roof valley. The cutting angle for roofing sheets to be installed in a roof valley can be copied, for example, using a triangular pattern.



Draw the cutting line on the back side of the sheet. N.B. Ensure that the size and shape of the cutting is as intended. Cut the sheet from the back side.



Install the roofing sheets that have been cut up to the top of the roof valley. A sealing compound is recommended for sealing the overlap of the roofing sheets installed in the roof valley. As the installation proceeds, ensure that the roof valley's angle follows the line drawn. If necessary, adjust the shape of the triangular pattern.

Fix the roofing sheets installed in the roof valley with self drilling screws. Fix each sheet with two screws, both positioned evenly one-third of the sheet away from each edge.



Finish the roof pane by brushing away debris from cutting and drilling using a soft brush. Perform touch-up painting if necessary.



Install a roofing sheet as installation support at the corner of the roof valley. Adjust the supporting roofing sheet to the right angle. For more information on adjusting the supporting sheet, see the installing the roof (p.8). Fix the supporting sheet to the battening with a number of Classic screws. Draw an indication line on the battening along the edge of the supporting roofing sheet.



Measure and draw the spacing of roofing sheets up to the ridge. Note that the first roofing sheet begins at the indication line drawn on the roof valley sheet.



Ensure that the angle of the triangular pattern is as intended. Cut the first roofing sheet to the right size and angle. Fix the sheet at the ridge using one Classic screw.



Press the next roofing sheet to the seam of the previous sheet.



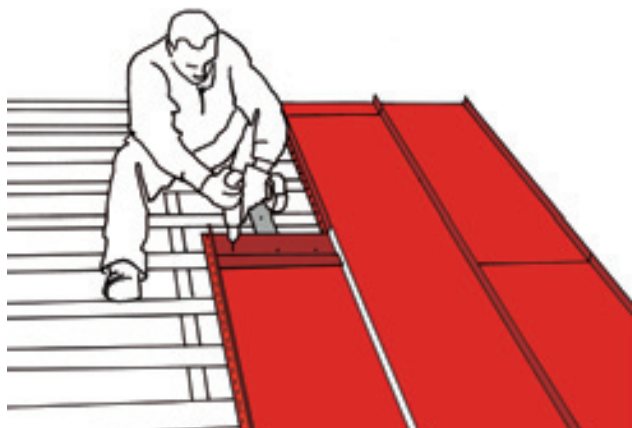
Measure the distance to the installation support sheet from the seam's top and bottom edge. Adjust the distance at the bottom edge to make it the same as the distance at the top edge by rotating the connected sheets around the fixing screw.



When the connected sheets are in line with the installation support sheet, fix them with Classic screws.



Measure, shape and install the rest of the roofing sheets to be installed in the roof valley. The sheets' running pattern can be monitored using the indication lines drawn on the battening or by measuring the distance between the sheet to be installed and the installation support sheet. Also pay attention to the angle of the roof valley and adjust the triangular pattern if necessary.



● **Overlapping extension**

The maximum length of Classic type roofing sheets is 12.5 metres. Lengthways overlapping is needed for roof panes longer than 12.5 metres. If more than one lengthways overlap is needed on a roof pane, it is recommended that these overlaps are positioned alternately at a distance of one-third of the roof pane's length, however, they must be at least 700 mm apart from one another. As the installation proceeds, pay attention to how the sheet overlaps run. In problem situations, contact our technical assistance.

Fix the roofing sheet requiring an extension to the battening with Classic screws. Install the joint flashing RA1ACJ at the end of the roofing sheet. Fix the joint flashing with three Classic screws.



Use the bumping mallet to hit the seams of both roofing sheets at least at the distance of the joint flashing RA1ACJ, in order to decrease the size of the seams so that the sheet to be located on top can be put in place.

Cut the seam's protective tape where the joint flashing is to be placed. Remove the tape only after the sheet to be placed on top has been installed in place.



Place the bend of the roofing sheet to be placed on top underneath the lip formed by the extension. Pull the sheet towards the ridge and press it in place.

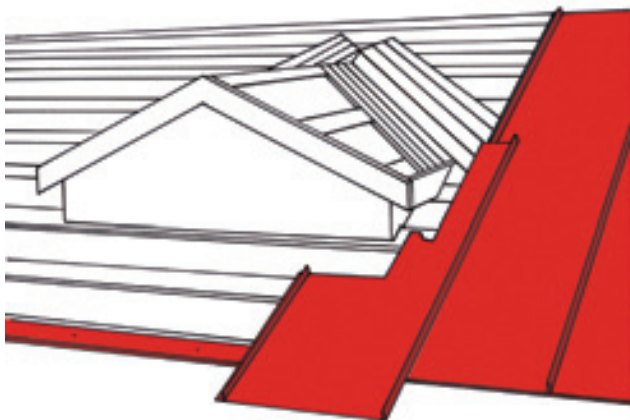


Lock both roofing sheet seams by hitting (with a bumping mallet) the sheet's inner corners downwards next to the seam.

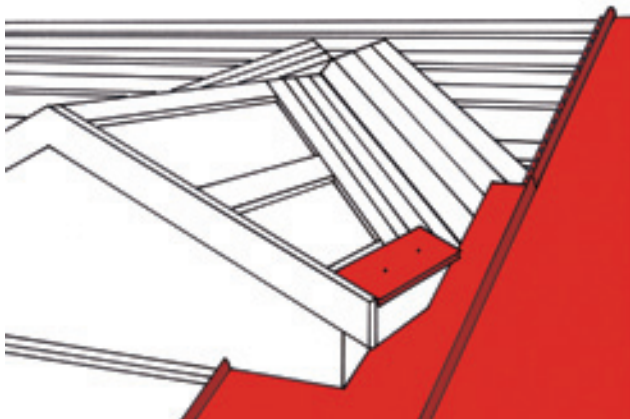


Complete the overlapping extension by gently squeezing both seams with pliers. Fix the sheet. Remove the protective tape from the seam.

