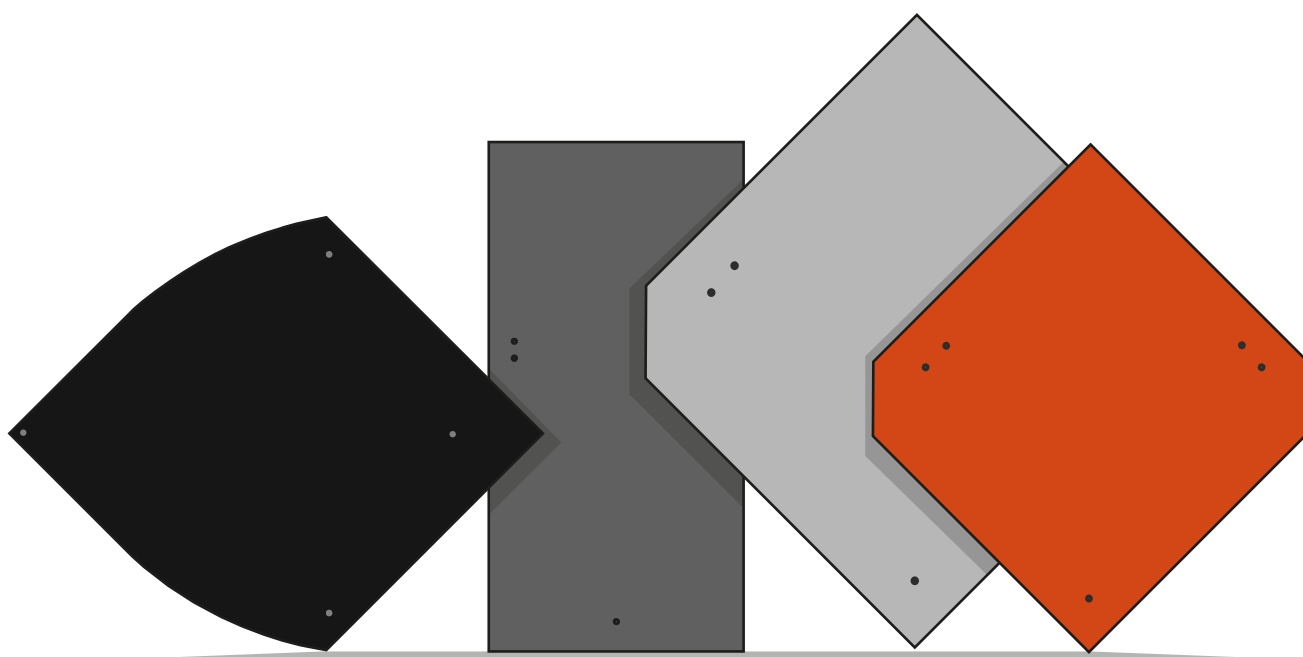




Ekoternit[®]
ECO-FRIENDLY ROOFING MATERIALS

TECHNICAL DATA SHEET AND INSTALLATION GUIDE FOR EKOTERNIT PLASTIC ROOFING



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These installation instructions are only a general installation guide. The accompanying drawings are also only schematic in nature. Current rules and standards should always be followed for designing and installing roofs, in particular ČSN 73 1901 Roof Design – General Provisions, ČSN 73 0540-2 Thermal Protection of Buildings, and the applicable rules for designing and installing roofs issued by the Tinsmiths, Roofers and Carpenters Guild of the Czech Republic.

BASIC FEATURES

Presenting to you Ekoternit environmental roofing. These roof tiles are made from 100% recycled plastic in energy-efficient machines. They are produced in presses with a large clamping force of up to 500 tons per cm², which gives this roofing material more positive features than any comparable product available on the market. That means every part of the roof tile is characterized by high resistance to weathering and mechanical damage. The input material (recycled plastic) is further refined during production with the addition of pigments, additives and stabilizers. These guarantee color fastness, long life and UV protection.

The Ekoternit Strong EB2 roofing tile was developed in response to market demand, mainly because its exceptional strength allows it to be installed on battens, thus significantly reducing the time required to install the roof. The material composition is a dyed composite, which also contains additives, especially UV stabilizers, which guarantee long-term protection and an attractive appearance even after several years of use.

The sophistication, shape and color variety of the roofing material make it ideal for most architectural compositions.

The dimensions of Ekoternit Strong EB2 roofing are identical to the dimensions of the EB2 template, i.e. 415 x 415 mm.

Ekoternit Strong EB2 does not flex like a soft roofing tile thanks to its DRS (Dynamic Ribs System – a specially designed rib construction).

Made in Czech Republic.

ADVANTAGES OF THE ROOFING

Other important advantages of Ekoternit roofing include resistance to high and low temperatures without the need for major and costly maintenance, easy to work with, walkable all year long, low weight without the need to strengthen trusses during reconstruction, and last but not least, manufacturer's warranty of 22 years. This roof easily handles the installation and use of conventional fixings and plastic roof elements, snow hooks and catchers, antenna passages, as well as solar panels and the like. Ekoternit roofing provides excellent noise dampening of falling rain. Thanks to its high ductility, it has been used very successfully in semicircular roof parts. Its appearance imitates natural slate.

PROPER FIT OF THE ROOFING:

Heat causes Ekoternit roofing to take the shape of the surface and so become perfectly adapted to the rooftop (not applicable for Ekoternit Strong EB2).

The following factors help ensure the roofing achieves a proper fit:

- Elasticity of the roofing material and its flexibility
- Properly done installation
- Wind clips made of copper wire measuring 25 mm x 30 mm and 2.12 mm thickness of the wire

LIFE OF THE ROOFING:

These factors have the greatest impact on the durability and functionality of Ekoternit roofing:

- Overall structure of the roof deck,
- The environment in which the roof is located,
- Design and quality of the roofing work,
- Location and right choice of anchoring elements, etc.

The functionality and durability of Ekoternit roofing are regularly tested during the production process. Experience shows that only slight changes occur over time, with a minimum percentage reduction in the main indicators (e.g. tensile strength, bending moment, etc.), which have the greatest effect on the functionality of the roofing.

The overall life expectancy of Ekoternit roofing is therefore estimated at 40 years, and regular checks and maintenance can prolong the life even more significantly.

TECHNICAL DETAILS

The roofing is produced in accordance with the building technical certificate issued by ITC a.s. Zlín no. STO – AO 224–197/2009/c

Line	EB1	EB2	EB3	EB4	Strong EB2	Standard
Outer size of the tile (mm)	340 x 340	415 x 415	300 x 445	320 x 320	415 x 415	
Weight (kg/tile)	0,77	1,35	1,00	0,77	0,70	
Thickness (mm)	5,4 ± 0,3	6,2 ± 0,3	5,4 ± 0,3	5,4 ± 0,3	6,2 ± 0,3	
Number of tiles pcs/1 m ²	13	8,4	17,5	16,6	8,4	
Recommended minimum pitch of the roof	25°	25°	20°	28°	25°	
Packaging (m ²)	100	100	70	100	100	
Use	New buildings, houses, reconstruction, listed buildings					
Surface	Matt				Matt/Gloss	
Reaction to fire	E					ČSN EN ISO 11925-2
Hardness	92±3 Shore A				98±3 Shore A	
Colors	Black, Graphite, Grey, Red					
Warranty	up to 22 years				10 years	
Water impermeability	No dripping or drops					
Mass per unit area (kg/m ²)	7,30 ± 0,35	8,60 ± 0,35	7,30 ± 0,35	7,30 ± 0,35	5,80 ± 0,20	
Average bulk density (kg/cm ³)	1,35				0,9	
Material composition	Recycled PVC, additives, pigment, UV stabilizer				Recycled PP, additives, pigment, UV stabilizer	
Dimensional stability	≤ 3 % after exposure to -20 °C; 110 °C 135 °C; 150 °C					ČSDN EN 1603 ČSN EN ISO 15 013 ČSN EN ISO 14632
Puncture resistance	Cracks permitted on the bottom no longer than one-third of the size					ČSN EN 477

EKOTERNIT PRODUCT RANGE

COLOURS



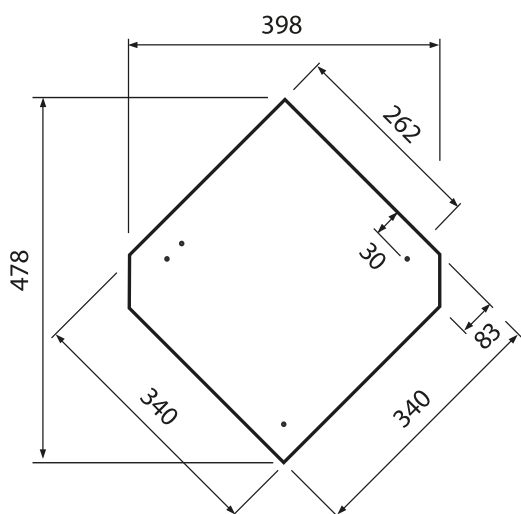
BLACK

GRAPHITE

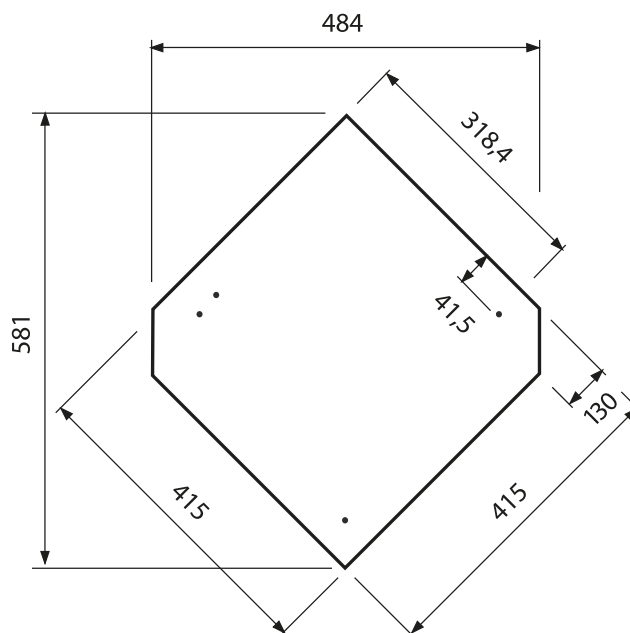
GREY

RED

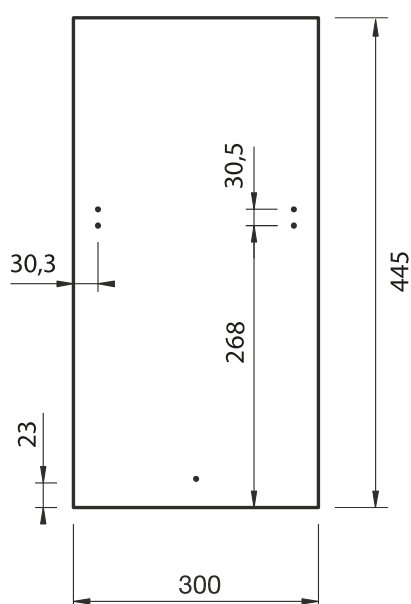
TEMPLATE EB1



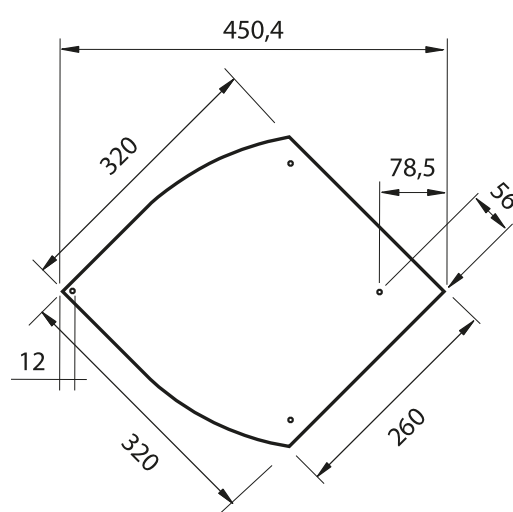
TEMPLATE EB2 TEMPLATE STRONG EB2



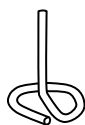
TEMPLATE EB3 TRADITIONAL RECTANGLE



TEMPLATE EB4 SCALE



ACCESSORIES, ANCHORS AND FIXINGS, TOOLS USED FOR INSTALLATION



WIND CLIP

Copper wind clip measuring 25 mm x 30 mm with a thickness of 2.12 mm wire is used to stabilize individual templates along the surface. It is made from copper wire.

