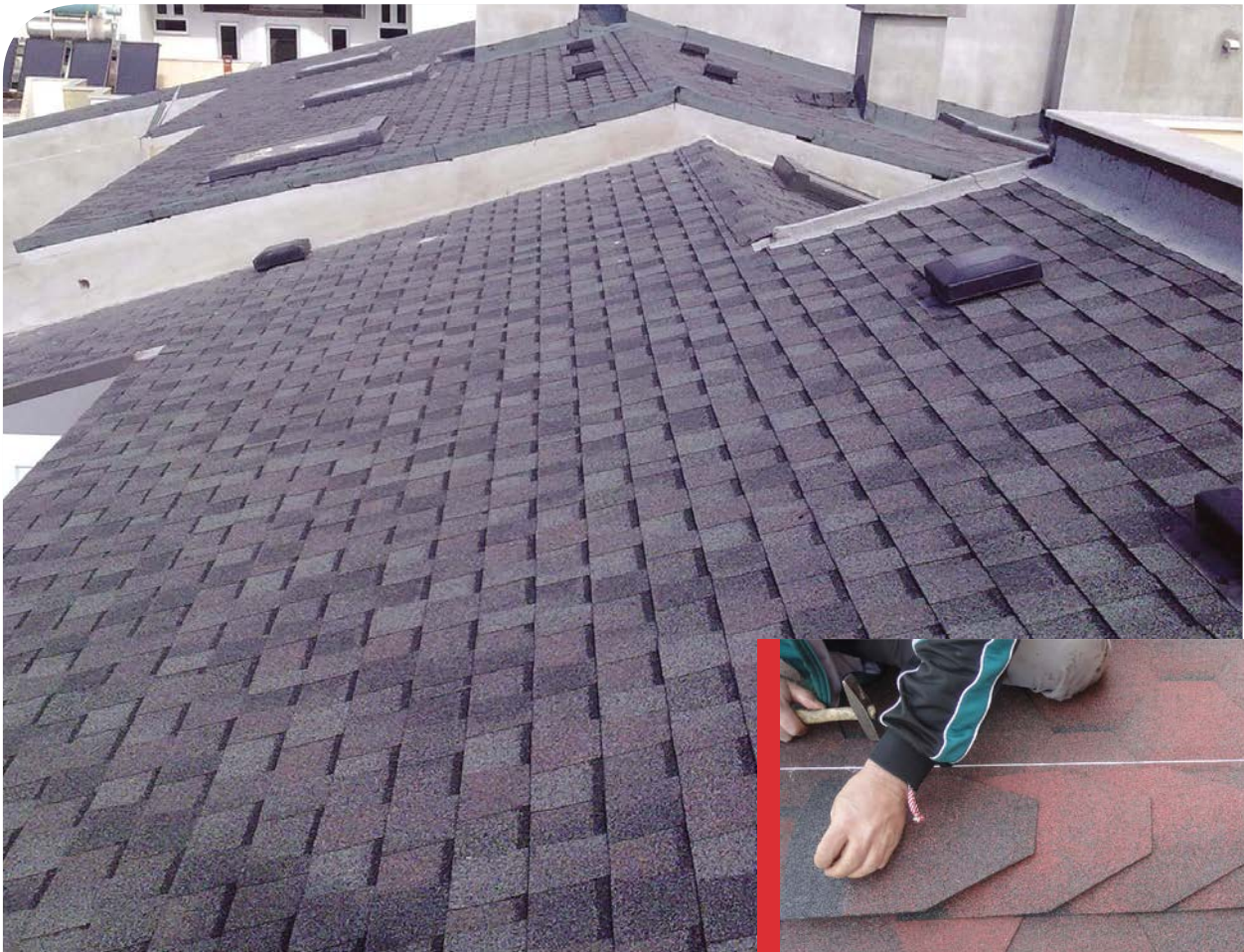


BARDOLINE®

INSTALLATION INSTRUCTIONS



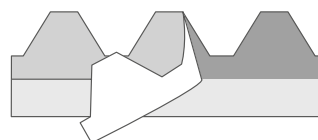
C O N T E N T S

General conditions	2	Estimating shingle requirements	4
Material requirements	2	Roof preparation	5
Terms	4	Shingle application	9

GENERAL CONDITIONS

- ONDULINE® assumes no responsibility for leaks due to improper application, or failure to properly prepare the roof surface. Shingles may not be installed directly over insulation; flow-through ventilated air space must be provided between the insulation and the nailable deck.
- Do not mix different production dates/codes on the same roof surface.
- Colour shading is inherent to shingles and is not a defect. In order to minimise shading, shingles should be picked and mixed randomly from different bundles and placed across and diagonally up the roof.
- Do not stack the shingles up the roof!
- Do not remove the tape from the back of the shingles. It is for packaging purposes and not for sealing.

- However, release film on the back of the **self-adhesive shingles**, it must be removed during application.



- The factory applied sealing strip will become effective when exposed to the heat of the sun. Hand sealing is necessary for cold weather and steep slope application. Bitumen mastic or sealant must be approved by ONDULINE® to be compatible with BARDOLINE®.
- Bend bundle before opening for easier separation.
- Caution: During sunny, hot periods, avoid stepping on shingles on the sunny side of the roof to prevent marking.