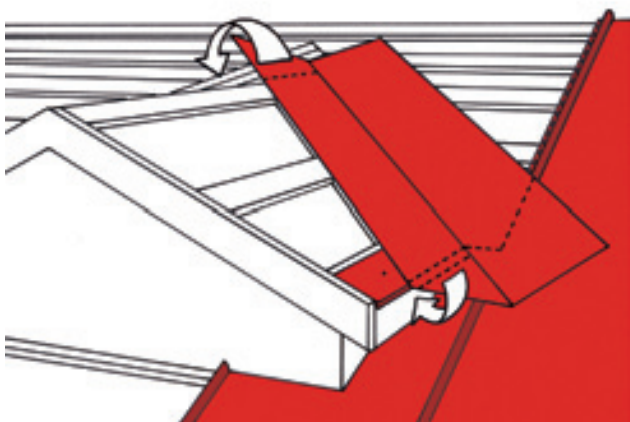
Continue the installation as described above.



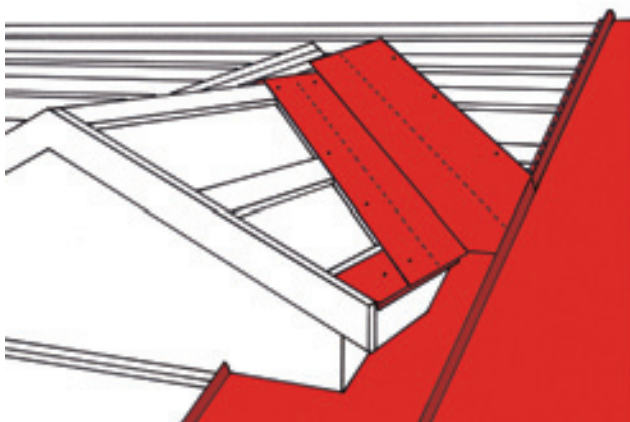
- Building roof valleys that end within the roof pane**
 Install full-length roofing sheets up to the corner of the roof valley that ends within the roof pane (e.g. a dormer). At the dormer, the installation of roofing sheets is two-fold: from the eaves to the roof valley and from the roof valley to the ridge. Shape the first sheet to have it optimally follow the structure of the dormer. Install the sheet in place.



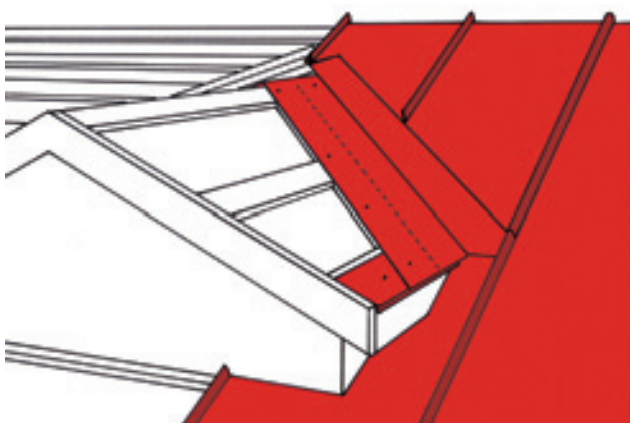
Install the dormer's eaves flashing.



Fit the roof valley sheet in place. Draw on the roof valley sheet how it must be cut and bent. Bend the top end of the roof valley sheet to the other side of the dormer at the ridge. Shape the roof valley sheet's bottom end against the roofing sheet's vertical seam and according the eaves flashing. It is recommended that at the eaves flashing the angled roof valley sheet is bent underneath the flashing. For more information on bending the angled roof valley sheet, see the building roof valleys (p.10).

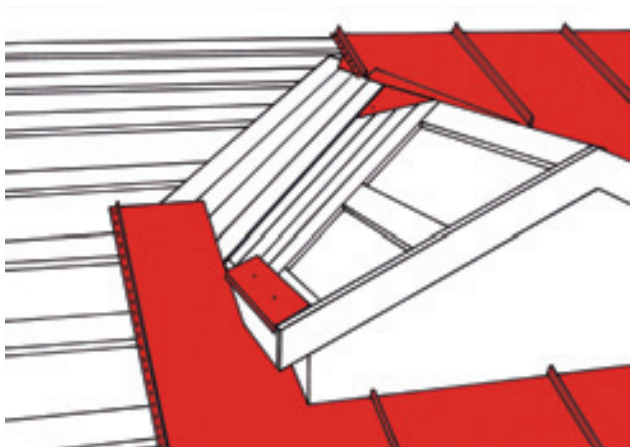


Squeeze sealing compound on to the roofing sheet to be covered by the angled roof valley sheet. First fix the roof valley sheet with galvanised nails or Classic screws. Squeeze the roofing sheet's vertical seam at least at the distance of the overlap. For more information on building overlaps, see the overlapping extensions (p.14).