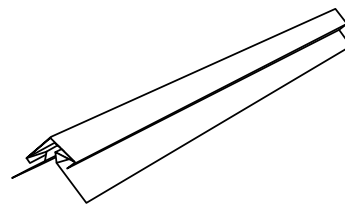
FIXINGS

Detailing roof installation with fixings in accordance with ČSN 73 3610.



CONVEX NAIL

For nailing each template into the underlay, a convex nail 32 mm long, 2.5 mm wide, with preferably an 8 mm head and enhanced pull-off resistance is used.



RIDGE VENT CAP

This is an original ridge ventilation element that is used to ventilate the roof deck and is wholly sufficient for it. It is produced in two stages of the pitch and can be further customized according to need. Ventilation of the roof deck using this element is not mandatory, it can be achieved e.g. by ridge design too, or using other plastic or metal ventilation elements available on the market.

TOOLS

The use of tried and tested roofing and fixing tools are recommended for installing Ekoternit tiles. The use of tin snips or a utility blade is recommended for cutting individual roof templates **EB1, EB2, EB3, EB4**.

A hand or electric jig saw or Ekoternit cutter can be used to cut **Strong EB2** tiles, or these tiles can be cut using a grinder with a cutting wheel.

Ekoternit Strong EB2 does not flex like soft roofing tiles thanks to its DRS (Dynamic Ribs System), a specially designed rib construction.

SAFE PITCH

The indicated safe pitch means the minimum gradient required to prevent rainwater from seeping through individual types of roofing without the need to take additional measures. The safe and minimum roof pitch indicated for the individual types of templates should be increased by at least 10° in the event of adverse weather conditions, the unfavorable position of the building, etc.

STRUCTURE OF THE ROOF DECK

The installation of Ekoternit plastic roof templates is usually done on the surface of formwork made out of dried squared timber with a recommended maximum width of individual boards of 120 mm, and thickness 24 mm or 30 mm depending on the distance of the individual rafters from each other. Besides formwork, the installation can be done on OSB or other suitable large-size boards.

Ekoternit Strong EB2 plastic roof tiles are usually installed on thick battens measuring 50×30 mm or 60×40 mm (depending on the span of the trusses). Up to a truss span of 80 cm, they can be 50×30 mm and above 80 cm they must be 60×40 mm.

A strong layer of waterproofing should always be added under Ekoternit roofing. For soft PVC tiles, this layer should contain no asphalt or bitumen.. The design of the correct structure and choice of suitable material for individual layers of the roof deck are especially governed by the standards ČSN 73 1901 Roof Design – General Provisions, ČSN 73 0540-2 Thermal Protection of Buildings, and the applicable rules for designing and installing roofs issued by the Tinsmiths, Roofers and Carpenters Guild of the Czech Republic

ADDITIONAL WATERPROOF LAYER

When designing the structure of the roof deck, the increased performance requirements for an additional waterproofing layer (DHL) must always be taken into account, such as the pitch of the roof, local weather conditions, roof design, presence of a loft for living in, local regulations, etc.

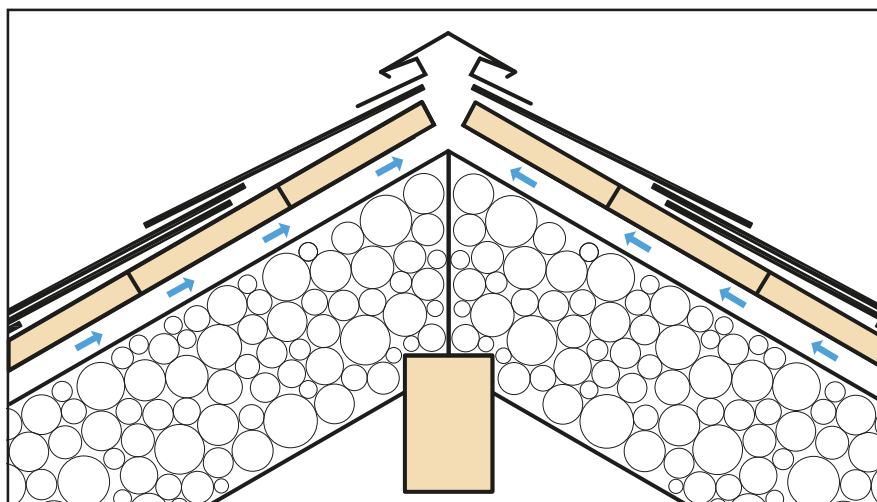
The choice of the waterproof underlayment (DHL) depends primarily on the desired degree of the seal tightness of the underlay (class of additional waterproofing layer). There is a total of six tightness classes, DHV 1–DHV 6, where DHV 1 is the most stringent class and conversely DHV 6 is the least stringent class. The roof is put in a particular class depending on the design of the roof (double-deck, triple-deck), on its pitch, on the type of roofing used, on the safe pitch of the roofing, etc.

ROOF DECK VENTILATION

The structure of a roof covered with Ekoternit plastic roofing is designed and built as ventilated. Such a roof is based on the principle of the natural circulation of air due to the difference in temperatures between the eaves and ridge. It is therefore essential to provide a ventilated air space under the formwork to direct sufficient airflow from the eaves to the ridge.

The ventilated air space has these functions:

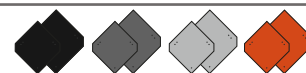
- Discharging moisture to the outside (moisture from the outside that penetrates the roofing, moisture from the interior that has penetrated through airtight layers and moisture built into the structure, e.g. from wet wood)
- Reducing the temperature under the roofing
- Comparing roofing temperatures
- Preventing the condensation of water vapor, which penetrates the roof deck from the interior.



Ridge ventilation using the innovative Ekoternit ridge cap

For ventilating the roof deck at the ridge, we recommend using the innovative Ekoternit ridge vent cap, which is made from sheet metal in two stages of the pitch and can be further customized according to requirements. Ventilation of the roof sheathing by this element is not mandatory and it can be achieved by, for example, the design of the ridge and edges or by using plastic ventilation fittings and tiles.

EB1, EB2 ROOFING INSTALLATION



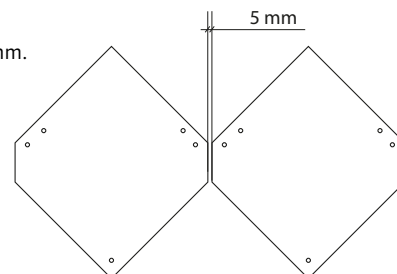
EB1 and EB2 templates are placed in horizontal rows along the tips of the templates going from the eaves to the ridge, generally from right to left.

A gap of 5 mm is left between the templates to allow for movement and the placement of wind clips. The template is laid with the tip facing downward and, depending on the weather for that area, 10 or 20 mm from the edges of the two templates lying underneath. The tile is fixed to the deck with two nails and 1 wind clip.

Finishing work is always done on the leeward batten with a sufficient expansion gap of at least 5 mm.

EXPANSION GAP

The nature of the plastic material used to make the Ekoternit roofing makes it always necessary to maintain a 5 mm expansion gap between the templates, which also serves for the placement of wind clip.

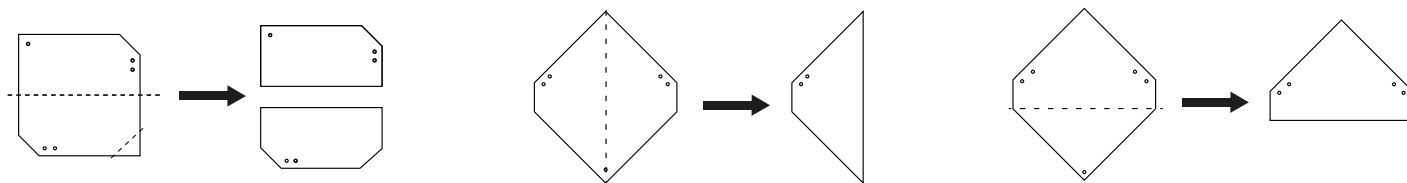


NOT FULLY HAMMERING OF THE NAILS

The nails going into individual templates are not fully hammered in (the same for fiber cement tiles). The templates are nailed into the holes made for this expressed purpose. If it is necessary to insert the nail in another location, that point must be pre-drilled with a minimum width of 4.5 mm.

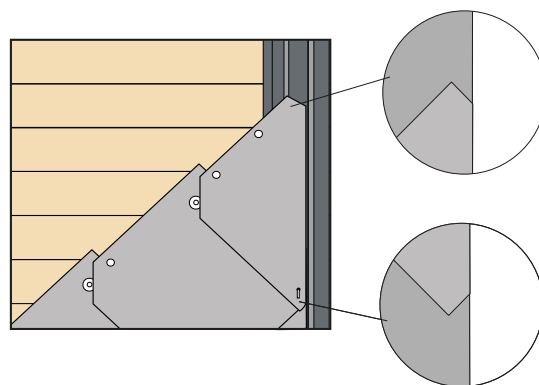
ACCESSORY TEMPLATE SHAPES

For refining the eaves and other details such as the ridge, hip, gable edges, gutters and the like, accessory template shapes made from different shapes of the basic templates are used. The width of the narrowest shape must always be greater than 12.5 cm.

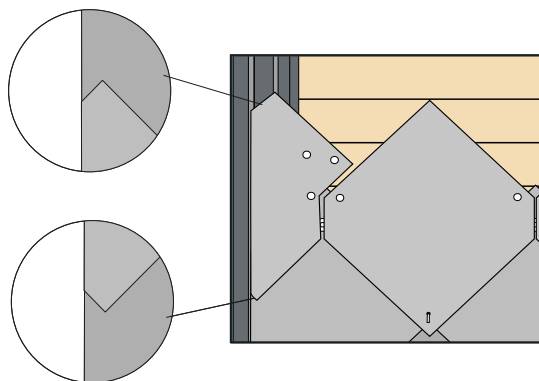


TRIMMING, ROUNDING OF THE TEMPLATES

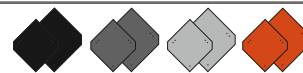
In order to drain water from a gable to the roof surface, the outer corners of the template must be chamfered or rounded (see Fig.).



In a situation where a template edge cannot be sufficiently fixed for the making of the gable, this piece is cut from a larger tile and secured with 3 nails. In this case, the lower part of the template needs to be rounded so that water drips from the edge to the roof surface (see Fig.).



EB1, EB2 ROOFING INSTALLATION

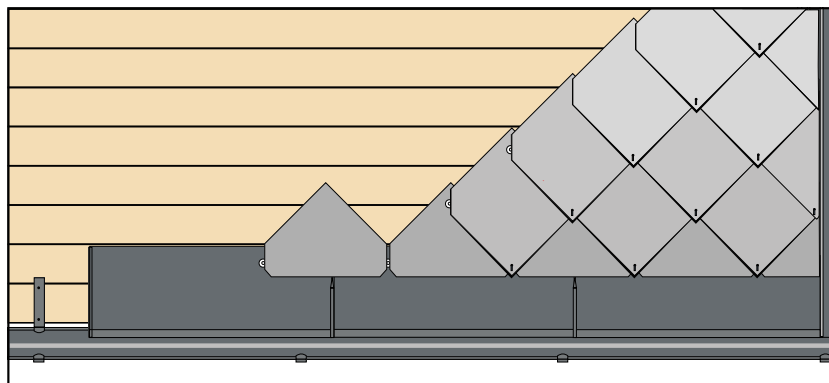
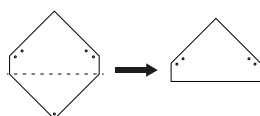


LAYING THE TILES

Laying Ekoternit EB1, EB2 tiles can be done in several ways, all chosen with regards to the nature of the building, the climate of the region, snow area, etc.