MATERIAL REQUIREMENT

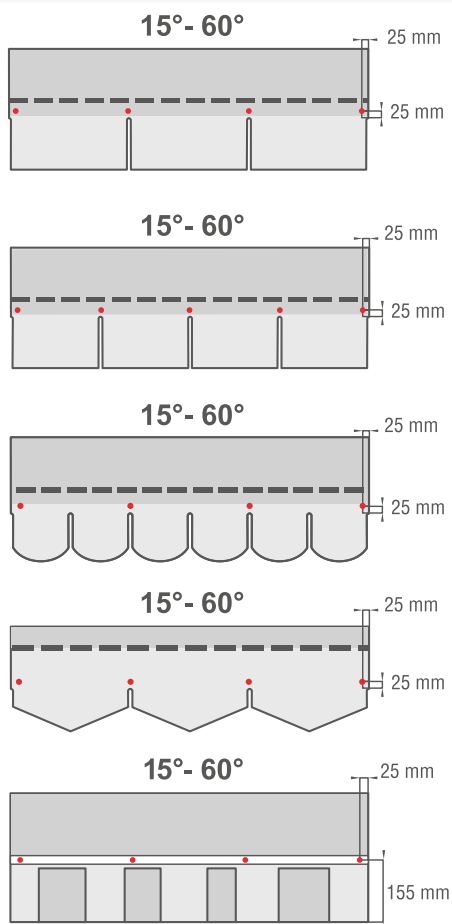
- **Shingles:** BARDOLINE® selection of more than 70 different types and colours of fibreglass based oxidised and APP modified bitumen shingles.
- **Underlays:** **ONDUTISS® STRONG:** a range of watertight roofing membranes.
- **Valley Coverings (for Open Valley Method):**
You can use **BITULINE®**, bitumen membranes 4 mm mineral and finishing profiles.
- **Drip edges**

- **Fasteners:** Corrosion resistant nails (galvanised clout nails) 25 mm in length and a head diameter of 9 mm. The shaft should be 3 mm in diameter. Laminated shingles and nailing of hips and ridges require nails 30 mm in length.
- **Bitumen mastic:** **ONDUMASTIC** or ONDULINE® approved bitumen mastic can help you to glue the shingles.
- **Vents:** **BARDOLINE®** ventilation pieces or sanitary chimneys are available to satisfy minimum venting requirements
- **Starter strip**
- **Quick Ridge**

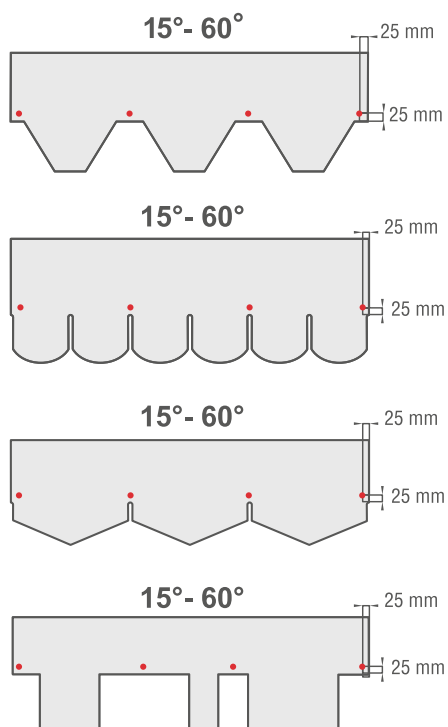
Shingle type	Roof pitch	Exposure	Roof coverage/Bundle	± kg/m ²
CLASSIC - RECTANGULAR (3 TABS)	15° - 85°	14.3 cm	3.00 m ²	9.6
CLASSIC - BEAVER	15° - 85°	14.3 cm	3.00 m ²	9.2
CLASSIC - HEXAGONAL SELF ADHESIVE	15° - 90°	13.4 cm	3.00 m ²	7.7
CLASSIC - BEAVER SELF ADHESIVE	15° - 90°	14.3 cm	3.00 m ²	9.1
PRO - RECTANGULAR (4 TABS)	15° - 85°	14.3 cm	3.00 m ²	10.9
PRO - BEAVER	15° - 85°	14.3 cm	3.00 m ²	10.4
PRO - TRIANGULAR	15° - 85°	11.2 cm	3.00 m ²	10.5
PRO - HEXAGONAL SELF ADHESIVE	15° - 90°	13.4 cm	3.00 m ²	9.2
PRO - TRIANGULAR SELF ADHESIVE	15° - 90°	11.2 cm	2.46 m ²	11.2
PRO - DESIGN	15° - 85°	13.4 cm	3.00 m ²	7.9
PRO - OPERA	15° - 85°	15.0 cm	3.10 m ²	11.6
PRO - OPERA	9.5° - 90°	15 cm	3.10 m ²	11.6
PRO S125 RECTANGULAR	15° - 85°	14.3 cm	2.58 m ²	12.5
PRO S125 HEXAGONAL	15° - 85°	11.2 cm	2.46 m ²	12.0