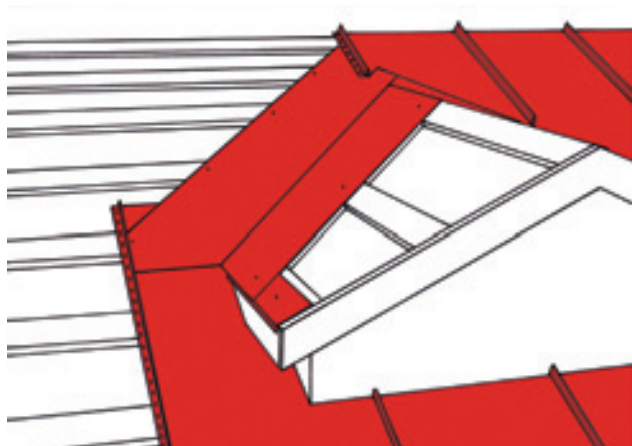
Install roofing sheets up to the dormer's ridge. Do not fix the last sheet but simply press it in place at the seam. The sheet should not be fixed before the dormer's other roof valley sheet has been installed.

Seal the overlap with sealing compound.

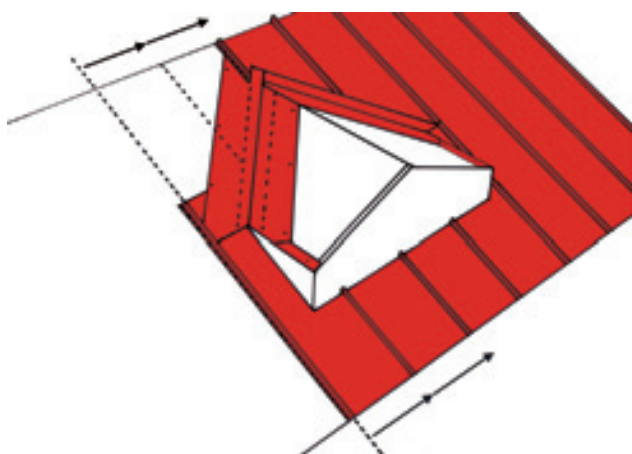


Install the roofing sheets below the dormer. Shape the first roofing sheet to have it optimally follow the dormer's structure. Fix the sheet in place.

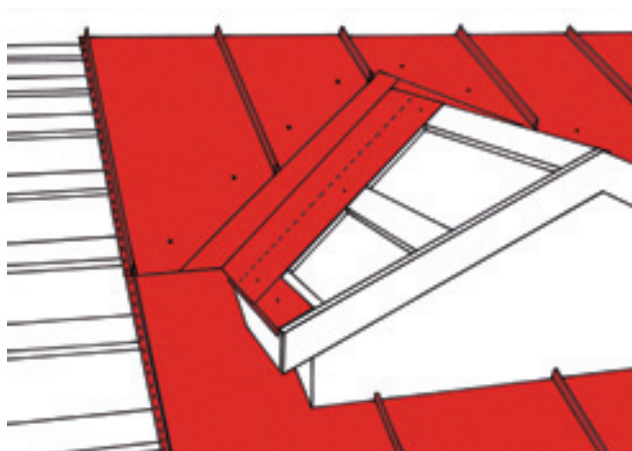
Install the eaves flashing.



Install the roof valley sheet as described above.

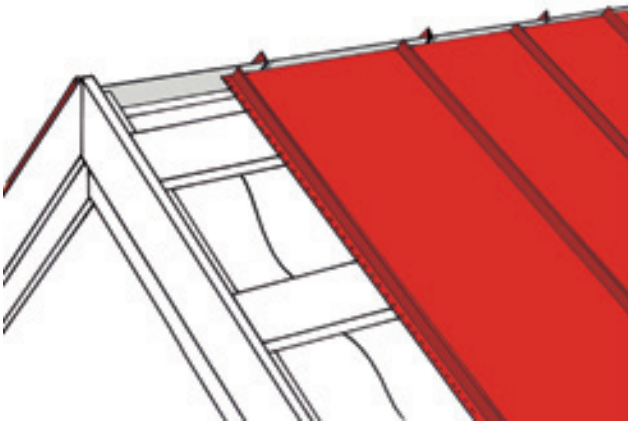


Measure the sheets' running pattern below the dormer. Copy the running pattern on to the battening up to the dormer's ridge.



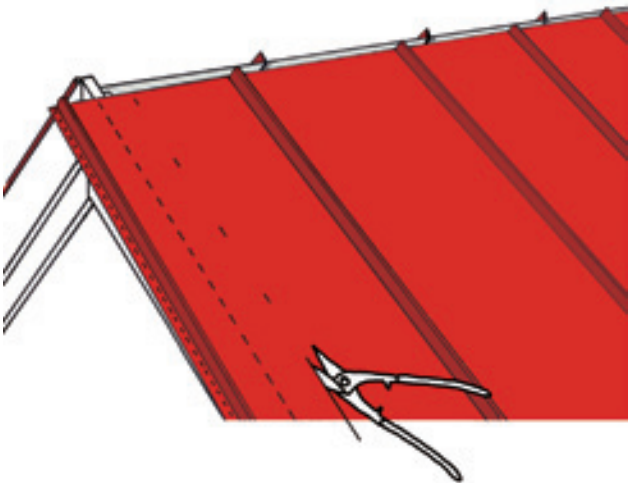
Begin installing sheets from the sheet that was last installed at the dormer ridge. Check how straight the sheets' running pattern is using the indication lines drawn on the battening. Complete fixing the roofing sheets installed in the roof valley using self-drilling screws. Fix each sheet with two screws, both positioned one-third of the sheet away from opposite edges.

