



TECHNONICOL

ARCHITECT



Roofing shingles
installation instructions

KNOWLEDGE. EXPERIENCE. CRAFTSMANSHIP.

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1.

General Recommendations

1. General Recommendations

The specified roof temperature and humidity can be ensured only if its structure includes solid vapor sealant, insulation thickness required for this region, a diffusive layer, and ventilated sub-roof space.

Do not use bundles with different production codes for the same roof. Possible slight difference in color hues is not a defect. To avoid undesired color unbalance that could appear in visible color spots on a roof, it is recommended to mix shingles from 5 or 6 random bundles.

Under outside temperature of +5°C or colder please store roofing shingles in a warm, dry place and take them out by batches of 5 or 6 bundles prior to installation.

Under outside temperature of +5°C or colder a hand-held hot air welding gun must be used to warm the adhesive strip on a shingle in order to improve adhesion.

To prevent damaging the roof's integrity, the material must be cut on the roof on a special board placed underneath.

Pallets of shingles should be stored in a covered, ventilated space where temperatures will not exceed 40°C. To avoid sticking of shingles inside the bundle do not expose them to direct sunlight. Transportation and storage of pallets in two or more rows is possible only when using the racks and special shelving units.

In order to ensure unobstructed separation of roofing shingles from one another, it is recommended to slightly bend and shake the bundle before opening.

ATTENTION! In order to avoid the appearance of stains and shoe marks, it is not recommended to walk on the roof in sunny or cold and moist weather. Special tracks shall be used to move at the roof slope.

1.1. Applied materials

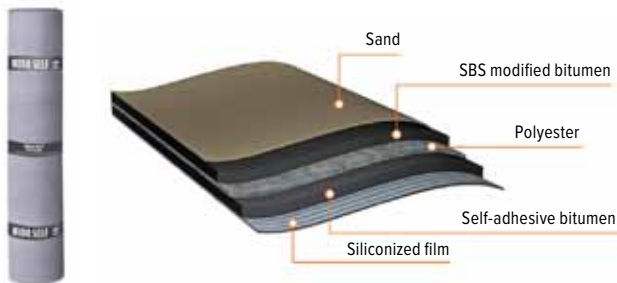
TECHNONICOL roofing shingles

Roofing shingles are a construction material for residential roofing application that is used on roof slopes of 12° or greater. It consists of three main elements: the fiberglass base, improved bitumen, and granules of volcanic rock basalt.

Underlayment with mechanical fixation

Underlay PRO (S) 500 stick SBS*

Underlay PRO (S) 500 stick SBS polymer modified asphalt and polyester reinforced ultralight and durable underlay membrane with a non-slippery polypropylene surface on both sides. The attached gluing longitudinal mounting bands exclude the use of bituminous adhesive mastic when forming longitudinal joints, thereby facilitating and speeding up the installation. Suitable for the application over the entire slope at any pitch of the roof.



Underlay BASE SBS*

Underlay BASE SBS polymer modified asphalt and fibreglass reinforced underlay sheet membrane with a non-slippery sand surface on both sides. Suitable for the application over the entire slope except for wall joints and the valleys. For joints we recommend underlays with more strong reinforcement such as MIDA SELF and Underlay PRO.

Valley roll material TECHNOMICOL

Valley roofing and waterproofing bitumen roll material. Used as waterproofing underlayment in roof valleys that are prone to leakages under snow and rain loads, and thus require extra protection. This material is also good to seal joints between roofing and piping or vertical walls.

Eaves and fronton flashings

Eaves and fronton flashings are made of metal with a special coating. They are intended for reinforcement of eaves and fronton edges and ensure efficient water disposal.

NOTE! Please, contact us for TECHNOMICOL DWG drawings of flashings with layouts and dimensions, if you order flashings from your local supplier.



Fixing mastic

MTECHNOMICOL FIXER N°23 mastic is a multicomponent material consisting of bitumen, butadiene-styrene thermoplastic elastomer or its modifications, filler, solvent, and technological additives. The compound is intended for sealing of roofing shingle joints,

gluing of valley membrane, gluing of underlayment joints and abutments to brick chimneys and walls.

* Or any other materials with the same specifications.

Roofing nails

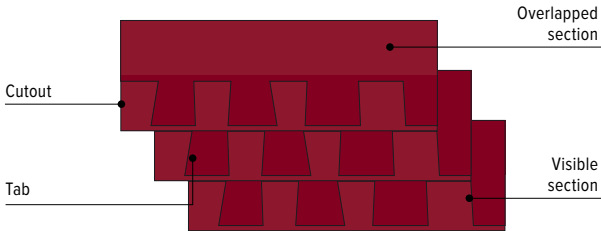
Special corrosion resistant roofing nails by TECHNOMICOL, 30 and 45 mm long. Nail head diameter is 9 mm minimum. Nail rod diameter is 3 mm minimum. Applied for reliable fixation of roofing shingles and all its components.

Technomicol ventilation systems

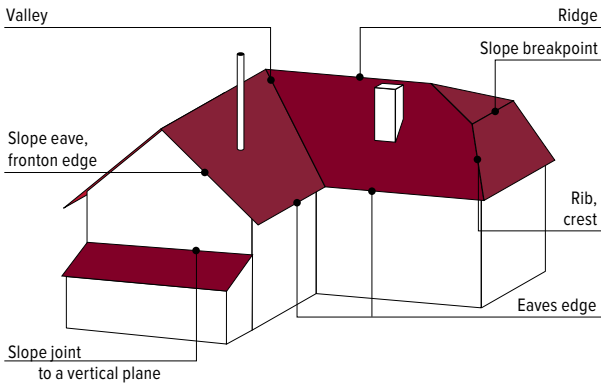
Ventilation elements are ready for installation.

1.2. Terminology

Elements of TECHNOMICOL multilayer roofing shingles.



Building structure elements.





2.

**Preparation
of roof base**

2. Preparation of roof base

2.1. Roof ventilation

Proper engineering of ventilation system along with right materials and accessories extend service life of the whole construction and of the roof, in particular.

Ventilation is a system of intake and exhaust that creates a flow of air in order to remove extra heat and moisture from under the roof.

The system of roof ventilation includes three main elements: an opening for fresh air inflow, a ventilated gap (duct over thermal ventilation layer) for air circulation, and exhaust openings in the top part of the roof. In order to ensure normal roof functioning, proper ventilation must be ensured.

An overheated attic, combined with moisture, can cause a number of problems, including damage to roof decking and roof shingles, ice dam formation in cold weather and moisture accumulation in the deck and/or building insulation.

This can lead to deck and shingle distortion and can significantly shorten the life of a shingle.

Ventilation arrangement in a cold attic

When constructing a roof with a cold attic (Fig.1), it is necessary to prevent heat leakage into its volume from residential premises, qualitatively insulating the attic ceiling and soundly sealing the ventilation ducts and a chimney passing through the attic.

It is necessary to ensure intensive ventilation of the entire volume of the cold attic chamber with the outside air.

In case of natural ventilation of attic premises, it is most rational to place ventilation openings under the overhang of the roof evenly along the perimeter of the building and in the roof ridge along its entire length.