BARDOLINE® RANGE

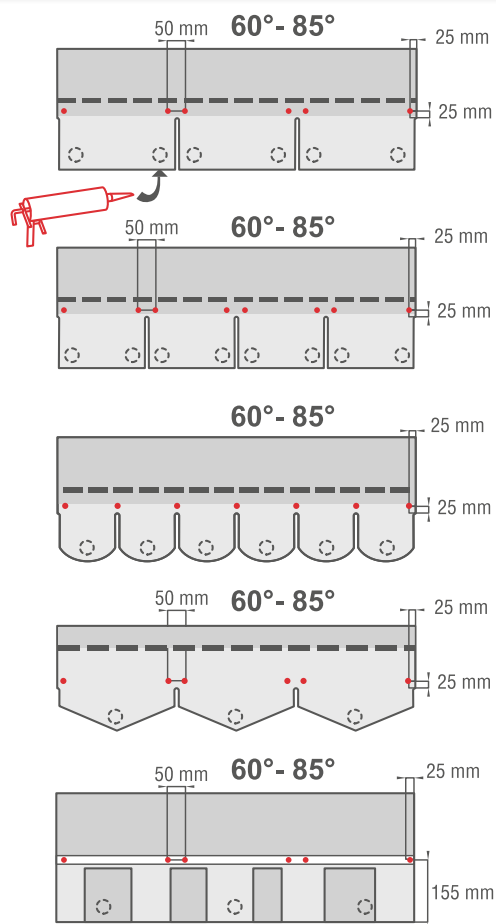
A



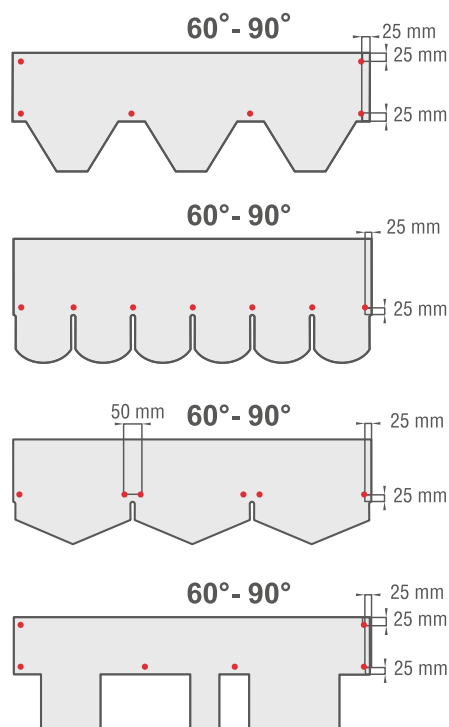
SELF-ADHESIVE



B



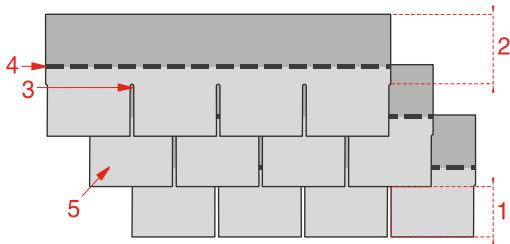
SELF-ADHESIVE



TERMS

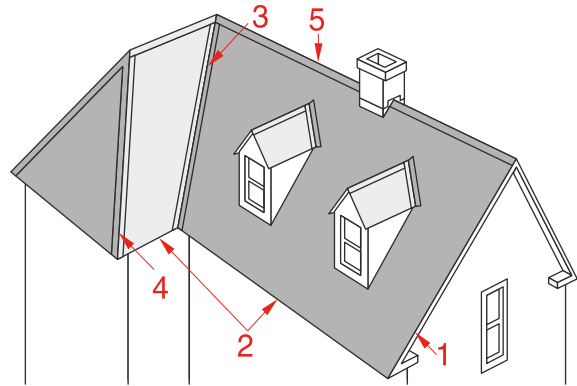
1a

- 1 - Exposure
- 2 - Headlap
- 3 - Cut-outs
- 4 - Self Sealink Strip
- 5 - Tabs



1b

- 1 - Rakes
- 2 - Eaves
- 3 - Valleys
- 4 - Hips
- 5 - Ridges



ESTIMATING SHINGLE REQUIREMENTS

1. FOR THE ROOF DECK

Shingle exposure is according to the roof pitch as displayed in the following table.
Shingles may not be applied on roof pitches not specified.
Certain countries may have different regulations.
Check local building codes.

2. FOR THE HIPS AND RIDGES

A good approximation is to order an extra 10 - 15 % material (depending on the amount of roof detail) for coverage of the hips, ridges and starter strip.

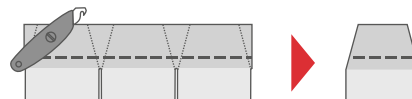
When applying round shaped, designer or laminated shingles be sure to order rectangular shingles in a matching colour to cover hips and ridges.

No time for cutting?

Choose **Starter strip** (Figure 2a) and **Quick Ridge** (to cover hips and ridges) (Figure 2b). These are pre-cut, so you will save on time.

2a

STARTER STRIP



2b

RIDGE AND HIP PIECES



ROOF PREPARATION

1. ROOF DECK

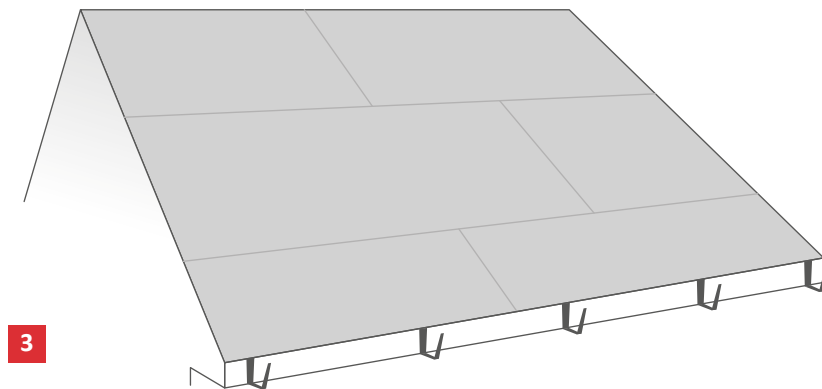
The roof deck must be smooth, firm, dry and securely fastened.

The deck should be made of good quality plywood, sheathing boards or nonveneer structural panels (wafer or strand board). Wooden boards can be maximum 15 cm wide.

The thickness of the deck depends on the span between the beams. Check your local building code regulations.

All wood products must be properly conditioned to be at moisture equilibrium. Decking should be installed in a staggered manner and sufficiently supported.

Failure to use proper decking material, which can provide a rigid deck surface, can result in deck movement which can damage the shingles.

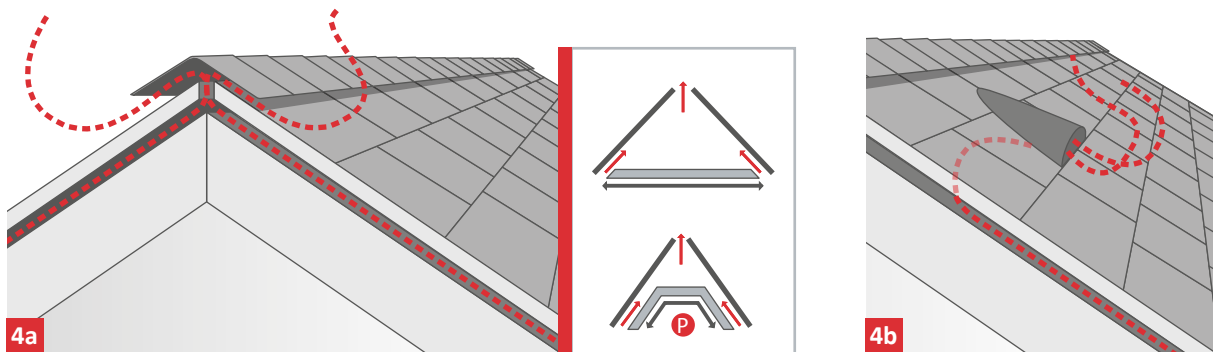


2. VENTILATION

It is essential to allow heat dissipation and water vapour to escape the roof system through proper ventilation.