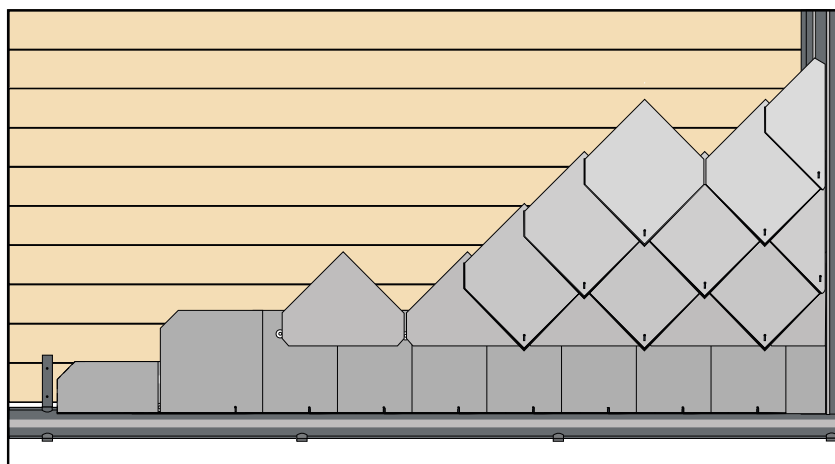
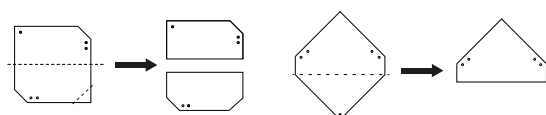
LAYING ON EAVES SHEET

The width of the eaves sheet is chosen with a view to the climate of the region, the nature of the building, etc. A leveling batten is installed underneath the eaves sheet to maintain the pitch. Made-up accessory template shapes (see Fig.) are installed on the first row parallel to the edge of the eaves with an overlap of at least 10 cm, thus forming an underlay for the wind clips for the subsequent row of templates. The first row of full templates is laid with the tip downward.

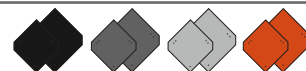


LAYING TEMPLATES ON REINFORCED, DOUBLE-EDGED TRIM

Reinforced, double-edged trim is done in combination with a sheet metal underlay. Accessory template shapes created by halving the basic templates will be used as the base line of eaves edging templates. This will create an underlay to support the wind clips and the upper layer of the full edging templates. Additional accessory template shapes are laid with the cut edge running in parallel to the eaves with the smallest possible overlap to the edging templates to serve as a support base for the wind clips of the first row of full templates, which are laid with the tips facing downward. The roofing should overlap 1/3 of the width of the eaves.



EB1, EB2 ROOFING INSTALLATION

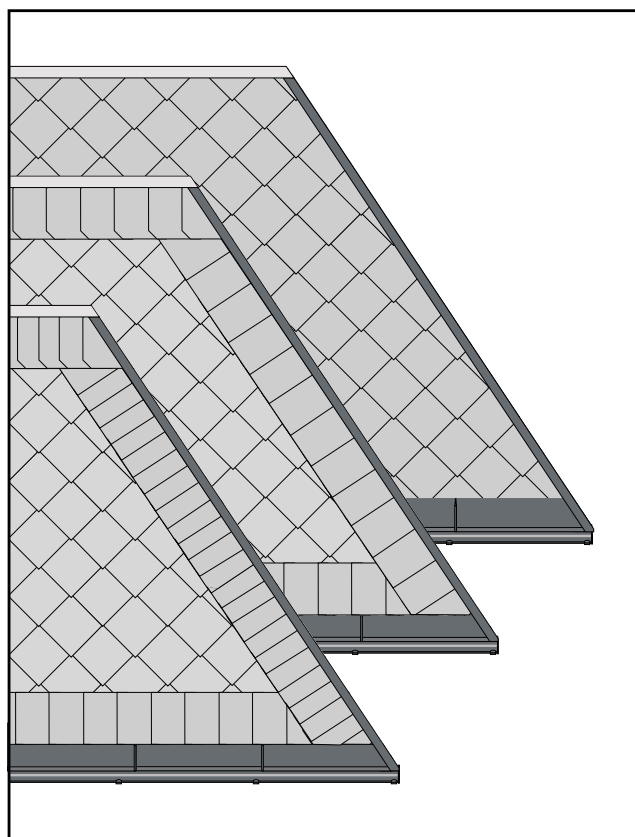
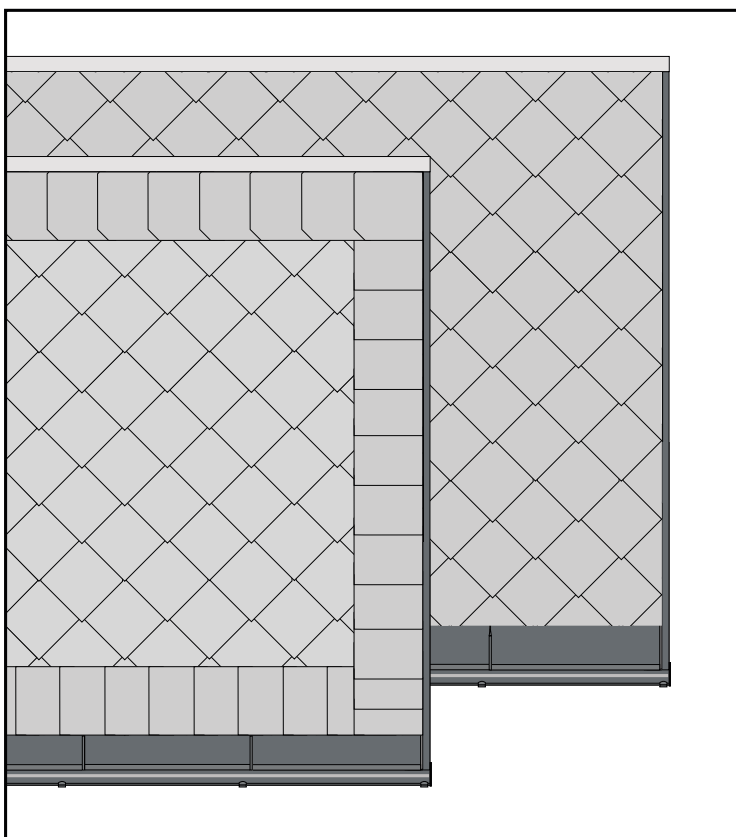


FINISHING WORK FOR A GABLE EDGE

Gable edges can be finished only with an overlap of templates (maximum 4 mm) over the area to be covered, or fully covering the leeward batten, or in combination with the use of edging templates, where the trim of the gable template overlaps the remaining edging templates by 100-120 mm. Compared to other templates in the roofing, edging templates should have the minimum overlap the templates in the roofing have between each other.

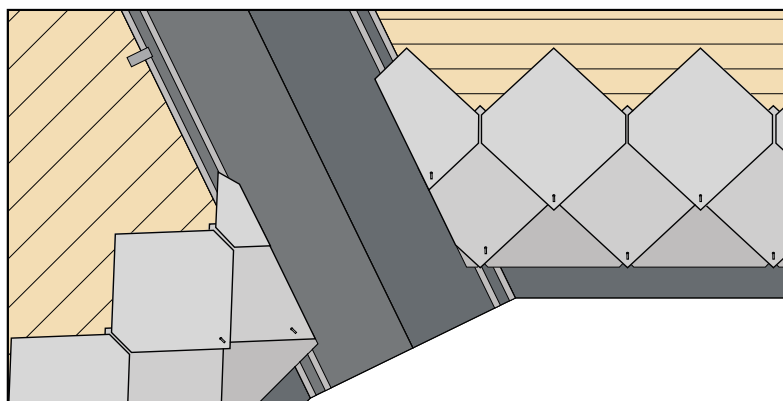
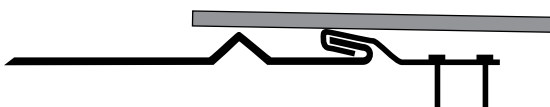
DESIGN OF THE RIDGE AND HIP

The making of the ridge and corners can be done by extending coverage up to the edge of the covered area using flashing or the innovative ridge vent cap on the saddle, again in combination with the use of edging templates, where the edging template overlaps the other edging templates by 100-120 mm. Compared to other templates in the roofing, edging templates should have the minimum overlap the templates in the roofing have between each other. An underlay must be provided to ensure templates in the corners have the same pitch as the rest of the surface. Other details based on the nature of the roof are resolved in the usual installation manner.



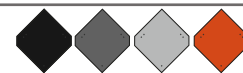
GUTTERS

Gutters for Ekoternit EB1, EB2 roofing should be made out of sheet metal. The gutter is covered at the same time as laying the rows on the roof surface. Gutters consist of a simple groove for water and groove to support the templates.



Other details for installing Ekoternit roofing are based on the nature of the building, and for those details not described in this installation guide, the same rules for laying fiber-cement slate of the same size can be followed.

STRONG EB2 ROOFING INSTALLATION



STRONG EB2 tiles are laid on full boarding or battening in horizontal rows on the tip of the tiles in the direction from the eaves to the ridge, usually from right to left or to the centre.

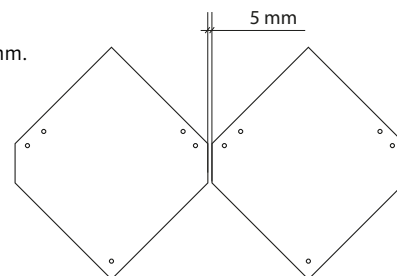
The installation is usually carried out on a batten size of 60×40 mm.

A gap of 5 mm is left between the templates to allow for movement and the placement of wind clips. The template is laid with the tip facing downward and, depending on the weather for that area, 10 or 20 mm from the edges of the two templates lying underneath. The tile is fixed to the deck with two nails and 1 wind clip.

Finishing work is always done on the leeward batten with a sufficient expansion gap of at least 5 mm.

EXPANSION GAP

The nature of the plastic material used to make the Ekoternit roofing makes it always necessary to maintain a 5 mm expansion gap between the templates. This gap is also used for inserting a wind clip.

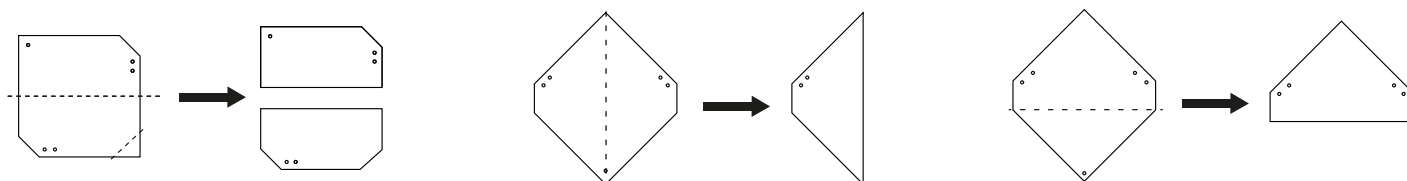


NOT FULLY HAMMERING OF THE NAILS

The nails going into individual templates are not fully hammered in (the same for fiber cement tiles). The templates are nailed into the holes made for this expressed purpose. If it is necessary to insert the nail in another location, that point must be pre-drilled with a minimum width of 4.5 mm.

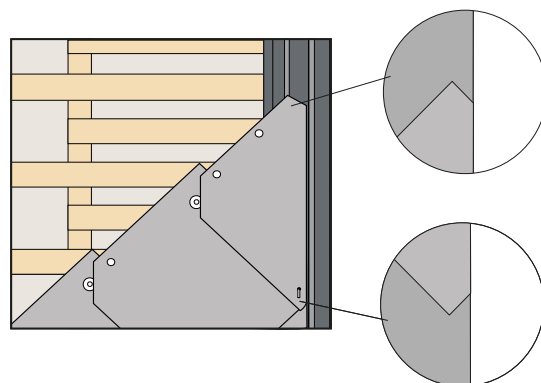
ACCESSORY TEMPLATE SHAPES

For refining the eaves and other details such as the ridge, hip, gable edges, gutters and the like, accessory template shapes made from different shapes of the basic templates are used. The width of the narrowest shape must always be greater than 12.5 cm.

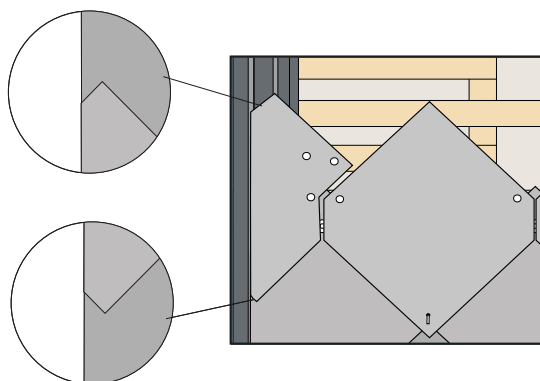


TRIMMING, ROUNDING OF THE TEMPLATES

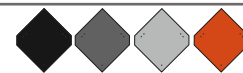
In order to drain water from a gable to the roof surface, the outer corners of the template must be chamfered or rounded (see Fig.).