Install the roofing sheets on the dormer. For more information on the installation, see the building roof valleys (p.10).

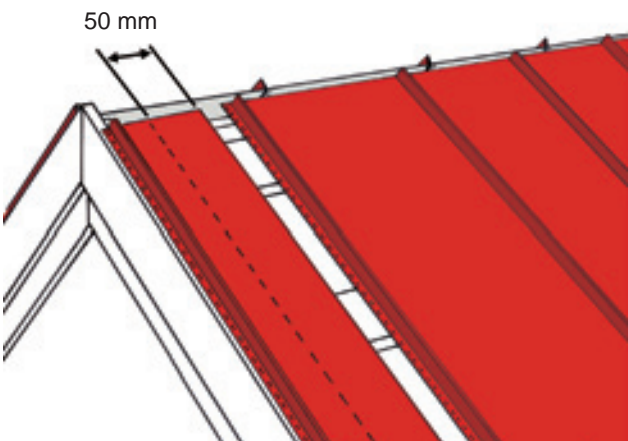


● **Gable and ridge**

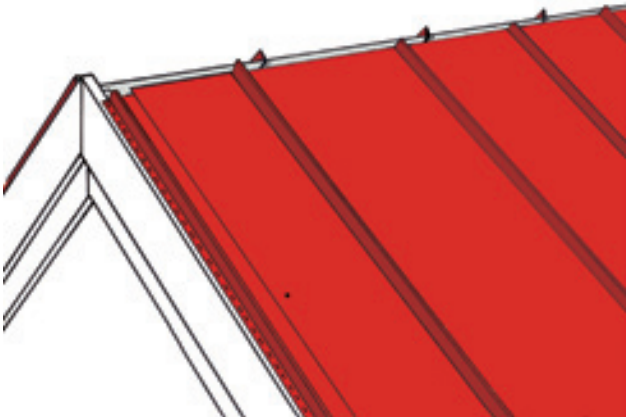
Roofing sheets are installed on the roof pane as long as the sheets can be fixed to the battening.



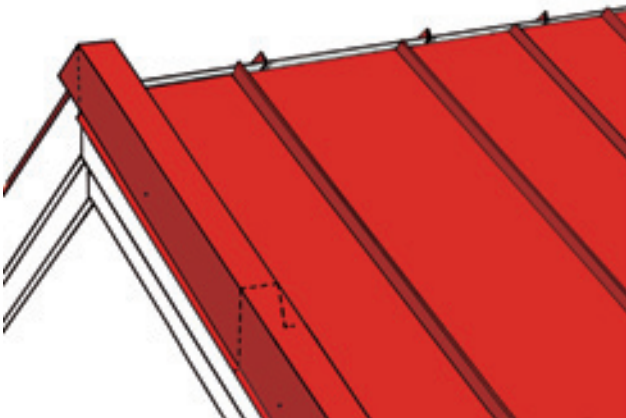
Draw the roof pane's end line on the sheet that first extends beyond the pane's edge. Cut the sheet not at the drawn line but 50 mm from the line in the pane's direction.



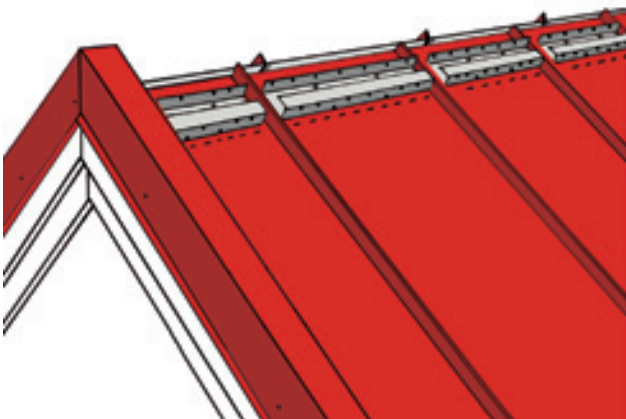
First install the piece that extended beyond the pane. Make it narrower if necessary. Fix it with a few Classic screws.



Install the remaining piece of roofing sheet to the seam of the last whole sheet. Fix the piece with a few screws at the edge in order to prevent the wind from moving it. The sheet will finally be fixed in conjunction with the fixing of the Classic verge trim.

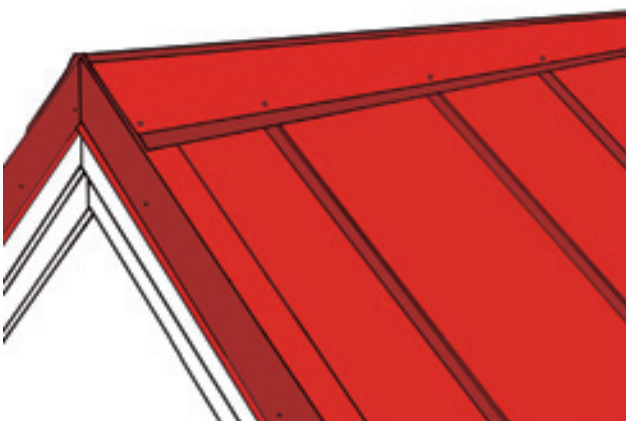


Fit the Classic verge trim in place. Cut and shape the verge trim's top end. Fix the trim with self-drilling screws through the roofing sheet to the battening. Fix the trim every 400-600 mm (depending on the distance between the battening boards). Also fix the trim to the verge board every 1000 mm. The verge trim must be overlapped by a minimum of 100 mm.