Therefore, air must be able to circulate freely between insulation and the nailable roof deck, from the eaves to the ridges.

On roof pitches 15° - 40° the minimum net free ventilation area is 33 cm², on 41° - 85° min. net free ventilation area is 16 cm² for each 1 m² of insulated ceiling area **P**, always divided evenly between the eaves and the ridge.

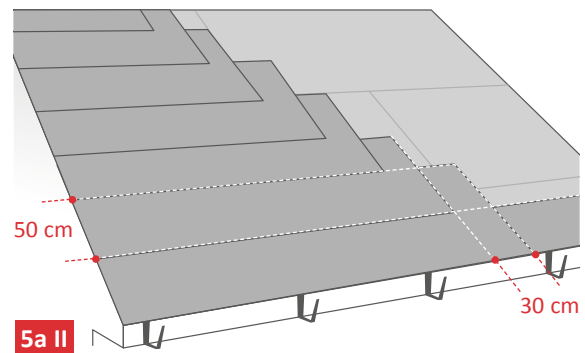
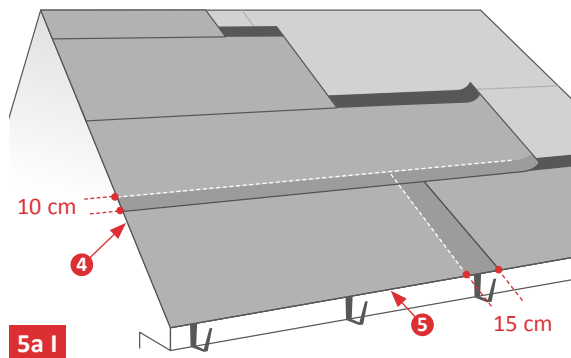


3. UNDERLAY

Install as flat as possible to prevent unevenness from being projected in the shingle surface. Install parallel to the eaves.

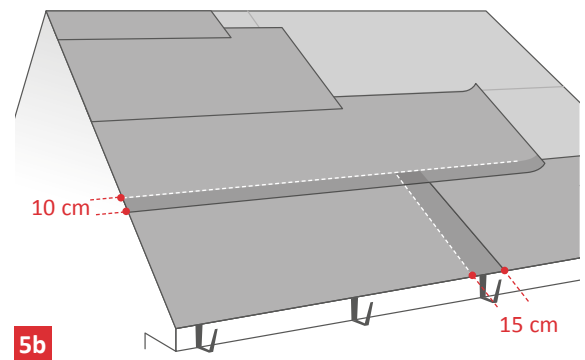
SLOPES 15°- 20°

- **Option 1 (Figure 5a I):** it is advised to cover the entire roof deck with **ONDUTISS® STRONG** and seal all overlaps. End overlaps must be 15 cm and horizontal overlaps 10 cm.
- **Option 2 (Figure 5a II):** use **ONDUTISS® STRONG** or a similar base sheet, to provide a double coverage of underlay to the roof deck. Cut a starter strip 50 cm wide and lay succeeding courses fastened with 50 cm horizontal laps and 30 cm end laps.



SLOPES 21°- 85° (Figure 5b)

The entire roof deck should be covered with **ONDUTISS® STRONG**. The underlay should be installed parallel to the eaves with a min. 10 cm horizontal lap and 15 cm end laps. Secure the underlay with only enough nails or staplers to hold it in place.



SLOPES 85°- 90°

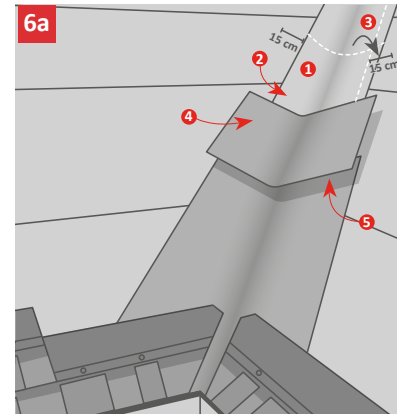
No underlay required. Only **self-adhesive shingles** can be applied.

4. VALLEY

One may follow either the Open, Woven or Closed Cut method for shingle application in the roof valleys. Valley preparation depends on the method:

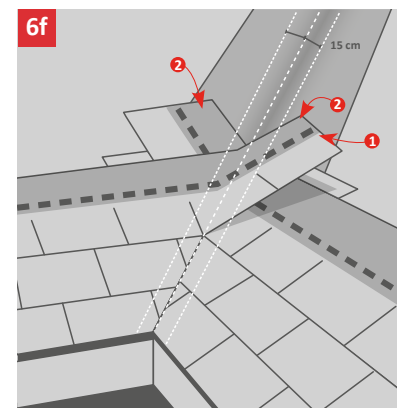
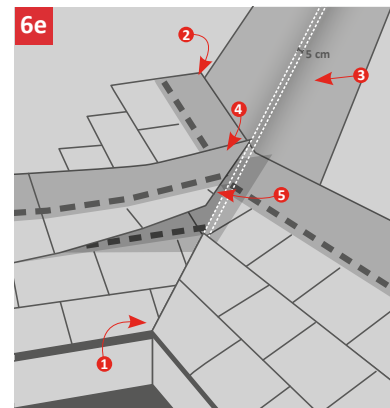
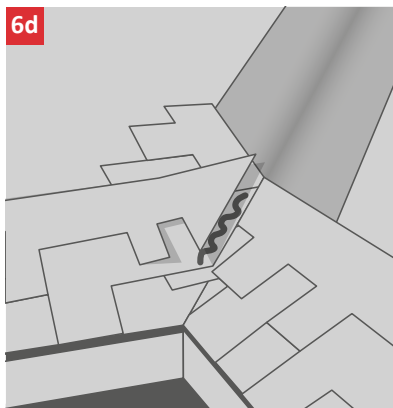
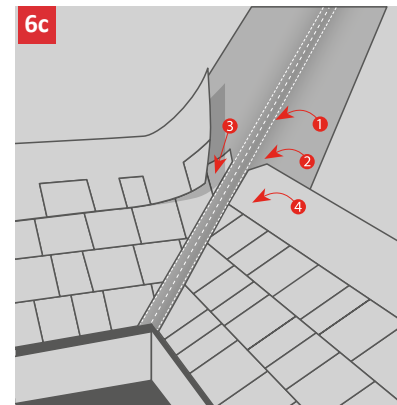
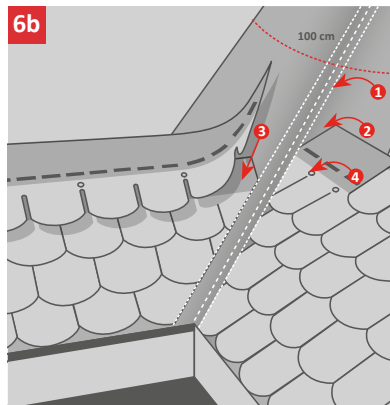
OPEN VALLEY PREPARATION (Figure 6a)

Cover the valleys with 1 m wide underlayment, **ONDUTISS® STRONG** ①. Vertical laps must be 30 cm and glued ②. The end laps from the roof deck underlayment must overlap the valley by 15 cm ③. Finish the valleys by applying the **BITULINE®** or metal flashing with metal sheet not less than 60 cm wide, 0,40 mm thick and corrosion resistant. Place on top of the underlay in the valleys ④. Nail the **BITULINE®** at 40 cm intervals 2,5 cm from the edge. If lapping is unavoidable it must be 30 cm and glued or torched ⑤. Metal flashing should be fastened every 25 cm and overlaps should be 30 cm and glued.



WOVEN OR CLOSED CUT VALLEY PREPARATION (Figures 6b, 6c, 6d, 6e, 6f)

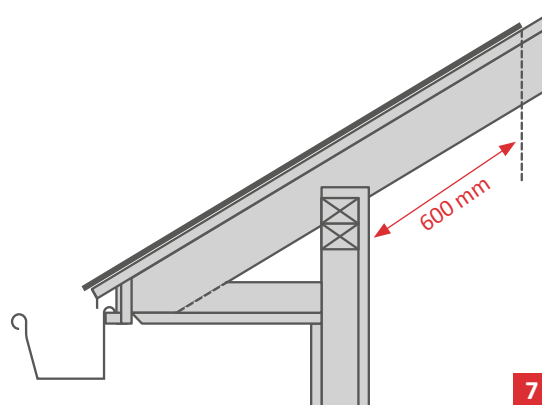
Prepare the valley with one layer of self-adhesive underlayment with 30 cm laps. Alternatively, use a layer of **ONDUTISS® STRONG** or an approved shingle underlayment, nailed 2,5 cm from the edge. Laps should be 30 cm and glued.



5. EAVES PROTECTION

In climates where average winter temperatures are -1°C , eaves should be protected against ice damming which can cause water to back up the roof under the shingles.

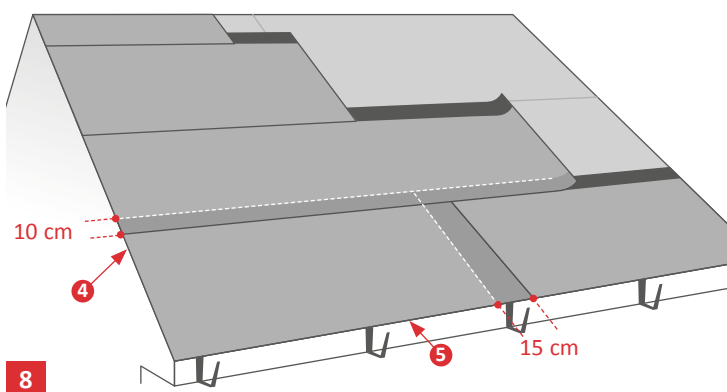
Apply self-adhesive underlay from the eaves to the least 60 cm beyond the inside wall line. Use 10 cm horizontal laps and 15 cm end laps. Alternatively, use **ONDUTISS® STRONG** and provide a double coverage of underlay to the eaves. Cut a starter strip 50 cm wide and lay succeeding courses glued with 50 cm horizontal laps and 30 cm end laps to a distance 60 cm beyond the inside wall line.



6. DRIP EDGES

Drip edges for the rakes and eaves of the roof should be made of corrosion-resistant material which extends at least 8 cm from the edges and bends downward over them.

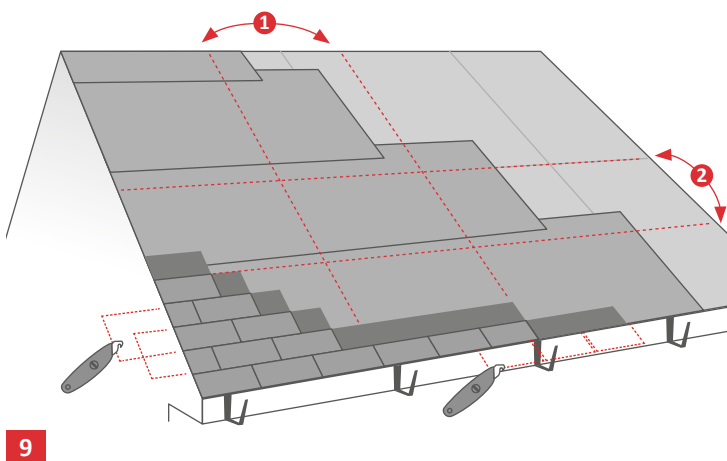
Drip edges should be applied over the underlay at the rakes ④ (Figure 8) and under the underlay at the eaves.