Ventilation arrangement of a heat-insulated attic

When constructing a roof with a heat-insulated attic (Fig.2), it is necessary to prevent heat leakage into the under-roof space qualitatively performing the roof insulation, as well as to ensure intensive ventilation of the entire under-roof space with outside air.

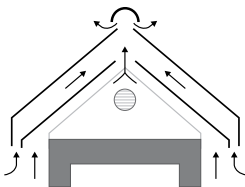


Fig.1 Cold attic

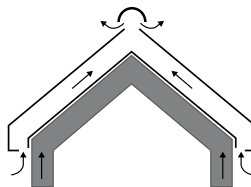
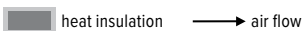
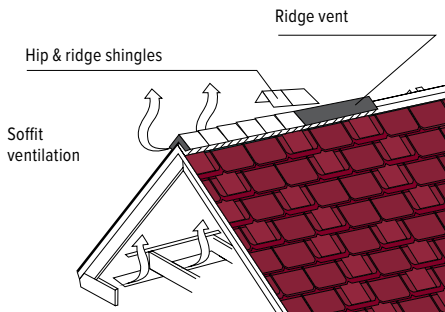


Fig.2 Heat-insulated attic





The system of sub-roof ventilation includes three main elements: an opening for fresh air inflow, a ventilated gap (duct over thermal ventilation layer) for air circulation, and exhaust openings in the top part of the roof. The area of the ventilation openings in a roof structure should make up 1/300–1/500 of the attic thermal insulation area. Pressure in the attic should be lower, therefore the area of exhaust openings should exceed that of the intake ones by 10–15%. Such location of vents will ensure intensive air circulation in the entire space of the attic.

Air must freely penetrate the ventilation gap and come out of it. If wooden wind boards are nailed to slope edges, use special ventilation elements – soffit strips. Exhaust ventilation systems are presented by ready-made ridge and point ventilation elements.

The ventilated gap is made using a wooden beam of counter lathing. The beam is mechanically fixed using notched nails or self-tapping screws for wood.

Counter batten should have the air way height of at least 50 mm for roof space ventilation with less than 20° slope angle. If the slope of the angle decreases (less than 20°), air way height must be increased to 80 mm.

Free air flow must be ensured in the ventilation gap by the installation of counter lathing; covering of air movement areas is not allowed.

IMPORTANT! If the above rules of the ventilation arrangement are not observed, it can result in such consequence as:

1. Accumulation of moisture, leading to formation of condensate on rafters and a substructure, and subsequently mold and fungus, destroying the wooden elements;
2. Formation of ice hillock on the roofing material and, as a result, damage to the roof and gutter system, penetration of melt water under the roofing during thaws;
3. Overheating of roofing material and the interior of the attic in the summer;
4. Humidification of thermal insulation, leading to a sharp decrease in its thermal resistance and increased cost for heating the house;
5. Increased cost for internal premises air conditioning.

2.2. Construction of the base for roofing shingles placement

When selecting material for sparse lathing, apply mostly coniferous wood of grade 2 or higher with a relative humidity of 20% maximum.

Clear distance between lathing:

– in rows: according to calculation;

– on eaves overhang: solid base of boards having a width equal to the distance from the eaves extension to the inner wall surface;

The material shall be fixed with nails or self-tapping screws for wood, 2 each per connection.

The transversal connection of two elements of sparse lathing in the same row shall be made so as to ensure that the connection of boards matches a rafter leg mechanically fixed with 2 fasteners per each board edge.

Joints of sparse lathing in adjacent horizontal rows must be displaced by one run of rafters minimum. The length of the boards must not be less than two spans of rafters.

Solid base

Base for roofing shingles laying must be solid, rigid, and flat. Elevation drops shall not exceed 1–2 mm.

The solid planking of the base must be made of the following materials:

– tongue-and-groove or straight edged boards of coniferous woods of grade 2 or higher with relative humidity not exceeding 20%, sorted by thickness;

– oriented strand boards with increased moisture resistance (OSB-3) or exterior plywood with increased moisture resistance placed upon sparse lathing.

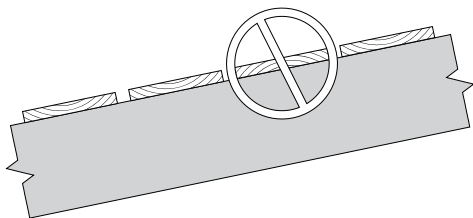
Recommended thickness of OSB-3 boarding for laying of roofing shingles is 15 (min 12) mm for WESTERN and CONTINENT and ATLANTIC collections, and 12 (min 9) mm for other collections.

IMPORTANT! Solid base thickness depends on rafter spacing, cross section and spacing of wooden lathing. Selection of the roof construction must be performed based on calculation of permanent and temporary loads, as well as on the roof shape and materials weight. Always follow the technical requirements set out in the National Building Codes.

IMPORTANT! It is not allowed to install roof boarding structures from raw or poorly dried wood. Violation of this requirement can lead to irreversible deformation of the roofing and as a consequence, a violation of its waterproofing function.

Tongue-and-groove or straight edge board

During installation of solid wooden cladding, make sure that fragments of annual rings are oriented with their convexities downwards.



To place shingles, make a selection of boards in terms of thickness, so as to make sure that thickness varies gradually with thicker boards installed closer to the eaves overhang. Board length joints shall be located on supports, 4 nails minimum shall be driven into the joint spots.

When using moist wood, ends of tongue-and-groove or straight edge boards shall be fixed with two self-tapping screws on each side.

OSB-3 or exterior plywood

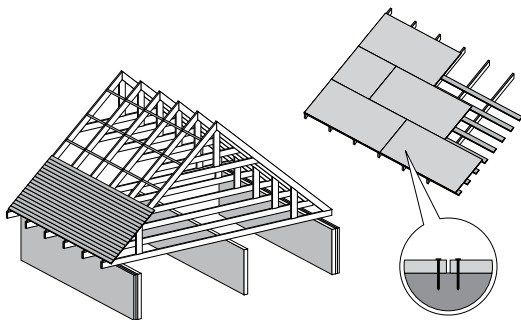
Solid boarding with alternating joints. The minimum alteration value must correspond to rafter spacing.

A gap of 3 to 5 mm must be left between sheets. Fixation must be made using notched nails or self-tapping screws.

Sheets of solid boarding are placed with the main axis (long side) perpendicular to the rafter legs. Horizontal joints (long edges) must rest on the auxiliary support (sparse lathing).

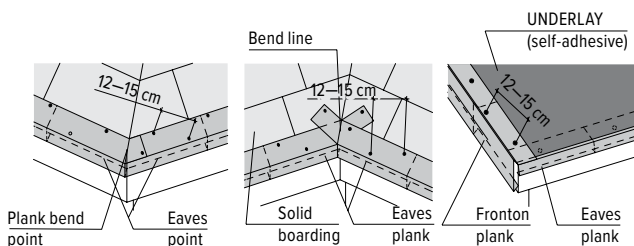
Nails for mechanical fixation are placed along the whole perimeter of the sheet with spacing according to the calculation.