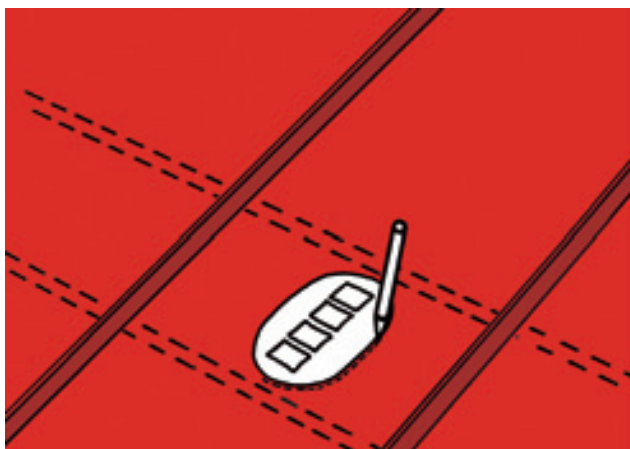


Install the verge trim on the opposite roof pane.

The fixing point for the ridge ventilating flashing can be determined by first fitting the ridge capping in place. Mark the edge of the ridge capping on the roofing sheet. The ridge ventilating flashing is installed not on the drawn line but 20 mm away from it in the ridge's direction. The ridge ventilating flashing is fixed to the roofing sheet with two self-drilling screws (N.B. not to the battening).



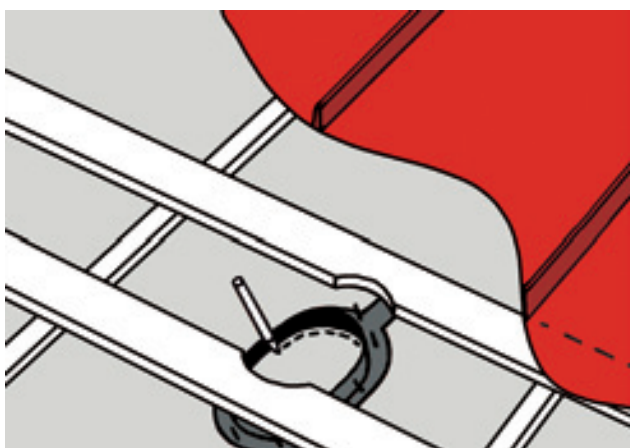
Put the ridge capping in place. Fix it with self-drilling screws to the ridge ventilating flashing at a distance of no more than 1000 mm. The overlap on the ridge capping must be at least 100 mm. N.B. do not fix pieces of ridge capping together, because this prevents their thermal expansion.



● **Lead-ins**

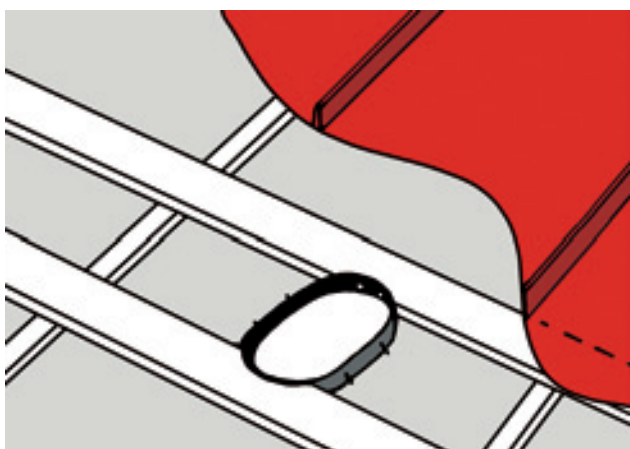
It is recommended that lead-ins are positioned as close to the ridge as possible. If lead-ins need to be positioned in lower parts of the roof pane, snow stops should be installed above the lead-ins.

Mark the position of the hole between the battening using the pattern supplied with the lead-in delivery. Cut the hole for lead-in installation.

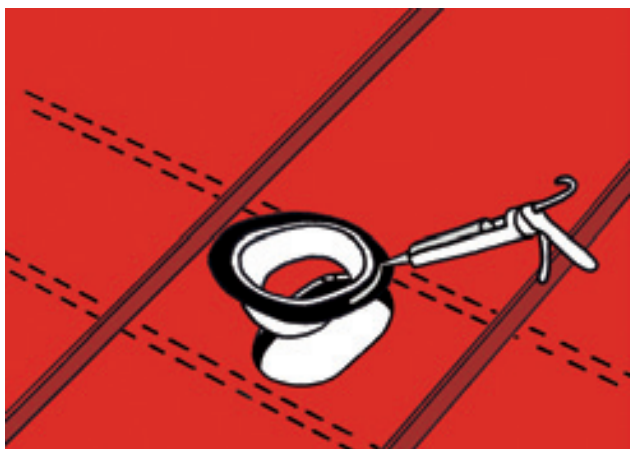


The purpose of the roof underlay's seal is to lift the underlay up and thus direct any moisture away through the lead-in.

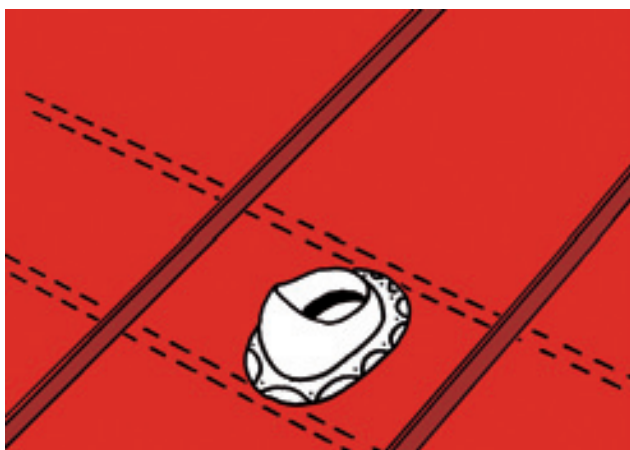
Draw the hole required for the seal on the roof underlay and cut a hole.