7. CHALK LINES

Chalk lines provide visual guides that help align the shingles horizontally and vertically.

They also align shingles on each side of a dormer or chimney. Horizontal lines can be snapped every 4 to 5 courses ① and a vertical line ② (Figure 9) should be used on long shingle runs, where a line is snapped in the centre of the run and shingles are applied to the left and right of the line. All chalk lines are to be considered as guiding lines, not application lines.



SHINGLE APPLICATION

1. NAILING & SEALING

Proper fastening is essential for a good roof. Drive the nails straight so that the nail heads are flush with, but not cutting into the shingle surface (Figure 10). Always nail 2,5 cm above the cut-out and 2,5 cm from each edge.

For correct positioning and nail quantities per type of shingle and roof slope, see Figure A. Note that steep slope application (> 60°) or high wind areas require extra nails and hand sealing with ONDUMASTIC as shown in Figure B.

During cold weather application extra glue must be added in the same manner. In high wind areas the tabs of each shingle should be glued for at least the top five courses of the roof. Bitumen mastic should be applied in amounts no greater than 25 mm in diameter and used sparingly.



STARTER STRIP (Figure 2a)

Prepare the starter strip by cutting off the shingle tabs along a line level with the top of the cut-outs. Begin the starter strip by cutting the strip half a tab short so that its joints will not line up with the joints of the first course of shingles.

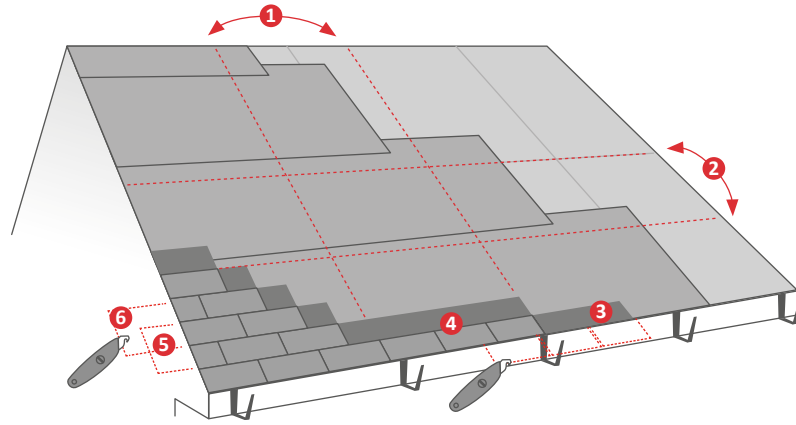
The starter strip should overhang the eaves by 6-10 mm and the rakes where applicable. For laminated shingles use rectangular shingles.

FIRST COURSES & APPLICATION PROCEDURE (see drawings new page)

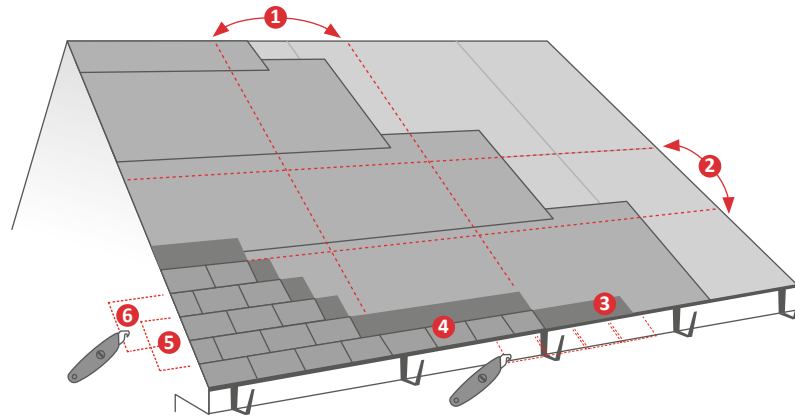
- **First course 4:**
Start with a complete shingle applied flush with the starter strip at rake and eaves. Nail as shown in Figure 10 and continue across the roof with full shingles.
- **Second course 5:**
Cut half a tab from a shingle and start at the rake end. Nail the shingle so that the lower edge of the tabs is flush with the top of the cut-out of the shingle in the first course.
- **Third and succeeding courses 6:**
Start the third course with a shingle from which a full tab has been cut. Cut off an additional half tab for each succeeding course. For maximum protection against wind driven rain, glue the shingle at the rake edges.

! When applying laminated shingles, trim off 25, 50, 75 ... cm respectively from the left end of the first shingle in the second (5), the third (6), the fourth (7), ... course. Note that other offsets between 10 - 25 cm are permitted.
When applying BARDOLINE® DESIGN, trim off about 16,7 cm, 33,3 cm, 50 cm ... respectively from the left end of the first shingle in the second (5), the third (6), the fourth (7), ... course.