When installing a roof window, it is necessary to place the joints of the solid substrate sheets with the seaming misalignment avoiding the coincidence with the window area.



2.3. Eaves overhang reinforcement

The roof eaves overhang is reinforced with metallic eaves planks. These are fixed with special roof nails alternately every 120–150 mm, and every 20–30 mm in overlapping spots. Plank overlapping should be 30–50 mm.



2.4. Installation of underlayment

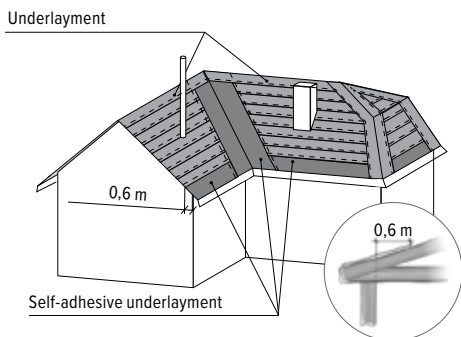
General recommendations for underlayment installation

Installation of underlayment shall be carried out in the same temperature mode (without sudden temperature changes, for example, from the evening to the morning). When rolling the material over the surface and fixing it, it is necessary to ensure the tension of the backing material and look over that the covering rests against the surface without waves and creases during the fastening.

Before direct fixing, it is necessary to straighten and stretch the material so that no waves or creases form between nails. Installation in winter (at an air temperature below +5 °C): Immediately before installation, the materials shall be kept in a room at a temperature of +23 °C for at least 24 hours. Raise materials on the roof in the amount that will be mounted immediately after the lift.

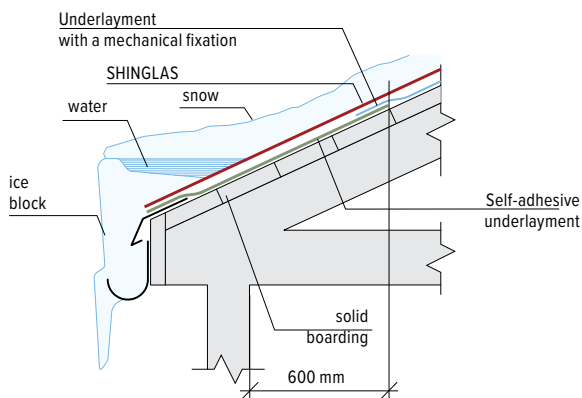
MIDA SELF underlayment is first laid in the valley.

MIDA SELF laid in the valley shall be 1 m wide (500 mm for each slope).



IMPORTANT! If possible, try to ensure solid underlayment (without overlaps) along the whole length of the valley. Otherwise, underlayment shall overlap and the joints must be thoroughly glued on the top part of the roof. The width of overlap is 300 mm. Under outside temperature of +5°C or colder, it is recommended to additionally fix the underlayment with roofing nails with a wide head every 300 mm. Preparation of roof base Installation of underlayment.

After MIDA SELF underlayment is laid in the valley, it must be installed in the eaves overhang. The underlayment is laid at the eaves overhang equivalent to the size of the eaves overhang plus 600 mm from the inner wall surface towards the inner side of the building*.



Underlayment must be installed in the whole roof with any roof slope:

- **MIDA SELF** self-adhesive underlayment or any other material with the same specifications* is installed in valleys and eaves overhangs;
- **Underlay PRO (S) 500** stick underlayment with a mechanical fixation or any other material with the same specifications* is installed on the remaining surface of the roof.

Underlay PRO, Underlay BASE underlayment material with mechanical fixation

Place UNDERLAY underlayment (with mechanical fixation) on the remaining part of slope. Same as during installation of adhesive underlayment, the fabric must be tried on site.

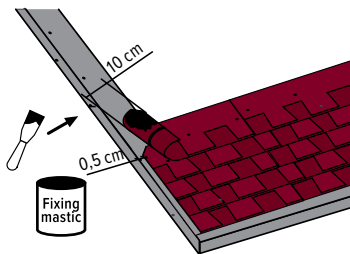
Fix the material along the perimeter, including the points of overlaps with lower fabric, with roofing nails with a stepout from the underlayment edge of 50 mm every 200–250 mm.

* This rule covers the roofs with a slope up to 60°; if the slope is more than 60°, the underlayment shall be installed with a width of 1 meter from the eaves edge.

Cover the overlap points with TECHNINICOL FIXER bitumen mastic in a 100 mm wide strip. The attached gluing longitudinal mounting bands exclude the use of bituminous adhesive mastic when forming longitudinal joints, thereby facilitating and speeding up the installation.

2.4. Reinforcement of fronton overhang

The roof fronton overhang is reinforced with metallic fronton planks. The fronton plank shall be placed on top of the underlayment with a 30–50 mm overlap, having cut the plank on site in advance. Fix the plank with special roofing nails alternately every 120–150 mm.



2.5. Valley preparation

Roofing shingles can be installed in the valley using two methods: open method and «undercut» method. Valley preparation depends on the selected method.

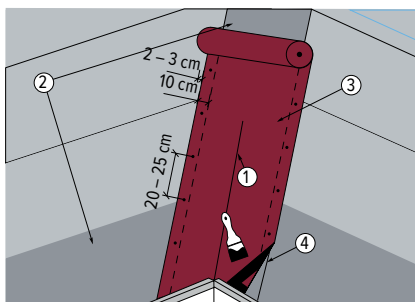
«Open valley» method

The valley roll material is placed along the valley centerline upon the self-adhesive underlayment.

IMPORTANT! The valley roll material at the lower edge must be cut with a slight rounding (tab).

Valley roll material must be folded in half along the whole length of the valley and the bend line must be pressed.

Next lay down the valley roll material.



IMPORTANT! Carefully stretch the fabric in order to avoid folds and uneven surfaces.

Cover the valley roll material along the perimeter of the rear side with TECHNINICOL FIXER bitumen mastic to a width of 100 mm.

Fix the valley roll material with special roofing nails on the front side with a 20–30 mm step-out from the edge every 200–250 mm.

Fixed valley roll material.

IMPORTANT! If the valley is arranged using the open method, a metallic sheet with corrosion resistant coating may be used instead of valley roll material (recommended for regions with a hot climate).

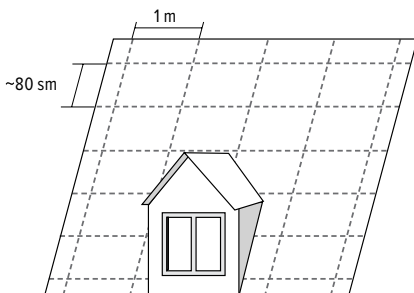
«Close valley» method

This method of roofing shingles installation does not require valley arrangement.

2.6. Slope marking

Marking lines play the role of guides and help align TECHNINICOL SHINGLAS roofing shingles horizontally and vertically. They also align roofing shingles, if any roof element is cut into the slope or if the roof slope geometry is disturbed. The spacing of vertical lines corresponds to the width of the course shingles, while the spacing of the horizontal lines is marked for every 5 rows of shingles (~800 mm).