In a situation where a template edge cannot be sufficiently fixed for the making of the gable, this piece is cut from a larger tile and secured with 3 nails. In this case, the lower part of the template needs to be rounded so that water drips from the edge to the roof surface (see Fig.).



STRONG EB2 ROOFING INSTALLATION

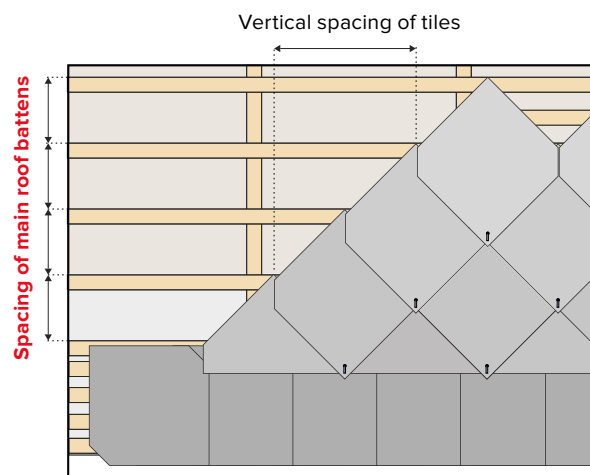
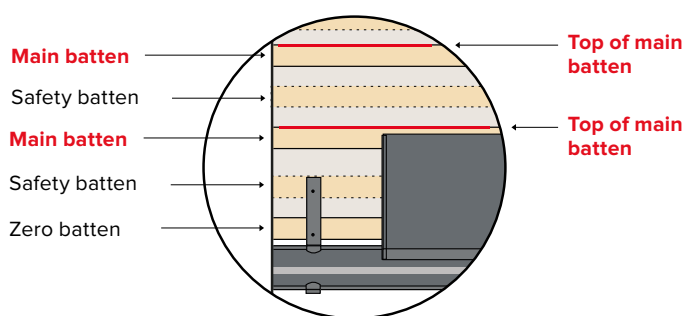


ROOF DIMENSIONING

Before installation, the roof must be measured accurately.

Installing the main batten:

- when the tile is extended 5 cm into the gutter, the bottom of the zero batten and top of the main batten is 36 cm
- when the tip of the tile is lowered by 1 cm, the batten is 23 cm (the distance between the upper edges of the main battens)
- when the tip of the tile is lowered by 2 cm, the batten is 22 cm (distance between the upper edges of the main battens)

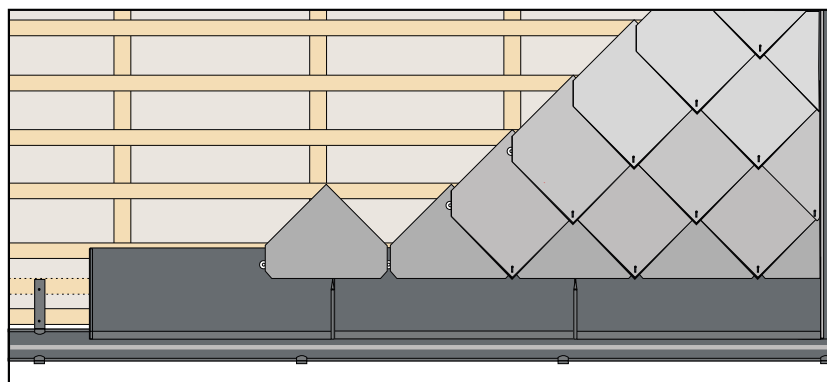
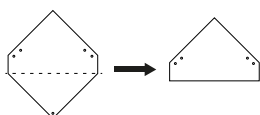


LAYING THE TILES

Laying Ekoternit Strong EB2 tiles can be done in several ways, all chosen with regards to the nature of the building, the climate of the region, snow area, etc.

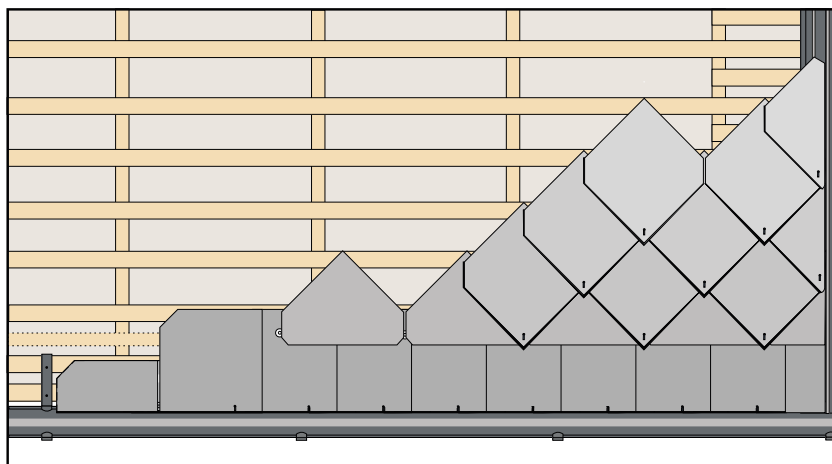
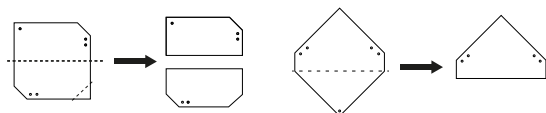
LAYING ON EAVES SHEET

The width of the eaves sheet is chosen with a view to the climate of the region, the nature of the building, etc. A leveling batten is installed underneath the eaves sheet to maintain the pitch. Made-up accessory template shapes (see Fig.) are installed on the first row parallel to the edge of the eaves with an overlap of at least 10 cm, thus forming an underlay for the wind clips for the subsequent row of templates. The first row of full templates is laid with the tip downward.

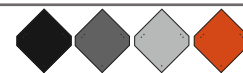


LAYING TEMPLATES ON REINFORCED, DOUBLE-EDGED TRIM

Reinforced, double-edged trim is done in combination with a sheet metal underlay. Accessory template shapes created by halving the basic templates will be used as the base line of eaves edging templates. This will create an underlay to support the wind clips and the upper layer of the full edging templates. Additional accessory template shapes are laid with the cut edge running in parallel to the eaves with the smallest possible overlap to the edging templates to serve as a support base for the wind clips of the first role of full templates, which are laid with the tips facing downward. The roofing should overlap 1/3 of the width of the eaves. The roofing should extend 5 to 8 cm into the width of the eaves (depending on the roof pitch).



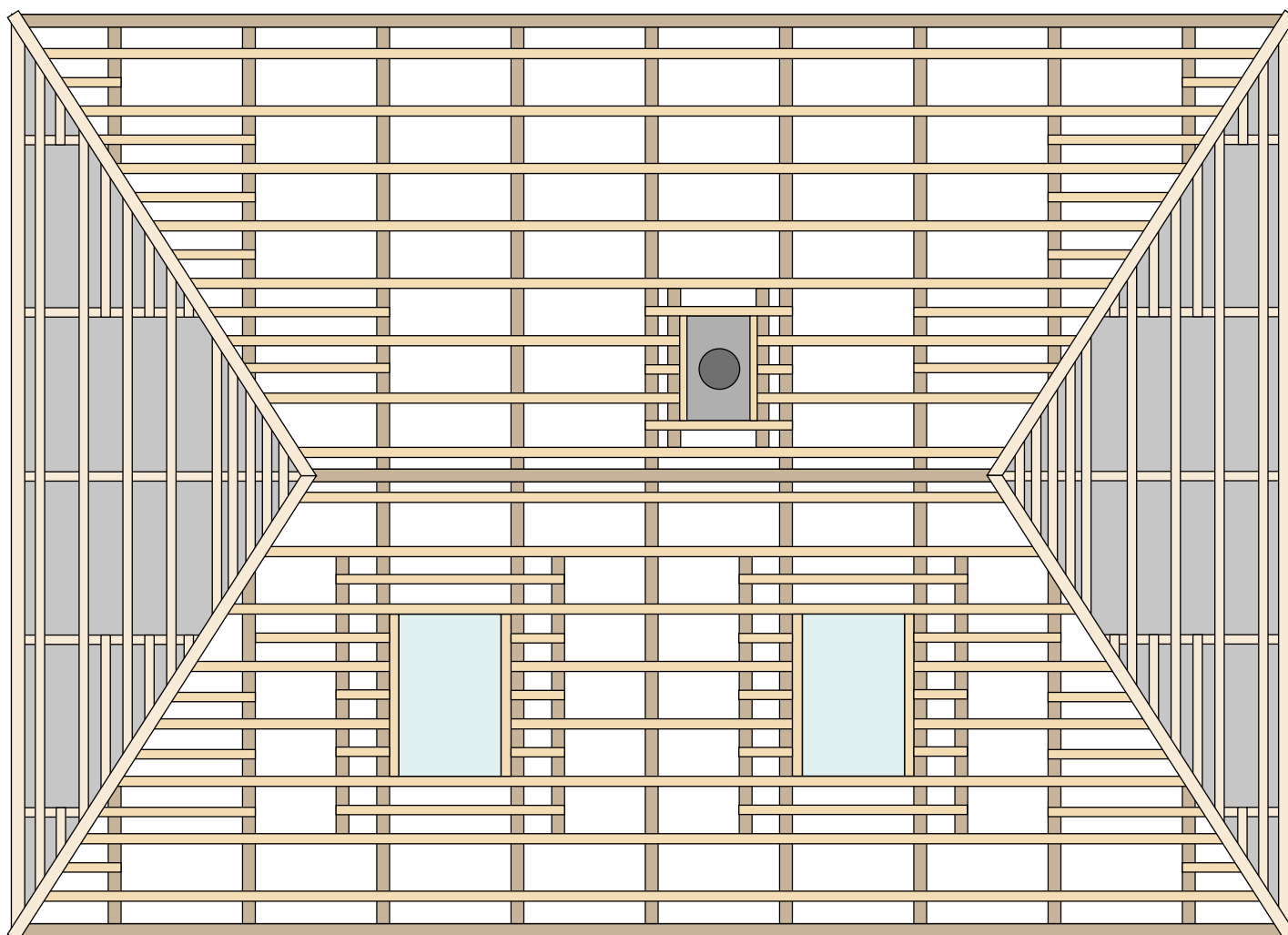
STRONG EB2 ROOFING INSTALLATION



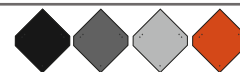
BATTENING

Thicken the battens for the Strong EB2 tiles at the gutter, roof, hip, chimney edging and all passages. Thickened battens throughout the area depend on the pitch and snow area.