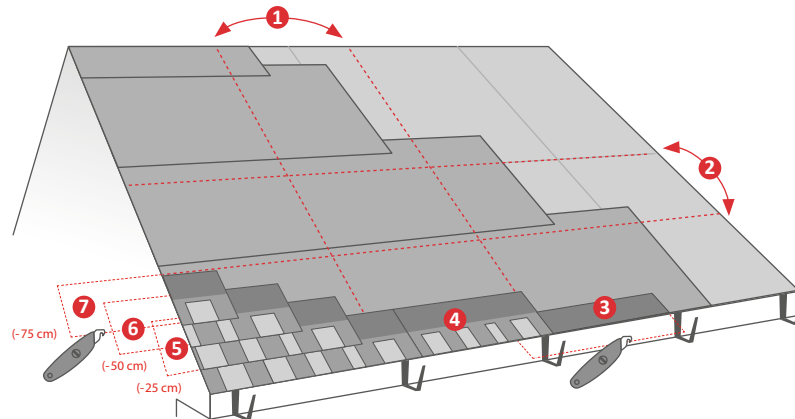
11a



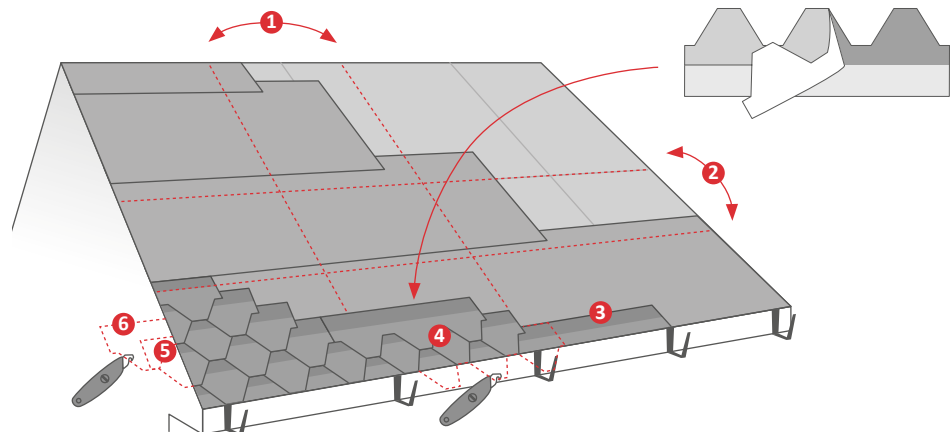
11b



11c

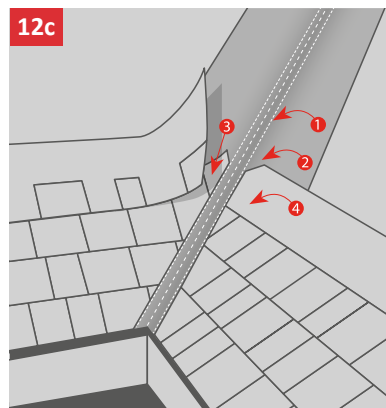
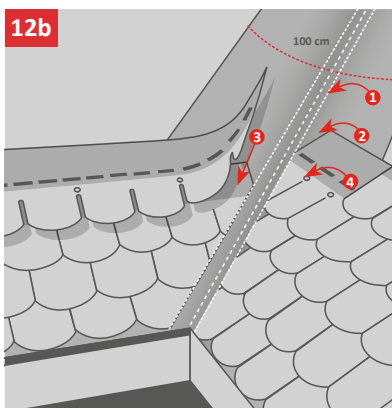
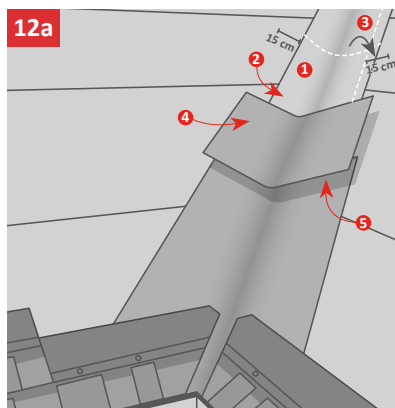


11d



2. SHINGLE APPLICATION IN VALLEYS

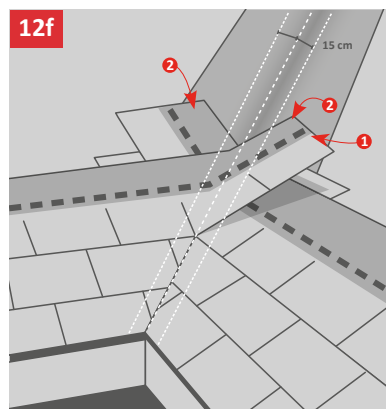
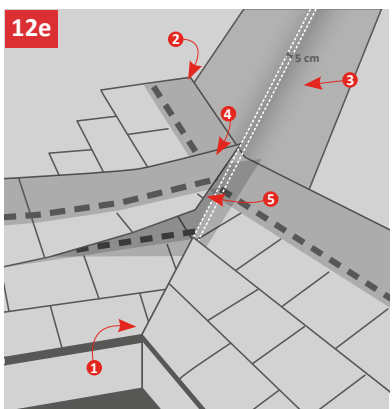
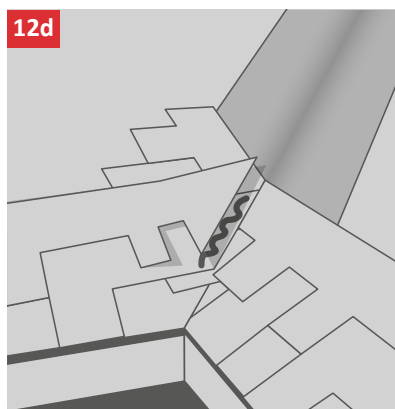
OPEN VALLEY METHOD (Figures 12a, 12b, 12c)



The valley is covered by underlayment (Figure 12a) for example. Snap two chalk lines from the ridge to the eaves 8 cm apart increasing in width by 1 cm per meter toward the eaves 1.

Trim the shingles to these lines and cut a 5 cm triangle off the top corner to direct the water into the valley 2.

Glue the valley end of each shingle with ONDUMASTIC 3 and nail the shingles 5 cm back from the chalk line 4.



! The Open Valley Method is recommended for Bardoline Design or Rectangular (Figure 12d). For all other shingles, alternative valley methods described below are possible.

CLOSED CUT METHOD (Figure 12e)

For best performance: start applying on roof plane with the lower slope or biggest surface. The starter strip must be woven 1 (extend + 25 cm onto adjoining roof plane). Extend the end shingle at least 30 cm on the adjoining roof. Do not nail within 15 cm of valley centreline. Use one extra nail 2 at the end of each shingle crossing the valley. After completing this roof plane, snap a chalk line 3 5 cm from centreline on roof plane still to cover. Apply the shingles onto second plane, trim shingles to the line and cut a 5 cm triangle 4 off the top corner to direct the water into the valley. Glue the valley end of each shingle with ONDUMASTIC 5.