IMPORTANT! Marking lines are for reference only. They do not serve as a guide for nailing the shingles.





3.

**Installation
of roofing
shingles**

3. Installation of roofing shingles

3.1. General recommendations for roofing shingles installation

Do not use bundles with different production codes for the same roof. Possible slight difference in color hues is not a defect.

To avoid undesired color unbalance that could appear in visible color spots.

Under outside temperature of +5°C or colder please store roofing shingles in a warm, dry place with air temperature of +18°C minimum for at least 24 hours. Then take them out by batches of 5 or 6 bundles prior to installation. Under outside temperature of +5°C or colder a hand-held hot air welding gun must be used to warm the adhesive strip on a shingle in order to improve adhesion.

To prevent damaging the roof's integrity, the material must be cut on the roof on a special board placed underneath.

ATTENTION! In order to avoid the appearance of stains and shoe marks, it is not recommended to walk on the roof in sunny or cold and moist weather. Use roof ladders and walkover bridges to move on the roof slope.

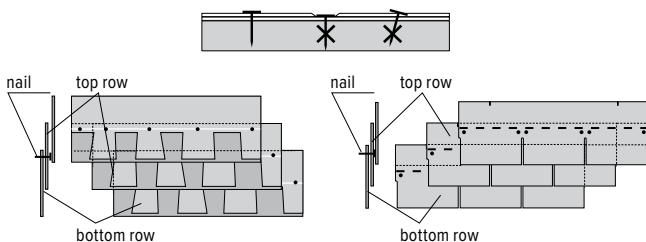
3.2. Course shingles fixation

Each course shingle is fixed to the roof base using special galvanized TECHNONICOL nails with wide heads in the amount depending on the slope angle.

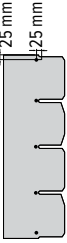
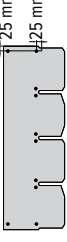
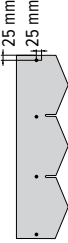
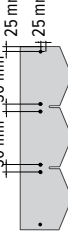

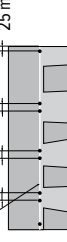

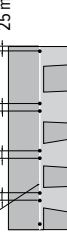
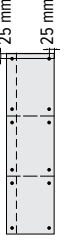
Correct nailing is critical. Nails must be driven so as to make sure that the head is in the same plane with the roofing shingles surface and does not cut through it.



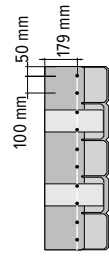
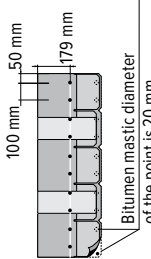
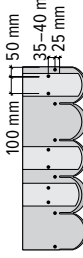
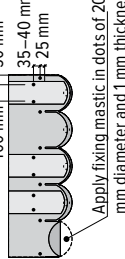
ATTENTION! If the «castle» cutting pattern is used, place roofing nails exactly at painted guide line to ensure you fasten through a shingle double layer area. The manufacturer applies the special guide line to the front surface of multilayer shingles for reference.

IMPORTANT! Triple-layer «Continent» and «Atlantic» cutting patterns require nails of at least 45 mm long.



Type of cutting pattern	Slope angle		Amount of fasteners		Length of fasteners
	12°–44°	45°–90°	12°–44°	45°–90°	
"trio"			4 pieces	6 pieces	30 mm
«quattro»			5 pieces	8 pieces	
«beaver tail»			4 pieces	6 pieces	
«sonata»			4 pieces	6 pieces	
«accord»			4 pieces	6 pieces	

Type of cutting pattern	Slope angle		Amount of fasteners		Length of fasteners
	12°–44°	45°–90°	12°–44°	45°–90°	
«bricks»			5 pieces	10 pieces	30 mm
			4 pieces	6 pieces	
«delta»			5 pieces	8 pieces	30 mm
«castle»			5 pieces	8 pieces	
TECHNONICOL hip & ridge & starter shingles			12 pieces		

Type of cutting pattern	Slope angle		Amount of fasteners		Length of fasteners
	12°-44°	45°-90°	12°-44°	45°-90°	
"western"			4 pieces	8 pieces	30 mm
"continent"			10 pieces	10 pieces + bitumen compound spreading	45 mm
«atlantic»			12 pieces	12 pieces	30 mm

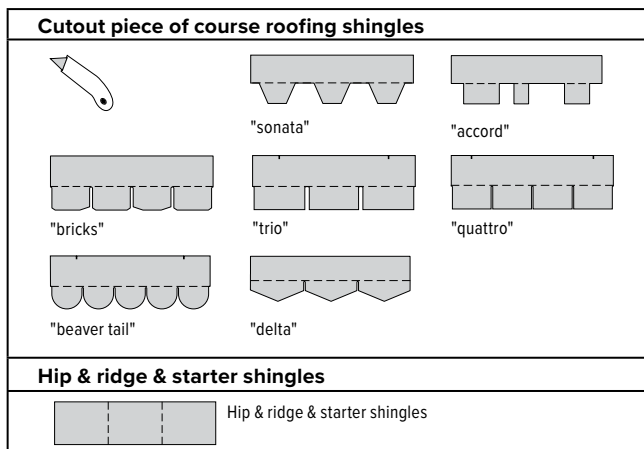
3.3. Starter strip fixation

Universal hip & ridge & starter TECHNOMICOL shingles, cutout piece of course shingles or course shingles are used as a starter strip. Options of starter strip construction depending on the shingles cutting pattern:

Type of cutting pattern	Starter at eaves
"sonata"	Hip & ridge & starter shingles / Cutout piece of course shingles
"accord"	Hip & ridge & starter shingles / Cutout piece of course shingles
"trio"	Cutout piece of course shingles
"quattro"	Cutout piece of course shingles
"beaver tail"	Hip & ridge & starter shingles / Cutout piece of course shingles
"bricks"	Hip & ridge & starter shingles / Cutout piece of course shingles
"delta"	Hip & ridge & starter shingles / Cutout piece of course shingles
"castle"	Course shingles
"western"	Hip & ridge & starter shingles
"continent"	Hip & ridge & starter shingles
"atlantic"	Hip & ridge & starter shingles

Cutout piece of course "atlantic" hip & ridge & starter shingles — shingle with cut off tabs separated according to cutting pattern.

Starter strip for "sonata", "accord", "trio" beaver tail", and "bricks" cutout patterns may be cut out from course shingles.



The dashed line shows where to cut the shingles.

The starter strip for the «castle» pattern shall be laid with course shingles without preliminary cutting.

If the cutout piece is made of course shingles, shingle tabs must be cut along the earlier marked line.

If required, remove the film from the cut off shingles.

NOTE! DO NOT REMOVE the anti-adhesive film with the «Do Not Remove» message on it from the «castle» shaped shingles.

If course shingles are cut to a certain pattern or if course shingles are used as a starter strip, cover the rear side with TECHNONICOL FIXER mastic where no adhesive layer is present.

Hip & ridge & starter shingles, the cutout piece of course shingles or course shingles are glued on top of underlayment with a step-out of 10–20 mm from the eaves plank bend point.