Press the seal's spikes through the roof underlay. Squeeze sealing compound between the seal and the roof underlay. Lift the roof underlay against the lower surface of the battening using the seal. Fix the roof underlay's seal to the battening with screws.

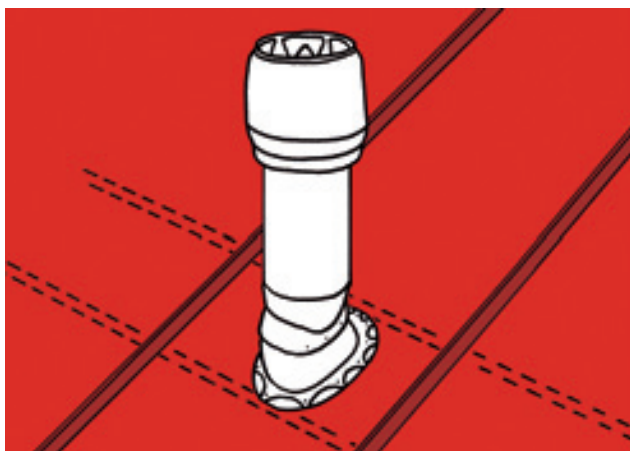


Squeeze sealant compound onto the lead-in's bottom plate seal.



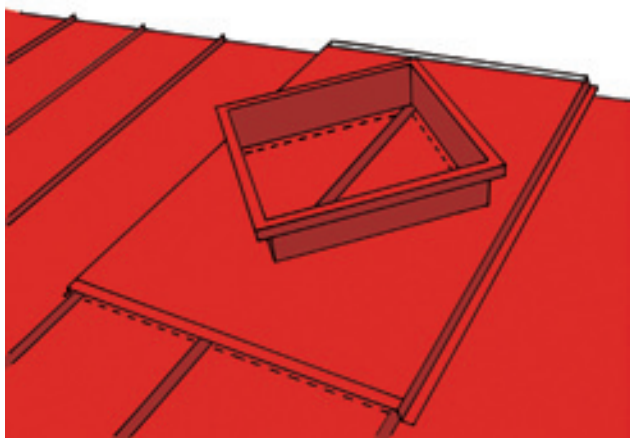
Press the bottom plate in place. Fix the bottom plate to the roofing sheet using the screws included in the lead-in delivery. See the lead-in delivery package for more specific information on the screw fixing sequence. Do not fix the screws too tight. Fixing the screws too tight may cause the bottom plate to crack in extremely cold weather.

Spread the sealing compound that spilled from under the bottom plate to create an even and tight seam between the roofing sheet and the bottom plate. If necessary, squeeze more sealing compound onto the joint.



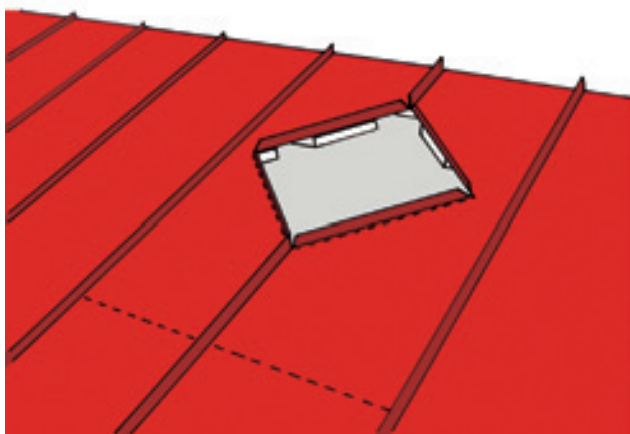
Place the lead-in element on top of the bottom plate. First fix it with one screw. Install the element vertically with a spirit level. Fix the remaining screws.

For more specific installation instructions for lead-ins, see the lead-in delivery package.

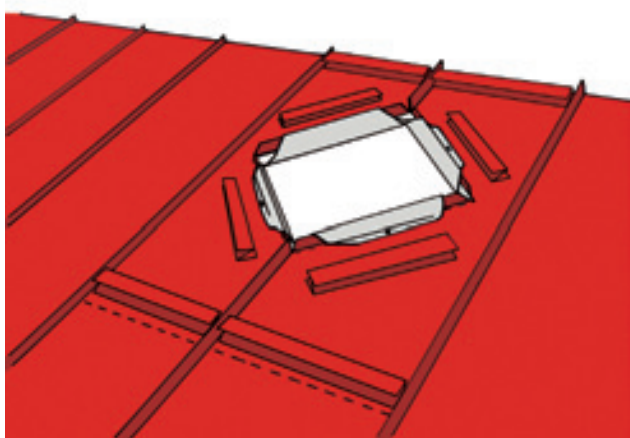


● Fire hatches

It is recommended that fire hatches are installed as close to the ridge as possible. Ensure that the hole to be made for the fire hatch is not located directly on a roof truss. Mark the hole's position by placing the fire hatch on top of the roofing sheet so that it covers three roofing sheet seams. In addition to marking the hole's position, also draw a line indicating the bottom end of the fire hatch.