WOVEN VALLEY METHOD (Figure 12f)

Install the shingles through the valley intersection. The last shingle should extend at least 30 cm onto the intersecting roof surface 1 fastened with an extra nail at the upper corner of the shingle 2. Press the shingles tightly into the valley before nailing. No nailing within 15 cm of the valley centreline.

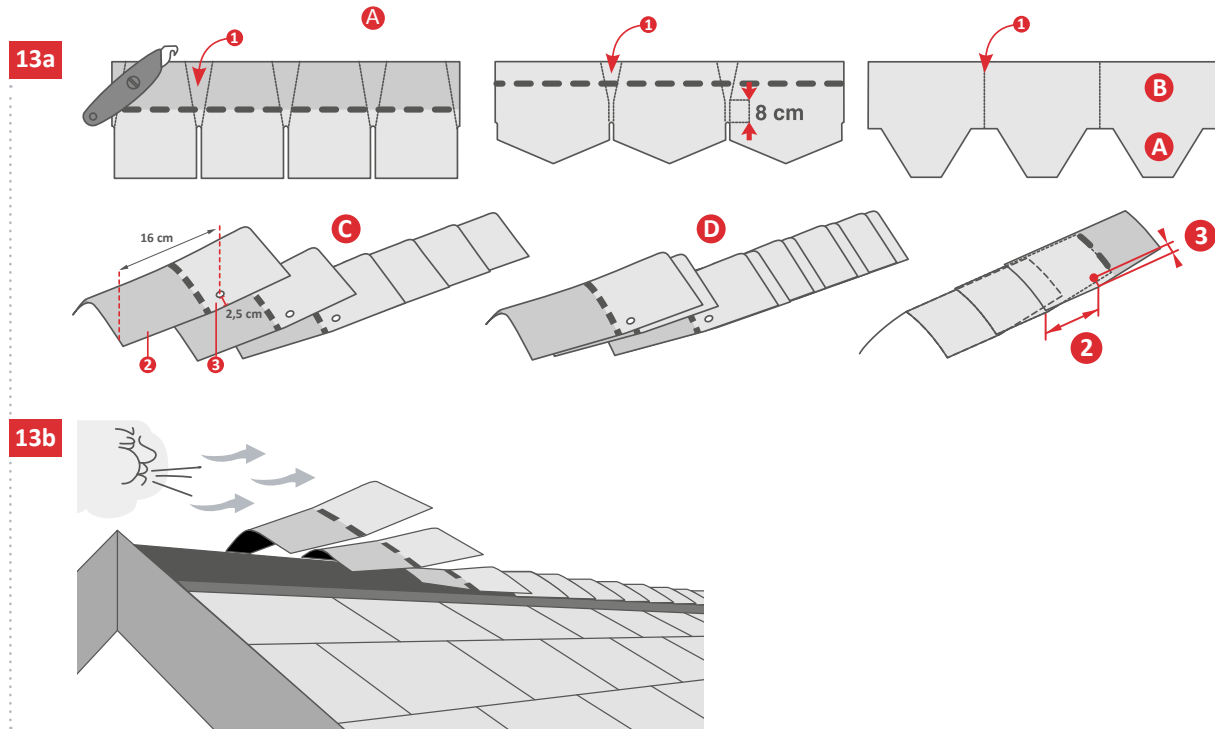
3. HIPS AND RIDGES

Adjust the last few courses of shingles so that the ridge capping will adequately cover the top courses of shingles equally on both sides of the ridge. Cut rectangular and triangular shaped shingles into individual pieces by dividing the shingle at the cut-outs **1**. (HEXAGONAL: **A** is visual part, **B** is covered part.) (Figure 13a). It's possible to use Quick Ridge **C** instead.

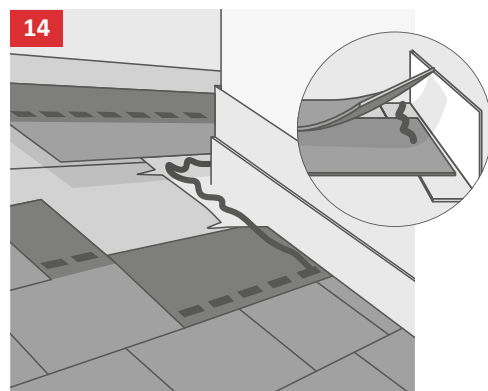
Apply the hip and ridge shingles double thickness by stacking two pieces and bending them over the hip or the ridge.

In cold weather warm the shingle before bending. Nail the capping 16 cm from the tab edge **2** and 2,5 cm from each side **3**, exposing each piece 14 cm. Start application from the end of the ridge opposite the direction of the prevailing winds (Figure 13b).

For **BARDOLINE® OPERA** to obtain a 3D-effect apply capping shingles by stacking 2 pieces on top of one another (slightly offsetting the shingles by 2,5 cm in exposure). (Figure 13a - **D**).

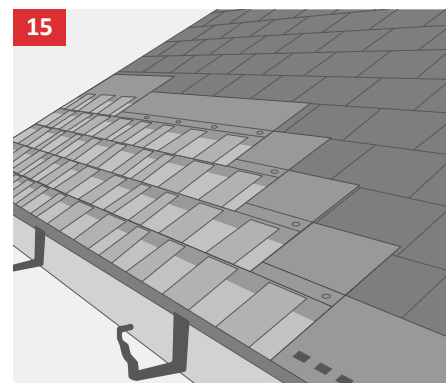


4. FLASHINGS



Chimneys

5. REROOFING



Example of reroofing with BARDOLINE® DESIGN

www.onduline.com

Onduline S. A.
35, rue Baudin
F-92300 Levallois-Perret

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Onduline®