Step-out value depends on slope length and angle, and it increases if they are increased.

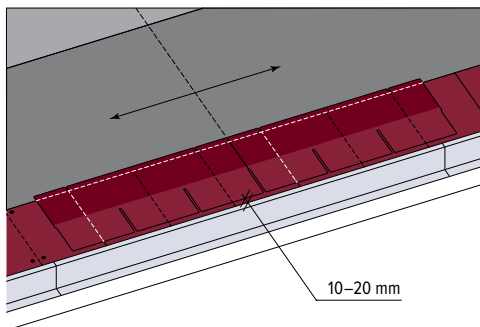
Hip & ridge & starter shingles and cutout pieces of course shingles are fixed with roofing nails in the amount of 12 nails minimum per shingle. Course shingles shall be fixed according to the table on pages 54–56.

3.4. Fixation of the first and following rows of shingles

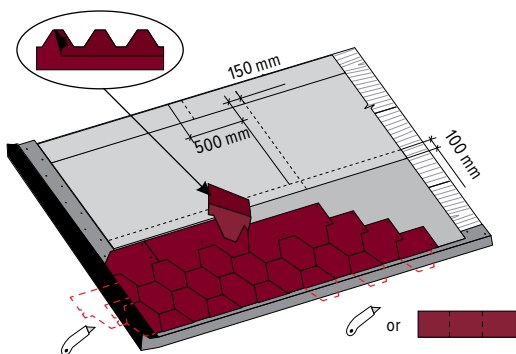
It is recommended to place the first row on long slopes from the slope center to ensure the convenience of horizontal leveling. The first row is laid with a step-out of 10–20 mm from the starter strip.

IMPORTANT! The first row of shingles must cover the points of the starter strip's mechanical fixation.

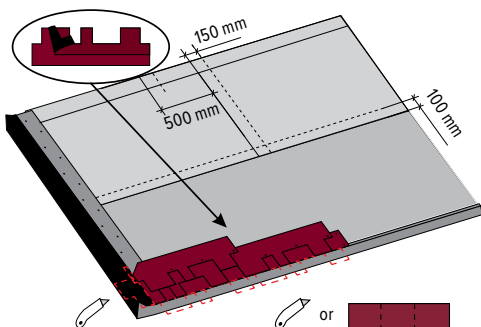
The installation shall be performed in diagonal strips.



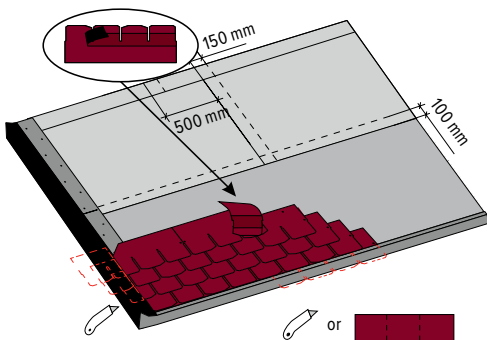
“sonata” cutting pattern



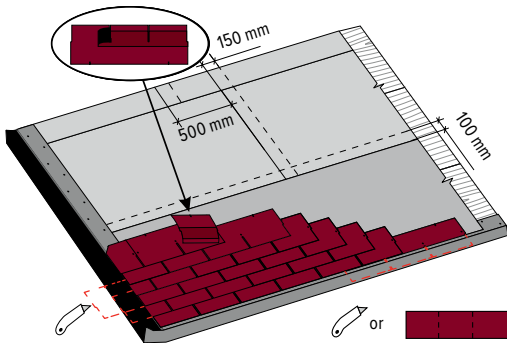
“accord” cutting pattern



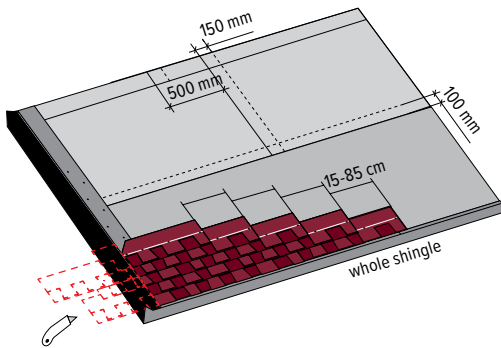
“bricks” cutting pattern



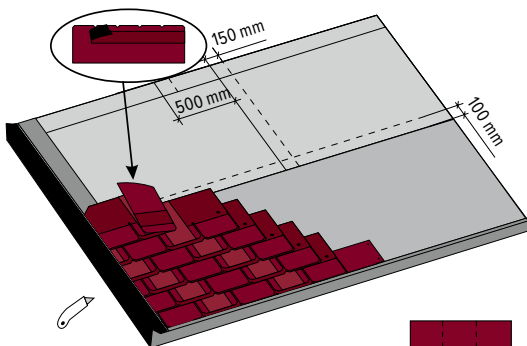
“beaver tail” or cutting pattern



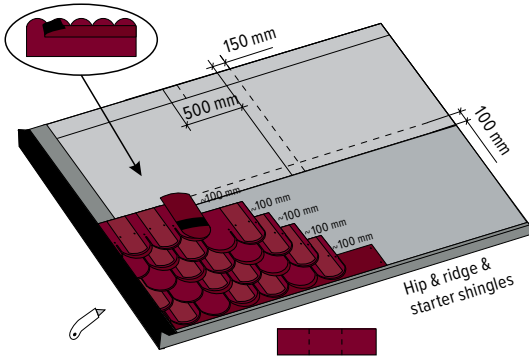
“castle” cutting pattern



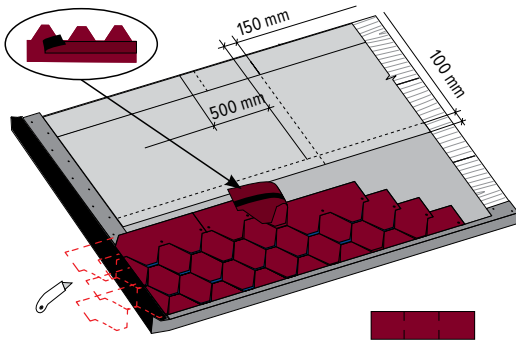
“continent” cutting pattern



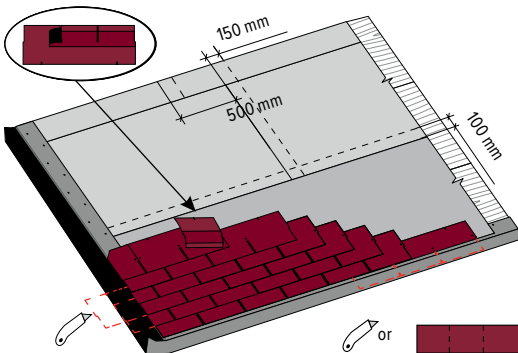
"atlantic" cutting pattern



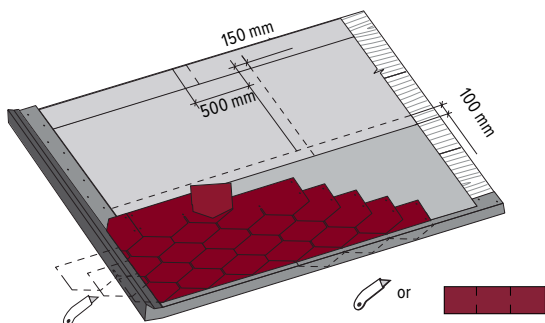
"western" cutting pattern



"trio", "quattro" cutting pattern



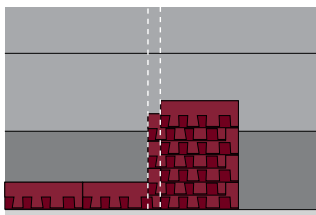
“delta” cutting pattern



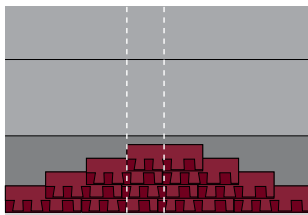
The second row is installed from the slope center, alternating to the left and to the right by half the tab. Roofing shingles must be nailed so that the bottom edge of the tabs is flush with the top edge of the cutouts in the first row.