SNOW AREA	PITCH OF THE ROOF	THICKENED BATTENS
K1 (up to 400 m above sea level)	25°–29°	NO
	30°–39°	NO
	40°–45°	NO
K2 (up to 600 m above sea level)	25°–29°	YES
	30°–39°	NO
	40°–45°	NO
K3 (up to 900 m above sea level)	25°–29°	YES
	30°–39°	YES
	40°–45°	YES

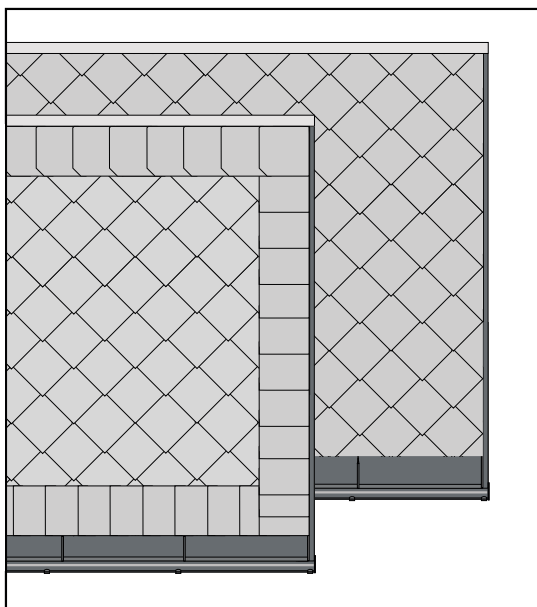


STRONG EB2 ROOFING INSTALLATION



FINISHING WORK FOR A GABLE EDGE

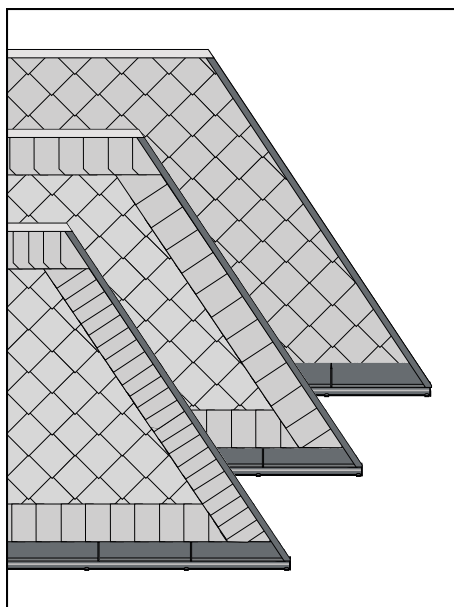
Gable edges can be finished only with an overlap of templates (maximum 4 mm) over the area to be covered, or fully covering the leeward batten, or in combination with the use of edging templates, where the trim of the gable template overlaps the remaining edging templates by 100-120 mm. Compared to other templates in the roofing, edging templates should have the minimum overlap the templates in the roofing have between each other.



DESIGN OF THE RIDGE AND HIP

The making of the ridge and corners can be done by extending coverage up to the edge of the covered area using flashing or the innovative ridge vent cap on the saddle, again in combination with the use of edging templates, where the edging template overlaps the other edging templates by 100-120 mm. Compared to other templates in the roofing, edging templates should have the minimum overlap the templates in the roofing have between each other. An underlay must be provided to ensure templates in the corners have the same pitch as the rest of the surface. Other details based on the nature of the roof are resolved in the usual installation manner.

The ridge and edges of Strong EB2 can also be created by overlapping the roofing of one section with the roofing of another, where the prevailing wind direction determines the ridge and corner tiles to be overlapped, i.e. the tiles more exposed to the wind. The overlap must cover 4-6 cm of the finished surface beneath it. The edge of the ridge second plane shall be fitted to the overlap or its upper edge shall be adjusted to fit as closely as possible. The corner boards must be underlain to ensure they have the same slope as the boards in the plane.



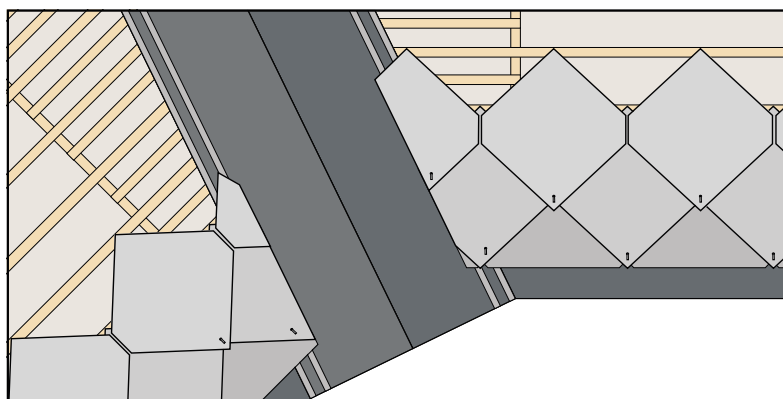
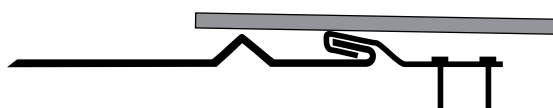
GUTTERS

Gutters for Ekoternit Strong EB2 roofing should be made out of sheet metal. The gutter is covered at the same time as laying the rows on the roof surface. Gutters consist of a simple groove for water and groove to support the templates.

For laying on battens with spacing greater than 13 cm, the sheet metal gutter must be underpinned by a plank underlay. The overlap of the roof tiles over the sheet metal gutter, measured perpendicular to the line of the gutter, must be for roof pitches

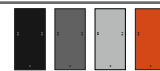
< 50° at least 12 cm,
≥ 50° at least 10 cm.

The corners of the tiles at the point of the gutter shall be rounded or chamfered for proper drainage.



Other details for installing Ekoternit roofing are based on the nature of the building, and for those details not described in this installation guide, the same rules for laying fiber-cement slate of the same size can be followed.

EB3 ROOFING INSTALLATION



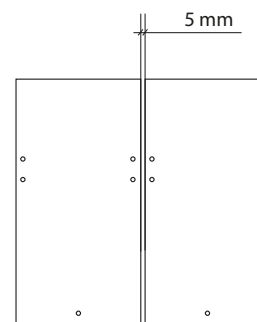
EB3 templates are placed in horizontal rows using the tips of the tiles and going from the eaves to the ridge, generally from right to left in so-called double coverage.

A gap of 5 mm is left between the templates to allow for movement and the placement of wind clips. The tile is fixed to the deck with two nails and 1 wind clip. Double-coverage roofing is stronger and more durable than a simple installation. The templates are overlapped in accordance with the symbol on the reverse side of the template, which gives the smallest overlap recommended by the manufacturer.

Finishing work is always done on the leeward batten with a sufficient expansion gap of at least 5 mm.

EXPANSION GAP

The nature of the plastic material used to make the Ekoternit roofing makes it always necessary to maintain a 5 mm expansion gap between the templates, which also serves for the placement of wind clips.

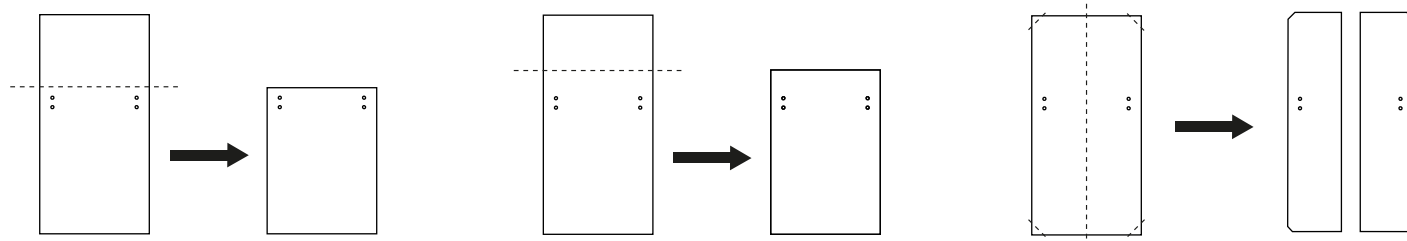


NOT FULLY HAMMERING OF THE NAILS

The nails going into individual templates are not fully hammered in (the same for fiber cement templates). The templates are nailed into the holes made for this expressed purpose. If it is necessary to insert the nail in another location, that point must be pre-drilled with a minimum width of 4.5 mm.

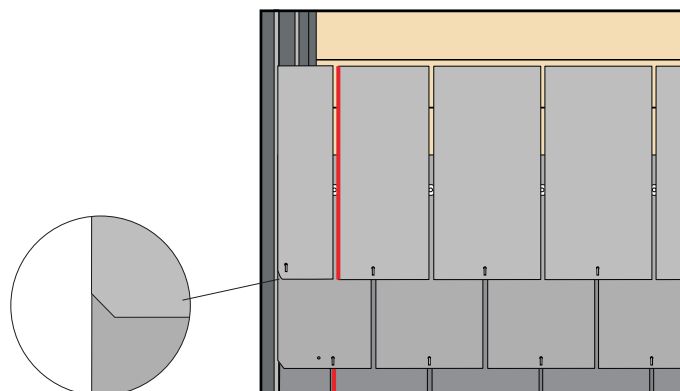
ACCESSORY TEMPLATE SHAPES

For refining the eaves and other details such as the ridge, hip, gable edges, gutters and the like, accessory template shapes made from different shapes of the basic templates are used. The width of the narrowest shape must always be greater than 12.5 cm.

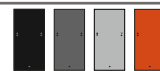


RIMMING, ROUNDING OF THE TEMPLATES

The double coverage on binding must be maintained even for covering the edge of the gable. For this reason, the templates at the gable must always be modified in one row. The width of the modified template must be at least 125 mm. In the event that the outer piece is narrow and not sufficiently secure, this piece needs to be enlarged at the expense of the penultimate template in the row (see Fig.), so that it can be sufficiently fixed with two nails and one wind clip. In the next row, the opening for the wind clip is moved in proportion to the gap created. The outer corners of the gable templates need to be chamfered or rounded to allow water to be drained towards the roof surface.



EB3 ROOFING INSTALLATION

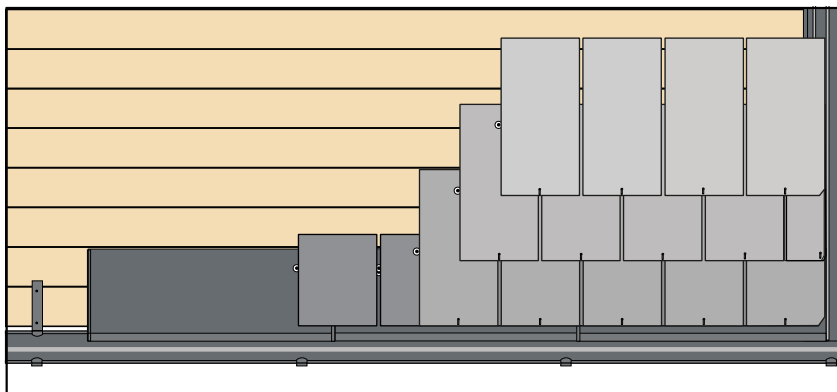
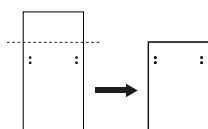


LAYING THE TILES

Laying Ekoternit EB3 tiles can be done in several ways, all chosen with regards to the nature of the building, the climate of the region, snow area, etc. Double-coverage roofing is stronger and more durable than a simple installation. The templates are overlapped in accordance with the symbol on the reverse side of the template, which gives the smallest overlap recommended by the manufacturer.

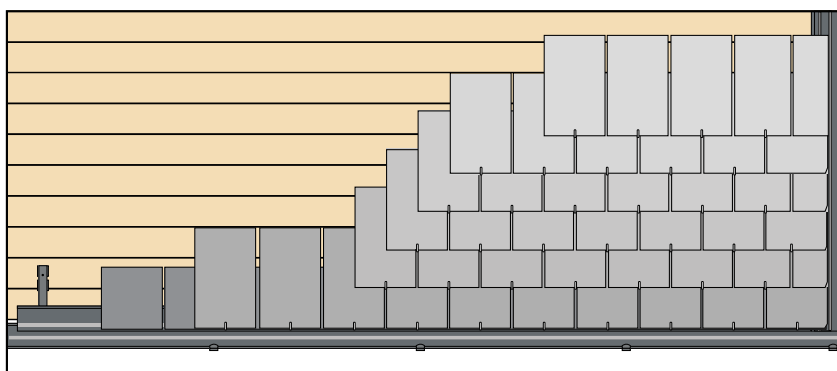
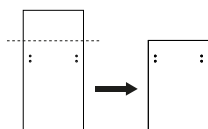
LAYING ON EAVES SHEET

The width of the eaves sheet is chosen with a view to the climate of the region, the nature of the building, etc. A levelling batten is installed underneath the eaves sheet to maintain the pitch. Made-up accessory template shapes (see Fig.) are installed on the first row parallel to the edge of the eaves with an overlap of at least 10 cm, thus forming an underlay for the wind clips for the subsequent row of templates. The first row of full templates is then laid.