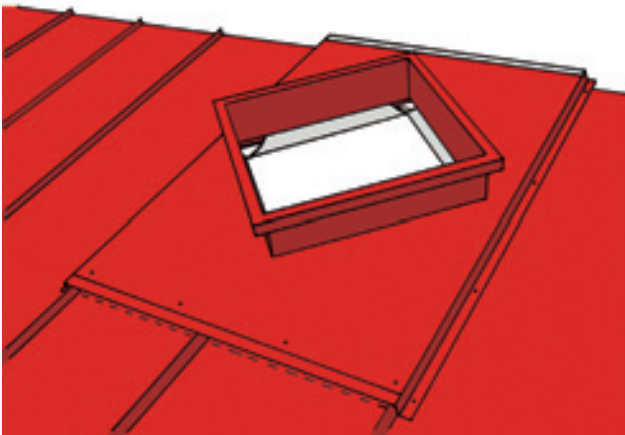


Cut a hole for the hatch, not as drawn but approx. 30 mm smaller. Bend the sheet edges up at the drawn lines. Saw off the battening at the hole.

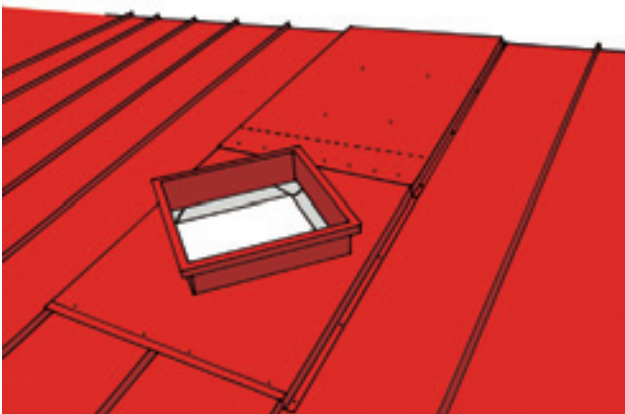


Make a cross-shaped cut in the roof underlay and fold the underlay strips on top of the roof. Fix the strips with a compound or with self-drilling screws.

Fix pieces of support flashing about 20 mm above the line drawn at the bottom end of the fire hatch. Also fix pieces of support flashing around the fire hatch and at the ridge.



Lift the hatch in place and fix the sides to the roofing sheet using self-drilling screws (4 screws/side). Fix the fire hatch's top and bottom end to the support flashing using self-drilling screws (4 screws for each end).

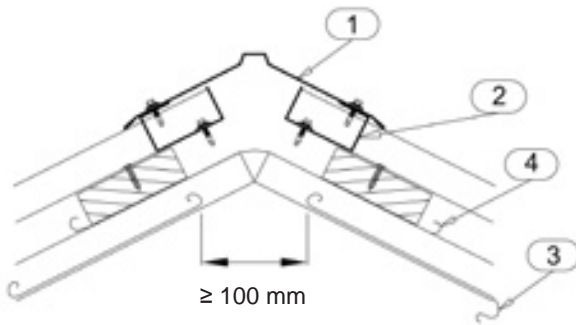


If it is not possible to install the fire hatch at the ridge, the top of the fire hatch must be connected to the ridge with sheet metal extensions. Install the fire hatch as described above. The sheet metal extension is supported in the middle by installing support flashing where the battening runs. Install the sheet metal extension above the fire hatch with a minimum overlap of 200 mm. Fix the sheet metal extension at the sides to the roofing sheet using self-drilling screws (4 screws/sides) and at the middle to the support flashing. The joint of the fire hatch and the sheet metal extension is fixed to the support flashing with self-drilling screws (8 screws/overlap).

• Detailed drawings 1/2

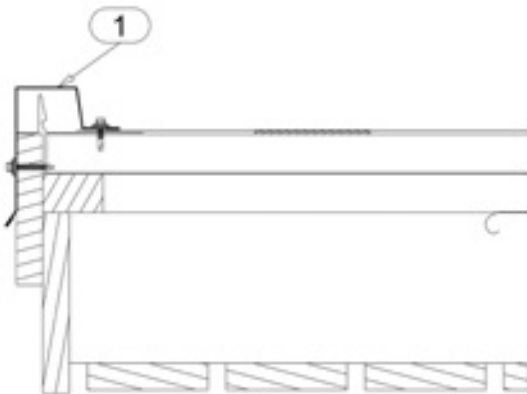
Ridge, vertical detail

1. Classic ridge capping RA1AR
2. Classic ridge sealing strip flashing RA1AS
3. Roofing underlay (ventilation gap ≥ 100 mm)
4. Roofing underlay strip