The third row is laid with a displacement relative to the second one by half the tab to the right or to the left depending on the originally selected direction.

Shingles installation must be started from the slope center in the form of strip or pyramid.



Laying in the form of a strip



Laying in the form of pyramid

To ensure maximum efficient protection against slanted rain, cover the course shingles in the fronton area with TECHNINCOL FIXER mastic:

Apply a 100 mm wide strip of TECHNINCOL FIXER mastic. Roofing shingles must be installed with a 15–20 mm step-out from the inner bend of the fronton plank.

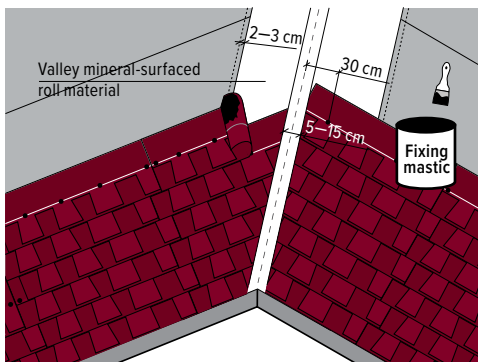
IMPORTANT! The top corners of shingles approaching the metallic fronton plank must be cut by 20–30 mm to divert water.

The minimum distance between the fronton and fixed shingles must be at least 200 mm.

The cutout of the course shingles with a width less than 200 mm must be fixed with two roofing nails minimum.

3.5. Valley arrangement

«Open valley» method



Mark out the valley roll material:

1. Undercut lines (2) towards the valley centerline (1). Valley gutter width varies from 50 to 150 mm.

2. Flexible shingles fixation line (3) at a distance of 300 mm minimum from the valley centerline.

Mark out chalk lines for cutting and fixation using a chalkline.

Lay course shingles to the cut line towards the valley centerline and mark out the cut line.

Cut the course shingles along the cut line using a special wooden pad to prevent damaging the integrity of waterproofing layer.

Fix each shingle on each slope surface using roofing nails along fixation line (3) (at a distance of 300 mm minimum from valley centerline (1)).

Cut each shingle by 20–30 mm to divert water in the valley.

Cover the shingles with TECHNINICOL FIXER mastic on the rear side by 100 mm in points without an adhesive layer.

Shingles must be covered with TECHNINICOL FIXER mastic at each slope surface.

IMPORTANT! The bitumen mastic must be applied not only to the valley roll material but also to the underlying shingle as well to ensure more reliable insulation.

Valley completed by open method.

NOTE! If the slope water drainage system differs significantly, the valley gutter must be displaced towards the lower water flow to offset flushing of the valley roll material with water.

«Close valley»

General view and designations:

- (1) – valley centerline;
- (2) – roofing shingles fixation line (distance of 300 mm minimum from the valley's centerline);
- (3) – cut line (distance of 80 mm minimum from the valley centerline);
- (4) – shingle undercut for water diverting;

Mark out the underlayment with fixation lines (2) of flexible shingles at a distance of 300 mm minimum from the valley centerline (1).

Place shingles starting from the low pitched slope with an overlap to a steeper slope by at least 300 mm.

Mark out the chalk line for fixation using a chalkline.

Fix each shingle of shingles using roofing nails along the fixation line (at a distance of 300 mm minimum from the valley centerline). Do not drive special nails closer to the fixation line (2) (at a distance of 300 mm from the valley centerline (1)).

Mark out the chalk line for undercut (3) at a steeper slope using a chalkline at a distance of 70–80 mm from the valley centerline (1).

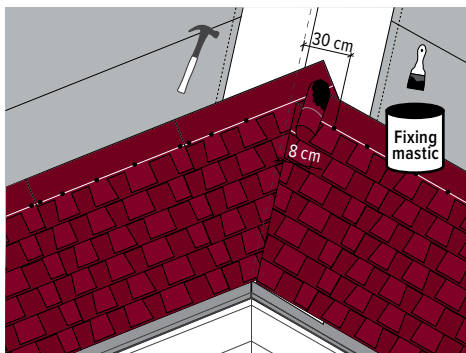
Place shingles at a steeper slope (red outline) over earlier installed shingles on the low pitched slope (green outline), so as to make sure the shingle end protrudes beyond the undercut line (3).

Cut the course shingles from the steeper slope along the chalked cut line using the special wooden pad to prevent damaging the integrity of the waterproofing layer.

Cut each shingle by 20–30 mm to divert water in the valley.

Cover the shingles with TECHNINICOL FIXER mastic on the rear side by 100 mm in points without an adhesive layer.

IMPORTANT! The mastic must be applied not only to shingles of a low pitched slope, but to the underlying shingle from a steeper slope as well to ensure more reliable insulation.



3.6. Installation of slope ribs and ridges

Two methods are available for installation of slope ribs and ridges: Method 1 is based on the use of hip&ridge&starter shingles; Method 2 is based on the use of the cutout of course shingles.

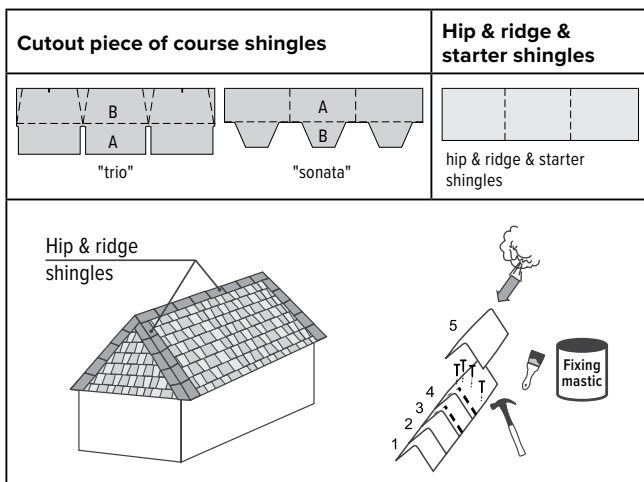
Table for selection of slope ribs and ridges installation method depending on cutting type:

Type of cutting pattern	Rib, ridge
"sonata"	Hip & ridge & starter shingles / Cutout piece of course shingles
"accord"	Hip & ridge & starter shingles
"trio"	Cutout piece of course shingles
"quattro"	Cutout piece of course shingles
"beaver tail"	Hip & ridge & starter shingles
"bricks"	Hip & ridge & starter shingles
"delta"	Hip & ridge & starter shingles
"castle"	Hip & ridge & starter shingles
"western"	Hip & ridge & starter shingles
"continent"	Hip & ridge & starter shingles
"atlantic"	Hip & ridge & starter shingles

The cutout piece of course shingles are the shingles separated according to cutout pattern.