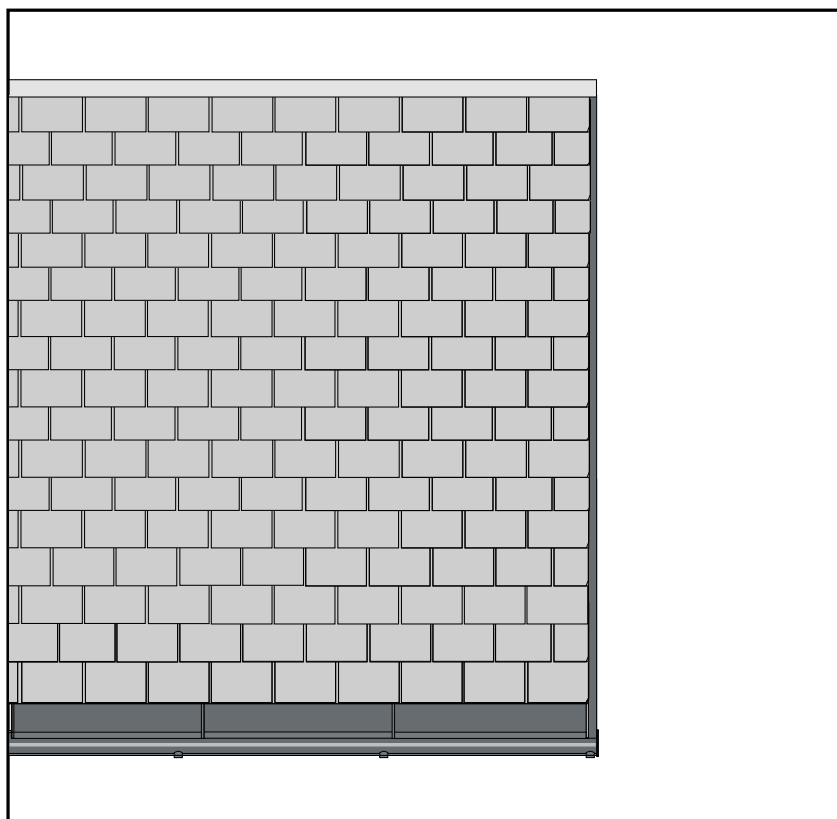
LAYING WITH DOUBLE-EDGED TRIM

Laying with double-edged trim is always done in combination with a sheet metal underlay. Accessory template shapes are cut from original templates (see Fig.). Accessory templates are laid with the cut edge butted up in parallel to the eaves. These templates also serve for attaching wind clips. Full templates are then laid on the prepared underlay. The roofing should overlap at least 1/3 of the width of the eaves.

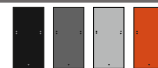


FINISHING WORK FOR A GABLE EDGE

Finishing the edge of the gable can be done only by overlapping the templates (maximum 4 mm) across the covered surface or by full coverage up to the leeward batten and to the ridge.

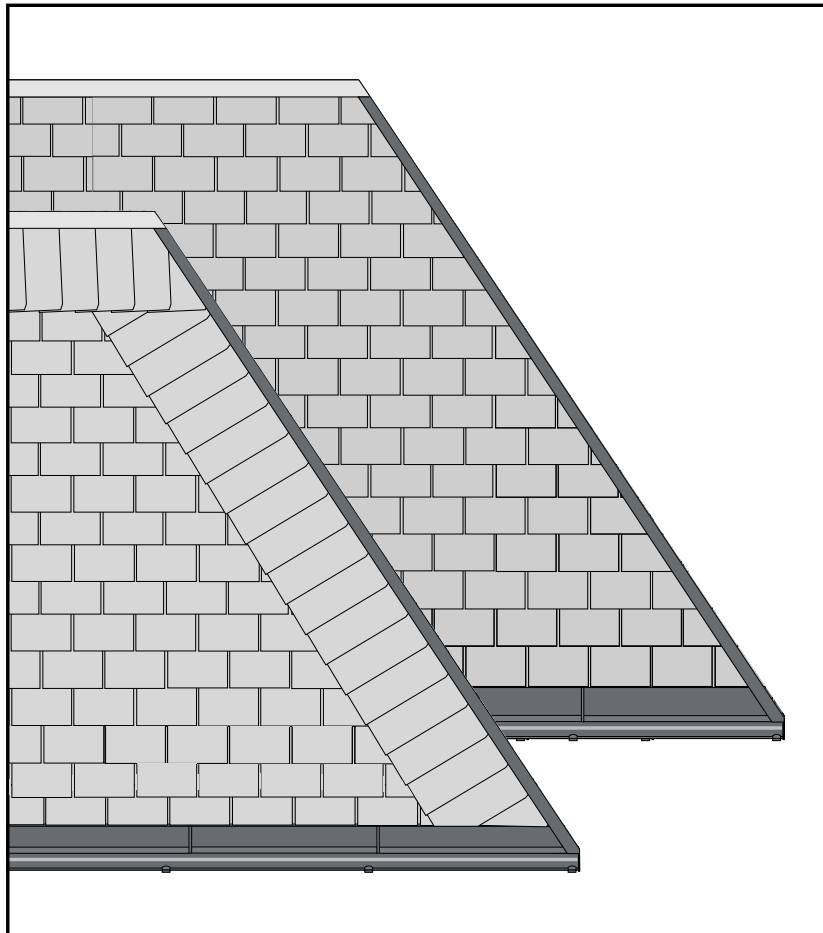


EB3 ROOFING INSTALLATION



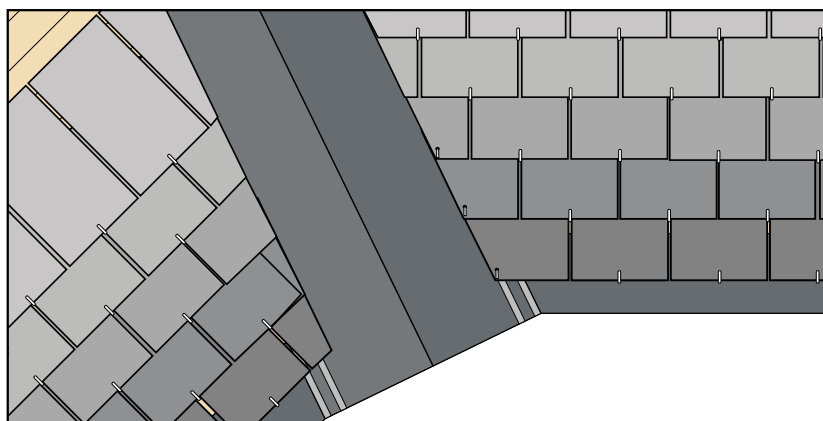
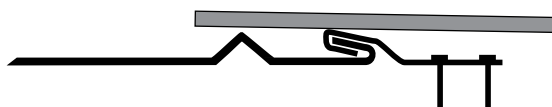
DESIGN OF THE RIDGE AND HIP

The making of the ridge and corners can be done by full coverage up to the edge of the covered area using flashing or the original ridge vent cap on the saddle, again in combination with the use of edging templates, where the edging template overlaps the other edging templates by 100-120 mm. Compared to other templates in the roofing, edging templates should have the minimum overlap the templates in the roofing have between each other. An underlay must be provided to ensure templates in the corners have the same pitch as the rest of the surface. Other details based on the nature of the roof are resolved in the usual installation manner.



GUTTERS

Gutters for Ekoternit EB3 tiles should be made out of sheet metal. The gutter is covered at the same time as laying the rows on the roof surface. Gutters consist of a simple groove for water and groove to support the templates.



Other details for installing Ekoternit roofing are based on the nature of the building, and for those details not described in this installation guide, the same rules for laying fiber-cement slate of the same size can be followed.

EB4 ROOFING INSTALLATION



Ekoternit EB4 tiles are installed with a greater overlap against the prevailing wind direction, so-called scaling. Finishing work is always done on the leeward batten with a sufficient expansion gap of at least 5 mm. The tile is fixed to the deck with two nails and 1 wind clip.

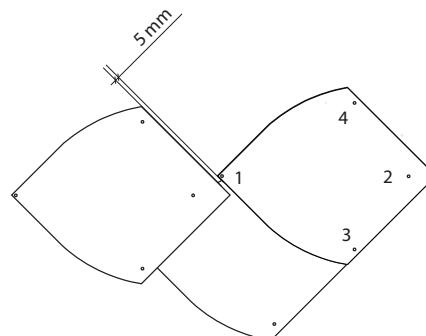
A gap of 5 mm is left between the templates to allow for movement and the placement of wind clips. The tile is fixed to the deck with two nails and 1 wind clip.

EXPANSION GAP

The nature of the plastic material used to make the Ekoternit roofing makes it always necessary to maintain a 5 mm expansion gap between the templates, which also serves for the placement of wind clips.

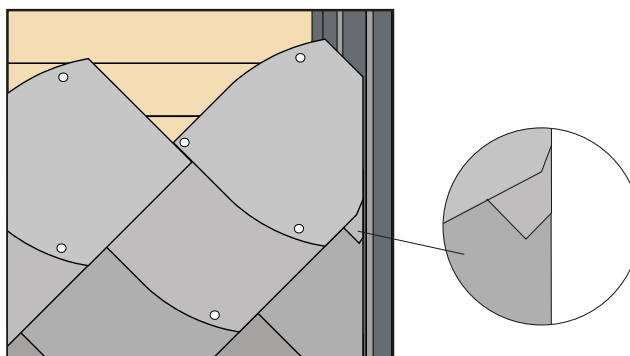
Notice:

- 1) 2) Points for nailing
- 3) 4) Points for wind clips



NOT FULLY HAMMERING OF THE NAILS

The nails going into individual templates are not fully hammered in (the same for fiber cement templates). The templates are nailed into the holes made for this expressed purpose. If it is necessary to insert the nail in another location, that point must be pre-drilled with a minimum width of 4.5 mm.

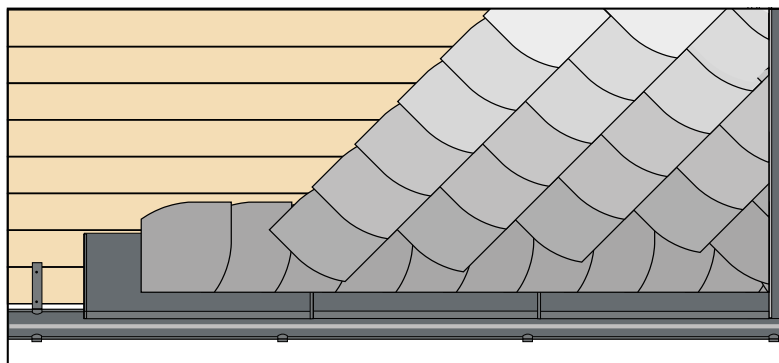


LAYING THE TILES

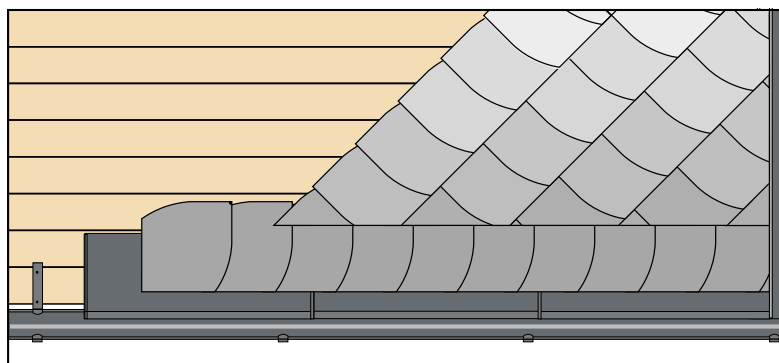
Laying Ekoternit EB4 tiles can be done in two ways, all chosen with regards to the nature of the building, the climate of the region, snow area, etc.

1. The rows are laid out at a 45° angle without a straight cut (see Fig.).

2. The rows are laid out at a 45° angle with a straight cut (see Fig.).



The bottom row is laid out across the sheet-metal eaves. The width of the eaves sheet is chosen with a view to the climate of the region, the nature of the building, etc. A levelling batten is installed underneath the eaves sheet to maintain the pitch. The tiles in the starting row are wind-clipped by inserting the wind clip in at the place designated for nails and then sliding in the next tile. Nailing is then done through a hole newly made at least 4.5 mm above the eaves plates. The diagonal throughout the length of the row and its flatness should be checked every third row. The tiles are nailed at points 1 and 2. A wind clip is put in the expansion gap and the overlapping tile is slid in at the point of the hole – 3 and 4, depending on the direction of the installation.