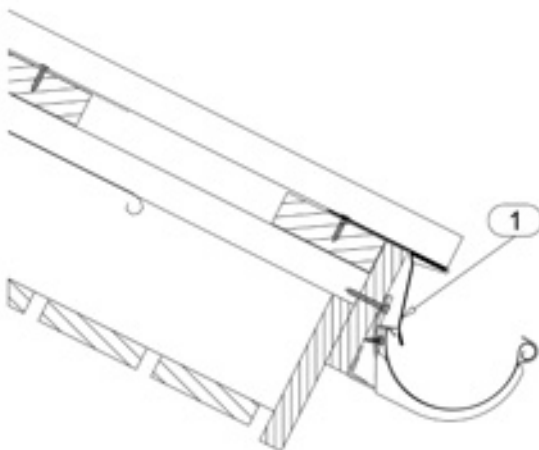
Verge trim, vertical detail

1. Verge trim flashing RA1AG

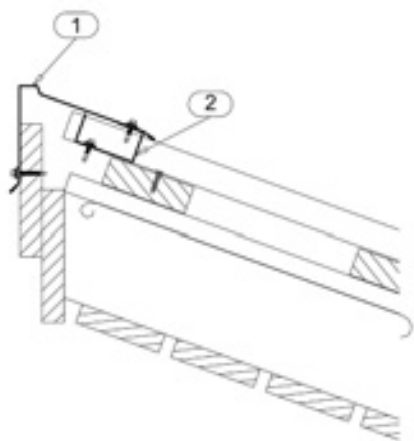


Eaves flashing, vertical detail

1. Eaves flashing foldable, RA1AEF

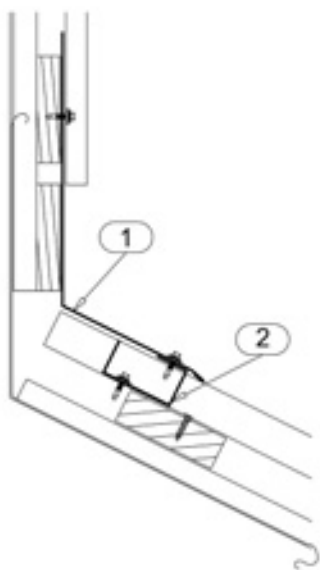


• Detailed drawings 2/2



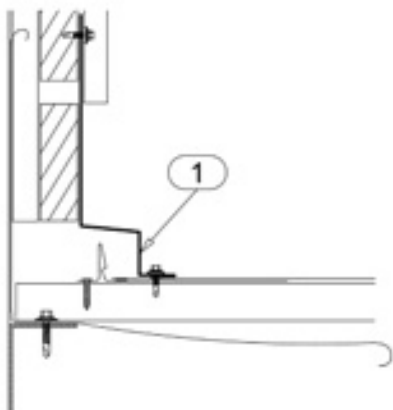
Single-pitch roof, vertical detail

1. Classic upper eaves flashing for mono-pitch roof
2. Classic ridge sealing strip flashing RA1AS



Roof-to-wall intersection, end wall, vertical detail

1. Classic connection flashing RA1AJ
2. Classic ridge sealing strip/hip flashing RA1AH



Roof-to-wall intersection, sidewall, vertical detail

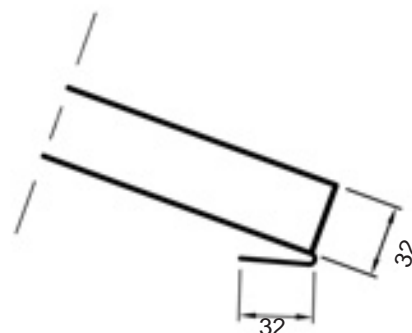
1. Classic connecting flashing to the side RA1AJD

• **Technical information**

Effective width	475 mm
Total width	505 mm
Maximum length	10 000 mm
Minimum length	800 mm
Height of joint	32 mm
Minimum pitch	1:7



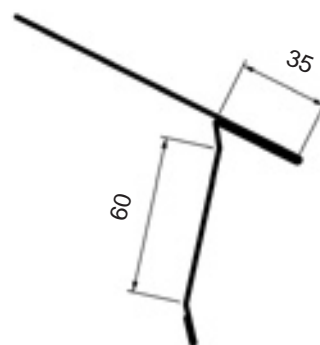
Cross section of Classic model C



Cross-section of Classic model at the eave



Cross section of Classic model D



Classic eaves flashing foldable, RA1AEF

- **Check the following annually:**

The ventilation of roof structures still works
Condition and fixings of rainwater systems
Condition and fixings of roof safety products
Condition, tightness and fixings of lead-ins
Condition of seals
Condition and fixing of self-drilling screws
Condition of paintwork on roofing sheets and flashing

- **When necessary:**

Clean the roof
Remove snow
Remove leaves, twigs etc.

- **Roof maintenance**

Annual maintenance

To ensure optimal condition and long service life the roof should be inspected regularly.

Removal of leaves, etc.

Usually rainwater is enough to keep the paint surface clean. But fallen leaves, twigs etc. are not always washed away by rainwater and should be cleaned annually. Roof valleys and rainwater systems also need to be cleaned annually.

Cleaning

Dirty or stained areas can be washed with a soft brush and water. Pressure washers (up to 50 bar) may also be used. More persistent dirt can be cleaned with detergent intended for cleaning painted surfaces. Follow the detergent's usage instructions or contact the product manufacturer to find out more about its suitability. A difficult localised stain can be rubbed off with a cloth dipped in white spirit. The paint coating should be rinsed from the top down to get all the detergent off. Finally the rainwater systems must be rinsed with water.

Removal of snow

Snow usually falls from painted roofs, and the snow that remains does not exceed the roof's structural load capacity. However, if the snow load needs to be reduced, a layer of snow (~100 mm) should be left on the roof to protect the coating.

- **Contact information**

Technical support department (more information) Tel. +358 20 59 127 Fax +358 20 592 7700

Rautaruukki Oyj

www.ruukki.com

The information given on this data sheet has been carefully checked. Rautaruukki Corporation does not, however, assume any responsibility for errors or omissions, or any direct or indirect damage caused by incorrect application of the information. Right to changes reserved.

Copyright © 2009 Rautaruukki Corporation. All rights reserved.

Ruukki, More With Metals, Rautaruukki and Ruukki's product names are either trademarks or registered trademarks of Rautaruukki Corporation.