IMPORTANT! In order to prevent formation of fractures during the cold season (at temperatures below +5°C), it is recommended to make a bend on metallic preheated pipe with a diameter of about 100 mm on TECHNOMICOL Roofing shingles.

Ridge shingles for “trio”, “quattro” and “sonata” cutting patterns may be cut out from course shingles. In this case, the top part of the TECHNOMICOL SHINGLAS “sonata” shingles is visible and the lower part is covered:



The dashed line shows where to cut the shingles;
A – visible part; B – covered part.

Material preparation

Before arranging slope rib and ridge, separate:

1. Hip & ridge & starter shingles into 3 parts by the points of perforation.

2. Course shingles into 3 parts according to cutout pattern.
Hip & ridge & starter shingle.

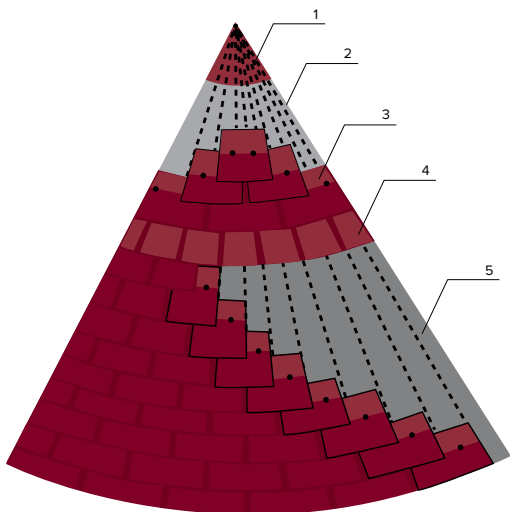
Remove the anti-adhesion film from the rear side of hip & ridge & starter shingles.

3.7. Roofing shingles installing on dome shaped and conical structures

There are two recommended methods for Roofing shingles installing on curved surfaces: segmental and seamless. In both cases, underlayment is placed first.

The segmental method implies separation of the dome or cone surface into equal segments with chalkline. Course shingles are applied to each segment. Joints between segments are covered by ridge shingles, similar to roof ribs and ridge. The dimensions of the segments and the width of the ridge shingles must correspond to the size of the surface being covered.

The seamless laying method requires special attention to slope marking. Chalk dots must be applied to the roof base with distance between them equal to half of the flexible shingle tab size. Chalk lines get connected from the roof. Next, cut course shingles to separate tabs and install the first row. The above rows of pre-cut shingle tabs must be placed with a displacement by half of a tab size in the underlying row of shingles. Shingles shall be cut according to drawn chalk lines. As soon as the width of course shingle tabs



1. Metallic tip (to be installed after roofing singles are installed);
2. vertical cutting lines (slope mark out);
3. single-piece shingle tab;
4. 1/2 of a shingle tab;
5. Underlayment.

in a row becomes two times smaller than the original one, the next row placing starts with shingle tabs of original dimensions. The installation is continued in this sequence up to the top of the roof.

The roof vertex is decorated with a metallic cap.

3.8. Joints arrangement

Joint with vertical surface

Straight joint General view of a joint with a slope angle over 135°:

IMPORTANT! If the straight joint angle is:

- up to 135° inclusively, moulding must be installed*;
- over 135°, moulding is not required.

If a vertical wall has a brick surface, it must be preplastered and primed with TECHNINICOL No.1 primer.

Install tootching at a height of 300 mm minimum from the horizontal section. Install underlayment and course shingles.

Apply TECHNINICOL FIXER bitumen compound to the whole rear surface of the cutout TECHNINICOL valley roll material. A strip of valley roll material must be at least 500 mm wide.

* A 50x50 mm diagonally split wooden beam or a regular wooden plinth may be used as moulding.

Install strips of TECHNONICOL valley roll material on top of the course shingles: the strip is extended to the primed surface by at least 300 mm*, and to the course shingles by 200 mm.

Mechanically fix metallic shield. Seal the shield with silicone, thiokol, or polyurethane sealant.

Side joint. Moulding is always required for a side joint.

For a wall height over 1 meter.

Underlayment must be brought over moulding to a primed vertical surface. Flexible shingles are installed up to the moulding.

Valley roll material is glued with bitumen compound similar to the arrangement of straight joint: the strip is extended to the primed surface by at least 300 mm, and to course shingles by 200 mm.

Mechanically fix metallic shield. Seal the shield with silicone, thiokol, or polyurethane sealant.

General view of side joint for the wall with height over 1 meter.

For wall height less than 1 meter.

Underlayment must be brought over moulding to a primed vertical surface.

Valley roll material is glued with bitumen compound. The strip is extended to the primed surface by at least 300 mm, and to the underlayment by 200 mm.

Mechanically fix metallic shield. Seal the shield with silicone, thiokol, or polyurethane sealant.

Roofing shingles are extended to the cutout piece from the valley roll material so as to make sure that the trough between the shingles and moulding is 80 mm wide. Cover the shingles with TECHNONICOL FIXER on the rear side by 100 mm in points without an adhesive layer. General view of side joint for the wall with a height less than 1 meter.

Joins with chimneys and vents

Joins with chimneys must be made using moulding in the point of the roof slope contact with the vertical surface. Bring the underlayment to the moulding and cut on site.

Cut out a piece of valley roll material.

The cutout piece is extended:

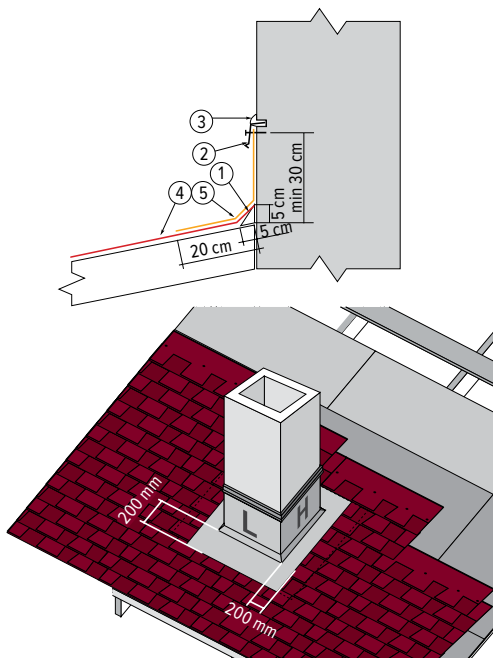
- to the vertical surface: by at least 300 mm from the slope surface (the height may vary depending on snow region);
- to the horizontal section: ~200 mm depending on the type of moulding applied.