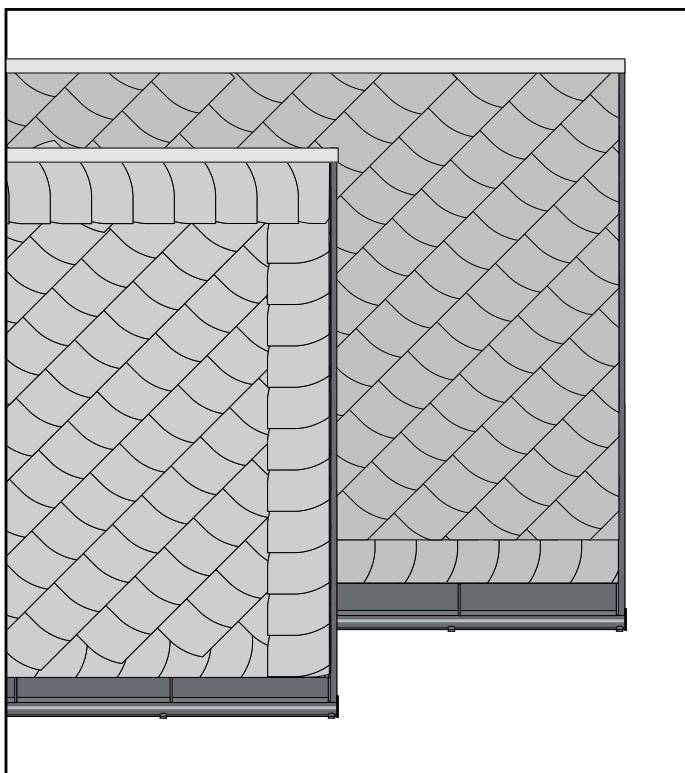


EB4 ROOFING INSTALLATION



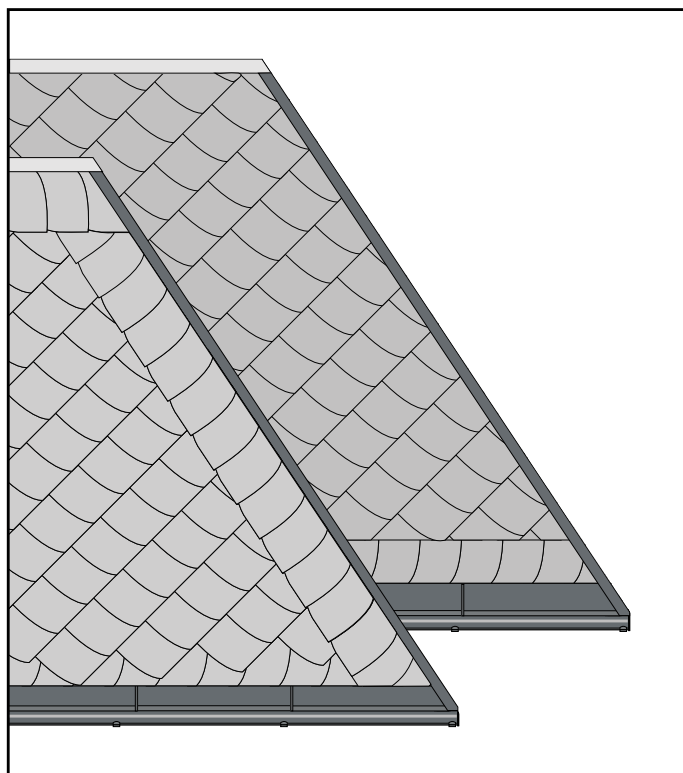
FINISHING WORK FOR A GABLE EDGE

Gable edges can be finished with an overlap of tiles (maximum 4 mm) over the area to be covered, or fully covering the leeward batten, or in combination with the use of edging templates, where the trim of the gable templates overlaps the remaining edging templates by 100-120 mm. Compared to other templates in the roofing, edging templates should have the minimum overlap the templates in the roofing have between each other.



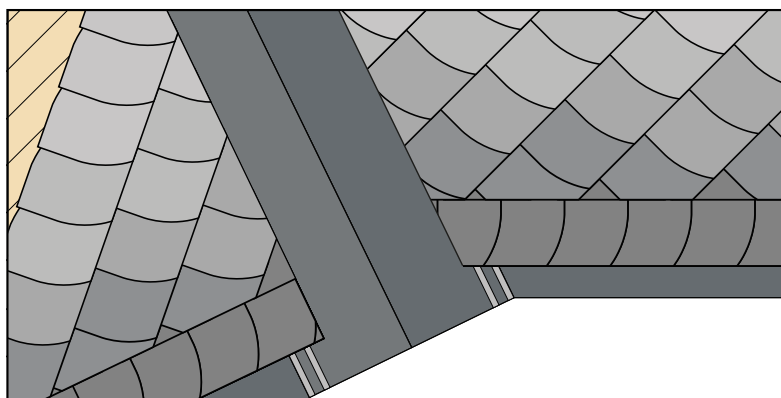
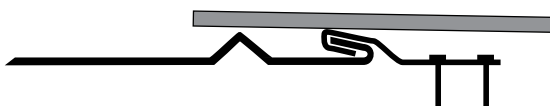
DESIGN OF THE RIDGE AND HIP

The making of the ridge and corners can be done by full coverage up to the edge of the covered area using flashing or the innovative ridge vent cap on the saddle, again in combination with the use of edging templates, where the edging template overlaps the other edging template by 100-120 mm. Compared to other templates in the roofing, edging templates should have the minimum overlap the templates in the roofing have between each other. An underlay must be provided to ensure templates in the corners have the same pitch as the rest of the surface. Other details based on the nature of the roof are resolved in the usual installation manner.



GUTTERS

Gutters for Ekoternit EB4 tiles should be made out of sheet metal. The gutter is covered at the same time as laying the rows on the roof surface. Gutters consist of a simple groove for water and groove to support the templates.



Other details for installing Ekoternit roofing are based on the nature of the building, and for those not described in this installation guide, the same rules for laying fiber-cement slate of the same size can be followed.

EKOTERNIT RECONSTRUCTION

Ekoternit is an excellent resource for the reconstruction of houses, apartment buildings, residential buildings, civic facilities, farm buildings, and especially for changing out old asbestos cement roofing.

RECONSTRUCTION – HOUSES, APARTMENT HOUSES (OLD ASBESTOS CEMENT ROOFING)

The Czech Republic has guidelines for the removal of old asbestos, with the conditions for working with asbestos specified by Act 258/2000 Coll., Public Health Protection, and other related regulations. Removing asbestos roofing requires obtaining a permit from the building authority and informing the local Regional Health Authority about the intention to remove asbestos roofing.

Homeowners can remove old asbestos cement roofing themselves, but in that instance they are responsible for ensuring that the roof is removed in a professional manner with the presence of a construction supervisor authorized for this action or else have a site manager oversee the handling of asbestos to make sure that it is disposed in accordance with the law. Another task is to find the nearest point for collecting and disposing of this waste in accordance with Act 185/2001 Coll., Waste Act.

For replacing asbestos cement roofing during the renovation of a roof deck of a house or apartment building, follow this procedure:

• REMOVE THE OLD ETERNIT ROOFING

Safely remove the existing Eternit tiles and dispose of them environmentally.

• CHECK THE CONDITION OF THE TRUSS AND FORMWORK

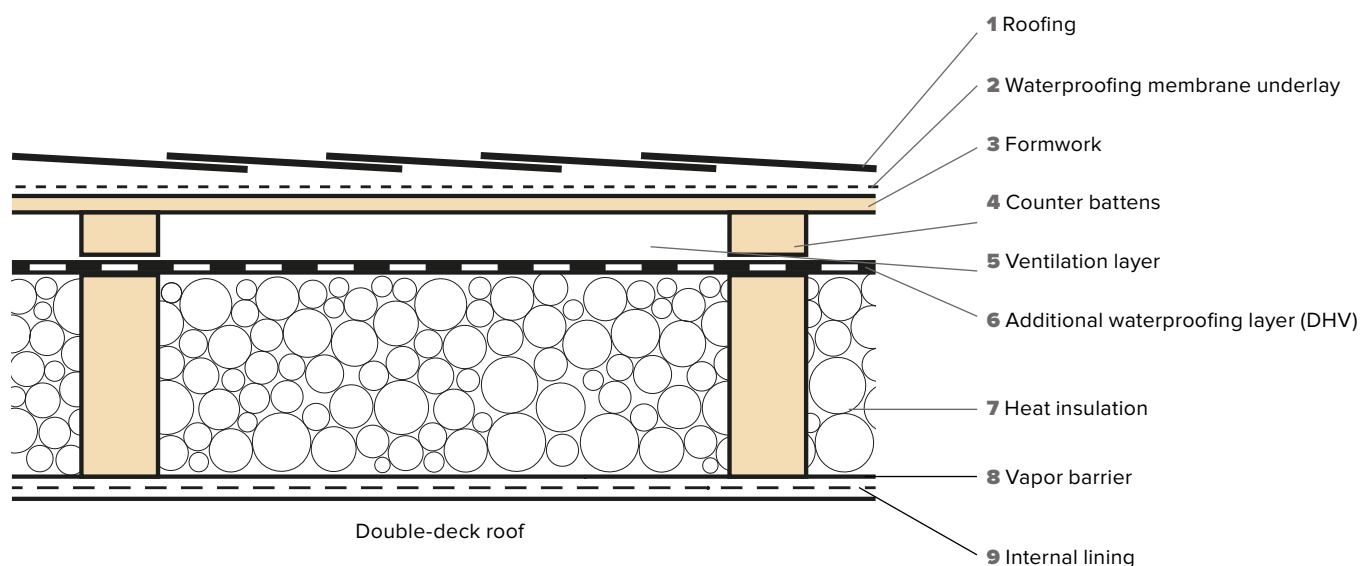
Check the condition of the old truss and formwork, especially whether the formwork is sufficiently flat. Remove any defects.

• CREATE A VENTILATION SPACE UNDER THE FORMWORK

Most commonly encountered during reconstruction is a simple roof where the entire roof deck consists only of a supporting structure consisting of formwork and roofing. In the event a thermally insulated attic roof exists or is under consideration, the roof needs to be ventilated and an additional ventilated air space built between the original and new formwork. The height of the air space depends on the height of the counter battens. The air in the ventilation space must flow beneath the formwork from the eaves to the roof top.

Then proceed in accordance with individual points

- Place diffusion-open film on the existing formwork.
- In place of rafters, install counter battens on the formwork (minimum 32 x 50 mm).
- Install and create a new formwork.
- Secure the roof accessories (flashings, fillers, eaves systems, roof safety elements, manchets, etc.).
- Install a waterproofing membrane underlay in parallel with the eaves - bitumen filler with polyester carrier liner – separating layer.
- Laying Ekoternit roofing.



RECONSTRUCTION – HOUSES AND APARTMENT BUILDINGS (OLD ASPHALT ROOFING)

Ekoternit roofing has lately found more application in replacing old asphalt shingles, which is surpassed many times over by the performance properties of Ekoternit. In many instances, the original installation of asphalt shingles used fixing elements that can be retained in certain cases, thereby significantly reducing the cost of reconstruction.

For reconstructing the roof deck of a house or apartment building that involves replacing old asphalt roofing, follow this procedure:

• REMOVE THE OLD ROOFING

Safely remove the existing asphalt roofing and dispose of it environmentally.

• CHECK THE CONDITION OF THE TRUSS AND FORMWORK

Check the condition of the old truss and formwork, especially whether the formwork is sufficiently flat. Remove any defects.

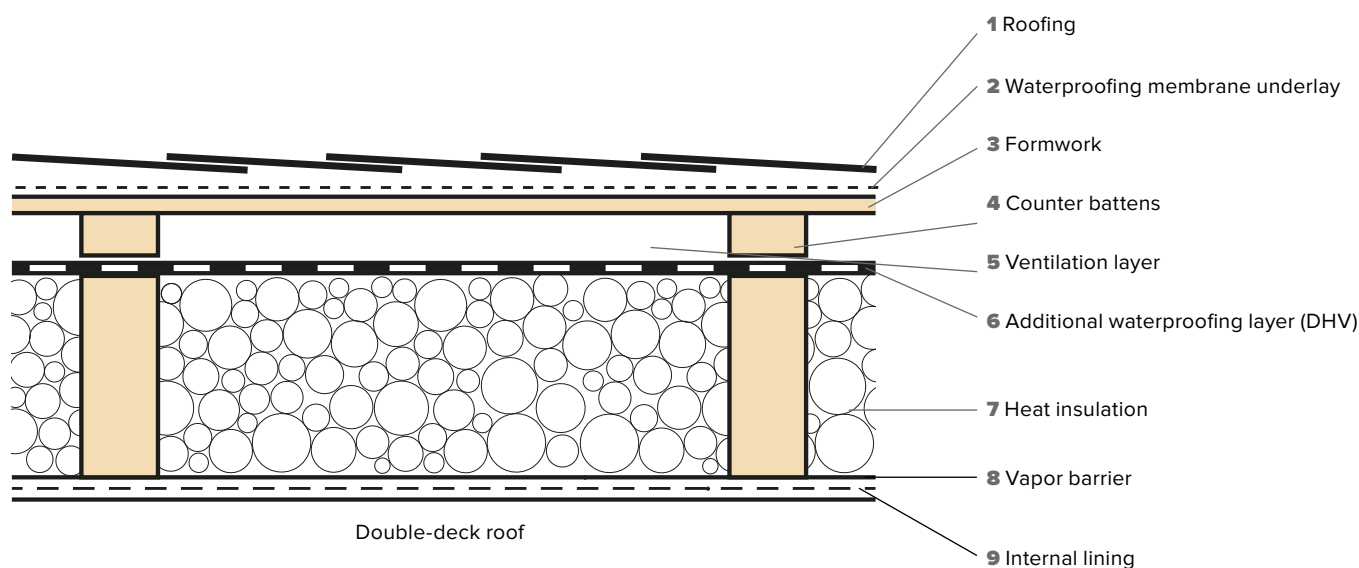
• CHECK AND CREATE A VENTILATION SPACE UNDER THE NEW FORMWORK

During reconstruction we can encounter double-deck roof with an existing ventilated air space. In this case, the ventilated air space needs to be checked to ensure that it is functioning properly.

If there is an existing insulated attic or one is being considered in a simple roof where the roof deck consists of only a supporting structure of formwork and roofing, a ventilated air space needs to be additionally installed between the original and new formwork. The height of the air space depends on the height of the counter battens. The air in the ventilation space must flow beneath the formwork from the eaves to the roof top.

Then proceed in accordance with individual points:

- Place diffusion-open film on the existing formwork (for a simple roof).
- In place of rafters, install counter battens on the formwork (minimum 32 x 50 mm (for a simple roof).
- Install and create a new formwork (for a simple roof).
- Secure or check and rework existing roof accessories (flashings, fillers, eaves systems, roof safety elements, manchets, etc.).
- Install a waterproofing membrane underlay in parallel with the eaves.
- Laying Ekoternit roofing.



RECONSTRUCTION – FARM BUILDINGS AND OUTBUILDINGS

The reconstruction of farm buildings often reveals a state where there is a full surface formwork underneath the existing roofing to be replaced (e.g. under tin, slate, or asbestos cement types of roofing). Since farm buildings and outbuildings usually do not require a ventilated roof, it is possible to maintain the existing formwork and thus significantly reduce the costs of reconstruction.

For reconstructing the roof deck of farm buildings with a simple roof, follow this procedure:

• REMOVE THE OLD ROOFING

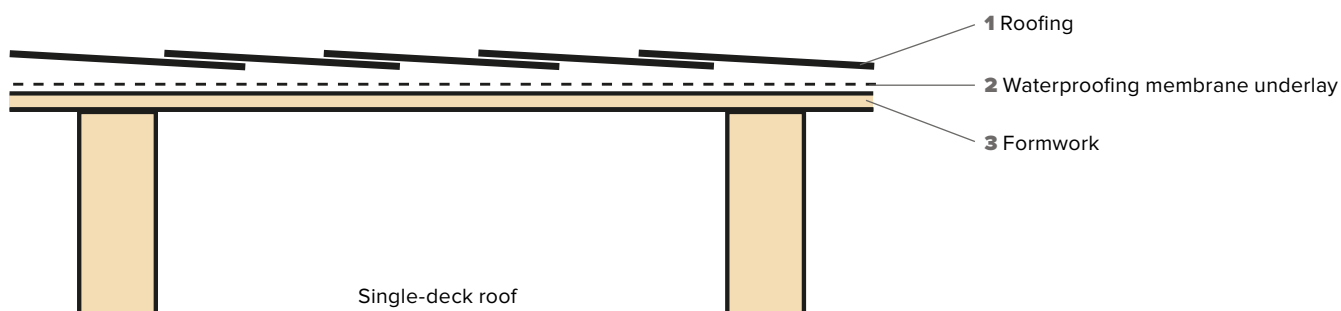
Safely remove the existing roofing and dispose of it environmentally.

• CHECK THE CONDITION OF THE TRUSS AND FORMWORK

Check the condition of the old truss and formwork, especially whether the formwork is sufficiently flat. Remove any defects.

Then proceed in accordance with individual points

- Secure or check and rework existing roof accessories (flashings, fillers, eaves systems, roof safety elements, manchets, etc.).
- Install a waterproofing membrane underlay in parallel with the eaves.
- Laying Ekoternit roofing.



ANTI-SNOW GUARDS

Snow guards and snow hooks are used to prevent snow from sliding off the roof and protect the roof structure, eaves and surrounding objects. Their design and deployment are decided in accordance with their purpose, the pitch of the roof, snow load, and the material and type of roofing.

Snow hooks are mounted under the roofing by nailing them into the formwork. The number of snow hooks and their distribution is decided in accordance with the pitch of the roof and snow area and must be spread over the entire roof. The quantity of snow hooks can range between 1.6-6.8 hook/m².

In the case of roof battening, the snow guard must be supported by the battens at the point of pressure on the roof so as to prevent the sheathing from sagging. These snow guards are not for walking on, for hanging ladders or foot bridges on or for any other incorrect use. They must be spaced evenly over the entire roof area from the eaves to the ridge.

Continuous snow-catchers working as an anti-snow grid, system of snow guards and snow catchers with wooden poles should be installed at points where people move underneath the eaves.

PLACEMENT AND USE OF SNOW HOOKS DEPENDING ON THE CLIMATE REGION (hook/m ²)			
Pitch of the roof	K1	K2	K3
18° – 25°	2	4	-
25° – 30°	3	6	8
30° – 40°	4	7	10

SCIP REGISTRATION AND SVHC DECLARATION

Ekoternit roofing tiles are made from recycled materials that may contain the DEHP phthalate and lead (LEAD) (EC 204-211-0; CAS 117-81-7), which are classified as restricted substances under Annex XVII of the REACH Regulation and also as substances subject to authorisation under Annex XIV of the REACH Regulation. Fortemix, s.r.o., has products made from ECO material registered in the SCIP database. The SCIP number for Ekoternit products is eb8c4969-da86-44f5-bda6-160396b8cb80. Phthalate is not significantly released from Ekoternit products under normal conditions. The phthalate content of the product can range from 0 to 11%.

Lead (LEAD) can range in concentration from 0 to 5%. Concentration of this substance has been decreasing due to increasing use of recycled material with low or zero share of substances subject to REACH.

The products of Fortemix, s.r.o., do not pose an environmental or health risk when used in the recommended manner. Therefore, no special precautions are required when handling or using the products. This disclosure is provided in accordance with REACH Regulation, Art. 33.

DISPOSAL, RECYCLING

The disposal of roofing waste is mostly done at landfills under waste catalogue number 19 12 04. The product is likewise completely recyclable.

WARRANTY CERTIFICATE

Date of issue:	
Delivery note number:	
Delivery date:	
Name of customer:	
Delivery address of the customer:	
Name and address of the roofing supplier:	

The warranty certificate is valid for Ekoternit roofing sold in stores in the Czech Republic and Slovakia.

The delivery of Ekoternit roof tiles comes with a 22-year warranty from the date of delivery to the location specified by the orderer/client provided that the conditions below are complied with, no change occurs in the performance properties of the roofing during that time (frost resistance, water impermeability) according to EN 492.

EXTENT AND CONDITIONS OF THE WARRANTY:

This warranty certificate is valid for the product, roofing, sold in stores in the Czech Republic and Slovakia under the brand name Ekoternit and comes with the product sold. The warranty certificate must be properly completed during the sale. Any warranty certificate that is incomplete or has been tampered with is invalid.

The warranty certificate is used to make claims for defects in sold products covered by the warranty. Together with the proof of purchase, the warranty certificate is the only document demonstrating the rights of the buyer and so should be carefully stowed away.

The warranty only applies to the first installation of roof templates.

If defects occur during the warranty period, the customer shall submit a complaint with the seller of the product and make a written statement of the defects, which shall include:

- number of the sales receipt and warranty certificate,
- description of the defects and how they manifest themselves,
- number of defective pieces,
- request to handle the complaint,
- copy of the invoice and warranty certificate.

MANUFACTURER:

Fortemix s.r.o.

head office at Kirilovova 812, Paskov, 739 21,
Czech Republic

THE ABOVE WARRANTY PERIOD WILL BE PROVIDED ONLY UNDER THE FOLLOWING CONDITIONS:

- When laying the roofing, the installation instructions and requirements of the manufacturer of Ekoternit must be followed, as well as all technical rules, regulations and standards relating to making the roof deck or designing roofs in general (ČSN 73 1901), the rules for designing and making roofs issued by the Tinsmiths, Roofers and Carpenters Guild of the Czech Republic, and other provisions in force at the time of installation. In the event of any difference between the regulations of the roofing manufacturer and other rules, the manufacturer's regulations take precedence.
- The warranty is only valid if the roof is made professionally and conforms to general static requirements.
- Ekoternit roofing must be ventilated across the entire roof deck of residential buildings (from eaves to the ridge) in accordance with the applicable standards. The warranty does not cover damage caused by non-compliance with the required ventilation.
- Any products found to be defective during delivery, handling or installation must not be built into the roof. For such case, the warranty provider guarantees replacement with new products.
- The warranty does not cover damage due to improper storage, handling or other errors that could have been avoided with regular inspection and maintenance of the roof.
- The warranty does not cover damage caused by force majeure (e.g. hurricane damage, etc.), by mechanical damage to the product or by any changes in the surface caused by weather conditions that do not affect the performance properties.

Any disputes arising from the Warranty or in connection with it shall be resolved by the local court of jurisdiction.

The basis for initiating services relating to the warranty is the notice of damage written to the manufacturer immediately after it occurs.

COMPENSATION

At their own expense and choice, the manufacturer shall:

- a) replace defective products with a new delivery of products that replace only the defective products, or
- b) reimburse the cost of the defective products according to the price list of the manufacturer valid at the time of the purchase of the products by the end user, or
- c) remove the defects in the products.

In the event templates of the same color or model are no longer available, a new model of corresponding quality shall be used as the replacement. The warranty is valid only if a professional installation has been made in compliance with the installation guide and applicable standards and regulations.

The warranty for a claimed product expires on the date of the delivery of new products.

THE WARRANTY DOES NOT COVER:

- Discoloration due to external influences (UV radiation, acid rain, etc.).
- Any color imbalance between individual tiles of the roofing.
- Abrasions on the surface and similar phenomena that do not affect the performance properties and are not considered defects in the product.
- The appearance of colored sediment and algae coating on the roofing due to prolonged storage or inadequate protection against external climatic conditions during storage.
- Defects caused by improper handling, mechanical and chemical damage and normal wear and tear in the product due to weather effects that do not cause a loss of the waterproofing of the product.
- Defects for which a discount was received or which the buyer was notified of during the sale.
- Defects in a product that was taken but not yet properly paid for.
- Claims for visible defects in the product that were obvious when the buyer received them must be made within 30 days of receiving the product. The later filing of such complaint will be deemed of no account.
- The rights of liability for defective products covered under the warranty period will expire if not exercised during the warranty period.
- Making a complaint does not have a suspensive effect on paying for the product in full and by the due date.
- If the right of liability for defects is exercised unjustifiably, the costs related to the complaint procedure shall be paid by the owner of the product.

The dealer shall initiate a proper complaint for direct handling by the manufacturer Fortemix s.r.o. The proprietor of the complaint and person delegated by the proprietor to install the Ekoternit roofing are required to follow the manufacturer's instructions and use standard processes in the installation of this roofing.

Other rights and obligations of the manufacturer or proprietor of the complaint are governed by the applicable provisions of Act 89/2012 Coll., Civil Code, and related regulations.