Bend or cut obtained cutout pieces in certain points according to the diagram.

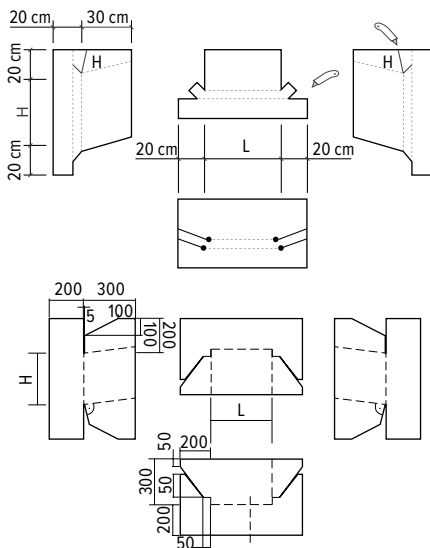
Valley roll material cutout pattern.

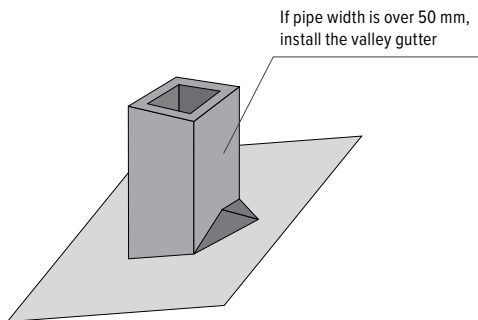
Install front cutout with extension to course shingles of 200 mm minimum.

* This value may be increased for climates with increased snow loads.



Install left and right parts extending underneath shingles so as to make sure that an 80 mm wide gutter may be installed afterwards between the shingles and moulding.





Lastly, install rear cutout piece extending underneath the shingles so as to make sure that an 80 mm wide gutter may be installed afterwards between the shingles and moulding.

Install shingles. Shingles in the left and in the right parts are extended to the cutout piece from the valley roll material so as to make sure that the trough between the shingles and moulding is 80 mm wide.

Cut each shingle by 20–30 mm to divert water in the valley.

Cover the shingles with TECHNONICOL FIXER mastic in points of cutout piece joint with course shingles on the rear side by 100 mm in points without an adhesive layer.

Lay shingles on rear side. Make sure that the trough between the shingles and moulding is 80 mm wide.

Mechanically fix metallic shield.

Seal the shield with silicone, thiokol, or polyurethane sealant.

NOTE! To prevent snow accumulation beyond chimneys and vents with cross section exceeding 500x500 mm and those located across the slope, it is recommended to install a valley gutter.

3.9. Arrangement of roof penetrations

The bottom parts of roof penetrations, antennas, and utility pipes are sealed with special penetration elements.

Sealing of TECHNONICOL ventilation component

Place the pass component so as to make sure that its bottom edge extends over shingles by at least 20 mm.

If there is not a possibility for extension of the bottom edge of the pass component to shingles, a cutout piece of underlayment must be made to meet this requirements so as to make sure that the underlayment extends underneath the pass component by at least 100 mm.

Mark the future location of penetration at the solid base and cut out a hole.

Apply TECHNONICOL FIXER mastic to the base or bottom part of the pass component skirt and glue to the base.

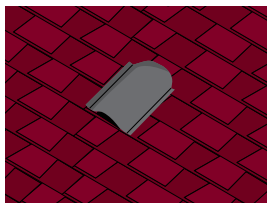
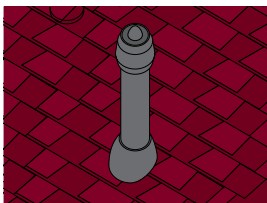
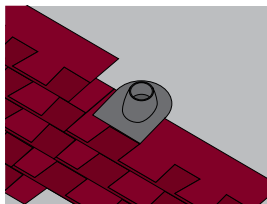
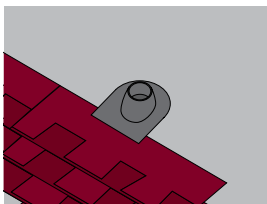
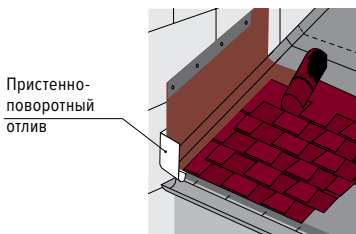
Mechanically fix the pass component using roofing nails along the perimeter. Apply bitumen mastic on the front face of the penetration element skirt. Install course shingles pre-cut to match the dimensions of the pass component. Fill the joint between the pass component and shingles with bitumen mastic. Cover the bitumen mastic with dressing to ensure protection against UV radiation.

INTERESTING FACT! Dressing may be easily obtained by rubbing pieces of refuse cutoffs of course shingles against each other.

Next, install the required roof outlet at the pass component. Install the KTV TECHNONICOL ventilation component.

Joint sealing using a rubber seal

Apply TECHNONICOL FIXER bitumen mastic to the lower side of the rubber seal skirt. Glue rubber seal to the base. Apply bitumen mastic on the front face of the rubber seal skirt. Install course shingles pre-cut to match the dimensions of the seal. Fix metallic clamp.





4.

**Roof care
recommendations**

4. Roof care recommendations

Roof condition must be checked in spring and autumn.

It is recommended to remove leaves, branches and other small debris from the roof with a soft brush. Use of sharp tools is unacceptable.

If there is a threat of growth of moss or fungus on the surface of roofing materials with stone coating, it is recommended to apply the TECHNONICOL roof care concentrated preservative or any other special treatment advisable for roofing shingles.

Sharp edged objects must be removed from the roof by hand.

To ensure free water drainage from the roof, clean water gutters and funnels as they get clogged.

If there is a threat of formation of a large snow layer, it must be cleaned off using wooden shovels that are not sharp. Remove the snow from the roof in layers, leaving a protective layer of 100 mm on the roof.

For preventive purposes, inspect and, if required, repair installation openings, holes, cracks, and parts of metallic sheets.

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry, no matter how small, should be recorded to ensure the integrity of the financial data. This includes not only sales and purchases but also expenses and income. The document provides a detailed list of items that should be tracked, such as inventory levels, supplier payments, and customer orders. It also outlines the procedures for recording these transactions, including the use of specific forms and the assignment of responsibilities to different staff members.

The second part of the document focuses on the analysis of the recorded data. It describes various methods for identifying trends and anomalies in the financial performance. This includes comparing current data with historical trends, analyzing seasonal fluctuations, and identifying areas where costs are higher than expected. The document also discusses the importance of regular reviews and reports to management, providing a clear and concise summary of the financial situation. It includes a sample report format and a list of key performance indicators (KPIs) that should be monitored.

The final part of the document addresses the overall financial health of the organization. It discusses the impact of the recorded data on budgeting and forecasting, and how it can be used to make informed decisions about future investments and operations. It also touches on the importance of maintaining a strong relationship with financial institutions and the need for transparency in all financial dealings. The document concludes with a summary of the key points and a call to action for all staff members to adhere to the established procedures and maintain the highest standards of financial accuracy.



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